



1980-1981 ANNUAL REPORT
BAILLY NUCLEAR-1 SITE
ENCOMPASSING
APRIL 1980 - MARCH 1981

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NORTHERN INDIANA
PUBLIC SERVICE COMPANY
5265 Hohman Avenue
Hammond, Indiana 46325

by
TEXAS INSTRUMENTS INCORPORATED
ECOLOGICAL SERVICES
P.O. Box 225621
Dallas, Texas 75265



SUMMARY AND CONCLUSIONS

Terrestrial

The 1980 terrestrial sampling on the Bailly study area was accomplished on schedule in May, July, and October. Soil conductivity, vegetation stress symptoms, and large mammals were surveyed in each of these months. Vegetation and insects were surveyed in July. Small mammals and birds were surveyed in May and October, and roadside surveys specifically for rabbits, pheasants, and doves were conducted in May and July. Reptiles and amphibians were surveyed in May and July.

In addition to regularly scheduled sampling, a comprehensive survey to record present land use/land cover and vegetation stress in the Bailly study area and vicinity was conducted in August 1980. The results of this survey were presented in a separate report. Generally, this survey showed most land use/land cover changes since 1974 had occurred in wet locations, and most vegetation stress was related either to moisture deficiency or excess, consistent with the change from dry to wet cover or vice versa.

Regular vegetation sampling showed no major changes in species composition, density, dominance, or other parameters. Succession was most pronounced in the Transmission Corridor, following fire and herbicide treatment. The Emergent Macrophyte Community showed mortality of aquatic species as Pond B dried as a result of living the NIPSCO fly ash ponds.

Soil conductivity values for May, July, and October 1980 were well below those potentially detrimental to plants and were generally consistent with those of past years.

Mammal surveys revealed the presence of the deer mouse, which has not been recorded recently from the vicinity of the study area and is newly recorded on the site. Large catches of the meadow vole and greater numbers of observations of the muskrat and white-tailed deer indicated a probable peak in the cyclic meadow vole population and an increase in populations of the other two species.



Bird surveys revealed bird usage of most habitats was consistent with that of the past. The disturbances in ponds A and B reduced usage of those locations by waterfowl and other aquatic species, as expected. Yearly comparisons of bird presence in Cowles Bog Woods showed that species composition is changing as the habitat matures, with the number of newly recorded species approximating that of species no longer utilizing the location. The Short-billed Marsh Wren, a Blue Listed species that was sighted in previous years, was also observed in 1980.

Reptile and amphibian surveys revealed one newly recorded species (the spotted turtle), which is a potential candidate for the Indiana Endangered and Threatened List, and two species sporadically recorded (the hognose snake and northern brown snake). These observations indicate that significant decline in herptofaunal species on the study area probably has not occurred as previously believed. However, loss of pond habitat will cause a decline in numbers of individuals, if not species removal.

Insect sampling during 1980 reflected warmest nighttime temperatures in 3 years, with lighttrap surveys producing several taxa not observed previously. Total insect families and distribution were consistent with past results.

Aquatic

Aquatic sampling was conducted during April, June, August, and November 1980 and January 1981. Phytoplankton, periphyton, zooplankton, benthos, macrophytes, fishery, water quality, and sediment particle size samples were collected and analyzed. Sampling in Pond B could not be accomplished after June 1980 as it was dry. This drying corresponded with lining of the ash-settling ponds.

Aquatic Flora. Mean phytoplankton density was significantly higher ($\alpha = 0.05$), in Lake Michigan in 1980 than in prior years. Phytoplankton biovolume generally followed the changes in density, although not at the same fast rate, implying species compositional change over years. Blue-green algae were numerically dominant throughout 1980 sampling. Phytoplankton density at the discharge was not significantly higher than the mean of all other stations.

Mean phytoplankton densities in the interdunal ponds were comparable to those recorded for previous years, with no apparent consistent change in density over time. The biovolume peak observed in August 1980 was second only to the one



which occurred in 1979 and resulted primarily from a large-celled dinoflagellate phytoplankton.

Comparing dominant algal forms with dominant forms from previous years indicated annual continuity, although considerable variability was evident among less common forms and the similarity between 1980 and 1979 was lower for both the lake and the pond samples. Eutrophication indices denote a change in Lake Michigan flora to more tolerant forms; however, no major changes in eutrophication indices were observed in the interdunal ponds.

Phytoplankton chlorophyll a and productivity levels did not correspond well to biovolume fluctuations. Successional changes throughout the sampling year and between years affect chlorophyll and productivity values.

As in previous years, 1980 periphyton data revealed similar abundances among stations. Periphyton distribution was only marginally affected by the presence of heated water. The presence of the thermointolerant taxon Rhoicosphenia curvata defined the effective extent of plume influence. The genera Eunotia, Synedra, and Navicula, which were collected primarily in the interdunal ponds, may be considered eurytopic or eutrophic indicators.

Zooplankton. Changes observed in the zooplankton community over the past 5 years were due primarily to periodic occurrences of uncommon species, principally of cladocerans and copepods. Seasonal density distributions in 1980, compared with previous years, indicated essentially unimodal patterns from year to year. Density maxima were higher in 1980 than in 1979 but similar to abundance in 1976. Seasonal succession patterns in 1979 Lake Michigan zooplankton, similar to previous years, are displayed by the shared dominance of calanoid copepodids and diaptomid copepods in the spring, cyclopoid copepodids and bosminid cladocerans in the summer and bosminid cladocerans and cyclopoid copepodids in November. As in previous years, the relatively stable community structure in the lake suggests none or only negligible influence from plant operation on Lake Michigan's major zooplankton components.

Zooplankton communities in the ponds over the past 5 years reflect the more unstable conditions prevalent within this system; densities have been variable since 1974. Periods of peak bosminid occurrence have decreased compared to previous years; concurrently, relative abundances of cyclopoid copepods and chydorid cladocerans have steadily increased since 1974, while calanoid copepod



relative abundance, although never very high, declined noticeably between 1974 and 1979. During 1980, calenoid numbers were up slightly. Such trends are described in the literature as indicative of increased eutrophication. As in previous years, 1980 pond zooplankton abundance was higher than that recorded in the lake; abundance peaked in August with low abundances in April and November.

The degree to which plant operation may influence pond community dynamics could not be assessed. However, trends similar to those described above have been found in the literature, suggesting that the major community component shifts may be a natural limnological process. During 1981, sampling should reveal if there has been detrimental effects from ash-settling pond seepage. Unfortunately, the most potentially effected pond, Pond B, has become dry.

Benthos. Benthic density in Lake Michigan increased to peak abundances in June with a small decline through August and November. Depth-related density variations were also observed in 1980 in that density generally increased with depth, primarily due to the abundance of tubificids. Little or no difference in seasonal density distribution was indicated between nearfield and farfield stations although, as in most previous years, densities at Station 10 (discharge) were considerably lower than at other stations. The overall density pattern during 1980 was very similar to that observed in previous years; however, total abundance along the 50-foot depth contour was not as high as observed in 1979 and 1978. The seasonal succession pattern in the lake was characterized by dominance of tubificids throughout the year with chironomids abundant in all month except June, amphipods in April and June, and naidids abundant in August. The basic community components and successional patterns of 1980 were consistent with those of previous years. Data indicated that while plant operation may exert a negative influence in the immediate vicinity of the discharge, no discernible deleterious effects of plant operation on Lake Michigan outside the area of the discharge are obvious.

Density of benthos in nearshore ponds was characterized by relatively uniform total densities from April through November. Cowles Bog generally displayed the lowest densities within this pond system, which has not been the case in previous years. Total densities have been relatively similar since 1976.



Pond benthic fauna during 1977 was dominated throughout the year by tubificid worms, which was not the case during 1978 or 1979. However, tubificids were again dominant in 1980. Chironomids and naids were dominant in 1978 and 1979.

A comparison of all data from 1974-1979 indicates a general similarity of benthos communities except in 1977 when the relative abundance of naids was atypically low and relative abundance of tubificids was atypically high.

Aquatic Macrophytes. Composition of aquatic macrophyte communities sampled in June 1980 was generally similar to that of previous years. The dominant and/or common species were bullhead lily, coontail, arrow arum (Cowles Bog), and pondweed. Areas along the edges of ponds B and C and throughout Cowles Bog were characterized, as in previous years, by a predominance of emergent species. Some factor other than natural variation may be influencing the dominant macrophyte species in Pond B, since the dominant macrophyte in the pond has usually been different each year of the study. Influence in Pond B during 1980 was due in part to the lowering of water levels prior to sampling.

Fisheries. The 1980 yield in fisheries sampling was distributed among 11 species. Alewife and lake trout were abundant in gill net samples, while spottail shiner and yellow perch were dominant in samples collected by beach seine. Electrofishing in Pond B yielded 8 black bullheads and 12 green sunfish. Ichthyoplankton collections were comprised of alewife and cyprinid eggs, and alewife and spottail shiner larvae. All species collected in 1980 have been reported in previous collections except spottail shiner larvae and no major change in fish species composition was found in samples from the Bailly study area. Spawning in the area apparently is confined primarily to alewives, smelt, and cyprinids. Condition of the collected fish was normal, and no external parasites were noted on salmonids collected during 1980. No potential disturbance of rare or endangered species was noted and none were collected.

Water Quality. Water quality values in both Lake Michigan and the interdunal ponds were similar to those from previous years. Virtually all values in Lake Michigan were well within applicable Indiana Stream Pollution Control



Board (ISPCB) standards. One exception was pH, which was slightly more alkaline than ISPCB standards for Lake Michigan, but was well within normal tolerance limits for resident biota. There was more variability of water quality values in the nearshore ponds than in Lake Michigan, as was the case in previous years. Highest variability and concentrations were generally in ash-settling ponds. Pond B values were usually higher than those of the ash ponds and appeared to reflect some seepage or accumulation from the ash ponds, although the relationship is not clear. Pond B dried and was not sampled after June. A trend of increasing sulfate concentrations since 1974 was noted in the ponds. Although some indication of increasing sulfate levels was also observed in the ash-settling ponds, the relationship between concentrations in the natural and artificial ponds is not clear; sulfate concentrations were higher in Pond B than in the ash-settling ponds during 1979. However, 1980 levels in Pond B were decreasing through June and increasing in the ash-settling ponds. Silica levels in Lake Michigan have been observed to be decreasing slightly over time, a condition also noted in other portions of Lake Michigan. The 1980 values appear similar to 1979, indicating a stabilizing of the overall values.

An examination of 1979 phytoplankton data indicates that this depletion may be one factor in the shift from a diatom-dominant fall population to a green/blue-green dominant fall population. In general, observations of silica, phosphorus, and nitrogen indicate that even with the lower silica levels, the lake supports a diverse planktonic community.

Trace elements in both water and sediment, and indicators of industrial or organic contamination were monitored only in the ash-settling and interdunal ponds. Trace element surveys revealed no consistent trends, but rather constant fluctuations of all values. Cadmium, iron, manganese, and mercury exceeded the ISPCB standard during one or more of the sampling periods. The observed high and low values, considering the scattered nature of the high values, may indicate a normal pond cycle. High iron levels in all the ponds observed during 1976 and 1977 and 1979 but not observed during 1978 were found again in 1980. The source of these high concentrations of iron has not been determined.



Total and fecal coliform levels in the ponds were also examined and values found quite variable. Highest values in natural ponds were found during August 1980 (Cowles Bog) and appear correlated with warm-water temperatures. Biochemical oxygen demand, total organic carbon, and chemical oxygen demand levels were reasonably low, with variations during the study apparently seasonally related to plant and animal successions. The remaining parameters (hexane-soluble materials, phenols, and methylene-blue active substances) were low. Phenols were above ISPCB standards in the ponds only during April; however the standards for Lake Michigan do not necessarily apply to the ponds. The source of these phenols is not known.

From the composite data, it appears that the biota and chemical parameters in the Bailly study area show natural variability from year to year.

With the exception of Pond B, into which some seepage may have been occurring, and Station 10, which is influenced by the discharge, there was no indication that Bailly Station operation has a significant effect on area biota or water quality.

Summary of Construction Activities, Bailly Generating Station

April 1980 - March 1981

The construction of Bailly N-1 was suspended pending completion of the review and concurrence of the pile design by the Nuclear Regulatory Commission. This release was received on March 6, 1981.

The new precipitator and balance draft conversion for Units #7 and #8 has been completed.

The sealing of the ash ponds by stations 14 and 15 has been completed, returning the ponds to operation. The remaining ash ponds will be sealed in summer 1981.

The Waste Water Treatment Facility has been completed and is operating.

Dredging operation on the intake structure was completed in the fall of 1980.

Construction on the Coal Dust Elimination System for the Crusher House was completed.



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SECTION 1 TERRESTRIAL

1.1 INTRODUCTION AND STATUS

The objectives of this seventh annual report on terrestrial monitoring activities in the Bailly study area are to document existing environmental conditions and to indicate changes in the terrestrial biota relative to construction of Northern Indiana Public Service Company (NIPSCO) Bailly Nuclear-1 Generating Station.

Monitoring of the terrestrial biota in the study area has continued since 1974 through a sampling program that encompasses vegetation, soil conductivity, mammals, birds, reptiles and amphibians, and arthropods. The terrestrial sampling program and investigators for 1980 are outlined on Table 1-1. Sampling locations for the various sampling activities are shown on Figures 1-1, 1-2, and 1-3. Sampling methods followed the procedures defined in the Standard Operating Procedures previously prepared for NIPSCO (Texas Instruments 1978a).

Table 1-1
Terrestrial Ecology Sampling Schedule and Personnel
for Spring, Summer, and Fall Seasons, 1980

<u>Sampling Activity</u>	<u>Sampling Location*</u>	<u>Spring May 1-16</u>	<u>Summer Jul 2-31</u>	<u>Fall Oct 2-15</u>
1. Vegetation and soils				
a. Vegetation analysis				
• Quantitative	1-8		x	
• Qualitative	9-11		x	
b. Foliar effects	1-11	x	x	x
c. Soil conductivity analysis	1-6, 8-10	x	x	x
2. Mammals				
a. Small mammal trapping	1,3,4,6,8	x		x
b. Large mammal observations	1-11	x	x	x
c. Roadside counts (rabbits)	22-mi route	x	x	
3. Avifauna				
a. Transect counts	1, 3-6, 8, Cowles Bog Trail	x		x
b. Roadside counts (pheasants and doves)	22-mi route	x	x	
c. Aquatic bird survey	A-J	x		x
4. Reptiles and amphibians	1-8		x	
5. Entomology	1-8		x	
PERSONNEL		Roy Greer	Roy Greer John Cunningham Audrey James	Roy Greer Scott Ziesenis

* See Figures 1-1, 1-2, and 1-3.

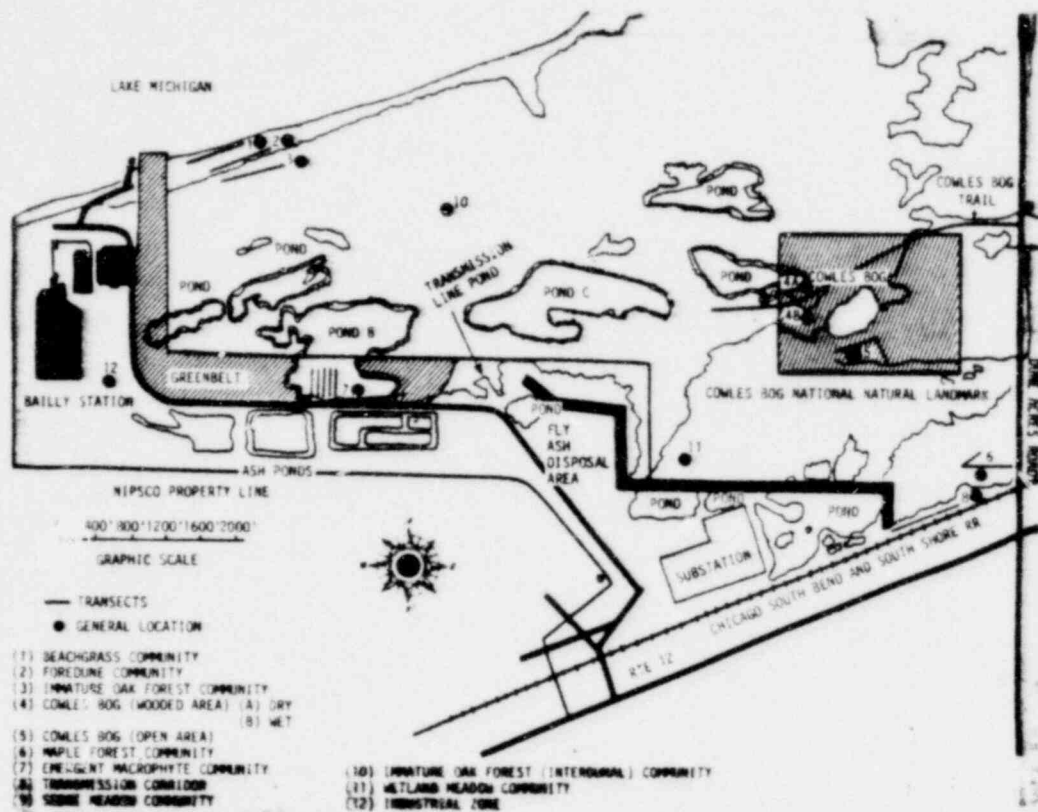


Figure 1-1. Terrestrial Sampling Locations in Vicinity of Baily Study Area

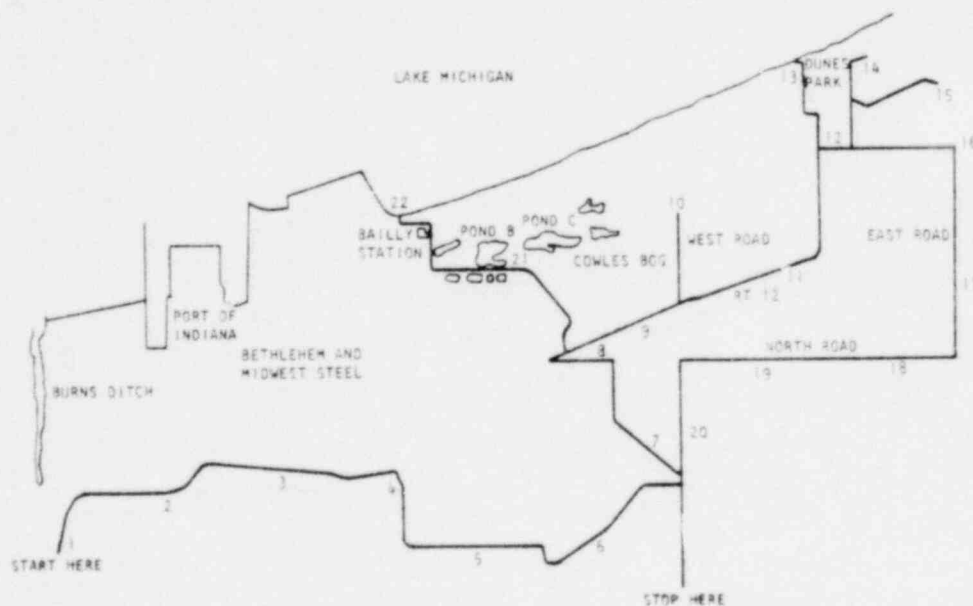


Figure 1-2. 22-Mile Road Route in Vicinity of Baily Study Area

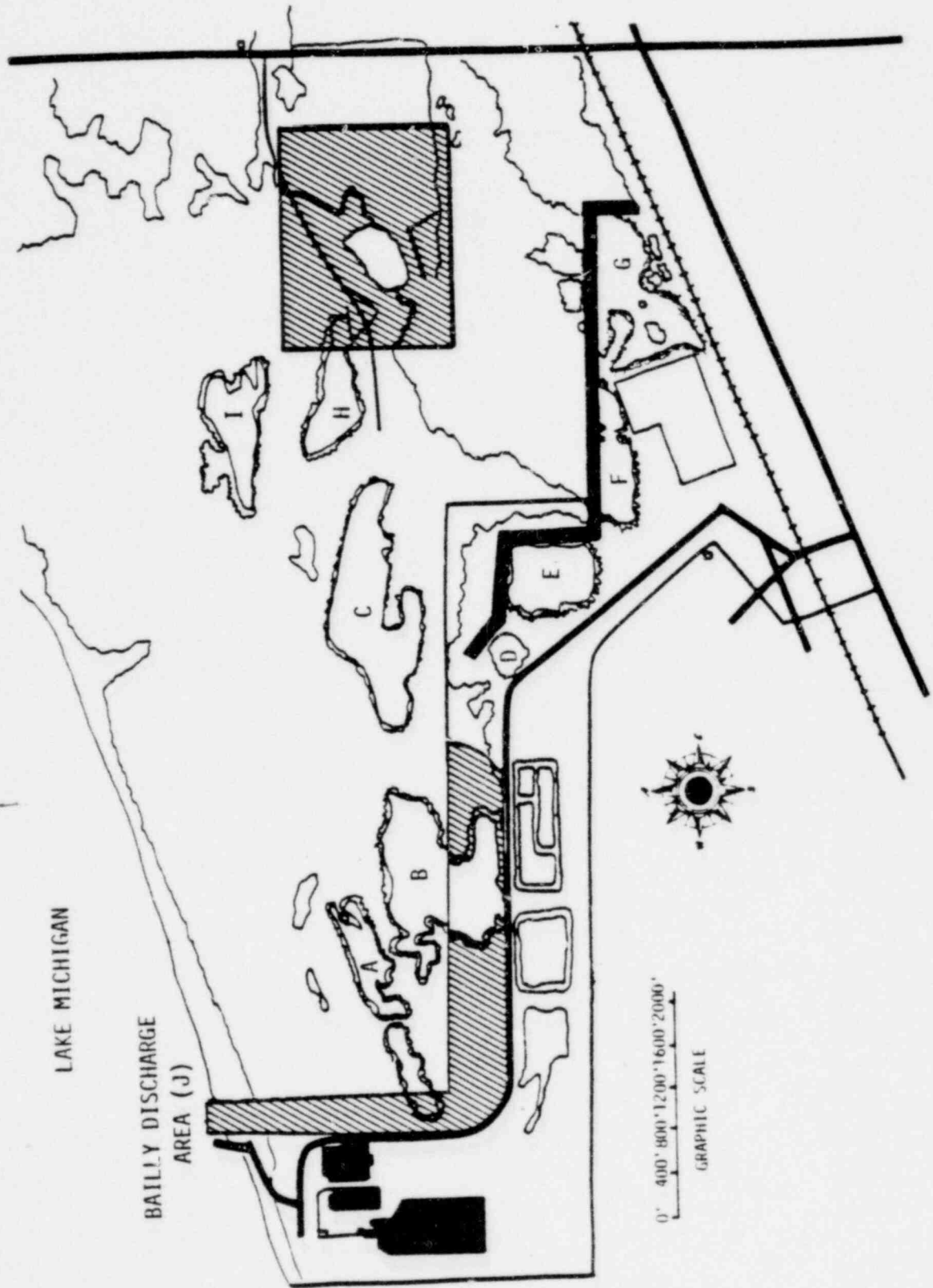


Figure 1-3. Aquatic Habitats (A through J) Sampled for Water Birds in the Bailly Study Area, 1980



1.2 VEGETATION

The general botanical history of the Bailly study area was described, vegetation types and land-use categories were mapped, and distinguishing characteristics of each mapped unit were discussed in the first annual report (Texas Instruments 1975). Color infrared aerial photography was taken in August 1980 and ground-truthed in September to document land use/land cover changes occurring since 1974, as well as to record vegetation stress present during 1980 in the vicinity of the Bailly Nuclear-1 site. A discussion of land cover changes and vegetation stress was presented in a separate report (Texas Instruments 1980).

Vegetation sampling during 1980 was conducted at the 11 established locations (Figure 1-1). The vegetational stratigraphy (herbs, shrubs, and trees) in each permanent sampling plot in locations 1, 2, 3, 4A, 4B, 5, 6, and 8 was quantitatively sampled in July 1980, as was that in the Emergent Macrophyte Community in Pond B. Locations 9, 10, and 11 were qualitatively investigated. These sampling data were used to characterize conditions of existing plant communities, with emphasis again placed on the dominant and important species. These data also were compared with those collected in September 1974 and July 1975, 1976, 1977, 1978, and 1979, to describe community dynamics and to indicate differences and similarities in vegetation over the seven years.

Data collected during 1980 vegetation sampling were generally consistent with those of previous years, indicating no major changes in species composition, density, dominance, or other parameters. The Transmission Corridor(8) showed changes associated with succession following herbicide treatment in 1978 and fire in early 1979. The Emergent Macrophyte Community (7) showed mortality of aquatic species resulting from decreased seepage from NIPSCO fly ash ponds. At other sampling locations notable changes were consistent with expected plant community dynamics and succession.

Sixteen plant species were newly recorded in 1980, bringing the 7-year total from the Bailly study area to 337 species. Two species, Euphorbia corollata and Viburnum cassinoides, are listed as endangered on A Preliminary List of Endangered, Threatened, and Rare Vascular Plants in Indiana (Bacone 1978). The majority of species newly recorded since the first vegetation survey in 1974 are forbs and grasses; based on quantitative data collected to date, they are minor components of the Bailly study area vegetation.



Soil conductivity values for May, July, and October 1980, were well below those potentially detrimental to plants and were generally consistent with data from previous years.

Vegetation stress within the Bailly study area was attributable primarily to either insufficient or excess soil moisture and was most extensive in the interdunal area north of NIPSCO fly ash ponds and at scattered locations within the wooded swamp.

Tables 1-2 through 1-6 and 1-19 and Figures 1-4 and 1-5 summarize selected data collected yearly since 1974. An annotated list of plant species observed in the Bailly study area during the 7-year monitoring is presented in Table 1-2. Importance values recorded yearly since 1974 are shown in Tables 1-3 (herbs), 1-4 (shrubs) and 1-5 (trees). Figure 1-4 depicts the number of species identified from 1974-1980 in each stratum at each location quantitatively sampled. Ground cover composition data for each year of the monitoring program are shown in Figure 1-5. Table 1-6 summarizes tree growth as indicated by change in tree basal area for all applicable sampling locations. Tables 1-7 through 1-18 present quantitative and qualitative sampling data collected in July 1980. Soil conductivity values for 1980 and previous years are presented in Table 1-19.



Table 1-2
Occurrence of Plant Taxa, Bailey Study Area, July 1980 and Previously
(Page 1 of 5)

Scientific Name	Common Name	1	2	3	4A	4B	5	6	7	8	9	10	11
Aceraceae	Maple family												
<i>Acer rubrum</i>	Red maple			X	*	*		*			*		
<i>Acer saccharinum</i>	Silver maple										X	X	
Alzooaceae	Carpetweed family												
<i>Mollugo verticillata</i>	Carpetweed		X							X			
Alliaceae	Water-plantain family												
<i>Alisma plantago-aquatica</i>	Water-plantain								X				
<i>Sagittaria arifolia</i>	Arrowhead												*
Anacardiaceae	Cashew family												
<i>Rhus aromatica</i>	Fragrant sumac			*									
<i>Rhus copallina</i>	Winged sumac				X							X	
<i>Rhus glabra</i>	Smooth sumac											*	
<i>Rhus radicans</i>	Poison ivy	*	*			X						X	*
<i>Rhus typhina</i>	Hairy sumac												
<i>Rhus vernia</i>	Poison sumac					*						X	*
Annonaceae	Custard-apple family												
<i>Asimina triloba</i>	Pawpaw		X										
Apocynaceae	Dogbane family												
<i>Apocynum androsaemifolium</i>	Dogbane												
<i>Apocynum mediae</i>	Dogbane												
Araceae	Arum family												
<i>Peltandra virginica</i>	Arrow arum												
<i>Symplocarpus foetidus</i>	Skunk cabbage					*							
Asclepiadaceae	Milkweed family												
<i>Asclepias incarnata</i>	Swamp milkweed							X					*
<i>Asclepias purpurascens</i>	Purplishweed												
<i>Asclepias tuberosa</i>	Butterfly-weed	X								X	*	*	X
<i>Asclepias verticillata</i>	Whorled milkweed											X	
Balsaminaceae	Touch-me-not family												
<i>Impatiens biflora</i>	Jewelweed					*	*	*		X		*	
Betulaceae	Birch family												
<i>Alnus incana</i>	Speckled alder					X							
<i>Betula lutea</i>	Yellow birch					*				X	X		
<i>Betula papyrifera</i>	Paper birch												
<i>Ostrya virginiana</i>	Ironwood				*								
Berberidaceae	Barberry family												
<i>Actea rubra</i>	Red barberry							*					
<i>Podophyllum peltatum</i>	Mayapple			X									
Boraginaceae	Forget-me-not family												
<i>Lithospermum carolinense</i>	Geelin's puccoon	X			X							*	
<i>Lithospermum croceum</i>	Hairy puccoon	X											
Cactaceae	Cactus family												
<i>Opuntia compressa</i>	Prickly pear											*	
Campanulaceae	Harebell family												
<i>Campanula rotundifolia</i>	Harebell										X	*	
Caprifoliaceae	Honeysuckle family					*							
<i>Lonicera linearis</i>	Northern bush-honeysuckle												
<i>Lonicera dioica</i>	Climbing honeysuckle												
<i>Lonicera tatarica</i>	Tatarian honeysuckle												
<i>Sambucus canadensis</i>	Elderberry					X						*	
<i>Viburnum acerifolium</i>	Maple-leaved viburnum							X		X			X
<i>Viburnum cassinoides</i>	Northern wild-raisin					*							
<i>Viburnum dentatum</i>	Arrowwood							X					
<i>Viburnum lentago</i>	Hannyberry							X					
Caryophyllaceae	Pink family												
<i>Arenaria sp.</i>	Sand wort												
<i>Cerastium vulgatum</i>	Mouse-ear chickweed												
<i>Lychnis alba</i>	Evening lychnis												
<i>Silene cucubatus</i>	Bladder campion												
<i>Silene noctiflora</i>	Night-flowering catchfly				X								
Celastraceae	Staff-tree family												
<i>Celastrus scandens</i>	Bittersweet												
Chenopodiaceae	Goosefoot family												
<i>Chenopodium albidum</i>	Goosefoot												
<i>Chenopodium sp.</i>	Goosefoot												
<i>Chenopodium standleyanum</i>	Goosefoot												
Ceratophyllaceae	Cornflower family												
<i>Ceratophyllum demersum</i>	Cornflower												
Compositae	Spiderwort family												
<i>Tradescantia virginiana</i> **	Spiderwort												
Compositae	Sunflower family												
<i>Achillea millefolium</i>	Yarrow												
<i>Actinomeris alternifolia</i>	Wingstem									X			
<i>Achillea millefolium</i>	Common ragweed					X							
<i>Achillea millefolium</i>	Ragweed									X			
<i>Antennaria sp.</i>	Pussytoes										X		
<i>Aster dumosus</i>	Cushy aster											X	
<i>Artemisia campestris</i>	Wormwood											X	X
<i>Aster multiflorus</i>	Stiff aster											X	
<i>Aster sp.</i>	Aster		X										

* Observed in sampling location in 1980.
x Observed in sampling location previously.
Unmarked species are recorded from the study area.

- * 1 = Beachgrass
- 2 = Foradune
- 3 = Immature Oak Forest
- 4A = Cowles Bog (wooded-dry)
- 4B = Cowles Bog (wooded-wet)
- 5 = Cowles Bog (Open)
- 6 = Maple Forest
- 7 = Emergent Macrophyte
- 8 = Transmission Corridor
- 9 = Sedge Meadow
- 10 = Immature Oak Forest (Interspersed)
- 11 = Wetland Meadow

** Previously recorded as *Tradescantia virginiana*.



Table 1-2 (Page 2 of 5)

Scientific Name	Common Name	1	2	3	4A	4B	5	6	7	8	9	10	11
Compositae (contd)													
<i>Bidens comosa</i>	Beggar-ticks					X	X			X			
<i>Bidens</i> sp.	Beggar-ticks						X						
<i>Centaurea dubia</i>	Knapweed												
<i>Centaurea jacea</i>	Knapweed												
<i>Chrysanthemum leucanthemum</i>	Ox-eye daisy												
<i>Cirsium arvense</i>	Canada thistle									X			
<i>Gnaphalium canadense</i>	Horseweed						X						
<i>Erigeron philadelphicus</i>	Common fleabane												
<i>Erigeron ramosus</i>	Daisy fleabane						X						
<i>Erigeron strigosus</i>	Daisy fleabane												
<i>Eupatorium maculatum</i>	Spotted Joe-oye weed												
<i>Eupatorium perfoliatum</i>	Murphy boneset												
<i>Eupatorium purpureum</i>	Joe-oye weed						X			X	X		
<i>Helianthus canadense</i>	Orange hawkweed												
<i>Helianthus</i> sp.	Hawkweed		X							X			
<i>Helianthus divaricatus</i>	Woodland sunflower									X	X		
<i>Helianthus giganteus</i>	Tall sunflower									X			
<i>Helianthus microcephalus</i>	Sunflower			X						X			
<i>Helianthus mollis</i>	Downy sunflower									X			
<i>Helianthus petiolaris</i>	Prairie sunflower									X			
<i>Lactuca canadensis</i>	Wild lettuce												
<i>Liatris aspera</i>	Blazing star									X	X		
<i>Krigia biflora</i>	Dwarf dandelion									X			
<i>Krigia virginica</i>	Dwarf dandelion									X			
<i>Krigia</i> sp.	Dwarf dandelion		X										
<i>Gnaphalium eupatorioides</i>	False boneset		X										
<i>Rudbeckia hirta</i>	Black-eyed susan									X	X		
<i>Senecio</i> sp.	Ragwort												
<i>Solidago altissima</i>	Tall goldenrod									X			
<i>Solidago caesia</i>	Blue-stemmed goldenrod												
<i>Solidago canadensis</i>	Canada goldenrod		X							X			
<i>Solidago graminifolia</i>	Narrow-leaved goldenrod									X			
<i>Solidago hispida</i>	Hairy goldenrod												
<i>Solidago ohioensis</i>	Goldenrod												
<i>Solidago</i> sp.	Goldenrod		X	X	X					X			
<i>Gnaphalium pteraceus</i>	Sow thistle												
<i>Artemisia officinalis</i>	Dandelion									X			
<i>Tragopogon pratensis</i>	Goatsbeard		X							X			
<i>Veronica missurica</i>	Drummond's ironweed												
Convolvulaceae													
<i>Convolvulus arvensis</i>	Morning-glory family												
<i>Convolvulus sepium</i>	Field bindweed				X					X			
<i>Cuscuta trionchii</i>	Hedge bindweed					X							
<i>Cuscuta purpurea</i>	Dodder					X							
Cornaceae													
<i>Cornus alternifolia</i>	Morning-glory												
<i>Cornus amomum</i>	Dogwood family												
<i>Cornus florida</i>	Alternate-leaved dogwood				X								
<i>Cornus racemosa</i>	Silky dogwood				X								
<i>Cornus stolonifera</i>	Flowering dogwood												
Cruciferae													
<i>Arabis lyrata</i>	Gray dogwood												
<i>Barbarea vulgaris</i>	Red-osier dogwood			X									
<i>Cakile edentula</i>	Mustard family		X							X	X		
<i>Candabine bulbosa</i>	Lyre-leaved rockcress												
<i>Graba</i> sp.	Winter cress												
<i>Hesperis matronalis</i>	Sea rocket									X	X		
<i>Lepidium apetalum</i>	Spring cress		X							X			
<i>Lepidium virginicum</i>	Whitlow cress									X			
Cyperaceae													
<i>Bulbostylis capillaris</i>	Daisy's rocket												
<i>Carex muhlenbergii</i>	Peppercress												
<i>Carex pennsylvanica</i>	Sedge family												
<i>Carex</i> sp.	Bulbostylis												
<i>Eleocharis acicularis</i>	Sand sedge												
<i>Scirpus acutus</i>	Pennsylvania sedge												
<i>Scirpus validus</i>	Sedge												
Elaeagnaceae													
<i>Elaeagnus argentea</i>	Spike rush												
Ericaceae													
<i>Arctostaphylos uva-ursi</i>	Bulrush												
<i>Gaylussacia procumbens</i>	Bulrush												
<i>Galium</i> sp.	Qleaster family												
<i>Vaccinium pennsylvanicum</i>	Loosestrife												
Euphorbiaceae													
<i>Euphorbia corollata</i>	Horsetail family												
<i>Euphorbia humifusa</i>	Field horsetail												
<i>Euphorbia polygonifolia</i>	Scouring rush		X										
Fagaceae													
<i>Quercus alba</i>	Heath family												
<i>Quercus rubra</i>	Bearberry												
<i>Quercus velutina</i>	Wintergreen									X	X		
Geraniaceae													
<i>Geranium maculatum</i>	Swamp laurel									X			
<i>Geranium robertianum</i>	Lowbush blueberry												
<i>Geranium</i> sp.	Spurge family												
Gramineae													
<i>Agropyron trachycaulum</i>	Flowering spurge												
<i>Agrostis alba</i>	Hairy spreading spurge												
<i>Amorpha brevifolia</i>	Sea-side spurge												
<i>Andropogon gerardii</i>	Beech family												
<i>Andropogon scoparius</i>	White oak												
<i>Calamagrostis canadensis</i>	Red oak												
<i>Calamagrostis</i> sp.	Black oak												
<i>Calamagrostis longifolia</i>	Geranium family												
	Wild geranium												
	Herb geranium												
	Geranium												
	Grass family												
	Slender wheatgrass												
	Red top												
	American beachgrass												
	Big bluestem												
	Little bluestem												
	Blue-joint reedgrass												
	Reed grass												
	Sand reedgrass												



Table 1-2 (Page 3 of 5)

Scientific Name	Common Name	1	2	3	4A	4B	5	6	7	8	9	10	11
Gramineae (contd)													
<u>Digitaria sanguinalis</u>	Crabgrass												
<u>Eragrostis pectinacea</u>	Purple lovegrass												
<u>Festuca octoflora</u>	Fescue												
<u>Leersia oryzoides</u>	Rice cutgrass						*	*		*		X	*
<u>Leersia virginica</u>	Cutgrass												
<u>Leptoloma cognatum</u>	Fall witchgrass						*			X			
<u>Panicum clandestinum</u>	Corn grass									X			
<u>Panicum dicotomum</u>	Panic grass											X	
<u>Panicum hauchuciae</u>	Panic grass			X						X	*		
<u>Panicum virgatum</u>	Panic grass												
<u>Panicum sp.</u>	Panic grass				X	X						*	
<u>Phragmites communis</u>	Common reed						*					X	*
<u>Poa pratensis</u>	Kentucky bluegrass											X	*
<u>Poa sp.</u>	Bluegrass		X	*	X		X			X	X	X	
Horaceae													
<u>Proserpinaca palustris</u>	Water-wilfoil family												
Ranunculiferae													
<u>Ranunculus virginiana</u>	Mermaid-weed												
<u>Ranunculus sp.</u>	Witch-hazel family												
<u>Ranunculus sp.</u>	Witch-hazel		X	*	X						X	*	
Iridaceae													
<u>Iris versicolor</u>	Iris family												
<u>Iris sp.</u>	Iris						X			*			
<u>Sisyrinchium sp.</u>	Blue-eyed grass									X			
Juglandaceae													
<u>Juglans cinerea</u>	Butternut family												
<u>Juglans sp.</u>	Butternut												
Juncaceae													
<u>Juncus effusus</u>	Rush family												
<u>Juncus sp.</u>	Rush									X			
<u>Juncus sp.</u>	Sayonet rush												
Labiatae													
<u>Collinsonia canadensis</u>	Mint family												
<u>Glechoma hederacea</u>	Horse-balm												
<u>Lycopus americanus</u>	Gill-over-the-ground							*					
<u>Lycopus virginicus</u>	Bugle weed												
<u>Mentha arvensis</u>	Bugle weed												
<u>Mentha sp.</u>	Wild mint							X					
<u>Mentha sp.</u>	Mint							X					
<u>Monarda fistulosa</u>	Wild bergamot		X							X	X	X	
<u>Monarda punctata</u>	Horse mint									X	X	X	
<u>Nepeta cataria</u>	Cat nip		X			X							
<u>Prunella vulgaris</u>	Self-heal							X					
<u>Pycnanthemum virginianum</u>	Mountain mint									*			
<u>Scutellaria galericulata</u>	Common skullcap							*					
<u>Stachys ambigua</u>	Hedge-nettle												
<u>Stachys hyssopifolia</u>	Hedge-nettle							X					
<u>Stachys palustris</u>	Hedge-nettle								X				
<u>Stachys tenuifolia</u>	Smooth hedge-nettle												
<u>Teucrium canadense</u>	Sermonder									X			
Lauraceae													
<u>Lindera benzoin</u>	Laurel family												
<u>Sassafras albidum</u>	Spice bush				X	*		*					
<u>Sassafras sp.</u>	Sassafras		*	*	*	*		*			*	*	
Leguminosae													
<u>Aplos tuberosa</u>	Legume family												
<u>Lathyrus palustris</u>	Ground nut					X							
<u>Lupinus perennis</u>	Vetchling						X						
<u>Medicago lupulina</u>	Lupine									*		X	
<u>Robinia pseudoacacia</u>	Black medic												
<u>Sephrosia virginiana</u>	Black locust							*					
<u>Trifolium dubium</u>	Goat's rue				*					*	*		
<u>Trifolium hybridum</u>	Little hoo clover												
<u>Trifolium sp.</u>	Alsike clover										X	X	X
<u>Vicia sp.</u>	Vetch										X		
Lemnaceae													
<u>Lemna minor</u>	Duckweed family												
<u>Lemna sp.</u>	Duckweed					*							
Lentibulariaceae													
<u>Utricularia purpurea</u>	Bladderwort family												
<u>Utricularia sp.</u>	Purple bladderwort												
Liliaceae													
<u>Allium canadense</u>	Lily family												
<u>Convallaria majalis</u>	Wild garlic												
<u>Lilium superbum</u>	Lily-of-the-valley								X			X	
<u>Mianthemum canadense</u>	Turk's cap lily												
<u>Polygonatum biflorum</u>	Wild lily-of-the-valley				X	*						X	
<u>Silene racemosa</u>	Solomon's Seal		*	*	*	*		*		X	X	X	
<u>Silene stellata</u>	False Solomon's seal		*	*	*	*		*		X	X	X	
<u>Silene herbacea</u>	Starry false Solomon's seal		*	*	*	*		*		*	*	*	
<u>Silene rotundifolia</u>	Catbrier		X	X	X			*					
<u>Trillium recurvatum</u>	Round-leaf catbrier			X									
<u>Uvularia grandiflora</u>	Prairie trillium							X					
<u>Uvularia sp.</u>	Large-flowered bellwort												
Lobeliaceae													
<u>Lobelia siphilitica</u>	Lobelia family												
<u>Lobelia sp.</u>	Blue lobelia												
Lycopodiaceae													
<u>Lycopodium obscurum</u>	Groundpine family												
<u>Lycopodium sp.</u>	Groundpine										X		
Lythraceae													
<u>Decodon verticillatus</u>	Loosestrife family												
<u>Decodon sp.</u>	Swamp loosestrife					X	*						
Najasaceae													
<u>Najas sp.</u>	Pondweed family												
<u>Potamogeton pulcher</u>	Naiad												
<u>Potamogeton vaseyi</u>	Pondweed									X			
<u>Potamogeton sp.</u>	Pondweed									*			
Nymphaeaceae													
<u>Brasenia schreberi</u>	Water lily family												
<u>Nelumbo lutea</u>	Water shield									*			
<u>Nuphar variegatum</u>	American lotus												
<u>Nymphaea tuberosa</u>	Bullhead lily									*			
<u>Nymphaea sp.</u>	White waterlily									*			
Rusaceae													
<u>Rhus sylvatica</u>	Gum family												
<u>Rhus sp.</u>	Black gum					*							



Table 1-2 (Page 4 of 5)

Scientific Name	Common Name	Sampling Locations											
		1	2	3	4A	4B	5	6	7	8	9	10	11
Onagraceae	Evening primrose family												
<i>Circaea quadrifida</i> ***	Enchanter's nightshade												
<i>Epilobium</i> sp.	Finweed												
<i>Ludwigia sphaerocarpa</i>	False loosestrife					X							
<i>Oenothera biennis</i>	Evening primrose												
<i>Oenothera auriculata</i>	Northern evening primrose												
<i>Oenothera</i> sp.	Primrose												
Osmundaceae	Royal fern family												
<i>Osmunda cinnamomea</i>	Cinnamon fern												
<i>Osmunda regalis</i>	Royal fern												
Oxalidaceae	Wood-sorrel family												
<i>Oxalis stricta</i>	Wood sorrel												
Phytolaccaceae	Pokeweed family												
<i>Phytolacca americana</i>	Pokeweed												
Pinaceae	Pine family												
<i>Larix laricina</i>	American larch												
<i>Pinus banksiana</i>	Jack pine												
<i>Pinus strobus</i>	White pine												
Phloxaceae	Phlox family												
<i>Phlox bifida</i>	Blue phlox												
<i>Phlox divaricata</i>	Phlox												
<i>Phlox</i> sp.													
Polygalaceae	Milkwort family												
<i>Polygala sanguinea</i>	Purple milkwort												
Polygonaceae	Buckwheat family												
<i>Polygonum amphibium</i>	Water smartweed												
<i>Polygonum arifolium</i>	Tear-thumb												
<i>Polygonum coquimbense</i>	Swamp smartweed												
<i>Polygonum sagittatum</i>	Arrow-leaved tear-thumb												
<i>Polygonum</i> sp.	Smartweed												
<i>Rumex acetosella</i>	Sheep sorrel												
<i>Rumex crispus</i>	Curly dock												
<i>Rumex verticillatus</i>	Water dock												
Polypodiaceae	Polypody family												
<i>Cystopteris fragilis</i>	Bladder fern												
<i>Dennstaedtia punctilobula</i>	Hay-scented fern												
<i>Oncoclea sensibilis</i>	Sensitive fern												
<i>Sparganium angustifolium</i>	Adder's tongue fern												
<i>Pteridium aquilinum</i>	Bracken fern												
<i>Thelypteris palustris</i>	Marsh fern												
Pontederiaceae	Pickering-weed family												
<i>Pontederia cordata</i>	Pickering-weed												
Primulaceae	Primrose family												
<i>Lysimachia ciliata</i>	Fringed loosestrife												
<i>Lysimachia terrestris</i>	Loosestrife												
<i>Ornithoglossum boreale</i>	Starflower												
Ranunculaceae	Crowfoot family												
<i>Anemone canadense</i>	Canada anemone												
<i>Anemone repens</i>	Thimbleweed												
<i>Aquilegia canadensis</i>	Columbine												
<i>Callitha palustris</i>	Marsh marigold												
<i>Ranunculus abortivus</i>	Kidney leaf buttercup												
<i>Ranunculus flabellaris</i>	Yellow water buttercup												
<i>Ranunculus pennsylvanicus</i>	Buttercup												
<i>Ranunculus sceleratus</i>	Cursed buttercup												
<i>Thalictrum polygonum</i>	Rue												
Rosaceae	Rose family												
<i>Agrimonia gryposepala</i>	Agri-mony												
<i>Aamelanchier canadensis</i>	Serviceberry												
<i>Aamelanchier laevis</i>	Serviceberry												
<i>Aronia arbutifolia</i>	Red chokeberry												
<i>Crataegus crus-galli</i>	Newcastle thornapple												
<i>Fragaria virginiana</i>	Wild strawberry												
<i>Rosa canadensis</i>	White avens												
<i>Rosa virginiana</i>	Avens												
<i>Potentilla canadensis</i>	Dwarf cinquefoil												
<i>Potentilla recta</i>	Cinquefoil												
<i>Potentilla simplex</i>	Common cinquefoil												
<i>Potentilla</i> sp.													
<i>Prunus serotina</i>	Black cherry												
<i>Prunus virginiana</i>	Choke cherry												
<i>Prunus</i> sp.	Cherry												
<i>Rosa blanda</i>	Wild rose												
<i>Rosa</i> sp.	Rose												
<i>Rubus allegheniensis</i>	Blackberry												
<i>Rubus flagellaris</i>	Dewberry												
<i>Rubus hispidus</i>	Bristly dewberry												
<i>Spiraea alba</i>	Meadow-sweet												
<i>Spiraea tomentosa</i>	Steeple bush												
Rubiaceae	Bedstraw family												
<i>Cephalanthus occidentalis</i>	Buttonbush												
<i>Galium aparine</i>	Bedstraw												
<i>Galium triflorum</i>	Fragrant bedstraw												
<i>Galium</i> sp.	Bedstraw												
Rutaceae	Rue family												
<i>Ptelea trifoliata</i>	Money tree												
Salicaceae	Willow family												
<i>Populus deltoides</i>	Cottonwood												
<i>Populus grandidentata</i>	Big-toothed aspen												
<i>Populus tremuloides</i>	Quaking aspen												
<i>Salix amygdaloides</i>	Peach-leaf willow												
<i>Salix nigra</i>	Black willow												
<i>Salix</i> sp.													
Santalaceae	Sandalwood family												
<i>Comandra umbellata</i>	Bestard-toadflax												

*** Previously recorded as *Circaea alpina*.



Table 1-2 (Page 5 of 5)

Scientific Name	Common Name	Sampling Locations											
		1	2	3	4A	4B	5	6	7	8	9	10	11
Sarraceniacae	Pitcher plant family												
<u>Sarracenia purpurea</u>	Pitcher plant												
Saxifragaceae	Saxifrage family												
<u>Ribes americanum</u>	wild black currant												
Scrophulariaceae	Snopdragon family												
<u>Aureolaria pedicularia</u>	Foxglove												
<u>Aureolaria purpurea</u>	Purple aureolaria											X	
<u>Aureolaria virginica</u>	Downy false foxglove												
<u>Linaria canadensis</u>	Blue toad-flax												
<u>Helianthus lineare</u>	Cow wheat												
<u>Mimulus alatus</u>	Sharp-winged monkey flower												
<u>Penstemon hirsutus</u>	Beardtongue										X		
<u>Penstemon sp.</u>	Beardtongue												
<u>Scrophularia lanceolata</u>	Flowert												
<u>Verbascum thapsus</u>	Mullein		X										
<u>Veronica americana</u>	Pennyroyal							X					
<u>Veronica scutellata</u>	Marsh speedwell												X
Solanaceae	Tomato family												
<u>Solanum carolinense</u>	Horse nettle				X	X							X
<u>Solanum dulcamara</u>	Nightshade					X	X						X
Sparganiaceae	Sur-reed family												
<u>Sparganium sp.</u>	Sur-weed												
Tiliaceae	Linden family												
<u>Tilia americana</u>	Basswood			X									
Typhaceae	Cattail family												
<u>Typha angustifolia</u>	Narrow-leaf cattail							X					X
<u>Typha latifolia</u>	Cattail							X	X				X
Ulmaceae													
<u>Ulmus americana</u>	American elm												
<u>Ulmus rubra</u>	Slippery elm				X	X							
Umbelliferae	Parsley family												
<u>Cicuta bulbifera</u>	waterhemlock												
<u>Erigena bulbosa</u>	Harbinger of spring							X					
<u>Osmorhiza claytoni</u>	Sweet cicely							X	X		X		
<u>Pastinaca sativa</u>	Wild parsnip							X	X		X		
<u>Sanicula trifoliata</u>	Black shakeroot								X				
<u>Sisya aurea</u>	Golden alexander							X		X			
Urticaceae	Nettle family												
<u>Boehmeria cylindrica</u>	False nettle					X	X						
<u>Pilea pumila</u>	Clearweed					X	X	X					
<u>Urtica dioica</u>	Stinging nettle												X
<u>Urtica urens</u>	Small stinging nettle					X	X			X			X
<u>Urtica sp.</u>	Nettle					X	X						
Verbenaceae	Vervain family												
<u>Verbena hastata</u>	Blue vervain									X			X
Violaceae	Violet family												
<u>Viola pedata</u>	Bird's foot violet			X	X	X							
<u>Viola pubescens</u>	Downy yellow violet												
<u>Viola sp.</u>	Violet			X	X			X			X	X	
Vitaceae	Grape family												
<u>Parthenocissus quinquefolia</u>	Virginia creeper	X			X	X		X		X	X	X	X
<u>Vitis -paria</u>	Riverbank grape										X	X	X
<u>Vitis sp.</u>	Grape	X	X		X						X		

1.2.1 QUANTITATIVE ANALYSIS

1.2.1.1 Beachgrass Community. American beachgrass (Ammophila breviligulata) was the only species sampled in 1980 at this location (Table 1-7). The single individual of smooth horsetail (Equisetum hyemale) recorded in 1979 did not survive, as might be expected. Comparison of 1979 values with those of 1980 showed a decrease in density and an increase in dominance for American beachgrass. These changes are within normal fluctuation for this species (Laing 1954).



1.2.1.2 Foredune Community. Vegetation in this community was similar to that recorded in 1979 and previously (Table 1-8). Little bluestem (Andropogon scoparius) was again the predominant member of the herbaceous stratum, having the highest importance value recorded of any species. Sand reedgrass (Calamovilfa longifolia) and poison ivy (Rhus radicans) were also important components of this stratum.

Throughout the 7-year monitoring program, beachgrass generally decreased in importance (Table 1-3). Densities and areal coverage of this species typically decrease with dune stabilization (Olson 1958). Poison ivy has steadily increased in importance (Table 1-3) during the monitoring program, also indicating stabilization of the foredune. A single individual of common dandelion (Taraxacum officinale) was observed for the first time in the sample plots. This introduced weed is locally abundant in old pastures, lawns, and disturbed places, but is not typically found on foredune slopes (Swink and Wilhelm 1970). Total ground cover recorded for 1980 at this exposed location was again the lowest of all quantitatively sampled locations (Figure 1-5).

In 1980, black oak (Quercus velutina) and basswood (Tilia americana) were again the most important species in the shrub stratum (Table 1-8). Although one jack pine (Pinus banksiana) reached shrub size, total shrub density decreased slightly primarily due to the loss of three basswood.

In 1980, basswood was the predominant species in the tree class. The total basal area of trees of this location remained approximately the same as that for 1979 due to the gain of one basswood and loss of one jack pine and one black oak.



Table 1-3

Herbaceous Stratum Taxa Important (Importance Value ≥ 20) for at Least One Sampling Year, Sampling Locations 1-8, Bailly Study Area, July 1974-1980

Sampling Location	Taxa	19.4*	1975	1976	1977	1978	1979	1980
(1) Beachgrass	<i>Ammophila brevilinguata</i>	300	300	300	300	300	290	300
(2) Foredune	<i>Ammophila brevilinguata</i>	41	28	28	9	5	7	11
	<i>Andropogon scoparius</i>	94	91	125	159	127	120	158
	<i>Calamovilfa longifolia</i>	—	40	21	22	26	34	24
	<i>Celastrus scandens</i>	29	35	25	10	22	18	5
	<i>Panicum virgatum</i>	38	—	—	—	—	—	—
	<i>Rhus radicans</i>	7	11	12	13	20	24	32
	<i>Solidago</i> sp.	36	36	39	30	23	34	12
(3) Immature Oak Forest	<i>Carex pennsylvanica</i> / <i>Carex</i> sp.	134	92	63	114	73	77	85
	<i>Rhamnus virginiana</i>	5	6	15	15	11	16	29
	<i>Poa</i> sp.	9	2	21	18	26	10	4
	<i>Pteridium aquilinum</i>	23	70	21	24	52	65	63
	<i>Rhus radicans</i>	19	19	38	21	20	10	23
	<i>Rosa blanda</i> / <i>Rosa</i> sp.	16	11	12	9	6	7	21
	<i>Smilacina</i> spp. (<i>S. racemosa</i> , <i>S. stellata</i>)	18	16	19	11	16	25	4
(4A) Cowles Bog, Wooded-Dry	<i>Carex pennsylvanica</i> / <i>Carex</i> sp.	100	97	73	91	96	85	100
	<i>Sassafras albidum</i>	22	3	24	13	3	23	22
	<i>Smilacina</i> spp. (<i>S. racemosa</i> , <i>S. stellata</i>)	11	49	21	17	17	23	17
	<i>Vaccinium pennsylvanicum</i> / <i>Vaccinium</i> sp.	100	72	101	113	92	105	93
(4B) Cowles Bog, Wooded-wet	<i>Carex</i> sp.	15	31	32	33	17	8	37
	<i>Cornus stolonifera</i>	28	27	17	5	12	6	11
	<i>Impatiens biflora</i>	30	18	33	25	29	26	23
	<i>Leersia oryzoides</i>	33	27	16	34	30	56	54
	<i>Malanthemum canadense</i>	—	36	9	9	12	25	18
	<i>Oenoclea sensibilis</i>	25	18	12	13	16	10	15
	<i>Osmunda cinnamomea</i>	66	49	50	22	19	20	22
	<i>Parthenocissus quinquefolia</i>	10	6	6	12	4	4	9
	<i>Pilea pumila</i>	14	6	30	—	—	11	22
	<i>Symplocarpus foetidus</i>	51	31	37	10	25	64	53
	<i>Urtica</i> spp.	—	—	2	11	45	42	7
(5) Cowles Bog, Open**	<i>Carex</i> spp.	9	9	9	—	—	—	13
	<i>Decodon verticillatus</i>	—	—	—	—	—	—	31
	<i>Impatiens biflora</i>	10	42	32	59	61	5	—
	<i>Leersia oryzoides</i>	3	49	55	58	60	58	61
	<i>Phragmites communis</i>	14	19	21	—	—	—	17
	<i>Pilea pumila</i>	19	—	6	37	29	5	29
	<i>Poa</i> sp.	70	54	62	—	—	—	—
	<i>Polygonum</i> spp.	25	24	24	19	38	—	—
	<i>Stachys palustris</i>	—	7	—	10	27	—	—
	<i>Thalictrum polygamon</i>	9	20	19	—	—	—	—
	<i>Thelypteris palustris</i>	—	8	7	—	—	—	7
	<i>Typha</i> spp. (<i>T. angustifolia</i> , <i>T. latifolia</i>)	25	11	18	38	43	176	99
(6) Maple Forest	<i>Acer rubrum</i>	4	3	20	21	12	47	27
	<i>Circaea quadrangulata</i>	—	—	31	25	3	41	52
	<i>Cerastium maculatum</i>	8	28	14	8	—	—	—
	<i>Geum</i> spp. (<i>G. canadense</i> , <i>G. virginianum</i>)	12	—	—	15	19	24	7
	<i>Impatiens biflora</i>	21	38	66	36	43	7	6
	<i>Lindera benzoin</i>	25	35	21	21	24	10	10
	<i>Parthenocissus quinquefolia</i>	10	29	22	33	27	35	14
	<i>Prunus</i> spp. (<i>P. virginiana</i> , <i>P. serotina</i>)	84	53	49	72	75	54	111
	<i>Rosa</i> sp./ <i>Rosa blanda</i>	16	12	12	24	18	23	22
	<i>Sassafras albidum</i>	21	10	10	—	—	22	10
(7) Emergent Macrophyte**	<i>Alisma plantago-aquatica</i>	—	—	24	—	—	—	—
	<i>Sagittaria schreberi</i>	—	—	—	—	—	24	11
	<i>Nuphar variegatum</i>	86	164	185	173	261	218	199
	<i>Nymphaea tuberosa</i>	—	—	—	—	—	—	14
	<i>Polygonum occidentale</i>	—	23	21	—	—	—	—
	<i>Pontederia cordata</i>	—	—	32	—	—	—	44
	<i>Potamogeton</i> spp.	92	114	24	126	39	58	22
	<i>Proserpinaca palustris</i>	23	—	—	—	—	—	—
	<i>Typha latifolia</i>	65	—	16	—	—	—	10
(8) Transmission Corridor	<i>Agrostis alba</i>	—	—	—	—	—	—	20
	<i>Andropogon gerardii</i>	4	10	7	56	95	108	108
	<i>Carex</i> spp. (<i>C. pennsylvanica</i>)	81	32	30	23	7	3	17
	<i>Leersia oryzoides</i>	—	35	37	39	41	41	43
	<i>Oxalis stricta</i>	—	—	5	—	—	22	7
	<i>Poa</i> sp.	24	16	11	12	6	48	35
	<i>Pycnanthemum virginianum</i>	—	—	1	2	18	25	19
	<i>Rubus</i> spp. (<i>R. allegheniensis</i> , <i>R. flagellaris</i>)	47	43	33	47	29	6	3
	<i>Thelypteris palustris</i>	—	24	22	13	26	—	3

Importance value = \pm relative values (density, dominance, frequency).

* 1974 values calculated from September data.

** Location of sample plots not identical for all years.

— Species not recorded.



Table 1-4

Yearly Importance Values for All Shrub Stratum Taxa, Sampling Locations 2-6,
Bailey Study Area, July 1974-1980

Sampling Location	Taxa	1974*	1975	1976	1977	1978	1979	1980
(2) Foredune	<u>Gelastrium scandens</u>	-	-	-	-	-	43	53
	<u>Pinus banksiana</u>	-	-	-	-	-	-	35
	<u>Prunus virginiana</u>	-	-	-	-	-	-	24
	<u>Quercus velutina</u>	128	125	127	211	102	116	113
	<u>Lilia americana</u>	172	175	173	89	199	108	68
(3) Mature Oak Forest	<u>Hammamelis virginiana</u>	138	138	134	123	160	170	134
	<u>Quercus velutina</u>	72	78	78	68	44	49	91
	<u>Sassafras albidum</u>	91	84	88	108	97	74	76
	<u>Vitis sp.</u>	-	-	-	-	-	6	-
(4A) Cowles Bog, Wooded-Dry	<u>Acer rubrum</u>	31	-	73	34	83	53	74
	<u>Prunus serotina</u>	92	18	129	167	124	172	106
	<u>Quercus alba</u>	63	29	26	-	74	21	61
	<u>Quercus velutina</u>	114	253	77	99	19	54	61
(4B) Cowles Bog, Wooded-Wet	<u>Acer rubrum</u>	31	-	73	34	83	53	42
	<u>Alnus incana</u>	-	-	-	34	17	-	-
	<u>Cornus spp. (C. amomum, C. stolonifera)</u>	130	164	163	95	94	185	70
	<u>Lindera benzoin</u>	60	43	41	90	85	55	67
	<u>Parthenocissus quinquefolia</u>	-	-	-	-	-	18	14
	<u>Rhus radicans</u>	-	-	-	14	17	-	-
	<u>Rhus vernix</u>	-	-	-	-	30	-	34
	<u>Salix nigra</u>	-	-	-	14	21	-	-
	<u>Ulmus rubra</u>	-	-	15	-	-	22	20
	<u>Viburnum cassinoides</u>	-	-	-	-	-	-	73
	<u>Vitis sp.</u>	-	-	-	-	-	-	14
(5) Cowles Bog, Open	<u>Lephalanthus occidentalis</u>	300	300	300	-	-	-	-
(6) Maple Forest	<u>Acer rubrum</u>	138	126	172	184	117	81	124
	<u>Cornus florida</u>	-	26	-	-	-	-	-
	<u>Cornus stolonifera</u>	-	-	-	-	49	-	-
	<u>Cretageus sp.</u>	10	-	10	-	-	-	-
	<u>Prunus virginiana</u>	-	-	-	-	-	-	49
	<u>Prunus serotina</u>	40	91	40	116	158	202	126
	<u>Quercus alba</u>	11	-	11	-	-	18	-
	<u>Robinia pseudo-acacia</u>	55	-	53	-	-	-	-
	<u>Sassafras albidum</u>	11	39	11	-	-	18	-

*1974 values calculated from September data.

Importance value = \pm relative values (density dominance, frequency).

- Species not recorded.

No shrubs recorded from sampling locations 1, 7, and 8 during monitoring program.



Table 1-5

Yearly Importance Values for All Tree Stratum Taxa,
Sampling Locations 2-4, and 6, Bailly Study Area, July 1974-1980

Sampling Location	Taxa	1974*	1975	1976	1977	1978	1979	1980
(2) Foredune	<i>Pinus banksiana</i>	72	73	73	74	75	78	75
	<i>Populus deltoides</i>	49	49	50	53	54	48	51
	<i>Quercus velutina</i>	34	34	35	34	36	56	48
	<i>Liriodendron americana</i>	145	144	143	140	137	118	126
(3) Immature Oak Forest	<i>Quercus alba</i>	14	14	14	15	13	12	13
	<i>Quercus velutina</i>	286	286	286	285	288	289	288
(4A) Cowles Bog, Wooded-Dry	<i>Amelanchier arborea</i> **	-	-	-	13	12	13	10
	<i>Prunus serotina</i>	20	18	19	18	20	21	21
	<i>Quercus alba</i>	32	29	29	18	32	29	31
	<i>Quercus velutina</i>	249	252	253	250	236	237	239
(4B) Cowles Bog, Wooded-Wet	<i>Acer rubrum</i>	145	145	144	143	158	160	143
	<i>Betula lutea</i>	49	47	43	45	50	50	74
	<i>Nyssa sylvatica</i>	13	11	11	14	15	15	13
	<i>Prunus serotina</i>	21	11	12	11	12	12	12
	<i>Salix amygdaloides</i> ***	43	62	63	66	22	21	25
	<i>Sassafras albidum</i>	28	24	24	23	25	25	23
	<i>Ulmus rubra</i>	-	-	-	-	19	20	11
(6) Maple Forest	<i>Acer rubrum</i>	174	173	177	173	184	179	183
	<i>Cretageus sp.</i>	10	9	10	46	10	10	9
	<i>Prunus serotina</i>	40	47	40	25	38	36	36
	<i>Quercus alba</i>	11	10	11	39	10	10	10
	<i>Robinia pseudoacacia</i>	55	50	53	9	49	49	48
	<i>Sassafras albidum</i>	11	10	11	10	10	17	14

*1974 Values calculated from May data.

**Previously recorded as *Lindera benzoin*.

***Previously recorded as *Salix nigra*.

- Species not recorded.

Importance Value = Σ relative values (density, dominance, frequency).

No trees recorded from locations 1, 5, 7, and 8 during monitoring program.

Table 1-6

Total Basal Area (Ft²/Acre) of Tree Stratum Species,
Sampling Locations 2, 3, 4A, 4B, and 6, Bailly Study Area, July 1974-1980

Sampling Location	1974*	1975	1976	1977	1978	1979	1980	Net Change 1974-1980
(2) Foredune	5.6	5.7	6.4	6.9	7.1	7.9	7.5	+1.9
(3) Immature oak	33.1	35.3	34.9	36.0	38.5	43.6	57.7	+14.6
(4A) Cowles Bog, wooded-dry	82.0	83.1	87.7	91.4	99.5	91.9	95.6	+13.6
(4B) Cowles Bog, wooded-wet	48.6	50.8	54.2	56.9	49.2	42.2	39.3	-9.3
(6) Maple forest	77.9	81.2	85.1	89.1	94.3	97.1	98.0	+20.1

*1974 values calculated from September data.

+ - Basal area in square feet per acre calculated from dbh measurements taken from ten 100-square-meter plots for locations 2, 3, and 6, from seven plots at locations 4A and 4B.

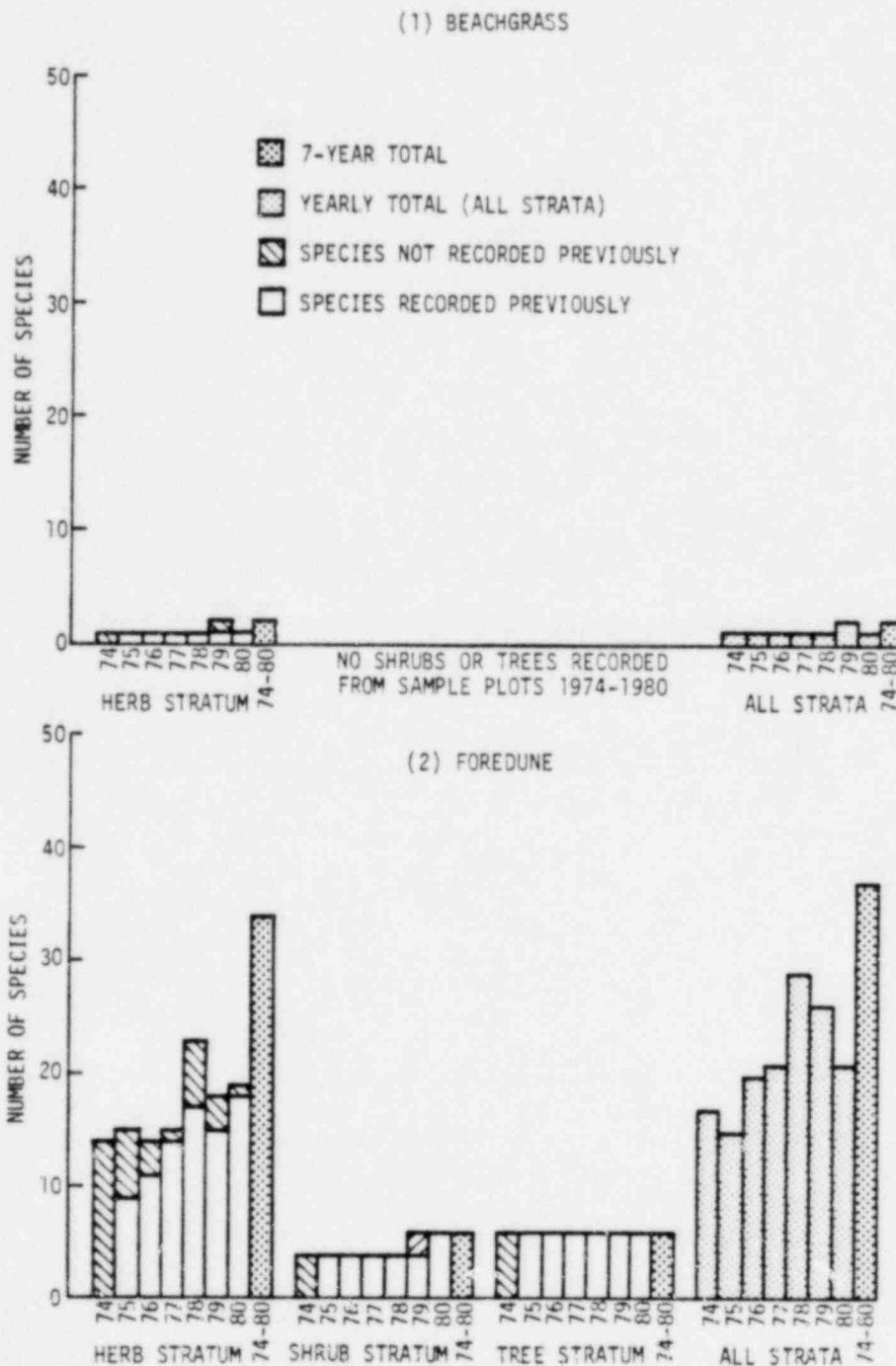


Figure 1-4. Cumulative and Yearly Species Totals, Sampling Locations 1-8, Bailliv Study Area, July 1974-1980 (1974 values calculated from September data.) (Page 1 of 5)

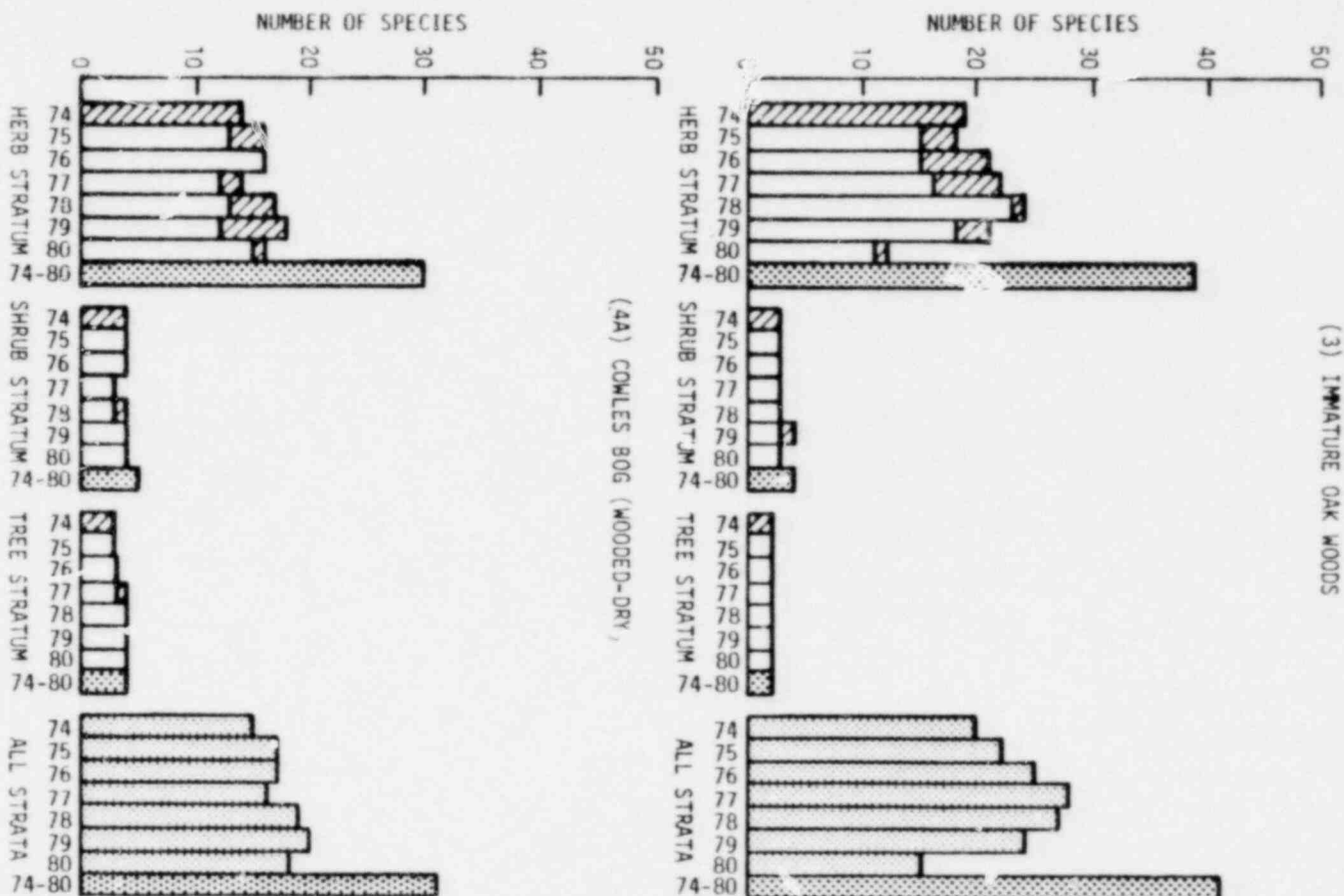


Figure 1-4. (Page 2 of 5)

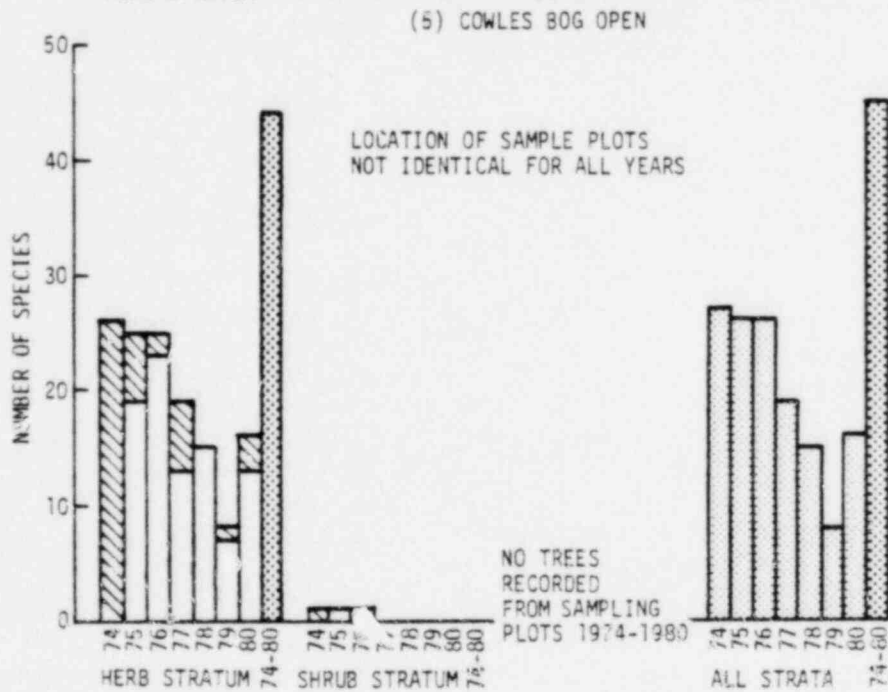
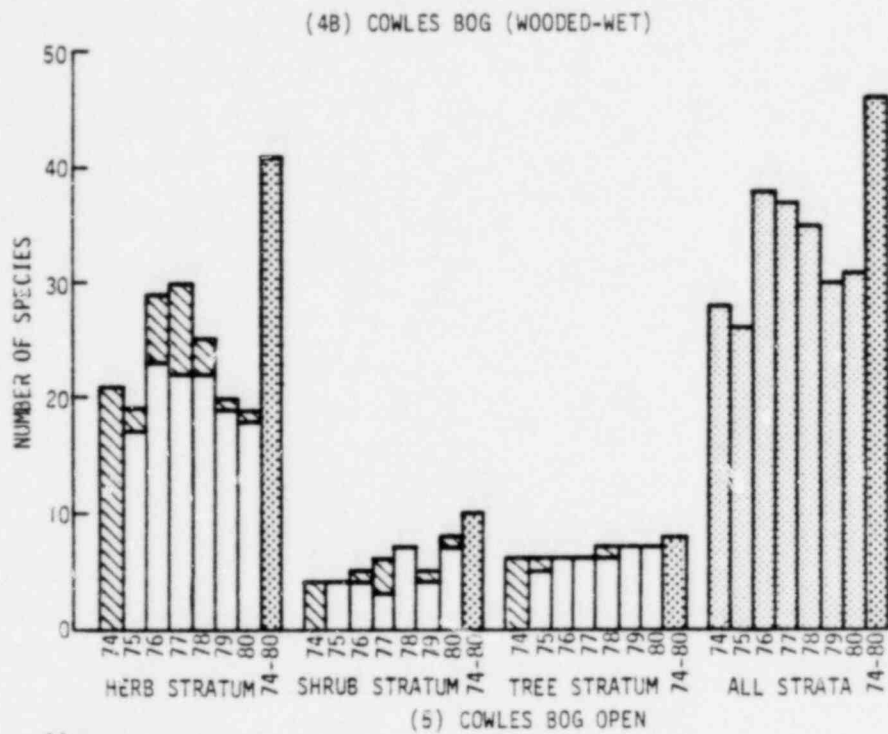


Figure 1-4. (Page 3 of 5)

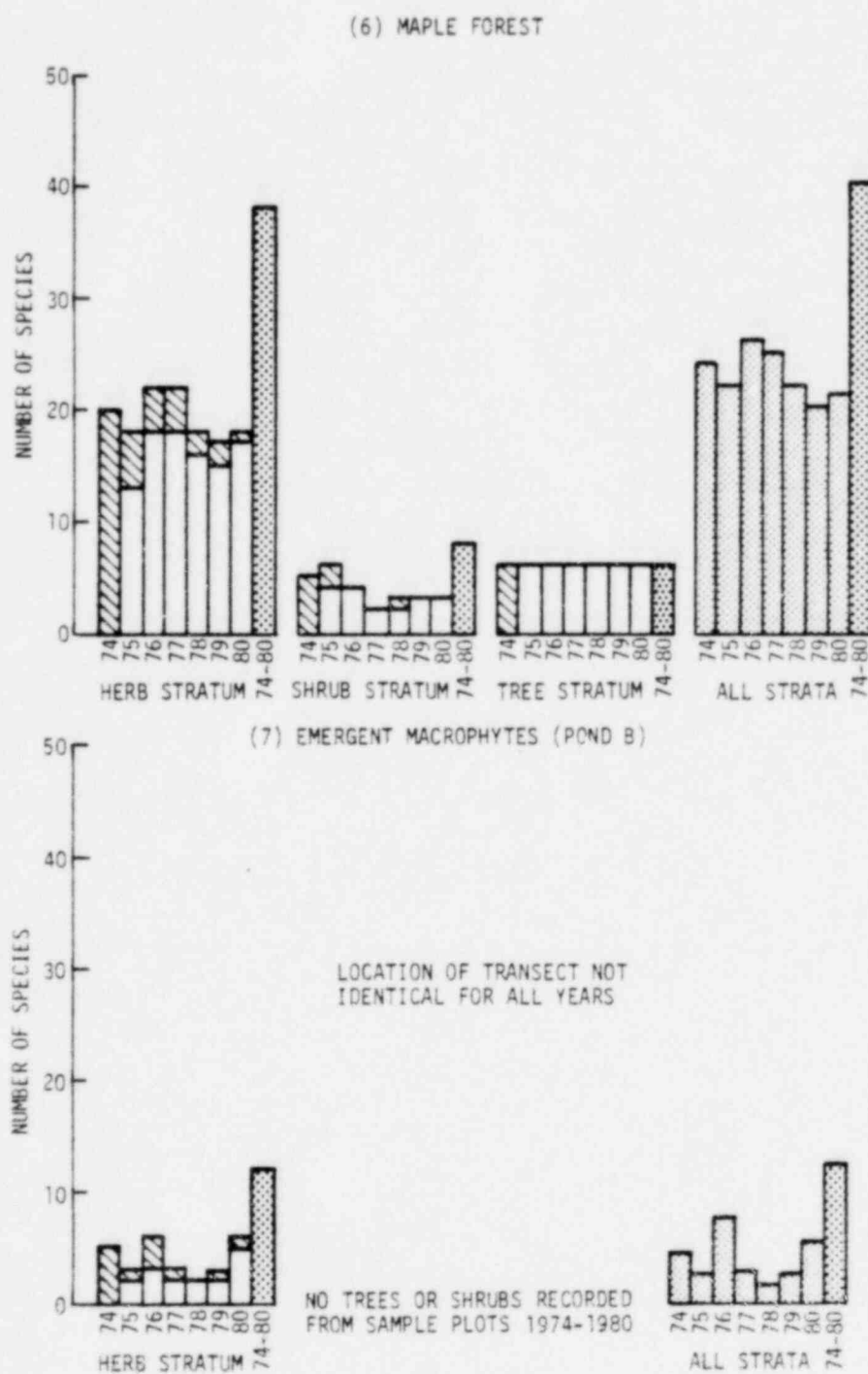


Figure 1-4. (Page 4 of 5)



(8) TRANSMISSION CORRIDOR

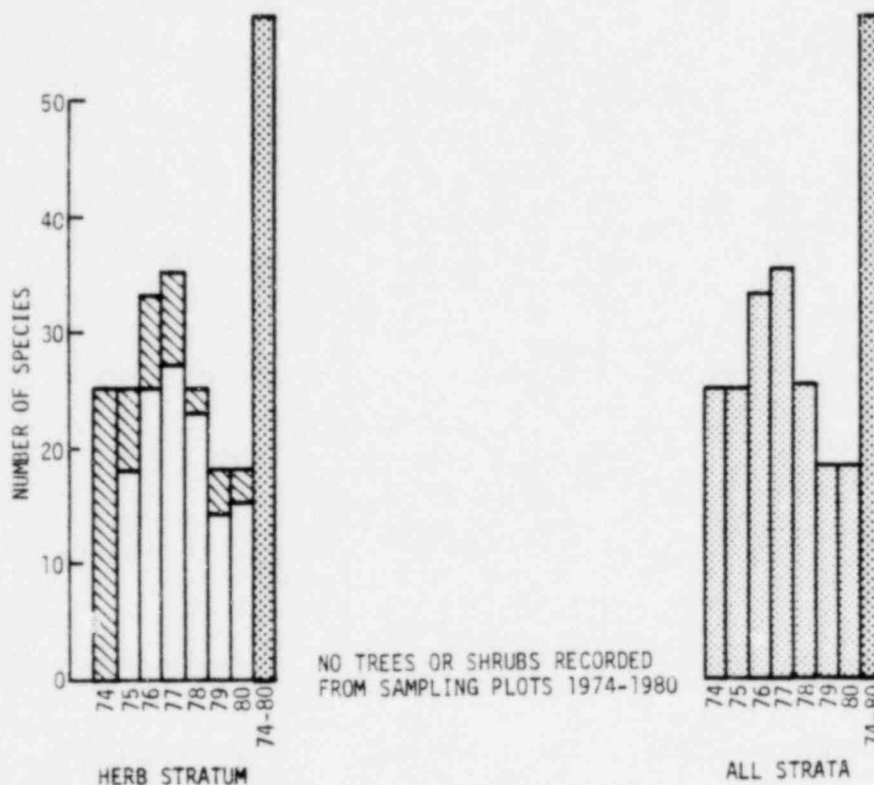


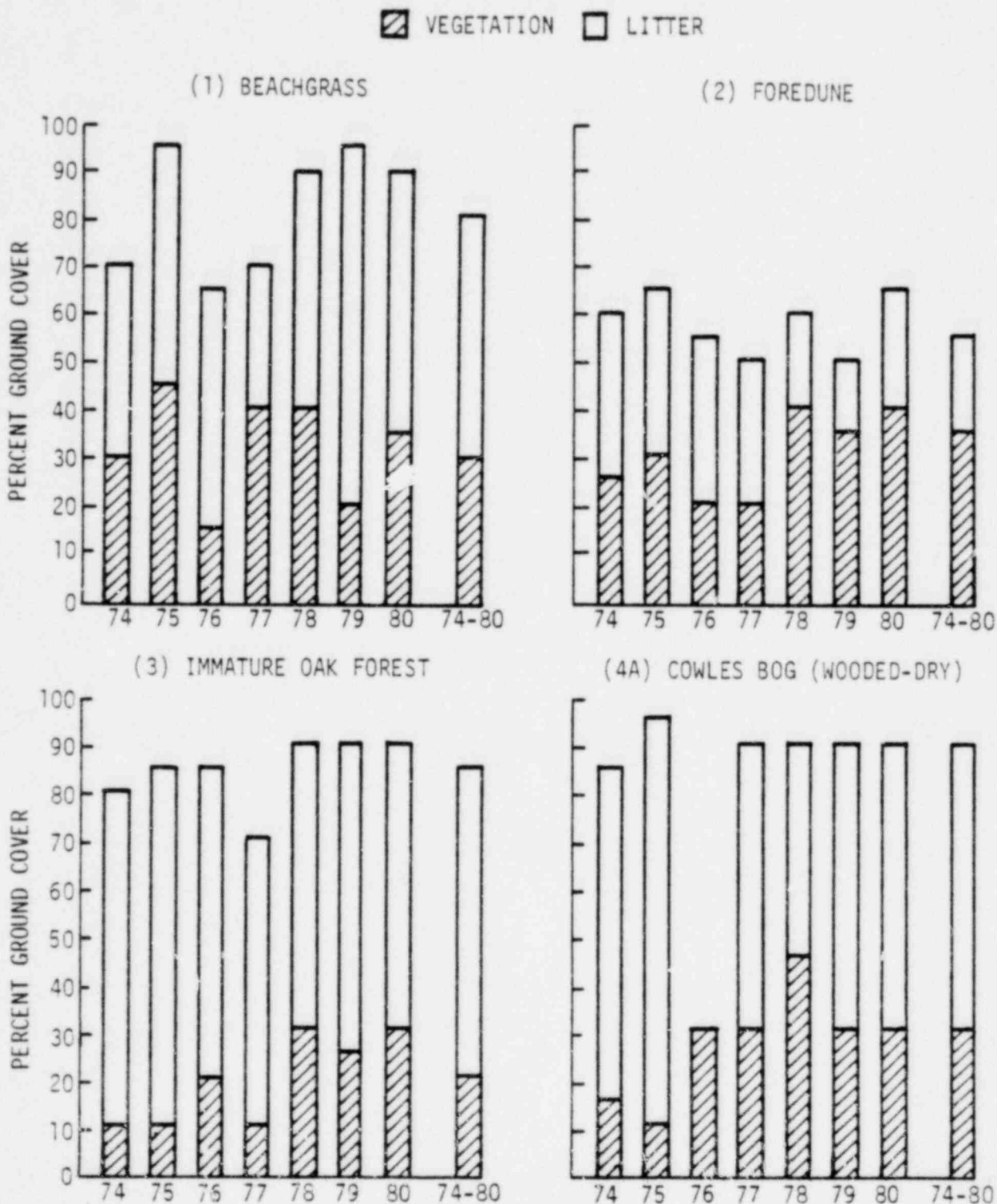
Figure 1-4. (Page 5 of 5)

Table 1-7

Density, Dominance, Frequency, and Importance Values
for Beachgrass Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value*
<i>Ammophila breviligulata</i>	685,761	1.00.0	14,454	100.0	100	100.0	300.0

*Density is expressed as number of individuals per acre, dominance as areal coverage in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.



* Percent is average based on estimated values for herbaceous (1 m²) sampling plots.

Figure 1-5. Yearly and 7-Year Mean Percent* Ground Cover (Vegetation, Litter, Total) for Sampling Locations 1-6 and 8, Bailly Study Area, 1974-1980 (Page 1 of 2)

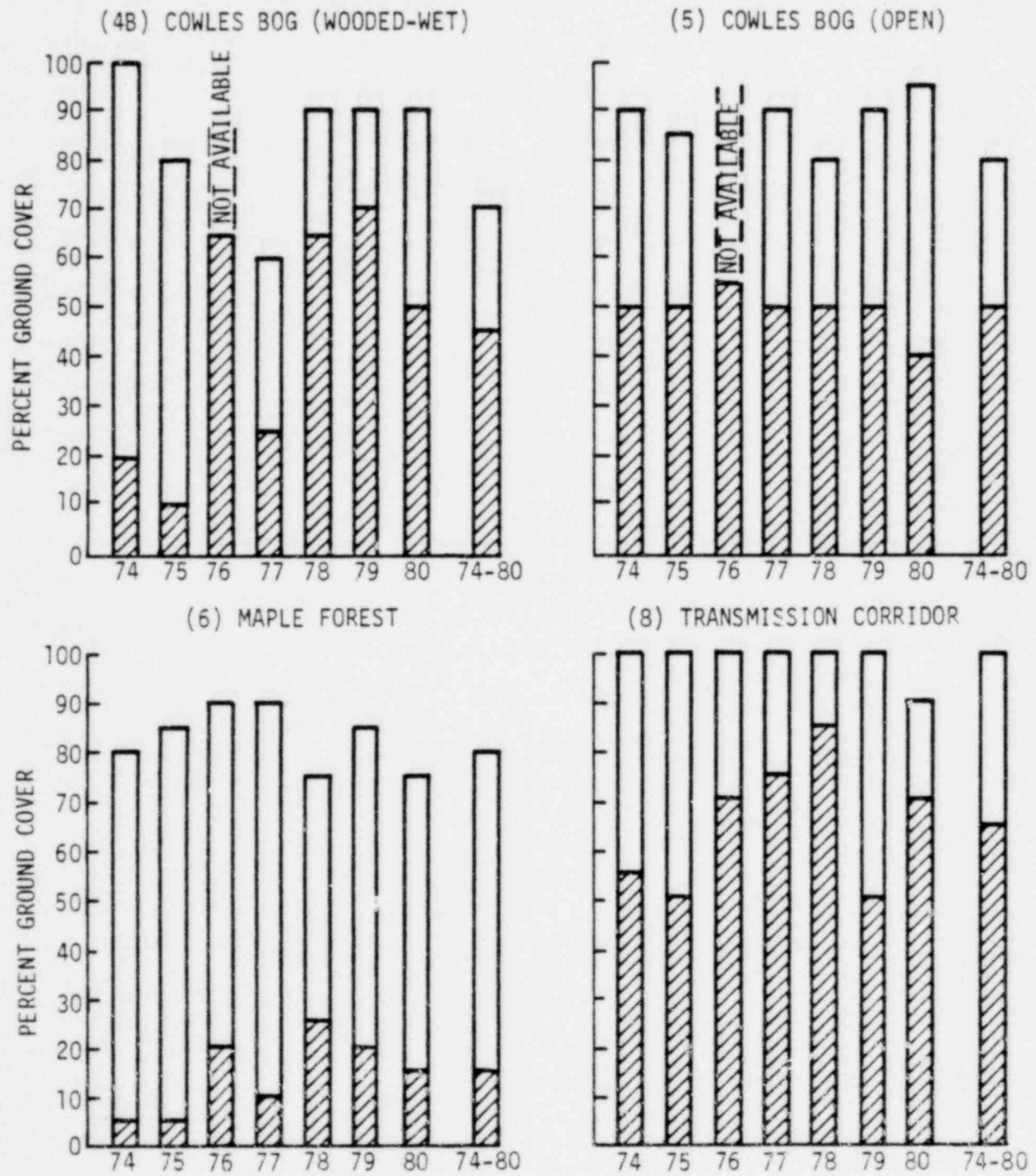


Figure 1-5. (Page 2 of 2)



Table 1-8

Density, Dominance, Frequency, and Importance Values
for Foredune Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value
Herbs							
<i>Ammophila brevifolius</i>	4,407	0.8	175.0	1.0	40	9.3	11.1
<i>Andropogon scoparius</i>	448,393	81.3	8,059.0	58.5	80	18.6	158.4
<i>Calamovilfa longifolia</i>	43,210	7.8	60.0	0.4	70	16.3	24.5
<i>Celastrus scandens</i>	809	0.1	60.0	0.4	20	4.7	5.2
<i>Euphorbia (carollata)</i>	8,462	1.5	198.0	1.4	30	7.0	9.9
<i>Galium</i> sp.	809	0.1	40.0	0.3	10	2.3	2.7
<i>Genethera</i> sp.	809	0.1	44.0	0.3	10	2.3	2.7
<i>Parthenocissus quinquefolia</i>	2,428	0.4	218.0	1.6	10	2.3	4.3
<i>Quercus velutina</i>	1,619	0.3	479.0	3.5	20	4.7	8.5
<i>Rhus radicans</i>	26,709	4.8	2,831.0	20.5	30	7.0	32.3
<i>Rosa (blanda)</i>	2,023	0.4	219.0	1.6	10	2.3	4.3
<i>Rubecula hirta</i>	809	0.1	48.0	0.3	20	4.7	5.1
<i>Smilacina stellata</i>	404	1.5	44.0	0.3	10	2.3	4.1
<i>Solidago (graminifolia)</i>	8,094	0.1	344.0	2.5	40	9.3	11.9
<i>Taraxacum officinale</i>	405	0.1	44.0	0.6	10	2.3	3.0
<i>Tradescantia virginiana</i>	405	0.1	87.0	0.6	10	2.3	3.0
<i>Vitis</i> sp.	1,619	0.3	871.0	6.3	10	2.3	8.9
Total	551,414						
Shrubs							
<i>Celastrus scandens</i>	121	27.2	436.0	6.1	10	16.7	53.3
<i>Pinus banksiana</i>	41	9.2	436.0	6.1	10	16.7	35.3
<i>Prunus virginiana</i>	41	9.2	348.0	4.9	10	16.7	24.1
<i>Quercus velutina</i>	121	27.2	3703.0	52.1	20	33.3	112.6
<i>Vitis americana</i>	121	27.2	2178.0	30.7	10	16.7	67.9
Total	445						
Trees							
<i>Pinus banksiana</i>	8	18.1	2.0	23.2	20	33.3	74.6
<i>Populus deltoides</i>	4	9.1	2.1	26.9	10	16.7	52.7
<i>Quercus velutina</i>	4	9.1	0.3	3.9	10	16.7	29.7
<i>Vitis americana</i>	28	63.7	3.6	46.0	20	33.3	143.0
Total	44						

*Density expressed as number of individuals per acre, dominance as areal coverage (herbs and shrubs) and basal area (trees) in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Parentheses indicate tentative identification.

This table has been corrected from the summer 1980 report.

1.2.1.3 Immature Oak Forest Community. Although both total density and total number of species were lower in the herbaceous stratum in 1980 than in 1979, important species were consistent with previous years (Table 1-3). The high density of Pennsylvanica sedge (*Carex pennsylvanica*) again gave this species the highest importance value for the herb class (Table 1-9). The high importance value of bracken fern (*Pteridium aquilinum*), which was approximately the same as in 1979, was due to the greatest areal coverage of this herb species. Other important herb species (those having importance values greater than 20) were false Solomon's seal (*Smilacina racemosa*), witch-hazel (*Hammamelis virginiana*),



poison ivy (Rhus radicans), and pale rose (Rosa blanda). Fragrant sumac (Rhus aromatica) was recorded for the first time from the sample plots. This woody species is a characteristic member of Indiana foredunes (Swink and Wilhelm 1979) and occurs commonly in both the foredune and open interdunal areas within the Bailly Study area.

Table 1-9

Density, Dominance, Frequency, and Importance Values
for Immature Oak Forest Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value
Herbs							
<u>Carex pennsylvanica</u>	125,495	70.5	309	4.2	30	10.0	84.7
<u>Hammamelis virginiana</u>	4,407	2.5	741	10.1	50	16.7	29.3
<u>Helianthus divaricatus</u>	809	0.5	131	1.8	10	3.3	5.6
<u>Panicum (hauchucac)</u>	2,833	1.6	44	0.6	10	3.3	5.5
<u>Poa sp.</u>	809	0.5	44	0.6	10	3.3	4.4
<u>Prunus virginiana</u>	809	0.5	44	0.6	10	3.3	4.4
<u>Pteridium aquilinum</u>	24,686	13.9	2,396	32.5	50	16.7	63.1
<u>Rhus aromatica</u>	405	0.2	4	0.1	10	3.3	3.6
<u>Rhus radicans</u>	4,856	2.7	1,002	13.6	20	6.7	23.0
<u>Rosa blanda</u>	3,237	1.8	915	12.4	20	6.7	20.9
<u>Rudbeckia hirta</u>	405	0.2	1	0.0	10	3.3	3.5
<u>Smilacina stellata</u>	9,308	5.2	1,742	23.6	70	23.3	52.1
Total	178,059						
Shrubs							
<u>Hammamelis virginiana</u>	930	50.5	500	39.7	40	33.3	135.5
<u>Cassia albidum</u>	405	26.4	390	31.0	40	33.3	90.7
<u>Quercus velutina</u>	202	13.2	370	29.4	40	33.3	75.9
Total	1,537						
Trees							
<u>Quercus alba</u>	4	2.1	0.4	0.8	10	10.0	12.9
<u>Quercus velutina</u>	194	97.9	47.3	99.2	90	90.0	287.1
Total	198						

*Density expressed as number of individuals per acre, dominance as areal coverage (herbs and shrubs) and basal area (trees) in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Parentheses indicate tentative identification.

This table has been corrected from the summer 1980 report.

Shrub vegetation was, in general, similar to that recorded in previous years, with importance values and recorded species showing little change (Table 1-3). Witch-hazel was again the major component of this stratum in 1980, having the highest density, dominance, and frequency values recorded (Table 1-9). The shrub class as a whole exhibited a decrease in density and dominance primarily due to relocation of two sampling plots. Also contributing to the decrease was the death of the wild grape recorded in 1979.

The tree canopy in the Immature Oak Forest Community continued to be dominated by black oak (Quercus velutina) in 1980, with a single white oak (Quercus alba) the only other species present in the plots. Overall, the basal area of the tree class increased by 5.2 square feet per acre over 1979, reflecting annual



growth and the addition of four black oak individuals to the tree class. Total basal area has increased 14.6 square feet per acre since 1974 (Table 1-6), with an average increase of 2.1 square feet per acre per year. Comparison of aerial photographs taken in 1980 with those of 1974 shows a conspicuous increase in canopy cover in the vicinity of this sampling location (Texas Instruments 1980).

1.2.1.4 Cowles Bog (Wooded-Dry) Community. Analysis of 1980 sampling data for this location revealed little change in species composition from previous years (Table 1-3). Lowbush blueberry (Vaccinium pennsylvanicum) and Pennsylvania sedge were again the most important species, recording the highest dominance and density values, respectively (Table 1-10). Sassafras (Sassafras albidum) and starry false Solomon's seal (Smilacina stellata) were the only other species with relatively high importance values. A total of six herb species was identified, with one species, serviceberry (Amelanchier arborea), recorded for the first time. The 7-year species total of 31 is the lowest of any location except that of the Beachgrass Community.

Table 1-10

Density, Dominance, Frequency, and Importance Values for Cowles Bog (Wooded-Dry) Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value
Herbs							
<u>Acer rubrum</u>	1,734	0.6	933	4.0	29	6.3	10.9
<u>Amelanchier arborea</u>	1,734	0.6	187	0.8	14	3.1	4.5
<u>Carex pennsylvanica</u>	230,093	69.4	4,978	21.1	43	9.4	99.9
<u>Ostrya virginiana</u>	578	0.2	62	0.3	14	3.1	3.6
<u>Panicum sp.</u>	2,312	0.6	6	0.0	14	3.1	3.7
<u>Parthenocissus quinquefolia</u>	1,734	0.5	311	1.3	14	3.1	4.9
<u>Pteridium aquilinum</u>	578	0.2	124	0.5	14	3.1	3.8
<u>Prunus serotina</u>	4,047	1.2	622	2.6	29	6.3	10.1
<u>Prunus virginiana</u>	578	0.2	62	0.3	14	3.1	3.6
<u>Quercus velutina</u>	578	0.2	124	0.5	14	3.1	3.8
<u>Rosa (blanda)</u>	2,312	0.7	436	1.8	29	6.3	8.8
<u>Sassafras albidum</u>	2,312	0.6	2,800	11.9	43	9.4	21.9
<u>Smilacina racemosa</u>	1,156	0.3	187	0.8	29	6.3	7.4
<u>Smilacina stellata</u>	5,781	1.7	560	2.4	57	12.5	16.6
<u>Tephrosia virginiana</u>	578	0.2	62	0.3	14	3.1	3.6
<u>Vaccinium pennsylvanicum</u>	75,734	22.8	12,135	51.4	86	18.7	92.9
Total	331,839						
Shrubs							
<u>Acer rubrum</u>	289	27.8	343	20.8	43	25.0	73.6
<u>Prunus serotina</u>	289	27.8	872	52.8	43	25.0	105.6
<u>Quercus alba</u>	231	22.2	218	13.2	43	25.0	60.4
<u>Quercus velutina</u>	231	22.2	218	13.2	43	25.0	60.4
Total	1,040						
Trees							
<u>Amelanchier arborea</u>	6	0.5	0.1	0.1	14	8.9	9.5
<u>Prunus serotina</u>	18	8.9	2.7	2.9	14	8.9	20.7
<u>Quercus alba</u>	18	8.9	3.1	3.2	29	18.5	30.6
<u>Quercus velutina</u>	156	81.7	89.7	93.8	100	63.7	239.2
Total	198						

*Density expressed as number of individuals per acre, dominance as areal coverage (herbs and shrubs) and basal area (trees) in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Parentheses indicate tentative identification.



Shrub stratum data for 1980 also showed little change from those of previous years (Table 1-3). Total density increased because of the addition of one red maple (Acer rubrum), four white oak, and three black oak. Although two black cherry (Prunus serotina) were lost, it remained the shrub stratum species with the highest importance value.

Basal area of trees in this community increased by 4.1 square feet per acre, resulting in a total increase over 7 years of 14.6 square feet per acre (Table 1-6). Overall there was a slight increase in tree density in 1980, although one black oak was lost as a result of wind-throw damage. One individual previously recorded as spicebush (Lindera benzoin) was identified as serviceberry (Amelanchier arborea). Serviceberry is reported common in high dunes of Porter County, Indiana (Swink and Wilhelm 1979).

1.2.1.5 Cowles Bog (Wooded-Wet) Community. Total number of species identified from sampling plots since 1974 (Figure 1-4) indicates this community has the greatest species richness of any location quantitatively sampled except the Transmission Corridor. The total number of species recorded from shrub and tree strata respectively (Figure 1-4) are the highest of any location; the herb stratum total is also high relative to other communities sampled.

No single species has predominated the herb stratum of this community, with 11 species recording importance values greater than 20 in the past 7 years (Table 1-3). This represents the greatest number of important species for any community sampled. Skunk cabbage (Symplocarpus foetidus) and cutgrass (Leersia oryzoides) recorded the highest values in 1980 and consistently have recorded high values in past years (Table 1-3). Other important species in 1980 were cinnamon fern (Osmunda cinnamomea), jewelweed (Impatiens biflora), and sedge (Carex sp.). The three members of the nettle family (Urticaceae) present on the plots had a combined importance value of 37.0; false nettle (Boehmeria cylindrica) was recorded for the first time. Duckweed (Lemna minor), which was not observed in 1979, was present in 57 percent of the plots. Duckweed is a minute, floating aquatic plant that requires stagnant water. It is an ecologically important species and a good indicator of changes in water levels. It is not technically a member of the herb stratum, although placed



as such in data accounts. Coverage estimates, as given in Table 1-11, are more precise as well as more meaningful than density estimates of this minute species.

Table 1-11
Density, Dominance, Frequency, and Importance Values
for Cowles Bog (Wooded-Wet) Community Vegetation,
Bailey Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value
Herbs							
<u>Boehmeria cylindrica</u>	2,891	0.8	498	1.8	43	6.8	9.4
<u>Carex</u> sp.	81,516	21.7	1,742	6.4	57	9.1	37.2
<u>Cornus stolonifera</u>	5,781	1.5	1,245	4.6	29	4.6	10.7
<u>Cystopteris fragilis</u>	1,156	0.3	6	0.0	14	2.2	2.5
<u>Impatiens biflora</u>	19,078	5.0	1,867	6.8	71	11.3	23.1
<u>Leersia oryzoides</u>	142,797	38.1	3,111	11.4	29	4.6	54.1
<u>Lemna minor</u> **	—	—	42,525	—	57	9.1	—
<u>Maianthemum canadense</u>	35,844	9.6	1,556	5.7	14	2.2	17.5
<u>Onoclea sensibilis</u>	8,094	2.2	2,178	8.0	29	4.6	14.8
<u>Osmunda cinnamomea</u>	10,984	2.9	3,423	12.5	43	6.8	22.2
<u>Parthenocissus quinquefolia</u>	2,891	0.8	249	0.9	43	6.8	8.3
<u>Pilea pumila</u>	40,469	10.8	1,058	3.9	43	6.8	21.5
<u>Polygonum (arifolium)</u>	1,734	0.5	311	1.2	14	2.2	3.9
<u>Solanum (dulcamera)</u>	1,536	0.4	436	1.6	29	4.6	6.6
<u>Symplocarpus foetidus</u>	9,250	2.5	9,334	34.2	100	14.9	52.6
<u>Thelypteris palustris</u>	1,734	0.5	62	0.2	14	2.2	2.9
<u>Urtica</u> sp.	5,781	1.5	87	0.7	29	4.6	6.8
<u>Viola</u> sp.	3,469	0.9	68	0.3	29	4.6	5.8
Total	375,005						
Shrubs							
<u>Acer rubrum</u>	173	7.7	280	14.3	25	20.3	42.3
<u>Cornus stolonifera</u>	925	41.0	373	19.1	14	9.9	70.0
<u>Lindera benzoin</u>	520	23.1	467	23.8	25	20.3	67.2
<u>Parthenocissus quinquefolia</u>	58	2.6	31	1.6	14	9.9	14.1
<u>Rhus vernix</u>	173	7.7	311	15.9	14	9.9	33.5
<u>Ulmus rubra</u>	58	2.6	156	7.9	14	9.9	20.4
<u>Viburnum cassinoides</u>	289	12.7	311	15.9	14	9.9	38.5
<u>Vitis</u> sp.	58	2.6	31	1.6	14	9.9	14.1
Total	2,254						
Trees							
<u>Acer rubrum</u>	75	49.6	19.5	49.6	86	43.2	142.4
<u>Betula lutea</u>	35	23.2	11.4	29.1	43	21.3	73.6
<u>Nyssa sylvatica</u>	6	4.0	0.7	1.8	14	7.1	12.9
<u>Prunus serotina</u>	6	4.0	0.4	1.0	14	7.1	12.1
<u>Salix amygdaloides</u>	6	4.0	5.3	13.5	14	7.1	24.6
<u>Sassafras albidum</u>	17	11.3	1.9	4.8	14	7.1	23.2
<u>Ulmus rubra</u>	6	4.0	0.1	0.3	14	7.1	11.4
Total	151						

*Density is expressed as number of individuals per acre, dominance as areal coverage (herbs and shrubs and basal area (trees) in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

**Only dominance was recorded for this species (see text).

Parentheses indicate tentative identification.



All shrubs observed in the wet woods plots in 1979 were recorded in 1980, and two other species, northern wild raisin (Viburnum cassinoides) and wild grape (Vitis sp.), were observed for the first time. Northern wild raisin is reported to be quite rare in this area (Swink and Wilhelm 1979). It is listed as endangered on: A Preliminary List of Endangered, Threatened, and Rare Plant Species in Indiana (Bacone 1978). Red-osier dogwood (Cornus stolonifera) was again the predominant shrub species, although spicebush (Lindera benzoin) was nearly as important (Table 1-11).

The tree class exhibited several changes in 1980, primarily due to tree growth and tree mortality, although relocation of one sampling plot contributed to data variation. For the second consecutive year, total basal area for the tree class decreased, resulting in a net loss of 9.3 square feet per acre since 1974 (Table 1-6). The addition of one red maple (Acer rubrum) and one yellow birch (Betula lutea) were offset by the mortality of four individuals — two sassafras and two red maples. High water levels, apparently present for an extended period of time in the past year, probably caused the sassafras mortality. This species is intolerant of flooding and the dead trees were located at the margin of the swamp where flooding generally is not prolonged or excessive. The red maples appeared to have suffered root damage, but whether water caused the death of this flood-tolerant species is uncertain. A swamp is typically a habitat of great natural disturbance. Fluctuating water levels may stress trees adapted to the swamp environment. Further, shallow root systems common to many swamp species render them highly susceptible to wind-throw damage.

1.2.1.6 Cowles Bog (Open) Community. Yearly data from 1974 through 1978 show a general decrease in species richness (Figure 1-4) and an increase in importance of cattail species (Typha angustifolia, T. latifolia) at this sampling location (Table 1-3). Twice as many species were recorded at this location in 1980 than in 1979, although this total was still considerably less than the totals for the first 3 years of sampling (Figure 1-4). As mentioned in past reports, the dense vegetation and unstable substrates of this marsh community make it virtually impossible to maintain permanent sampling plots. Relocation of plots makes comparison of yearly values difficult and undoubtedly



accounts for some of the observed data variation. However, a general increase in cattail populations in recent years has been reported by other investigators (Cook and Jackson 1978, Wilhelm 1980). Further, comparison of recent aerial photographs (Texas Instruments 1980) also indicate an increase in areal coverage of cattail species at a number of locations within the Bailly study area, including parts of the open bog. Cattails are well adapted to wet, disturbed environments, especially where water levels fluctuate frequently. Once established, cattails exclude establishment or reproduction of other species.

Cutgrass was also an important species sampled in 1980 (Table 1-12), inhabiting areas where cattail is not yet established. Cutgrass is the only species in this community having consistently high yearly importance values (Table 1-3). Swamp loosestrife (Decodon verticillatus) was recorded for the first time and was a significant component of the sampled vegetation with an importance value of 31.2. This species forms large vegetative colonies, as do the great majority of dominant marsh species. Although no shrubs or trees were present on sample plots, scattered shrubs (poison-sumac, red-osier dogwood, spirea) and a few small trees (various species of willow) are present throughout the marsh.

Table 1-12

Density, Dominance, Frequency, and Importance Values
for Cowles Bog (Open) Vegetation, Bailly Study Area, July 19

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value*
Herbs							
<u>Boehmeria cylindrica</u>	1,214	0.6	218	1.1	20	4.7	6.4
<u>Carex</u> sp.	10,522	5.5	174	0.9	30	7.0	13.4
<u>Decodon verticillatus</u>	3,237	1.7	4,574	22.5	30	7.0	31.2
<u>Eupatorium maculatum</u>	1,214	0.6	261	1.3	20	4.7	5.6
<u>Eupatorium perfoliatum</u>	405	0.2	87	0.4	10	2.3	2.9
<u>Leersia oryzoides</u>	70,820	36.8	3,049	15.0	40	9.3	51.1
<u>Onoclea sensibilis</u>	1,214	0.6	305	1.5	20	4.7	6.8
<u>Osmunda regalis</u>	405	0.2	44	0.2	10	2.3	2.7
<u>Phragmites communis</u>	10,927	5.7	915	4.5	30	7.0	17.2
<u>Pilea pumila</u>	27,923	14.5	1,006	4.9	40	9.3	28.7
<u>Scirpus lacustris</u>	1,214	0.6	1	0.0	10	2.3	2.9
<u>Scutellaria galericulata</u>	405	0.2	Tr	0.0	10	2.3	2.5
<u>Solanum dulcamara</u>	2,023	1.1	305	1.5	40	9.3	11.9
<u>Thelypteris palustris</u>	2,023	1.1	305	1.5	20	4.7	7.3
<u>Typha angustifolia</u>	35,422	18.9	5,184	25.5	70	16.3	60.7
<u>Typha latifolia</u>	22,258	11.6	3,920	19.3	30	7.0	37.9
Total	192,226						

*Density expressed as number of individuals per acre, dominance as areal coverage in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of three relative values.

Parentheses indicate tentative identification.

Tr = trace.



1.2.1.7 Maple Forest Community. Species composition in this community generally remained similar to that of previous years, although densities for all strata were lower than in 1979 (Table 1-13).

Table 1-13
Density, Dominance, Frequency, and Importance Values
for Maple Forest Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value*
Herbs							
<i>Acer rubrum</i>	10,927	12.5	180	1.2	70	13.5	27.2
<i>Circaea quadrisulcata</i>	28,328	32.4	2,047	13.6	30	4.8	41.8
<i>Cornus florida</i>	1,619	1.9	261	1.7	20	3.8	7.4
<i>Galium aparine</i>	405	0.5	Tr	0.0	10	1.9	2.4
<i>Geum canadense</i>	1,619	1.9	218	1.5	20	3.8	7.2
<i>Glechoma hederacea</i>	1,214	1.4	1	0.0	20	3.8	5.2
<i>Hieracium</i> sp.	405	0.5	Tr	0.0	10	1.9	2.4
<i>Impatiens biflora</i>	809	1.0	131	0.8	20	3.8	5.7
<i>Lindera benzoin</i>	1,542	4.2	697	4.6	50	9.6	18.4
<i>Parthenocissus quinquefolia</i>	4,452	5.1	436	2.9	30	5.8	13.8
<i>Prunus virginiana</i>	7,284	8.3	1,438	9.6	40	7.7	25.6
<i>Prunus serotina</i>	16,997	19.4	7,857	52.3	40	13.5	85.2
<i>Rosa (blanda)</i>	5,666	6.5	611	4.1	60	11.5	22.1
<i>Sanicula trifoliata</i>	405	0.5	44	0.3	10	1.9	2.7
<i>Sassafras albidum</i>	1,619	1.9	871	4.8	10	1.9	9.6
<i>Smilacina racemosa</i>	1,214	1.4	88	0.6	30	4.8	7.8
<i>Smilax herbacea</i>	405	0.4	Tr	0.0	10	1.9	2.4
<i>Thalictrum (polygonum)</i>	405	0.5	131	0.9	10	1.9	3.3
Total	87,415						
Shrubs							
<i>Acer rubrum</i>	231	38.8	1970.	52.7	20	33.3	124.8
<i>Prunus virginiana</i>	81	13.7	1740.	18.9	10	16.7	49.3
<i>Prunus serotina</i>	283	47.6	2610.	28.4	30	50.0	126.0
Total	595						
Trees							
<i>Acer rubrum</i>	186	72.1	63.8	65.1	90	45.0	182.2
<i>Cretageus crus-galli</i>	8	3.1	1.0	1.1	10	4.0	9.2
<i>Prunus serotina</i>	24	9.3	16.7	17.0	20	10.0	36.3
<i>Quercus alba</i>	8	3.1	1.8	1.8	10	5.0	9.9
<i>Robinia pseudoacacia</i>	24	9.3	13.4	13.7	50	25.0	48.0
<i>Sassafras albidum</i>	8	3.1	1.3	1.3	20	10.0	14.4
Total	258						

*Density expressed as number of individuals per acre, dominance as areal coverage (herbs and shrubs) and basal area (trees) in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Parentheses indicate tentative identification.

Tr = trace.

This table has been corrected from the summer 1980 report.

Total density and areal coverage of herbaceous species was the lowest of all locations sampled. The consistently low ground cover values and herb densities recorded for this community are the result of low light penetration through the dense canopy present at the time of July sampling. Periodic spring flooding is a likely factor contributing to low ground cover also. As in most previous samplings, black cherry again recorded the highest importance value in the herb



stratum in 1980 (Table 1-3). Enchanter's nightshade (Circaea quadrisulcata) remained an important species in spite of widespread leaf miner damage. Jewelweed, an important species in previous samplings until 1979, again was present in the plots in small numbers (Table 1-3). Yearly variation, shown in Table 1-3, is not unusual for many annual plants, including jewelweed, that require a specific microenvironment for seed germination. The large yearly fluctuation in the importance of tree seedlings (e.g., Acer rubrum) is likely due to variation of annual seed crop as well as microenvironment factors mentioned above.

Mortality occurred in both the shrub and tree strata in the past year. Several black cherry and one sassafras were lost from the shrub stratum. The cause of the mortality was uncertain although shading out by the overstory was one contributing factor. Three red maples in the tree stratum died, resulting in basal area remaining approximately the same as in 1979 (Table 1-6). Both insect damage (wood borer) and fungus infection were observed, although the primary cause of mortality could not be determined. Many of the second growth red maples at this location are trees which developed from stump sprouts. Sprouting trees, when young, are exceptionally fast growing due to established root systems, but they also are highly susceptible to many plant pathogens (Fowells 1965). Reflecting the rapid growth and high importance of red maple at this location, tree basal area has increased 20 square feet per acre since 1974, the greatest of any location sampled (Table 1-6).

1.2.1.8 Emergent Macrophyte Community. The habitat at this location has been drastically altered due to changes in drainage patterns associated with sealing of NIPSCO ash ponds south of the access road. At the July 1980 sampling, approximately 60 percent of Pond B was dry, including the area sampled for emergent aquatic plants in past years. All previously submerged vegetation had died, and although most of the emergent macrophytes were still living at the time of sampling, they showed symptoms of severe stress.

Sampling for 1980 was conducted in an area of Pond B where standing water was still present (north and east of the area sampled in past years). Species composition was similar to previous years (Table 1-3), although white water



lily (Nymphaea tuberosa) was recorded for the first time on the study area at this new sampling location (Table 1-14). It is reported to be a common species of shallow waters (Swink and Wilhelm 1979). Species density and frequency did not differ significantly from previous years.

Table 1-14

Density, Dominance, Frequency, and Importance Values
for Emergent Macrophyte Community Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value*
<u>Brasenia schreberi</u>	162	2.7	22	1.4	10	7.1	11.2
<u>Nuphar variegatum</u>	4,695	78.4	1,092	70.9	70	50.0	199.3
<u>Nymphaea tuberosa</u>	162	2.7	64	4.2	10	7.1	14.0
<u>Pontederia cordata</u>	484	8.1	328	21.3	20	14.3	43.7
<u>Potamogeton vaseyi</u>	324	5.4	34	2.2	20	14.3	21.9
<u>Typha latifolia</u>	162	2.7	Tr	0.0	10	7.1	9.8
Total	5,989						

*Density is expressed as number of individuals per acre, dominance as areal coverage in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Tr = trace.

Pond B and other ponds north of NIPSCO ash ponds are likely to experience continued lowering of water levels in the future (Texas Instruments 1980). Vegetation changes that are expected because of the hydrological change will be monitored closely.

1.2.1.9 Transmission Corridor Community. Sampling data for 1980 show that monocot species continue to dominate this managed and disturbed location (Table 1-15). Big blue stem (Andropogon gerardii), cutgrass and bluegrass (Poa sp.) recorded a combined importance value greater than all other species together. Red top (Agrostis alba) showed a significant increase over 1979, especially in the plots burned by fire in spring 1979 (Texas Instruments 1979). As expected, the pioneer species wood sorrel (Oxalis stricta) was out-competed by grasses and sedges and decreased in importance from 1979. One individual of common evening primrose (Oenothera biensis) was recorded for the first time at this sampling location, raising the 7-year herb stratum species total to 57, the greatest of any location quantitatively sampled. The primrose is a common weedy species in this area (Swink and Wilhelm 1979).

Total cover at this location has been consistently the highest of any location. Yearly ground cover values (Figure 1-5) reflect effects of fire in summer 1979, and general recovery of herbaceous species in 1980.



Table 1-15

Density, Dominance, Frequency, and Importance Values
for Transmission Corridor Vegetation, Bailly Study Area, July 1980

Taxon	Density*	Relative Density	Dominance*	Relative Dominance	Frequency*	Relative Frequency	Importance Value*
Herbs							
<u>Agrostis alba</u>	63,941	7.9	1,525	5.5	20	5.3	18.7
<u>Andropogon gerardii</u>	371,907	45.9	12,197	44.1	70	18.4	108.4
<u>Bulbostylis (capillaris)</u>	405	0.1	Tr	0.0	10	2.6	3.2
<u>Calamagrostis (bolanderi)</u>	405	0.1	44	0.2	10	2.6	2.9
<u>Carex sp.</u>	27,519	3.4	784	2.8	40	10.5	16.8
<u>Cerium arvense</u>	4,452	0.5	261	1.0	10	2.6	4.1
<u>Cuscuta (groenii)</u>	405	0.1	Tr	0.0	10	2.6	2.7
<u>Iris versicolor</u>	11,736	1.4	1,089	3.9	10	2.6	7.9
<u>Juncus sp.</u>	2,428	0.3	44	0.2	20	5.3	5.8
<u>Leersia oryzoides</u>	153,781	19.0	5,924	21.4	10	2.6	43.0
<u>Oenothera biennis</u>	809	0.1	87	0.3	10	2.6	3.0
<u>Oxalis stricta</u>	12,950	1.6	741	2.8	10	2.6	7.0
<u>Panicum sp.</u>	15,783	1.9	348	1.3	30	7.9	11.1
<u>Phleum pratensis</u>	2,023	0.2	Tr	0.0	10	2.6	2.8
<u>Poa sp.</u>	108,051	13.3	1612	10.2	60	15.8	34.9
<u>Pycnanthemum virginianum</u>	30,352	3.7	2,831	10.2	20	5.3	19.2
<u>Rubus allegheniensis</u>	1,214	0.1	131	0.5	10	2.6	3.2
<u>Tradescantia virginiana</u>	1,214	0.1	44	0.2	10	2.6	2.9
<u>Thelypteris palustris</u>	405	0.1	Tr	0.0	10	2.6	2.7
Total							

*Density is expressed as number of individuals per acre, dominance as areal coverage in square feet per acre, and frequency as percent of sample plots in which a species occurred. Importance value is the sum of the three relative values.

Parentheses indicate tentative identification.

Tr = trace.

This table has been corrected from the summer 1980 report.

1.2.2 QUALITATIVE ANALYSIS

1.2.2.1 Sedge Meadow Community. A total of 26 species was observed at this location (Table 1-16). Most common species recorded in previous years were again present in 1980. Bristly dewberry (Rubus hispidus) was recorded for the first time in this community. It is locally common in acid woods and boggy areas (Swink Wilhem 1979).

Table 1-16

Plants Observed in Sedge Meadow Community, Bailly Study Area, July 1980

Scientific Name	Common Name
<u>Acer rubrum</u>	Red Maple
<u>Aquilegia canadensis</u>	Columbine
<u>Asclepias tuberosa</u>	Butterfly-weed
<u>Carex pennsylvanica</u>	Woodland sedge
<u>Euphorbia corollata</u>	Flowering spurge
<u>Galium sp.</u>	Bristow
<u>Krigia biflora</u>	Dwarf dandelion
<u>Lupinus perennis</u>	Lupine
<u>Nyssa sylvatica</u>	Black gum
<u>Panicum hauchucæ</u>	Panic grass
<u>Pinus banksiana</u>	Jack pine
<u>Poa sp.</u>	Bluegrass
<u>Prunus serotina</u>	Black cherry
<u>Prunus virginiana</u>	Choke cherry
<u>Pteridium aquilinum</u>	Bracken fern
<u>Quercus velutina</u>	Black Oak
<u>Rosa blanda</u>	Pale rose
<u>Rubus allegheniensis</u>	Blackberry
<u>Rubus hispidus</u>	Dewberry
<u>Sassafras albidum</u>	Sassafras
<u>Smilacina racemosa</u>	False Solomon's seal
<u>Smilacina stellata</u>	Starry false Solomon's seal
<u>Solidago (graminifolia)</u>	Grass-leaved goldenrod
<u>Tephrosia virginiana</u>	Goat's rue
<u>Tradescantia virginiana</u>	Spiderwort
<u>Vaccinium pennsylvanicum</u>	Low-bush blueberry
<u>Vitis (riparia)</u>	Riverbank grape

Parentheses indicate tentative identification.



1.2.2.2 Immature Oak (Interdunal) Community. This community recorded the greatest number of species (40) of any of the qualitatively sampled locations (Table 1-17). A number of taxa were newly recorded, including harebell (Campanula rotundifolia), seaside spurge (Euphorbia polygonifolia), and bristly catbrier (Smilax tamnoides). All these plants are characteristic of the Indiana dunes (Swink and Wilhelm 1979). Seaside spurge is listed as endangered on A Preliminary List of Endangered, Threatened, and Rare Vascular Plant Species in Indiana (Bacone 1978).

Table 1-17

Plants Observed in Immature Oak (Interdunal) Community, Bailly Study Area, July 1980

<u>Scientific Name</u>	<u>Common Name</u>
<u>Amelanchier arborea</u>	Serviceberry
<u>Andropogon scoparius</u>	Little bluestem
<u>Asclepias tuberosa</u>	Butterfly-weed
<u>Campanula rotundifolia</u>	Harebell
<u>Carex pennsylvanica</u>	Woodland sedge
<u>Commandra umbellata</u>	Bastard toad-flax
<u>Erigeron strigosus</u>	Daisy flea-bane
<u>Euphorbia corollata</u>	Flowering spurge
<u>Euphorbia polygonifolia</u>	Spurge
<u>Fragaria virginiana</u>	Strawberry
<u>Hammamelis virginiana</u>	Witch-hazel
<u>Helianthus divaricatus</u>	Woodland sunflower
<u>Krigia biflora</u>	Dwarf dandelion
<u>Lithospermum carolinense</u>	Puccoon
<u>Maianthemum canadense</u>	Wild lily-of-the-valley
<u>Opuntia compressa</u>	Prickly pear
<u>Panicum sp.</u>	Panic grass
<u>Parthenocissus quinquefolia</u>	Virginia creeper
<u>Pinus banksiana</u>	Jack pine
<u>Poa sp.</u>	Bluegrass
<u>Populus tremuloides</u>	Trembling aspen
<u>Prunus serotina</u>	Black cherry
<u>Prunus virginiana</u>	Choke cherry
<u>Pteridium aquilinum</u>	Bracken fern
<u>Quercus alba</u>	White oak
<u>Quercus velutina</u>	Black oak
<u>Rhus aromatica</u>	Fragrant sumac
<u>Rhus glabra</u>	Smooth sumac
<u>Rhus radicans</u>	Poison Ivy
<u>Rosa blanda</u>	Pale rose
<u>Rubus allegheniensis</u>	Blackberry
<u>Rudbeckia hirta</u>	Black-eyed susan
<u>Sassafras albidum</u>	Sassafras
<u>Smilacina stellata</u>	Starry false Solomon's seal
<u>Smilax rotundifolia</u>	Greenbrier
<u>Smilax tamnoides</u>	Bristly catbrier
<u>Solidago graminifolia</u>	Grass-leaved goldenrod
<u>Tephrosia virginiana</u>	Goat's rue
<u>Tradescantia virginiana</u>	Spiderwort
<u>Vaccinium pennsylvanicum</u>	Low-bush blueberry
<u>Vitis riparia</u>	Riverbank grape

1.2.2.3 Wetland Meadow Community. Communities of this type exist sporadically throughout the marsh where cattails are not established. A total of 27 species was observed in this location, including six newly recorded species



(Table 1-18). Cattail appears to be increasing in this community at the expense of many of the herb species recorded this year and in the past. As mentioned previously (subsection 1.2.1.8), comparison of CIR photographs also indicate an increase in cattail for a number of locations within the Bailly study area including this sampling location.

Table 1-18

Plants Observed in Wetland Meadow Community, Bailly Study Area, July 1980

<u>Scientific Name</u>	<u>Common Name</u>
<u>Alisma plantago-aquatica</u>	Water plantain
<u>Asclepias incarnata</u>	Swamp milkweed
<u>Boehmeria cylindrica</u>	False nettle
<u>Carex stricta</u>	Sedge
<u>Carex sp.</u>	Sedge
<u>Cephalanthus occidentalis</u>	Buttonbush
<u>Cornus stolonifera</u>	Red-osier dogwood
<u>Cuscuta groenlandica</u>	Dodder
<u>Decodon verticillatus</u>	Swamp loosestrife
<u>Eleocharis sp.</u>	Spikerush
<u>Eupatorium perfoliatum</u>	Boneset
<u>Impatiens biflora</u>	Jewelweed
<u>Leersia oryzoides</u>	Cutgrass
<u>Pilea pumila</u>	Clearweed
<u>Polygonum sagittatum</u>	Tearthumb
<u>Rhus vernix</u>	Poison sumac
<u>Rumex orbiculatus</u>	Water dock
<u>Salix nigra</u>	Black willow
<u>Salix sp.</u>	Willow
<u>Sambucus canadensis</u>	Elderberry
<u>Scirpus (acutus)</u>	Bullrush
<u>Thelypteris palustris</u>	Marsh fern
<u>Typha angustifolia</u>	Narrow-leaved cattail
<u>Typha latifolia</u>	Cattail
<u>Utricularia purpurea</u>	Bladderwort
<u>Verbena hastata</u>	Blue vervain
<u>Veronica scutellata</u>	Marsh speedwell

Parentheses indicate tentative identification.

1.2.2.4 Foliar Effects. In summer 1980, observed foliar symptoms indicating physiological stress were most obvious among vegetation occupying the interdunal area north of the NIPSCO fly-ash settling ponds. Color infrared photography taken in August 1980 also revealed stress in this area and among trees growing in the wooded swamp (Cowles Bog, Wooded-Wet). Although a variety of biotic and abiotic stress-causing agents were identified, water (excess or deficiency) appeared to be the most important stress factor. A more detailed account of vegetation stress recorded in the vicinity of Bailly Nuclear-1 site appears in a separate report (Texas Instruments 1980).



Vegetation stress present in the inter-tunal area north of the NIPSCo fly-ash settling ponds was caused primarily by insufficient soil moisture, although foliar symptoms indicating mineral imbalances and air pollution damage also were evident. The general drying of this area in 1980 is largely attributable to decreased seepage from the NIPSCo fly-ash ponds (Texas Instruments 1980). Cottonwood (Populus deltoides) was the most highly stress species at this location, with approximately 20 trees defoliated and apparently dead. Other woody species exhibiting stress symptoms included black oak, black gum (Nyssa sylvatica), trembling aspen (Populus tremuloides) and red-oshier dogwood. As previously mentioned (subsection 1.2.1.8), aquatic vegetation located in Pond B exhibited extensive stress and mortality.

Although aerial color infrared photographs indicated widespread stress in the wooded swamp, the stress generally was not severe enough to show externally. Symptoms of physiological stress due to excessive moisture were exhibited by scattered individuals of several lowland hardwood species, including red maple, the predominant swamp tree species. Cottony maple scale (Pulvinaria innumabilis) also contributed to red maple stress at this location, and several other insects caused minor damage to vegetation throughout the study area (Texas Instruments 1980).

1.2.2.5 Soil Conductivity. As recorded for most previous years, mean soil conductivity values for May, July, and October 1980 (Table 1-19) were well below values (2000 to 4000 micromhos per centimeter) reported to have detrimental effects to salt-sensitive plant species (Richards 1954). The highest mean values recorded in 1980 were 1127 micromhos per centimeter from the Cowles Bog (Open) (5) sampling location and 1098 from the Maple Forest (6) sampling location. These two locations also showed the greatest month-to-month variation in values. In general, year-to-year (1980 versus 1979) variation was greater than seasonal variation for most locations. These results are consistent with data collected since 1974. They reflect expected relationships of soil conductivities to soil types (Figure 1-6) and topographical orientation (Texas Instruments 1978b, 1979).



Table 1-19

Mean Soil Conductivities ($\mu\text{mhos/cm}$), Bailly Study Area,
May, July, and October 1974-1980

Sampling Month	Sampling Location	1974	1975	1976	1977	1978	1979	1980	1974-1980
May	(1) Beachgrass	70	50	50	219	228	207	283	218
	(2) Foredune	90	50	50	250	755	255	251	215
	(3) Immature oak forest	151	56	63	97	242	417	392	181
	(4A) Cowles Bog, wooded-dry	94	97	111	300	301	326	208	192
	(4B) Cowles Bog, wooded-wet	894	990	1623	1211	390	626	315	737
	(5) Cowles Bog, open	589	1237	1500	1000	418	-	1127	979
	(6) Maple forest	227	165	311	625	631	535	474	391
	(8) Transmission corridor	152	119	135	258	387	464	451	287
	(9) Sedge meadow	98	81	71	-	251	-	355	171
	(10) Immature oak forest, interdunal	278	108	98	165	377	411	280	245
July	(1) Beachgrass	73	50	50	73	149	341	169	130
	(2) Foredune	79	50	52	65	196	643	333	204
	(3) Immature oak forest	131	56	89	76	127	303	260	150
	(4A) Cowles Bog, wooded-dry	106	97	100	129	210	667	210	217
	(4B) Cowles Bog, wooded-wet	2221	990	1043	314	267	1010	573	1046
	(5) Cowles Bog, open	2082	1237	1642	224	369	-	330	981
	(6) Maple forest	188	165	243	379	339	1332	364	430
	(8) Transmission corridor	122	119	130	68	189	857	181	238
	(9) Sedge meadow	950	81	55	288	152	-	100	271
	(10) Immature oak, interdunal	60	108	62	128	165	469	115	158
October	(1) Beachgrass	65	58	59	84	125	312	203	129
	(2) Foredune	61	58	59	96	150	421	326	166
	(3) Immature oak forest	91	49	91	124	160	608	446	224
	(4A) Cowles Bog, wooded-dry	168	71	149	159	79	281	456	286
	(4B) Cowles Bog, wooded-wet	1400	961	1372	136	483	1321	518	885
	(5) Cowles Bog, open	1046	1378	1169	223	695	2095	528	1019
	(6) Maple forest	210	358	171	251	410	1011	1098	824
	(8) Transmission corridor	124	125	111	121	237	537	459	245
	(9) Sedge meadow	1812	53	52	96	71	264	291	468
	(10) Immature oak, interdunal	96	46	51	110	336	226	392	180

COMMUNITIES (SAMPLING LOCATIONS) RANKED BY
SOIL STRUCTURE/COMPOSITION

BEACHGRASS (1)
FOREDUNE (2)
IMMATURE OAK FOREST (3)
IMMATURE OAK FOREST (INTERDUNAL) (10)
COWLES BOG (WOODED-DRY) (4a)
TRANSMISSION CORRIDOR (8)
SEGE MEADOW (9)
MAPLE FOREST (6)
COWLES BOG (WOODED-WET) (4b)
COWLES BOG (OPEN) (5)

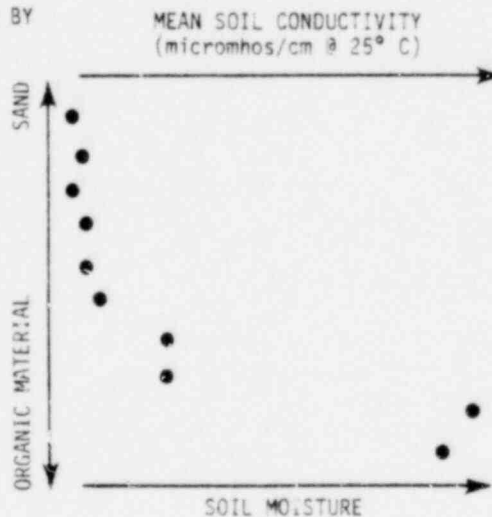


Figure 1-6. Relationship of Vegetation Communities, Mean Soil Conductivity, Soil Structure/Composition, and Soil Moisture, Bailly Study Area



1.3 MAMMALS

1.3.1 INTRODUCTION. Eighteen mammal species were observed in the Bailly study area during 1980. One, the deer mouse (Peromyscus maniculatus), was observed for the first time during the monitoring program. An annotated checklist of common and scientific names of these species is presented in Appendix A. Larger mammal sightings and signs are summarized in Table 1-20. Small mammal live-trapping data along transects in five sampling locations are presented in Table 1-21. Figure 1-7 shows the number of mammal species recorded in each sampling location and sampling period during 1980. Table 1-22 presents the results of cottontail surveys from 1974 through 1980. Tables 1-23 and 1-24 describe population fluctuations of selected mammal species from 1974 through 1980.

Table 1-20
Sightings of Mammals or Mammal Signs, Bailly Study Area, 1980

Species	Beachgrass			Foredune			Immature Oak Forest			Cowles Bog (Wooded)			Cowles Bog (Open)			Maple Forest			Emergent Macrophyte			Transmission Corridor		
	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct	May	Jul	Oct
Opossum	*			*	*		*	*		*	*	*	*	*		1	*		*	*		*	*	
Eastern mole										*	*	*		*				*				*	*	
Raccoon	*	*	*	*	*	*	*	*	*	*	1	*	*	1	*	*	*	*	*	*	*	*	*	*
Red fox													*											
13-lined ground squirrel	1																							
Eastern chipmunk								5		14	10	7				2	4							
Woodchuck								*		1	*	1						*						*
Red squirrel							1	1		3	1	4				2	2	1						
Fox squirrel							1	1		2	3	6						1						
Muskrat													*	*					3	1				
Meadow jumping mouse																								*
Eastern cottontail	*	*	*	*	*	*				*	*						1					*	*	*
White-tail deer	*	*	*	*	*	*	2	*		2	2	*	*	*	1	*	*		*	*	2	*	*	*
Total species	5	3	3	4	4	3	4	5	4	9	9	9	4	4	3	5	7	4	4	3	3	4	5	4

* Denotes sightings of signs only.

1.3.2 RESULTS

1.3.2.1 Beachgrass Community. Eight species of mammals were observed in the Beachgrass Community in 1980 (Figure 1-7). Five of the species were detected by signs or sightings (Table 1-20) and three species were caught in Sherman live-traps (Table 1-21). The white-tailed deer (Odocoileus virginianus), eastern cottontail rabbit (Sylvilagus floridanus), raccoon (Procyon lotor),

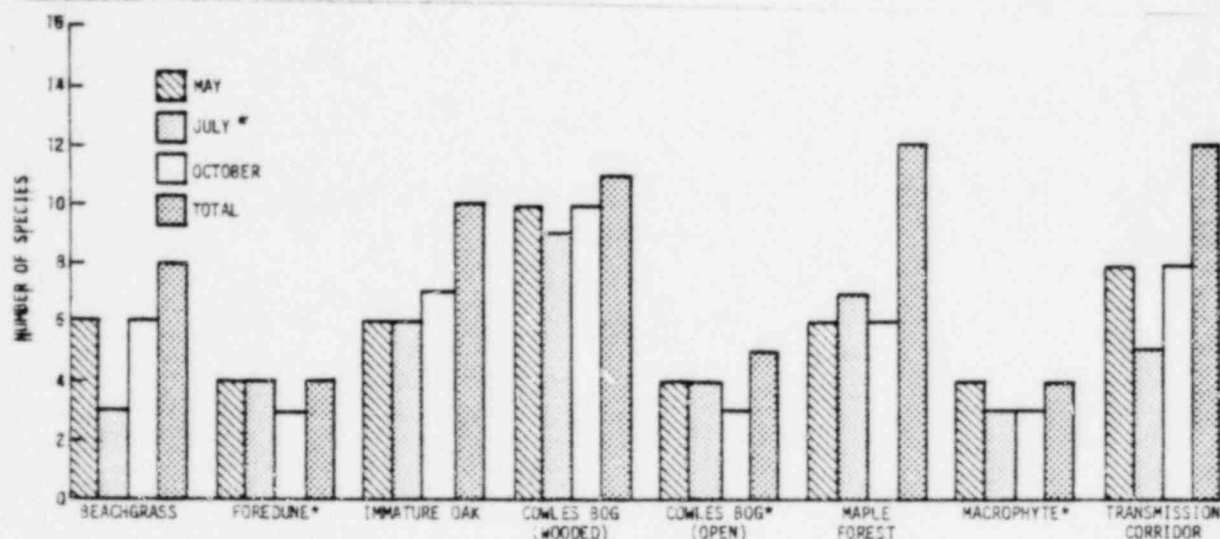


and opossum (*Didelphis virginianus*) commonly use the Beachgrass Community. In May, a 13-lined ground squirrel (*Spermophilus tridecemlineatus*) was seen in the Beachgrass Community; it was previously unrecorded in this community.

Table 1-21

Abundances (No./100 Trap-nights) of Small Mammals Collected by Trapping, Bailly Study Area, May and October 1980

Species	Beachgrass		Oak Forest		Cowles Bog (Wooded)		Maple Forest		Transmission Corridor	
	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct
Short-tailed shrew	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	4.0
Masked shrew	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern chipmunk	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0
13-lined ground squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Deer mouse	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0
White-footed mouse	0.0	1.0	2.0	0.7	1.0	1.3	1.3	3.3	0.7	0.3
Meadow vole	13.7	10.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	15.3
Meadow jumping mouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.7



* NO SMALL MAMMAL TRAPPING.

Figure 1-7. Numbers of Mammal Species Encountered, Bailly Study Area, 1980



The three species trapped in the Beachgrass Community (Table 1-21) were the meadow vole (Microtus pennsylvanicus), white-footed mouse (Peromyscus leucopus), and masked shrew (Sorex cinereus). The masked shrew was first observed in the Beachgrass Community in 1979 and appears to be maintaining its population there. Both the white-footed mouse and meadow vole have maintained populations in this community since the study began.

Meadow vole populations are known to be eruptive with a peak in numbers at approximately 3 to 5 year intervals (Krebs and Myers 1974). The meadow vole population in the Beachgrass Community appeared to be at the peak of the cycle in May of 1980 (13.7 voles per 100 trap-nights). Population numbers were high in October 1979 (6.7 voles per 100 trap-nights) and increased over the winter of 1979-1980 indicating high over-winter survival and winter breeding that is characteristic of meadow vole populations during the increase and peak period. The catch in October was slightly less than in May, indicating that population is decreasing. Peak populations of meadow voles are seldom maintained for more than a year (Krebs and Myers 1974).

1.3.2.2 Foredune Community. Partly because small mammal trapping is not conducted in this community, the total number of species observed (4) is lower than in the two adjoining sampling locales (Figure 1-7). Small mammals utilizing the community likely are similar to those in adjacent communities. Because the Fore dune Community has a greater variety of browse, the white-tailed deer may use it more than the Beachgrass Community.

1.3.2.3 Immature Oak Forest Community. Ten species of mammals were observed in this community (Figure 1-7). Four of these species were collected in Sherman live-traps (Table 1-21); seven were detected by sightings or signs, with the eastern chipmunk (Tamias striatus) observed in both efforts.

In May, the short-tailed shrew (Blarina brevicauda) and white-footed mouse were caught in Sherman live-traps. The short-tailed shrew has been caught in this community only sporadically in the past, but the white-footed mouse is a consistent observation.



In October, the eastern chipmunk, white-footed mouse, and deer mouse (Peromyscus maniculatus) were caught in the Sherman live-traps. The deer mouse has not been recorded in the Beachgrass and Immature Oak Communities since the study began. Trapping efforts in 1970 (NIPSCO 1971) and in 1974 (R.E. Mumford personal communication) failed to record the species. However, in 1922 the species was common in beachgrass in the general vicinity of the study area (Lyon 1923).

Small animals often appear in an area for a short while, but fail to establish a viable population. The house mouse (Mus musculus) for instance, appeared in the Beachgrass Community in 1976 and 1977 after a fire, but failed to maintain a population there. Future trappings will determine if the deer mouse is established in the area.

The six other species recorded during the larger mammal surveys in the Immature Oak Forest Community (Table 1-20) commonly have been recorded in the past. Woodchuck (Marmota monax) dens were noted in several locations, especially near the sedge meadows that occur sporadically in this forest. Although woodchucks commonly appear in wooded habitats on the site, they feed almost exclusively on grasses and other herbaceous vegetation (Martin et al. 1951).

1.3.2.4 Cowles Bog (Wooded) Community. In 1980, 11 species of mammals were detected in this community. Two were live-trapped (Table 1-21); the remainder were detected from signs and sightings.

All of the mammals observed in this community have been recorded often in the past except the red fox (Vulpes fulva), which has not been observed on the study area since 1976. The fox scat found on Cowles Bog trail was assumed to be that of red fox, because it is the more common of the two fox species in northern Indiana (Mumford 1969).

1.3.2.5 Cowles Bog (Open) Community. Of the six species of mammals observed using this community, all but the muskrat (Ondatra zibethica) were seen on the dike that runs along the southern border of the bog. White-tailed deer, racoon, and eastern cottontail rabbit signs were common in this area. Several tunnels characteristic of the eastern mole (Scalopus aquaticus) were noted. Opossum signs were noted in two of the three sampling periods.



Fresh signs of muskrat were found in May and July, but not in October. This valuable furbearer was common during the early years of the study but has decreased in numbers until only occasional sightings now occur. The species has not been seen in the open bog since 1977, but was sighted in the Emergent Macrophyte Community in May and July 1980.

1.3.2.6 Maple Forest Community. Eleven species of mammals were observed in the Maple Forest Community in 1980 (Figure 1-7). Virtually all the inhabitants of the wooded portion of the study area were observed during at least one of the sampling periods. The raccoon and red squirrel (Tamiasciurus hudsonicus) were observed during all sampling periods.

The deer mouse, trapped in the Immature Oak Forest Community, also was trapped in the Maple Forest Community (Table 1-21). This species is reported to prefer open, dry areas such as the Immature Oak Forest edge where the other individual was caught. The single deer mouse caught in the Maple Forest may have been a migrant or temporary resident rather than part of an established population.

1.3.2.7 Emergent Macrophyte Community. The number of mammal species observed in this community (4) (Figure 1-7, Table 1-20) was equal to that seen in the Fore-dune Community. The opossum, raccoon, and white-tailed deer forage for food here, while the muskrat, which was seen in May and July but not in October, inhabits the community. Absence of fall observations is not unusual and more muskrats have been recorded in the spring and summer during the monitoring period.

1.3.2.8 Transmission Corridor. Eleven species of mammals were observed in the Transmission Corridor (Figure 1-7). Only the woodchuck is newly recorded in this cover type; its signs were observed along the periphery of the corridor in October. Five of the species observed in the Transmission Corridor were collected in the Sherman live-traps (Table 1-21).



The meadow vole population in the Transmission Corridor reached high densities in 1980, similar to the Beachgrass population. However, meadow vole numbers were lower in the spring and peaked in the fall on the Transmission Corridor, whereas spring population numbers were higher in the Beachgrass.

1.3.2.9 Road Route. Numbers of eastern cottontail rabbits seen on the road route were highest since 1976 (Table 1-22). This increase in numbers indicates good reproduction and recruitment. Significant variations in eastern cottontail rabbit populations are common (Preno and Labinski 1971).

Table 1-22
Cottontail Rabbit Sightings along 22-Mile Road Route
near Bailly Study Area, 1974-1980

Stop	Month of Observation													
	1974		1975		1976		1977		1978		1979		1980	
	Jun	Aug	Apr	Jul	May	Jul	May	Jul	May	Jul	May	Jul	May	Jul
1														
2						2								
3											3		1	
4					4	2	3	3		1	4			5
5	1			1	2	6		3	3		2	2		1
6	4	1		2	1	2	7	4	2	2				
7	5	2	1	3	3	7		1	1		1		2	
8	4	1			1		3				1		1	2
9	2			1		1								
10						5			1				2	1
11		3	1	1		2							1	
12	2	1	2	1	1		3				3		1	
13			2					1						1
14						1								1
15									1					
16	3	1		2									1	
17	1	1							1		1			2
18	1	2		3	1	2	1		2		1			1
19	1	1			1	4	1							1
20				2	1									1
21				3										5
22													2	1
Total	24	13	6	19	15	34	18	12	7	7	5	16	11	22
Observations/Mile	1.1	0.6	0.3	0.9	0.7	1.5	0.8	0.6	0.4	0.4	0.2	0.7	0.5	1.0



1.3.2.10. Yearly Comparison. Since the beginning of the study in 1974, several changes in the mammalian fauna have been detected. The gray squirrel (*Sciurus carolinensis*) may have disappeared from the study area, consistent with its status in the vicinity (Mumford 1969). The deer mouse may be reestablishing in the area.

Fluctuations in population numbers are caused by many interacting factors, most of which cannot be isolated. Generally, fluctuations in population density may be either regular or random (Krebs 1972). Cycles (e.g., a 4-year cycle in the abundance of meadow voles) have been the source of much controversy and study in an attempt to determine causal mechanisms (Krebs and Myers 1974).

Changes in mammalian fauna are described using two analyses. For the larger mammal species listed in Table 1-23, the total number of individuals of a species that were sighted during the year (all 3 sample periods combined) was calculated. Because these species were noted by observation only, the basic assumption of this analysis was that an approximately equal amount of effort was expended each year in sighting individuals. The assumption holds except during 1974 when transects and plots were initially established resulting in more time spent in the field and more sightings. Years 1975 through 1980 are years of approximately equal effort.

Table 1-23

Population Fluctuations of Four Species of Mammals As Determined from
Total Sightings, Bailly Study Area, 1974-1980

<u>Species</u>	<u>1974*</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Red squirrel	28	9	13	18	12	10	15
Gray squirrel	18	3	1	1	0	0	0
Fox squirrel	29	16	16	25	17	13	14
Muskrat	23	21	21	12	1	2	4

* Because of the greater field effort during 1974, the data for that year are not as comparable as the other years.

The second analysis was conducted on three small mammals that have been trapped in two or more communities on the study area (Table 1-24). For these species,



population fluctuations in a variety of communities were described. The two quantitative analyses are followed by a qualitative description of the fluctuations of several species of mammals.

Table 1-24
Catch per 100 Trap-Nights of Three Small Mammals in
Different Communities, Bailly Study Area, 1974-1980

Species	Community*	1974		1975		1976		1977		1978		1979		1980		Community Average
		October	May	October	May	October	May	October	May	October	May	October	May	October		
Short-tailed Shrew	1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	1.0	0.0	0.0	0.2
	3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.1
	4	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.7	0.0	1.7	0.0	0.0	0.3
	6	1.0	0.0	0.0	0.3	0.0	0.0	1.0	0.0	3.0	0.0	0.3	0.0	0.0	0.0	0.2
	8	4.0	0.3	2.7	3.7	4.1	0.7	4.3	0.3	7.3	0.3	1.7	0.0	4.0	2.6	2.6
Study area average		1.8	0.1	0.5	0.8	0.9	0.1	1.2	0.1	2.3	0.1	0.9	0.1	0.8		
White-footed Mouse	1	3.0	2.7	5.0	0.7	3.0	0.0	9.0	0.0	0.7	0.0	1.3	0.0	1.0	2.0	2.0
	3	4.3	2.7	2.3	2.3	6.0	5.0	5.3	0.0	1.3	0.0	5.7	2.0	0.2	2.9	2.9
	4	6.7	1.2	2.7	2.3	3.7	5.0	11.7	0.3	1.3	1.0	4.7	1.0	1.3	3.3	3.3
	6	6.7	1.7	5.0	2.0	6.3	5.3	10.0	2.3	6.7	1.3	5.3	1.3	3.3	4.4	4.4
	8	0.7	0.3	1.7	0.0	0.7	0.0	9.0	0.0	1.7	0.0	3.0	0.2	0.3	1.4	1.4
Study area average		4.3	1.7	3.3	1.5	3.9	3.1	9.0	0.5	2.3	0.5	4.0	0.9	1.2		
Meadow Vole	1	6.3	0.0	2.7	5.0	0.0	2.7	4.3	0.0	1.7	0.0	6.7	13.7	10.0	4.4	4.4
	8	14.3	0.3	1.7	2.0	10.0	2.0	8.0	0.7	3.0	0.0	6.3	1.3	15.3	5.1	5.1
Study area average		10.3	0.2	2.2	3.5	7.4	2.4	6.2	0.4	2.4	0.0	6.5	7.5	12.7		

* 1 = beachgrass; 3 = immature oak forest; 4 = Cowles Bog, wooded; 6 = maple forest; 8 = transmission corridor.

Among the larger mammals, the red and fox squirrel populations appear to be relatively stable (Table 1-23). Somewhat more sightings occurred in 1977, perhaps because of increased activity related to a year of good fruit and nut production, which is the major food source for both species. In contrast, sightings of gray squirrel decreased steadily from 1974 to 1977, when it was last seen. Considered rare to absent in northern Indiana for several decades (Lyons 1923, Mumford 1969), the species was reintroduced in the area based on the assumption that it once (before settlement) was common. Apparently, however, the species is unable to maintain a viable population in the study area.

Sightings of the muskrat on the study area exhibited a distinct decline, reaching a low in 1978 and apparently now increasing. Muskrat populations fluctuate widely and have been shown to have a regular cycle of about 10 years (Bulmer 1974). If this periodicity is characteristic of the muskrat population of the Indiana dunes, then the peak apparently occurred in 1974, or before.

With the exception of the gray squirrel, these species appeared to be manifesting characteristic fluctuations in numbers (either random or periodic), although poaching was previously mentioned as a possibility in the decline of the muskrat. The gray squirrel apparently has become locally extinct.



The small mammal/habitat quantitative analysis (Table 1-24) showed that the short-tailed shrew reaches highest density and is most consistent in the Transmission Corridor (Table 1-24). In 1974 and 1978, it was found in all the areas sampled, but its presence in areas other than the Transmission Corridor has been erratic. The population on the study area was highest in 1978. Lower catches in May than in October were recorded in all years, reflecting the results of summer breeding and high winter mortality.

The white-footed mouse prefers wooded communities and highest densities occur in the maple woods (Table 1-24). As in the short-tailed shrew population, densities of white-footed mice are greater in the fall than in the spring. Greatest densities on the study area were reached in 1977.

The meadow vole has been captured only in the two grassy habitats (Table 1-24). This species exhibits a 3- to 5-year cycle in numbers (Krebs and Meyer 1974). The Transmission Corridor population has demonstrated this cycle better than the Beachgrass population. Because population size before 1974 is unknown, October 1976 can be assumed to have been the first clear peak in numbers of meadow voles in the Transmission Corridor. Density was slightly lower the following October, followed by 2 years of relative scarcity. In October 1980, the population was large again, 4 years after the initial peak.

In the Beachgrass meadow vole population, a clear peak was not noticeable in October 1976, although a fire in July 1976 may have altered the cycle of abundance there. As in the Transmission Corridor, October 1977 density was similar to that of October 1976. The Beachgrass population apparently bred over the winter of 1979-1980, which is characteristic of the increased phase of the population cycle, and reached the highest population density recorded in the location in May 1980. Although the Transmission Corridor population did not indicate over-winter breeding, it too reached highest population densities recorded in 1980 (October).

These three small mammal populations appear to be fluctuating in numbers (either randomly or with a distinct periodicity) around an average density that is characteristic for the community. Disappearances from some communities (the short-tailed shrew) appear to be followed by repopulation. High densities (the meadow vole) are followed by years of low densities.



The white-tailed deer often is sighted on the study area. Sightings apparently have increased in recent years. Many were sighted in 1974, consistent with the greater effort in that year. However, few sightings occurred in 1975 and none in 1976. Observations of tracks in 1976 indicated that the species was still present in the study area. In 1977 and 1978, a white-tailed deer was sighted in each year. Sightings increased to five in 1979 and nine in 1980. Although the reason for the scarcity of the white-tailed deer sightings from 1976 to 1978 is obscure, recent sightings indicate the species may be increasing in numbers.

1.3.2.11 Disease and Parasites. No occurrences of disease were encountered during the 1980 sampling. A previous report (Texas Instruments 1975) described sources and vectors of disease likely to occur in wildlife populations in the Bailly study area.

1.4 AVIFAUNA (BIRDS)

1.4.1 INTRODUCTION. Transect counts of birds were taken in sampling locations 1, 3 through 6, 8, and along Cowles Bog Trail (Figure 1-1) during May and October (Tables 1-25 through 1-28). Roadside surveys (Figure 1-2) for Ringed-necked Pheasant (Phasianus colchicus) and Mourning Dove (Zenaida macroura) were performed during May and July. Table 1-29 lists all bird species recorded during road routes conducted in 1980. Birds inhabiting aquatic areas (Figure 1-3) were censused during May and October (Table 1-30). A checklist of all species seen in the Bailly study area since 1974 and an annotated checklist of 1980 sightings are presented in Appendix B.

1.4.2 RESULTS

1.4.2.1 Beachgrass Community. Only three bird species were reported in the Beachgrass Community during 1980 (Table 1-25), a reflection of the limited usage of this location by birds. These same species have been observed during past years in this community.

1.4.2.2 Immature Oak Forest Community. During 1980, seven species of birds were observed along transects in the Immature Oak Forest Community (Table 1-25).



The Blue Jay (Cyanocitta cristata) was observed most frequently. The Pine Warbler (Dendroica pinus) previously was unrecorded on the study area.

Table 1-25

Bird Abundances (No./100 Acres) in Beachgrass and Immature Oak Forest Communities, Baily Study Area, 1980

Species	Transect	Beachgrass				Immature Oak Forest			
		May		October		May		October	
		A	B	A	B	A	B	A	B
Blue Jay						58	58	116	232
American Crow							58		
White-breasted Nuthatch						58			
Red-breasted Nuthatch									58
Ruby-crowned Kinglet								116	
Pine Warbler							116	116	
Palm Warbler						58			232
American Goldfinch				58					
Savannah Sparrow			58		58				
Song Sparrow				58					
Total Abundance		0	58	116	58	174	232	174	522
No. Species			3				7		

1.4.2.3 Cowles Bog (Wooded) Community. Only three of the 17 species seen in this community during 1980 were observed in both May and October surveys (Table 1-26). These species were the Blue Jay, American Robin (Turdus migratorius), and White-throated Sparrow (Zonotrichia albicollis). The White-throated Sparrow was numerous in October.

Several species with limited geographic distributions were observed in the wooded bog. The Brown Creeper (Certhia familiaris), for instance, reportedly common in Indiana only in northeastern woodlands (Webster 1965), has occurred commonly in the Baily study area each year. The Veery (Catharus fuscescens), listed as threatened in Illinois (Illinois Department of Conservation 1979), nests annually in the wooded bog.

Forty species of birds were observed in the Cowles Bog Trail transects (Table 1-27). As in the past, the most species of birds were seen on Transect 4. The White-throated Sparrow and Blue Jay commonly were sighted. Brewer's Blackbird (Euphagus cyanocephalus) was recorded for the first time in the study area on Transect 1 in October 1980.



Table 1-26

Bird Abundances (No./100 Acres) in Cowles Bog Wooded and Open Communities, Bailly Study Area, 1980

Species	Cowles Bog, Wooded				Cowles Bog, Open			
	May		October		May		October	
	A*	B*	A	B	A	B	A	B
Sora						58		
Common Flicker						58		
Red-headed Woodpecker	58					58	58	
Tree Swallow					116			
Blue Jay	58	58	116	116				
Common Crow		116						
Black-capped Chickadee		58			58			
White-breasted Nuthatch				116				
Brown Creeper				58				
Long-billed Marsh Wren						58		
Short-billed Marsh Wren						116		
American Robin	116		116					
Wood Thrush			58					
Hermit Thrush			174					
Golden-crowned Kinglet			58					116
Ruby-crowned Kinglet			116	58				
European Starling								58
Yellow-throated Vireo						58		
Red-eyed Vireo		116						
Yellow-rumped Warbler								116
Palm Warbler	116				116			
Yellow Warbler					116			
Kentucky Warbler				58				
Common Yellowthroat						58		
Red-winged Blackbird					290	116	232	116
Common Grackle		58						
Brown-headed Cowbird								58
American Goldfinch					116		116	
Northern Junco							232	
White-throated Sparrow	116		464		116			
Fox Sparrow			116					116
Swamp Sparrow						232	58	
Song Sparrow					58			116
White-crowned Sparrow					58			
Total Abundance	474	406	1218	406	1044	812	696	696
Total No. Species			17				23	

* Transects

1.4.2.4 Cowles Bog (Open) Community. Twenty-three species of birds were observed using this community in 1980 (Table 1-26), more than in any other year of the study. Fourteen of these species seen in this community (61%) were observed in May. The Red-winged Blackbird (Agelaius phoeniceus) was recorded in



large numbers during both May and October transect sampling. The Short-billed Marsh Wren (*Cistothorus plantensis*) is a "Blue Listed" species (Arbib 1979) that has nested in the open bog each year.

Table 1-27

Bird Abundances (No./100 Acres) along Cowles Bog Trail, Bailly Study Area, 1980

Species	Transect															
	1		2		3		4		5		6		7		8	
	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct
Mallard			58													
Common Flicker					58				58						116	
Red-headed Woodpecker		58														58
Yellow-bellied Sapsucker								48								
Downy Woodpecker		58											58			
Blue Jay	116			232	116	232	58	116	58	58	232	232		116	58	58
Black-capped Chickadee												174				
Tufted Titmouse				116												
White-breasted Nuthatch				116		58		116					58			116
Brown Creeper				58								58				
Gray Catbird			58				116		58							
American Robin			58			58				116						58
Wood Thrush							58				58				58	
Hermit Thrush										58						116
Gray-cheeked Thrush														174		
Veery								58						58		
Golden-crowned Kinglet								58								
Ruby-crowned Kinglet				174		58			116			174				
Yellow-throated Vireo							58									
Red-eyed Vireo															116	
Warbling Vireo									58					58		
Black-and-white Warbler				58								58				
Tennessee Warbler								116				58				
Nashville Warbler								116								
Yellow Warbler			116													
Cerulean Warbler								58								
Chestnut-sided Warbler																116
Ovenbird									58							
Kentucky Warbler			116		116											
Common Yellowthroat						58										
American Redstart														116		
Red-winged Blackbird	232															58
Brewer's Blackbird		58														
Common Grackle				116										116		
Northern Cardinal					58		58									
Rufous-sided Towhee														116		
White-throated Sparrow	58	580		232		174		174		116		116		290		232
Fox Sparrow														116		
Swamp Sparrow							116			116						
Song Sparrow	116	116					58									
Total Abundance	406	986	406	1102	348	638	580	812	348	522	290	870	406	870	406	754
No. Species	3	6	5	8	4	6	8	8	6	6	2	7	5	7	5	7
Total No. of Species	7		13		9		15		10		8		12		11	

1.4.2.5 Maple Forest Community. Thirteen species of birds were observed in this community during 1980 (Table 1-28). The Blue Jay and American Robin were the most frequently sighted species. The species observed here were a mixture of woodland (e.g., Hermit Thrush) and ecotonal inhabitants (e.g., White-throated Sparrow).



Table 1-28

Bird Abundances (No./100 Acres) in Maple Forest and
Transmission Corridor Communities, Bailly Study Area, 1980

Species	Maple Forest				Transmission Corridor			
	May		October		May		October	
	A*	B*	A	B	A	B	A	B
Red-headed Woodpecker			58					
Downy Woodpecker			58	58				
Eastern Phoebe				174				
Blue Jay	58	116	116	116				
American Crow		58						
White-breasted Nuthatch	58							
American Robin	48	174	116			58		
Hermit Thrush				116				
Swainson's Thrush				116				
Gray-cheeked Thrush				58				
Red-eyed Vireo	116							
Warbling Vireo	58	116						
Red-winged Blackbird						116		
Common Grackle				116		58		
American Goldfinch					116		116	
Northern Junco								58
American Tree Sparrow							58	116
White-throated Sparrow								
Song Sparrow					58			
Total Abundance	348	464	348	754	174	232	174	232
Total No. Species			13				7	

*Transects

1.4.2.6 Transmission Corridor Community. Seven species of birds were sighted in this locale during transect surveys (Table 1-28). The American Goldfinch (Carduelis tristis) was abundant in May and October. All species observed were common open-field inhabitants.

1.4.2.7 Road-Route Census. The May and July road-route surveys yielded no sightings of Ring-necked Pheasants, but several of the Mourning Dove (Table 1-29). In the farm belt regions, the absence of suitable cover causes many pheasants to die during the severe winters; however, protective cover is ample in the Bailly study area. Mourning Dove counts were highest since the study began and were approximately four times greater than those in 1979. Other species commonly observed around the road route included the Ring-billed Gull (Larus delawarensis), Herring Gull (Larus argentatus), Blue Jay, American Robin, European



Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Red-winged Blackbird, and Common Grackle (*Quiscalus quiscula*) (Table 1-29). Most of these species were common in the Bailly study area in 1980.

Table 1-29
Numbers and Occurrences of Birds along a 22-Mile Road Route, Bailly Study Area, 1980

Common Name	May		July	
	No. Observed	Occurrences	No. Observed	Occurrences
Green Heron	1	1	1	1
Great Blue Heron	1	1	1	1
Common Merganser	14	2	0	0
Mallard	1	1	0	0
Wood Duck	1	1	2	1
Broad-winged Hawk	0	0	1	1
American Kestrel	0	0	1	1
Killdeer	2	1	5	4
Herring Gull	37	1	10	1
Ring-billed Gull	51	1	14	1
Rock Dove	3	2	9	6
Mourning Dove	12	6	24	11
Yellow-billed Cuckoo	0	0	1	1
Chimney Swift	0	0	2	2
Common Flicker	2	2	3	3
Red-bellied Woodpecker	1	1	1	1
Red-headed Woodpecker	0	0	3	3
Hairy Woodpecker	2	2	0	0
Downy Woodpecker	3	3	1	1
Eastern Kingbird	0	0	2	2
Eastern Phoebe	1	1	0	0
Least Flycatcher	0	0	1	1
Barn Swallow	3	1	18	5
Tree Swallow	5	2	20	7
Purple Martin	0	0	1	1
Blue Jay	19	8	12	9
Common Crow	4	2	10	5
Black-capped Chickadee	1	1	3	2
Tufted Titmouse	1	1	1	1
White-breasted Nuthatch	3	2	4	2
House Wren	2	2	0	0
Gray Catbird	4	3	2	2
Brown Thrasher	2	1	4	3
American Robin	41	13	15	9
Wood Thrush	2	2	2	2
Hermit Thrush	0	0	1	1
European Starling	23	7	20	11
White-eyed Vireo	0	0	1	1
Red-eyed Vireo	2	1	3	3
Palm Warbler	4	2	0	0
Northern Parula Warbler	1	1	0	0
Yellow Warbler	1	1	0	0
Magnolia Warbler	1	1	0	0
Chestnut-sided Warbler	1	1	0	0
Ovenbird	1	1	0	0
Louisiana Waterthrush	1	1	0	0
Common Yellowthroat	0	0	2	2
House Sparrow	25	7	18	9
Eastern Meadowlark	3	2	4	2
Red-winged Blackbird	22	5	31	11
Common Grackle	46	10	33	11
Northern Cardinal	14	6	8	5
Rose-breasted Grosbeak	1	1	0	0
Indigo Bunting	0	0	8	6
American Goldfinch	4	2	8	5
Savannah Sparrow	0	0	2	2
White-throated Sparrow	7	2	0	0
Chipping Sparrow	3	3	1	1
Field Sparrow	3	2	5	4
Swamp Sparrow	4	2	2	2
Song Sparrow	~	2	1	1
American Tree Sparrow	4	3	3	2



Table 1-30

Maximum Numbers of Waterfowl and Shore Birds Observed in Aquatic Bird Surveys, Bailly Study Area, 1980

Species	Sampling Locations																			
	A		B		C		D		E		F		G		H		I		J	
	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct	May	Oct
Common Loon					2															
Pied-billed Grebe			1	1					1				9							
Great Blue Heron		1		3									3						1	
Great Egret				2	2															
Green Heron					1															
Mute Swan			1	1																
Canada Goose				23							3		7							
Mallard							5	2	1				2	14						
Gadwall				4																
Green-winged Teal				4		2	9											6		
Blue-winged Teal									6	8			4							
Wood Duck					6				2				2	56		2				
Ringed-necked Duck													4							
Common Merganser																				
American Coot				10	4	2					4		20	23						2
Least Sandpiper																				6
Herring Gull																			15	1
Ring-billed Gull																			29	89
Belted Kingfisher																			1	1
Killdeer											1									
Total No. Observations	0	1	2	48	9	10	0	14	2	10	16	0	35	109	0	2	0	6	48	92
No. of Species	0	1	2	8	4	3	0	2	1	4	4	0	5	6	0	1	0	1	5	4
Total No. of Species	1		8		6		2		4		4		8		1		1		6	



1.4.2.8 Aquatic Sampling Location. Sightings of waterfowl on the onsite aquatic areas were reduced from 32 species in 1979 to 20 species in 1980 (Table 1-30). By October 1980, ponds A and B had little water, causing some of the reduction in waterfowl species. The Black Duck (Anas rubripes), which was seen in decreasing numbers during 1977 to 1979 (25 were seen in 1977, 10 in 1978 and 5 in 1979), was not observed in 1980. Similar decline has been reported nationwide due to habitat decline (Arbib 1979).

The major reduction in the species of birds seen, however, was in the shore birds utilizing Area J (Bailly Discharge Area). In 1979, 14 species of birds were in this area, but in 1980 only six species were seen. Similar year-to-year variations have occurred in the past.

As expected from the lower overall amount of water in the ponds (especially A and B), there were fewer individuals of waterfowl species in 1980 than in 1979. The American Coot (Fulica americana) and Wood Duck (Aix sponsa) were the most frequently sighted species; they were observed in four of the ten aquatic areas. The Mute Swan (Cygnus olor), which was seen on Pond B in 1980, was previously unrecorded.

1.4.2.9 Yearly Comparisons. The richness of the avian fauna on the Bailly study area permitted an analysis of fluctuations in species composition. Fluctuations in species composition may be caused by a variety of factors. Yearly fluctuations in weather may cause spring and fall species lists to be different by alternating the rate and timing of migration (Lincoln and Peters 1979). Plant succession will cause an associated change in bird species composition (Odum 1971). Changes in vegetation and land use on the wintering ground and migration routes may also change the species observed in a study area.

Fluctuations in species composition on the Bailly study area were analyzed using data from the Cowles Bog Trail Transect Survey conducted during May and October. This data base was selected because of a long species list. May and October data were combined to increase the species list.

Analysis of yearly species lists was conducted with a modification of a technique developed by Hendrickson (1978), which involves constructing a matrix with years as rows and columns. Each cell has the number of species common to



each pair of years. The diagonal represents the number of species a year has in common with itself, or the total species count for that year. Table 1-31 is a matrix with the yearly bird species lists from the Cowles Bog Trail transects.

Table 1-31

Numbers* of Bird Species Common to Each Year of Study (1974-1980),
Cowles Bog Trail, Bailly Study Area

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
1974	49	29	30	25	20	25	23
1975		35	24	19	13	23	18
1976			42	21	13	24	22
1977				34	17	15	21
1978					36	18	20
1979						37	24
1980							38

*May and October observations combined.

Hendrickson's technique was developed to determine differences between species composition of impacted and control areas rather than change over time. To detect changes over time, the percent of the species that a given year had in common with the initial year of study (1974) was calculated (Table 1-32).

Table 1-32

Proportion* of Bird Species Common to Each Year of Study (1974-1980),
Cowles Bog Trail, Bailly Study Area

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
1974	1.00	0.83	0.71	0.74	0.56	0.68	0.61
1975		1.00	0.52	0.56	0.36	0.62	0.47
1976			1.00	0.62	0.36	0.65	0.58
1977				1.00	0.47	0.41	0.55
1978					1.00	0.49	0.53
1979						1.00	0.64
1980							1.00

*May and October observations combined.



The species list for 1975 had the highest percentage of species in common with 1974 (83%) and the species list for 1978 had the least in common (56%) (Table 1-32). The general trend of decreasing similarity of yearly species lists with that from 1974 was tested for significance using a modification of standard regression procedures developed for proportions (Snedecor and Cochran 1967). This test demonstrated a significant decreasing trend in proportion of the species of each year's list that are in common with those observed in 1974 ($Z = 2.19$, $P = 0.029$).

The gradual succession in the species composition of Cowles Bog Trail demonstrated in Table 1-32 does not mean that some species no longer exist in the area. Many of the species not seen in the Cowles Bog survey since 1974 were common in the area in 1980 (e.g., American Crow). The actual number of species did not decline consistently over the time of study and birds new to the study were seen every year (Table 1-33).

Table 1-33

Total Species Count* and Number of New Species Seen on
Cowles Bog Transect Surveys, Bailly Study Area, 1974-1980

<u>Year</u>	<u>Species Count</u>	<u>No. New Species</u>
1974	49	49
1975	35	6
1976	42	9
1977	34	10
1978	36	11
1979	37	2
1980	38	5

* May and October observations combined.

Examination of the vegetation data base for sampling locations 4A and 4B demonstrated no changes that correlate with the succession of bird species composition. During the course of the study, no changes in the vegetation community were detected except for a small increase in basal area in the dry portion of Cowles Bog (wooded), and a small decrease in the wet portion (Table 1-6). The increase in basal area resulted from normal tree growth associated with aging, while the decrease in basal area occurred when trees blew over. Neither of these changes



appeared large enough to produce the observed changes in the avian fauna. Like tree growth, the changes in the avian community may reflect the consequences of aging of the community in general.

1.5 AMPHIBIANS AND REPTILES

1.5.1 INTRODUCTION. Thirteen species of reptiles and amphibians were observed during scheduled sampling in May and July 1980, and three other species were observed incidentally (Table 1-34). Although water levels were low and morning temperatures cool in May, 12 of the species were observed at that time. Nine of these species were observed in July, along with three others. One species, the spotted turtle (*Clemmys guttata*), was newly recorded on the study area. Appendix C provides an annotated checklist of the reptile and amphibian observations.

Table 1-34
Abundances of Amphibians and Reptiles, Bailly Study Area, 1980

Species	Beachgrass		Foredune		Oak Forest		Cowles Bog, Wooded		Cowles Bog, Open		Maple Forest		Emergent Macrophyte		Transmission Corridor	
	May	Jul	May	Jul	May	Jul	May	Jul	May	Jul	May	Jul	May	Jul	May	Jul
American toad	U												A			
Cricket frog									C				C		C	
Spring peeper							A		A				A			
Gray treefrog							C	U					C			
Bullfrog									C	C						
Green frog							C	C	C	C			C	C		
Wood frog							C	U								
Eastern box turtle							U	U					C			
Spotted turtle										U						
Painted turtle													A	A		
Northern water snake													U	U		
Eastern garter snake															U	U
Blue racer					U		U	U			U					
No. Abundance	1	0	0	0	1	0	6	5	4	3	0	2	8	3	2	1
No. Species	1		0		1		6		5		2		8		2	

* Recorded from greenbelt.

A = numerous individuals seen or heard, C = several, and U = only one or two observations.

Additional Observations:

- Eastern hognose snake - one observed in immature oak forest in July.
- Six-lined racerunner - one observed in NIPSCO's greenbelt in July.
- Northern brown snake - one observed on Cowles Bog Trail in October.

1.5.2 RESULTS

1.5.2.1 Lakefront Communities. The American toad (*Bufo americanus*) and blue racer (*Coluber constrictor*) were in the lakefront communities in May.



The eastern hognose snake (Heterodon platyrhinos) was observed there in July (Table 1-34). The latter is a well-known inhabitant of the Indiana dunes, but apparently one that is becoming less common as development continues.

1.5.2.2 Cowles Bog (Wooded) Community. Six species of reptiles and amphibians were observed in this community during May and July 1980 (Table 1-34), including four species of frogs, the eastern box turtle (Tereapene carolina), and the blue racer. All species have been found in this community in the past.

In addition to the six species observed during May and July, one northern brown snake (Storeria dekayi) was seen on the Cowles Bog Trail in October. This species is generally secretive, but suns itself in open areas on warm, fall afternoons. This was the first sighting of this species on the study area since 1974. It was also seen in the fall at that time, in the Maple Forest Community.

1.5.2.3 Cowles Bog (Open) Community. Five species were observed in this community. The only reptile was the spotted turtle, a secretive inhabitant of the marsh that is a potential candidate for the Indiana endangered and threatened list (Indiana Department of Natural Resources 1978). This is the first observation of the spotted turtle on the study area.

The four frogs observed in the open bog were all commonly observed in past sampling. The spring peeper (Hyla crucifer) was present in large numbers in May calling from the vegetation along the dike at the southern edge of the bog. The bullfrog (Rana catesbeiana) is typical of open marsh such as Cowles Bog. The green frog (Rana clamitans) and cricket frog (Acris crepitans) also are typical inhabitants of an open bog.

1.5.2.4 Maple Forest Community. Sampling in the Maple Forest Community yielded no species in May and the green frog and blue racer in July. Both species were observed in a variety of communities in 1980.

1.5.2.5 Emergent Macrophyte Community. As often in the past, the sampling in the Emergent Macrophyte Community yielded more species of reptiles and amphibians (eight) than any other sampling location. Two species, the green frog



and the northern water snake (Natrix sipedon), were observed during both May and July sampling efforts.

The green frog, which appeared to be abundant during May and July, is an aquatic species that prefers clear, permanent water in or adjacent to wooded locations (Minton 1966); it is a consistent component of this community. The painted turtle (Chrysemys picta) has been the reptile most consistently recorded in this community during the monitoring period; it generally is observed basking on appropriate objects in or near the pond. The northern water snake also has been a consistent inhabitant for this locale. Although the habitat affinities of this species are broad, including practically all moist habitats and a variety of dry habitats (Conant 1975), it is rarely observed on the Bailly study area in locations other than the Emergent Macrophyte Community.

1.5.2.6 Transmission Corridor Community. The eastern garter snake (Thamnophis sirtalis) was the only reptile and the cricket frog the only amphibian that were observed in this community. The eastern garter snake prefers edge habitat (Smith 1961) and consistently has been recorded in the Transmission Corridor since the study began.

1.5.2.7 Annual Comparisons. The number of herpetofaunal species observed in 1980 (16) was greater than that observed in 1979 (10) and more consistent with numbers observed during previous years of the monitoring program. The eastern hognose snake again was observed on the study area, for the third observation during the monitoring period. The northern brown snake was observed for the first time since 1974. These sporadic observations, among others, are indicative of the difficulty in observing many herpetofaunal species and assessing their populations in general.



1.6

INVERTEBRATES

1.6.1 SAMPLING LOCATIONS AND CONDITIONS. Invertebrate samples collected in July 1980 included sweepnet and litter samples from locations 1, 2, 3, 4A, 4B, 6, and 8; dipnet samples from locations 2, 5, 6, 7, and 8; and lightrap samples from 1, 2, 3, 4B, 6, and 8 (Figure 1-1). The dipnet sample scheduled for 4B was not taken because the location was dry. This location had been dry the previous summer and in 1977.

Since July 1979, changes had occurred in dipnet sampling locations 2 and 7 (the shallow-pool cattail habitat near the Bailly plant outfall and Pond B). Insect communities associated with Pond B will change as de-watering continues and vegetation changes. Some de-watering also had occurred in the cattail/shallow-pool location, along with additional removal or decline of cattail and some accumulation of materials waste.

1.6.2 RESULTS. Arthropod taxa identified during July 1980 sampling on the Bailly study area are listed in Table 1-35. The number of insect families identified in the collections (148) was consistent with numbers observed during previous warm summers. Most of the taxa and abundances also were consistent with those of past sampling periods, although four insect families and several species were newly observed on the study area. The beachgrass sample, which reflects a monoculture-like habitat, contained the fewest insect families of the sweepnet collections. The numbers of insect families in the other sweepnet collections were approximately equal. The greatest number of individuals was collected from the Transmission Corridor reflecting the density of herbaceous vegetation in that location.

Lighttrap activity was generally good because of warm nighttime temperatures throughout the sampling period. It was most intense at the station on Cowles Bog Trail adjacent to the wooded bog. Despite low water and essentially dry conditions next to the trail, several species of predaceous diving beetles and water scavenger beetles flew to the lighttrap. Some species of water scavenger beetles were represented by 100 or more individuals. Other intense activity occurred at the Immature Oak Forest Community lighttrap where, consistent with past results, mosquito activity was most significant.



Table 1-35

Occurrence of Arthropod Taxa, Bailly Study Area, July 1980 (Page 1 of 4)

Taxon	Beachgrass	Foredune	Immature Oak Forest	Cowles Bog (Dry-wooded)	Cowles Bog (Wet-wooded)	Dunes Creek	Maple Woods	Pond 8	Transmission Corridor
Order Collembola (springtails)									
Poduridae	X		X				X		
Isotomidae		X	X	X	X				
Entomobryidae		X	X						
Order Ephemeroptera (mayflies)									
Caenidae									
Caenis spp.									
Baetidae		X						X	X
Callibaetis sp.		X							
Order Anisoptera (dragonflies, damselflies)									
Aeshnidae (dragonflies)									
Aeshna verticalis									
Libellulidae (dragonflies)		X							X
Erythemis sp.				X					X
Libellula sp.		X							
Stenonema lydia		X							
Symphetrum vicinum				X					
Coenagrionidae (damselflies)									
Enallagma spp.		X							X
Ischnura spp.	X	X				X		X	X
Nehalennia sp.		X							
Leptidae (damselflies)									
Lestes sp.		X		X					
Order Orthoptera (grasshoppers, katydids, roaches, etc.)									
Achrididae (grasshoppers)		X							X
Dissosteira carolina (Carolina grasshopper)									X
Tettigoniidae (katydids)		X				X			X
Conocephalus sp.							X		X
Neoconocephalus J.	X	X							X
Orchelimum sp.									X
Scudderia fuscata			X						
Gryllidae (crickets)									
Decanthus sp.		X							X
Phasmatidae (walkingsticks)									
Diactrotrix femorata		X	X						
Order Plekoptera (stoneflies)									
Perlidae (stoneflies)									
Perlodes sp.									
Order Psocoptera (psocids)									
Psocids									
Order Hemiptera (bugs)									
Corixidae (waterboatmen)									
Trichocorixa spp.		X						X	X
Notonectidae (backswimmers)									
Notonecta sp.		X							
Psephenidae (pleid water bugs)									
Neopsephenus sp.									X
Hebridae (velvet water bugs)		X							X
Salidae (shore bugs)		X							
Gerridae (water striders)									
Gerris sp.		X					X	X	X
Trepobates sp.									X
Mesoveliidae (water treaders)									
Mesovelia sp.		X							X
Miridae (plant bugs)									
Ceratocapsus luteus						X			X
Neolygus sp.			X	X					X
Neurocypus sp.					X				
Orthotylus sp.									X
Plagiognathus obscurus						X			
Poecilopsus lineatus							X		
Stenopoma trispinosum						X			
Trigonotylus ruficornis							X		X
Tarsalis									X
Nabidae (damselfly bugs)									
Nabis sp.			X						
Reduviidae (assassin bugs)									
Reduvius sp.									
Sinea sp.				X					
Stelus sp.				X					
Phymatidae (ambush bugs)									
Phymata sp.		X							
Tingitidae (lace bugs)									X
Acanthosoma annulatus	X								
Corithuca contracta									
C. harmorata									
Leptopharsa sp.		X							
Lygaeidae (seed bugs)									
Blissus leucophaea (chinch bug)									X
Schizodermus ruficornis									X
Nysius sp.									X
Scutellaria sp.									X
Phlegmaria abbreviatus				X					
Berytidae (stink bugs)									
Calystus sp.									X
Pentatomidae (stink bugs)		X	X			X	X		X
Acrosternum sp.									X
Coreoperla bimaculata		X	X	X					
Stenonema persimilis	X								
Coreoperla sp.									
Order Thysanoptera (thrips)									
Thripidae (thrips)									X
Phlaenothripidae (thrips)									X

This table has been corrected from that appearing in the Summer 1980 report.

Table 1-35 (Page 2 of 4)

Taxon	Beachgrass	Foredune	Oak Forest	Cowles Bog (Dry-wooded)	Cowles Bog (Wet-wooded)	Dunes Creek	Hemp Woods	Pond 8	Transmission Corridor
Order Homoptera (hoppers, aphids)									
Membracidae (treehoppers)									
<i>Cyrtolobus</i> sp.		X	X						
<i>Igniderma</i> sp.		X	X		X				
<i>Stellia camelus</i>		X	X						
<i>Stictocaprea bubalus</i>		X			X				X
<i>Telanomus</i> sp.		X							
Cicadellidae (leafhoppers)	X	X	X		X		X		X
<i>Agallipopsis</i> sp.		X					X		
<i>Chlorotettix</i> sp.							X		X
<i>Pelliocephalus</i> sp.			X						
<i>Draculacephala</i> sp.				X					
<i>Empoasca</i> sp.	X	X	X		X		X		
<i>Cyrtoneura</i> sp.							X		
<i>Plexamia</i> sp.							X		X
<i>Graphocephala</i> sp.		X	X				X		
<i>Gyponana</i> sp.				X	X		X		
<i>Diocerus</i> sp.					X				
<i>Lasius</i> sp.			X	X			X		
<i>Trietettix</i> sp.									X
<i>Macrostelus</i> spp.	X						X		X
<i>Scaphoides</i> sp.	X								
<i>Pyrops bifidus</i>							X		
Cercopidae (spittlebugs)	X	X	X	X	X		X		X
Delphacidae (delphacid planthoppers)	X	X	X	X					
Cixiidae (cixiid planthoppers)				X			X		
Achilidae (achilid planthoppers)					X				X
Scutes									X
Aphididae (aphids)	X	X	X	X	X				X
Order Coleoptera (beetles)									
Carabidae (ground beetles)									
<i>Harpalus</i> sp.			X						
<i>Platysus</i> sp.					X				
<i>Leptus</i> sp.					X				
Haliplidae (crawling water beetles)									
<i>Peltodytes duodecimnotatus</i>		X					X		X
Dytiscidae (predaceous diving beetles)									
<i>Scaphisoma confinis</i>					X				
<i>Scaphisoma fimbriolatus</i>					X				
<i>Scaphisoma</i> sp.						X			X
<i>Hydrophilus</i> sp.						X			X
<i>H. confinis</i>						X	X		
<i>H. niger</i>						X			
Hydrophilidae (water scavenger beetles)									
<i>Cymbiodyta blanchardi</i>						X			
<i>C. fimbriata</i>					X				
<i>Hydrophilus cinctus</i>						X			X
<i>H. ochraceus</i>					X				
<i>Hydrophilus</i> sp.		X							
<i>Hydrophilus scaberrimus</i>							X		
<i>H. subcupreus</i>									X
<i>Paracymus</i> sp.					X				X
Ptilinidae (featherwinged beetles)									
<i>Prinella</i> sp.					X				
Staphylinidae (rove beetles)	X		X		X				
Anthracidae (antlike flower beetles)									
<i>Anthrax</i> sp.					X				
<i>Noticus</i> sp.		X							
Cantharidae (soldier beetles)									
<i>Cantharis</i> sp.			X		X				
<i>C. nectus</i>					X				
<i>Podabrus</i> spp.									
Lampyridae (fireflies)			X				X		
<i>Lucidota punctata</i>							X		
<i>Photinus</i> sp.					X		X		X
<i>Photuris pennsylvanica</i>			X		X				
Cleridae (checkered beetles)									
<i>Inoclerus</i> sp.							X		
<i>Ischnocera</i> sp.							X		



Table 1-35 (Page 3 of 4)

Taxon	Beachgrass	Foredune	Immature Oak Forest	Cowles Bog (Dry-wooded)	Cowles Bog (Wet-wooded)	Dunes Creek	Maple woods	Pond 8	Transmission Corridor
Order Coleoptera (Contd)									
Pyrochroidae (firecolored beetles)							X		
Mordellidae (tumbling flower beetles)									
Mordella spp.		X		X	X		X		X
Mordellistena spp.		X							
Alleculidae (combclawed beetles)				X					X
Isomira senicea									
Meloidae (false darkling beetles)							X		
Symphor sp.			X						
Lucanidae (stag beetles)	X								
Cerambycidae (longhorned beetles)									
Batyromma suturale		X							
Elaphidion myronetum							X		
Scarabidae (scarabs)									
Ataenius spp.		X					X		
Popillia japonica									X
Chrysomelidae (leaf beetles)									
Alicia sp.							X		
Chaetochasma minus									X
Colaspis sp.	X	X	X						
Gibbilia sp.							X		
Glyptocelis sp.							X		
Lema collaris	X								
Nodoplia sp.					X				
Pachybrachis sp.		X							
Phyllotreta sp.		X							
Stenoplia sp.		X							
Trichopoda virgata		X					X		X
Curculionidae (weevils)		X	X						X
Aptis sp.	X				X		X		
Scolytidae (bark beetles)				X					
Order Neuroptera (antlions, lacewings, dobsonflies, etc.)									
Corydalidae (dobsonflies)						X			X
Chrysobidae (green lacewings)		X	X	X	X				
Hemeroptidae (brown lacewings)		X		X					
Myrmeleontidae (antlions)	X								
Order Mecoptera (scorpionflies)									
Panorpidae (scorpionflies)							X		
Panorpa sp.									
Bittacidae (scorpionflies)							X		
Bittacus sp.									
Order Trichoptera (caddisflies)									
Hydroptilidae (caddisflies)							X		
Hydropsychidae									
Hydropsyche sp.	X	X							
Leptoceridae									
Leuctra sp.	X								
Trichoptera sp.	X								
Phryganeidae									
Agrypnia sp.					X				
Sankia selina					X		X		
Phryganea sp.							X		
Limnephilidae							X		
Order Lepidoptera (butterflies, moths)									
Papilionidae (swallowtail butterflies)									
Papilio glaucus (tiger swallowtail)		X							
Papilio polyxenes (black swallowtail)		X	X						X
Pieridae (whites, sulfurs)									
Colias philodice (common sulfur)									X
Pieris protodice (southern cabbageworm)									X
Pieris rapae (imported cabbageworm)				X					X
Danaidae (milkweed butterflies)									
Danaus alexandus (monarch butterfly)									X
Nymphalidae (brushfooted butterflies)									
Euphydryas phaeton (Baltimore)		X							
Amantia archippus (viceroys)		X							
Glycyphodes pharis (pearl crescent)		X							X
Speyeria cybele (great spangled fritillary)									X
Vanessa atalanta (red admiral)									X
Satyrinae (satyr butterflies)									
Euptychia cymela (little wood satyr)				X					
Lethe eurydice (eyed brown)		X		X					X
Lycenidae (blues, coppers, hairstreaks)									
Eurema comyntas (eastern tailed blue)				X			X		
Lycenops argiolus (spring azure)				X					
Satyrus laryxvornus (hickory hairstreak)				X					
Hesperiidae (skippers)	X	X			X				X
Phengidae (sphinx moths)									
Roanias nyops (shalleyed sphinx)					X				
Arctiidae (tiger moths)									
Haliostola testularis (pale tussock moth)		X	X	X					
Hyperbaena fusca			X	X					
Noctuidae (owl moths, underwings)									
Euthysanota unio					X				
Pyra (ae) pyralis (moths)							X		
Pyra (ae) pyralis (moths)		X							
Geometridae (geometrid moths)			X	X					
Chlorochlamys chloroleucaria					X		X		X
Physoctenia pustularia							X		
Calpodon transversata							X		
Stenoclis tricalata							X		
Microlethys	X	X	X	X	X	X	X		X
Larvae (waterpillars)	X	X	X	X	X	X	X		X



Table 1-35 (Page 4 of 4)

Taxon	Seachgrass	Foredune	Immature Oak Forest	Cowles Bog (Dry-wooded)	Cowles Bog (Wet-wooded)	Dunes Creek	Maple woods	Pond 8	Transmission Corridor
Order Diptera (Flies)									
Tipulidae (crane flies)	X	X	X	X	X		X		X
Ptychopteridae (phantom crane flies)									
Sittacomorpha clavipes				X	X	X	X		
Psychodidae (moth flies)					X				
Chaoboridae (phantom midges)		X		X	X		X		X
Chironomidae (midges)	X	X		X	X	X	X	X	X
Culicidae (mosquitoes)			X	X	X		X		X
Mycetophilidae (fungus gnats)				X					
Sciaridae (darkwinged fungus gnats)	X				X		X		
Cecidomyiidae (gall midges)	X		X		X		X		
Ceratopogonidae (biting midges)	X			X	X			X	X
Stratiomyidae (soldier flies)		X				X		X	X
Nemotelus sp.									X
Pedicia sp.					X				
Tabanidae									
Chrysops cuculus					X				
C. vittatus				X	X				X
Tabanus trimaculatus					X				
Therevidae (stiletto flies)				X					
Rhagionidae (snipe flies)				X					
Dialysis sp.					X				
Asilidae (robber flies)									
Efferia albipennis	X								
Leptogaster sp.				X					
Bombyliidae (bee flies)		X							
Empididae (dance flies)									
Chelipoda sp.			X		X		X		
Hybos sp.			X		X		X		
Tachypeza sp.					X				
Dolichopodidae (longlegged flies)									
Angya sp.		X							
Chrysotus spp.	X	X	X	X	X		X		X
Condyllostylus sp.			X		X				X
Dolichopus sp.	X								
Symptetrus sp.				X	X				
Plagioneurus sp.		X							
Sciapus sp.			X		X				X
Phlogophilus sp.				X	X				
Lonchopodidae (spearwinged flies)									
Lonchopoda sp.			X						
Phoridae (humpbacked flies)				X	X		X		
Pipunculidae (bigheaded flies)									
Alloneura sp.					X				
Lyphidae (flower flies)		X			X		X		X
Platystomatidae (platystomatid flies)									
Rivellia sp.					X				X
Otitidae (otitid flies)					X		X		X
Tephritidae (fruit flies)									X
Sepsidae (black scavenger flies)									
Sepsis sp.				X					
Lauaxanidae (lauaxanid flies)									
Campoprosopea									X
Homoneura sp.					X		X		
Sapromyza sp.	X		X	X	X		X		X
Chamaemyiidae (chamaemyid flies)		X							
Piophilidae (skipper flies)		X		X					X
Sphaeroceridae (dung flies)									
Leptocera sp.			X		X		X		
Ephydriidae (shore flies)									
Ptilomyia sp.					X				
Grosophiliidae (vinegar flies)					X				
Chymomyza sp.									
Grosophila sp.			X				X		
Chloropidae (chloropid flies)									
Chlorops sp.			X						
Ceteraphala sp.									X
Clusiidae (Clusiid flies)									X
Agromyzidae (leafminer flies)							X		X
Calliphoridae (blow flies)	X	X		X	X				
Muscidae (muscid flies)	X	X	X	X	X				
Musca domestica (house fly)	X								
Tachinidae (tachinid flies)	X	X							
Order Hymenoptera (sawflies, wasps, ants, bees)									
Tenthredinidae (sawflies)			X	X					X
Braconidae (braconids)		X	X		X		X		X
Ichneumonidae (ichneumonids)	X	X		X	X		X		X
Chrysididae (chrysidids)									
Ceraphronidae (ceraphronids)					X				
Pteromalidae (pteromalids)									X
Chalcididae (chalcidids)				X					
Cynipidae (gall wasps)			X		X				
Perilampidae (perilampids)			X						X
Formicidae (ants)	X	X	X	X	X		X		X
Diapriidae (diapriids)				X					
Figitidae (figitids)		X							
Sphacidae (mud daubers)		X	X						X
Andrenidae (andrenid bees)				X					
Colletidae (yellowfaced bees)							X		
Halticidae (sweat bees)							X		
Apidae (bees)									
Apis mellifera (honey bee)	X	X		X					X
Ceratina sp.							X		X
Trypoxys virginica (large carpenter bee)									X
Order Amphipoda (scud)		X					X		X
Order Phalangida (harvestmen)		X	X		X		X		X
Order Acari (mites)	X	X		X	X		X		X
Order Araneida (spiders)	X	X	X	X	X		X		X
Order Isopoda (isopods)		X					X		
Class Diplopoda (millipedes)			X	X					
Order Chiloneuthida (pseudoscorpions)					X				



The variety of aquatic insect taxa was diminished somewhat from that of previous years, primarily because of the changes in Pond B. In the past, this location supported larvae of aquatic moths and marsh beetles in greater abundance than any other sampling station. Soldier fly larvae and fishfly larvae also were among the regular components of samples from Pond B. Although these groups have been collected occasionally from other aquatic locations, they are not prominent members of those aquatic communities. Aquatic moths are associated especially with water lily.

Butterfly activity during July 1980 reflected typical summer weather conditions as did the sweepnet collections. Rather large aggregations of the imported cabbageworm (Pieris rapae) and the checkered white (Pieris protodice) were noted along the pond dikes. The viceroy (Limenitis archippus), pearl crescent (Phyciodes tharos), and eyed brown (Lethe eurydice) were frequently encountered in the Transmission Corridor, and the little wood satyr (Euptychia cymela) and eastern tailed blue (Everes comyntas) were frequently encountered in Cowles Bog woods.

Conspicuous pests during the sampling period were primarily blood-sucking species, with no widespread plant pests noted. As in the past, mosquito activity was most notable in the wooded locations, especially the Immature Oak Forest and Maple Woods communities. The deer fly Chrysops vittatus was again abundant along Cowles Bog Trail, and horse flies (Tabanus spp.), although not abundant, were observed in this location and in the Transmission Corridor Community. For the first time, an abundance of stable flies (Stomoxys calcitrans) was observed on the study area. This medium-sized fly, which resembles the house fly, was most active along the Lake Michigan beach but was present in the Foredune and Immature Oak Forest communities as well.

Except for shore bugs (Hemiptera: Sauidae), all of the insect families newly recorded for the study area belong to the order Hymenoptera: Colletidae (yellowfaced bees), Chrysididae (cuckoo wasps), and Figitidae (figitids). The three hymenopteran families occur in a variety of terrestrial habitat types, including wooded and open areas. Yellowfaced bees nest in the ground or in crevices and cavities in plant stems. The larvae of cuckoo wasps and figitids



are both parasites on other insects. Cuckoo wasps are external parasites of wasps and bees, while figitids parasitize the pupae of various flies or lacewings, depending upon the species. Shore bugs inhabit shores of streams, ponds, and other water bodies. They generally hunt prey on or near the ground and fly only short distances. The shallow-pool cattail habitat is the most suitable one for these species on the study area. It is the only location where toad bugs (Gelastocoridae), another hemipteran group with habits similar to shore bugs, have been found.

1.6.2.1 Beachgrass Community. Delphacid planthoppers were again the most abundant component of the beachgrass sweepnet sample, as they had been in July of 1976, 1978, and 1979. False antlike flower beetles also were characteristically abundant. Longlegged flies were the most abundant predaceous insects swept from vegetation, although the convergent lady beetle (Hippodamia convergens) was frequently observed on the beach at the edge of the Beachgrass Community.

Several false antlike flower beetles were collected at the beachgrass light-trap also. Midges and other flies, including phantom midges and crane flies, were the most abundant species at the lighthouse. Hydropsychid caddisflies and antlions were prominent along with the flower beetles. Leaf beetles and leafhoppers were lesser components of the lighthouse sample as they were in the sweepnet sample.

One of two newly recorded stink bugs was collected from the beachgrass: Chlorochroa persimilis; the other, Coenus delius, was taken in the Transmission Corridor. Both of these are widespread in eastern United States. C. persimilis apparently feeds on a wider variety of plants, although both are associated with grasses (Furth 1974), which predominate in these communities.

The Beachgrass Community litter and soil sample contained several more taxa and many more individuals than usual. Soil mites, as might be expected, were the most numerous individuals (315), and mesostigmatid mites also were abundant. Two springtail families and rove beetles were among the other groups present.



1.6.2.2 Foredune Community. Leafhoppers and ants were the most abundant insects in the foredune sweepnet collection. Three fly groups - muscid flies, skipper flies, and small dung flies - and one colepteran group, shining fungus beetles, were nearly as abundant as the leafhoppers and ants. Other prominent and characteristic groups in this location were treehoppers, longlegged flies, and spittlebugs.

Treehoppers, which consistently are prominent components of the Fore-dune Community sweepnet sample and frequently so in sweepnet samples from the Immature Oak Forest and Maple Forest communities. were represented by five species, Smilia camelus, a widely ranging treehopper over eastern United States, was newly recorded on the study area. A feeder on oak leaves and stems, this species appropriately was found in the Immature Oak Forest as well as the Fore-dune.

The longhorned beetle Batyleoma suturale, also newly observed on the study area and swept from vegetation in the foredune, reportedly breeds in dead branches of oak and hickory (Knull 1946). This species also is widely distributed in the eastern deciduous forest.

The July 1980 lighttrap sample included another species associated with basswood, which is a dominant plant in the community. In the past, the basswood borer (Saperda vestita), among other basswood feeders, was collected from the location, and in 1980 the basswood leaf roller (Pantographa limata) was collected. The caterpillar of this pyralid moth also feeds on oak foliage. It is a common species in wooded habitats east of the Great Plains. Midges were the most abundant species at the lighttrap and Ataenius spp., a group of small scarab beetles that consistently are collected in this location, were second-most abundant.

The litter and soil samples from the Fore-dune Community contained the fewest individuals of the 1980 ground-arthropod samples. Soil mites were the only abundant species in the sample, and the other groups, including entomobryid and ostomid springtails, were represented by single individuals.



Despite continued disturbance in the shallow-pool cattail habitat near the Bailly plant outfall structure, many aquatic insects associated with pools and small ponds were abundant in the location. Coenagrionid damselflies in the genus Ischnura, velvet water bugs (Hebrus spp.), and water treaders were abundant in the 1980 dipnet sample from this area as they were in the past. Other prominent groups also were consistent with those of the past, including caenid and baetid mayflies, libellulid dragonflies, crawling water beetles, and water boatmen.

1.6.2.3 Immature Oak Forest Community. Once again, midges were the dominant component of the Immature Oak Forest Community sweepnet sample, with ants the second-most prominent group. Two homopteran groups, spittlebugs and treehoppers, also were abundant. The treehoppers were represented by fewer species but greater numbers of individuals than in the Foredune Community sweepnet sample. Additional groups characteristically associated with vegetation in this community and collected in 1980 were gall wasps, katydids, longlegged flies, ichneumons, braconids, and dance flies. Two species frequently collected in this location, the lace bug Corythuca marmorata and the stink bug Cosmopepla bimaculata, also were prominent in the 1980 sample.

At the lighttrap, mosquitoes were more abundant than midges and both outnumbered all other groups. Small dung flies, which occasionally have made up a significant portion of the sweepnet collection in this community, were common at the lighttrap as were crane flies and micromoths.

The number of individuals in the litter and soil sample from this location was second-greatest in the 1980 collections. Taxa in the sample included oribatid and mesostigmatid mites, three springtail families, millipedes, click beetle larvae, dipteran larvae, rove beetles, and caterpillars.

1.6.2.4 Cowles Bog (Wooded-Dry) Community. Several groups were abundant in the 1980 sweepnet sample from the high side of Cowles Bog woods: longlegged flies, lauxaniid flies, mosquitoes, aphids, spittlebugs, and ants. Less abundant but characteristic groups in this location included assassin bugs, false



darkling beetles, plant bugs, muscid flies, and tenthredinid sawflies. A single individual of the combclawed beetle Isomira sericea, which has been observed previously in this location and others toward Lake Michigan, also was collected.

The litter and soil sample from the dry woods contained snipe fly, syrphid fly, and flat bark beetle larvae in addition to numerous mites and a few millipedes. Only one springtail was observed in the sample.

1.6.2.5 Cowles Bog (Wooded-Wet) Community. In the sweepnet sample from the wet part of Cowles Bog woods, flies and leafhoppers predominated again. Important fly groups included crane flies, mosquitoes, deer flies, longlegged flies, lauxaniid flies, small dung flies, black scavenger flies, and muscid flies. Fly groups of somewhat less abundance included darkwinged fungus gnats, gall midges, dance flies, and snipe flies. Moth flies, which are distributed in the maple woods as well, were observed only in this location during 1980 sampling. Other abundant species besides flies and leafhoppers were spittlebugs and plant bugs.

At least five species of water scavenger beetles comprised the intense water beetle activity at the Cowles Bog woods lighthouse. The most abundant were Enochrus ochraceus and Hydrochara obtusata. Cymbiodyta fimbriata and Paracymus sp. were common, and Enochrus cinctus was least abundant. Predaceous diving beetles made up considerably less of the water beetle activity, but captures at this lighthouse were the only 1980 observations of Agabus confinis and Cybister fimbriolatus. Other abundant groups at the lighthouse included ground beetles, phantom midges, crane flies, mosquitoes, and midges.

Moths observed at the Cowles Bog wooded lighthouse included the pearly wood nymph (Elthisanotia unio), one of relatively few brightly colored noctuid moths. This was the first observation on the study area of the pearly wood nymph, which is a common species that ranges westward to the Rocky Mountains. Known food plants of the caterpillar include members of the primrose and loosestrife families (Kimball 1965).



Taxa present in the soil and litter sample from the wet woods included spiders, mites, springtails, millipedes, featherwinged beetles, and pseudoscorpions. The springtails, all ostomids, were nearly as abundant as soil mites. The occurrences of pseudoscorpions and featherwinged beetles in the sample were the only observation of those groups during the 1980 sampling period.

1.6.2.6 Dunes Creek Community. Insects collected from Dunes Creek were consistent with past samples. The predaceous diving beetle Hydroporus consimilis was by far the most abundant component. Other abundant taxa included water striders and midges. Characteristically less abundant groups included phantom crane fly and soldier fly larvae.

1.6.2.7 Maple Woods Community. Ants, spittlebugs, leafhoppers, and dance flies were the most abundant insect groups in the Maple Woods Community sweep-net sample. Lauxaniid flies, scorpionflies, mosquitoes, and longlegged flies were common in the sample. Several beetle groups, including checkered beetles, tumbling flower beetles, leaf beetles, anobiid beetles, and false click beetles also were important. Consistent with past results, the greatest number of harvestmen were found in this sample, and this year the sample contained the greatest number of spiders as well.

Two caddisfly families, several genera of leafhoppers, and several species of geometrid moths were taken at the 1980 Maple Woods Community lighttrap. Midges were the most abundant insects at the light and crane flies were second-most abundant. Marsh beetles, which were collected over the study area as in the past, were most common at this lighttrap.

Two groups of springtails, podurids and eutomobryids, were the most numerous arthropods in the soil and litter sample from the Maple Woods Community. Soil mites and a beetle larva were the only other taxa present.

Midges and amphipods were the dominant groups in the dipnet sample from the Maple Woods Community tributary to Dunes Creek. Others present included water striders, which were abundant, and velvet water bugs, isopods, water scavenger beetles, predaceous diving beetles, and crawling water beetles.



1.6.2.8 Emergent Macrophyte Community. Pools remaining in Pond B contained water boatmen, coenagrionid damselflies, and caenid mayflies.

1.6.2.9 Transmission Corridor Community. Consistent with past results, the seed bug Ischnodemus falicus and the plant bug Trigonotylus tarsalis were the most abundant insects in the sweepnet sample from the Transmission Corridor Community. Another seed bug, the chinch bug (Blissus leucopterus), which is a widespread pest on corn and grass crops, also was abundant. Another, less host-restrictive pest, the Japanese beetle (Popillia japonica), was present though not abundant in the sample. The plant bug Ceratocapsus luteus was a predominant insect in the sample, as were two groups of spiders — jumping spiders and longjawed spiders.

The 1980 observation of the Japanese beetle was the first on the study area, although this well known pest species has recently been of concern in the vicinity (Yaeger, personal communication 1980). Japanese beetles are reported to feed on over 250 different plant species, but are especially fond of roses, grapes, smartweed, soybeans, and corn. In areas of heavy infestation, larvae may seriously damage lawns by feeding on roots, and adults can cause considerable damage to foliage, flowers, and fruits (Baker 1972).

Activity at the Transmission Corridor Community lighttrap was the least intense of any during the sampling period, although midges were abundant as usual. Leptocerid caddisflies, leafhoppers, crane flies, and pedilid beetles were among the other insects present.

Ants and mites were the most abundant arthropod components in the soil and litter sample from this location. No springtails were extracted from the sample. Thrips, scales, and beetle larvae made up the remainder of the species.

The dipnet sample from the channel adjacent to part of the Transmission Corridor contained water mites, pleid water bugs, caenid mayflies, coenagrionid damselflies, libellulid dragonflies, and velvet water bugs in abundance. Crawling water beetles, water boatmen, water striders, amphipods, and predaceous diving beetles were common. The single observation of corydalid larva during 1980 occurred in this location.



1.6.3 SUMMARY

Much of the insect and other arthropod data collected during the 7-year monitoring program on the Bailly study area reflects the type of habitats available. Approximately 240 insect families have been identified from sweepnet, lighttrap, litter and water samples from the study area. Distribution of some families apparently is limited to certain components of the study area's habitat mosaic, and several species/habitat relationships have been noted.

Insect fauna of the Lake Michigan beach/Beachgrass Community edge is characterized by a variety of ground-inhabiting beetles, especially ground beetles (Carabidae). There are large populations of at least two species of tiger beetles, Cicindela repanda and C. hirticollis, and of several species of the scarabaeid genus Ataenius. Periodic occurrences, such as extensive deposits of dead fish on the beach, will produce large populations of opportunistic species. These have included blow flies (Calliphoridae) breeding in the decaying fish and the stable fly (Stomoxys calcitrans) apparently breeding in decaying algal masses. Windswept clumps of the western corn rootworm (Diabrotica virgifera) and other species periodically abundant on the beachgrass have been observed.

Insect fauna associated with the beachgrass is much like that of a typical monoculture: relatively large populations and few species. Among the abundant species observed during the past 7 years were the western corn rootworm, the flea beetle Chaetocnema minuta, the striped cucumber beetle (Acalymma vittata), the southern corn rootworm (Diabrotica undecimpunctata), the convergent lady beetle (Hippodamia convergens), and a delphacid planthopper.

In the Foredune Community, the variety of insects associated with vegetation generally is greater than that associated with the beachgrass and populations are smaller. As mentioned in subsection 1.6.2.2, basswood feeders are among the insects that are distinctive of this habitat. Oak feeders also are found frequently in the Foredune Community but are most commonly associated with the Immature Oak Forest and Cowles Bog dry woods. These include the metallic wood borer Brachys ovatus, the combclawed beetle Hymenorus niger, the darkling beetle



Xylopinus saperdiodes, and the pyralid moth Herculia himonalis. Dry, rather sparsely vegetated sites in the Beachgrass/Foredune interface provide the most suitable habitat on the study area for antlions, which have been consistent components of lighttrap samples in the two locations.

The predominance of oak in the Immature Oak Forest also accounts for the frequency and abundance of gall wasps (Cynipidae: Cynipinae) in the community. Many species in this large subfamily feed on oak tissue. The distribution of certain lace bugs (Tingidae: Corythuca) on the study area is also related to plant distribution: C. contracta, which is associated with several tree species in the north central states, occurs in all wooded communities; C. arcuata, found on white oak in this area, is infrequent on the study area and primarily associated with Cowles Bog dry woods; C. Marmorata, associated with goldenrod, is most abundant in the Foredune Community.

Cowles Bog trail, like the beach and other exposed ground, has a variety of ground beetles and the tiger beetle Cicindela scutellaris, which reportedly prefers more stabilized sandy areas than the two species prominent on the beach (Knisley 1980). Another species characteristic of the trail is the deer fly Chrysops vittatus. This is Indiana's most common deer fly (Burton 1975) and like other tabanids, it frequently rests on paths (Pechuman 1972).

The Maple Forest supports a variety of moths that reflect available host plants. These include the grapevine looper (Lygris diversilineata), which feeds on Virginia creeper as well as grape, the blackberry looper (Chlorochlamys chloroleucaria), and the twin-spot sphinx (Smerinthus jamaicensis) and eastern tent caterpillar (Malacosoma americana), whose principal food is black cherry.

Consistent with herbaceous vegetation diversity and density in the Transmission Corridor, the greatest variety of insects and total number of individuals often are collected there. Frequently collected species with suitable host plants are the leaf beetle Lema collaris, which favors spiderwort, the goldsmith beetle (Chrysochus auratus), which is particularly associated with m' d's, the seed bug Ischnodemus falicus, which feeds on grasses and sedges, and plant bugs Trigonotylus ruficornis and T. tarsalis, which feed on grasses.



Aquatic species of the study area are characteristic of lentic habitats. These include several species of dragonflies, damselflies, water scavenger beetles, predacious diving beetles, marsh beetles, midges, and aquatic Hemiptera. Caddisflies and mayflies also are represented in most habitats. The only aquatic habitat apparently remaining on the study area that can support lotic species is the small maple woods tributary to Dunes Creek, as evidenced by the occurrence of Oligostomis ocelligera, one of the few phryganeid caddisflies that live only in lotic waters.

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SECTION 2 AQUATIC ECOLOGY

2.0 INTRODUCTION AND STATUS

Sampling during the 1980-1981 sampling year (April 1980 - March 1981) was scheduled for April, June, August, and November 1980 and January 1981 at the stations shown in Figure 2-1 and as scheduled in Table 2-1. Samples were collected on the dates and by the personnel shown in Table 2-2.

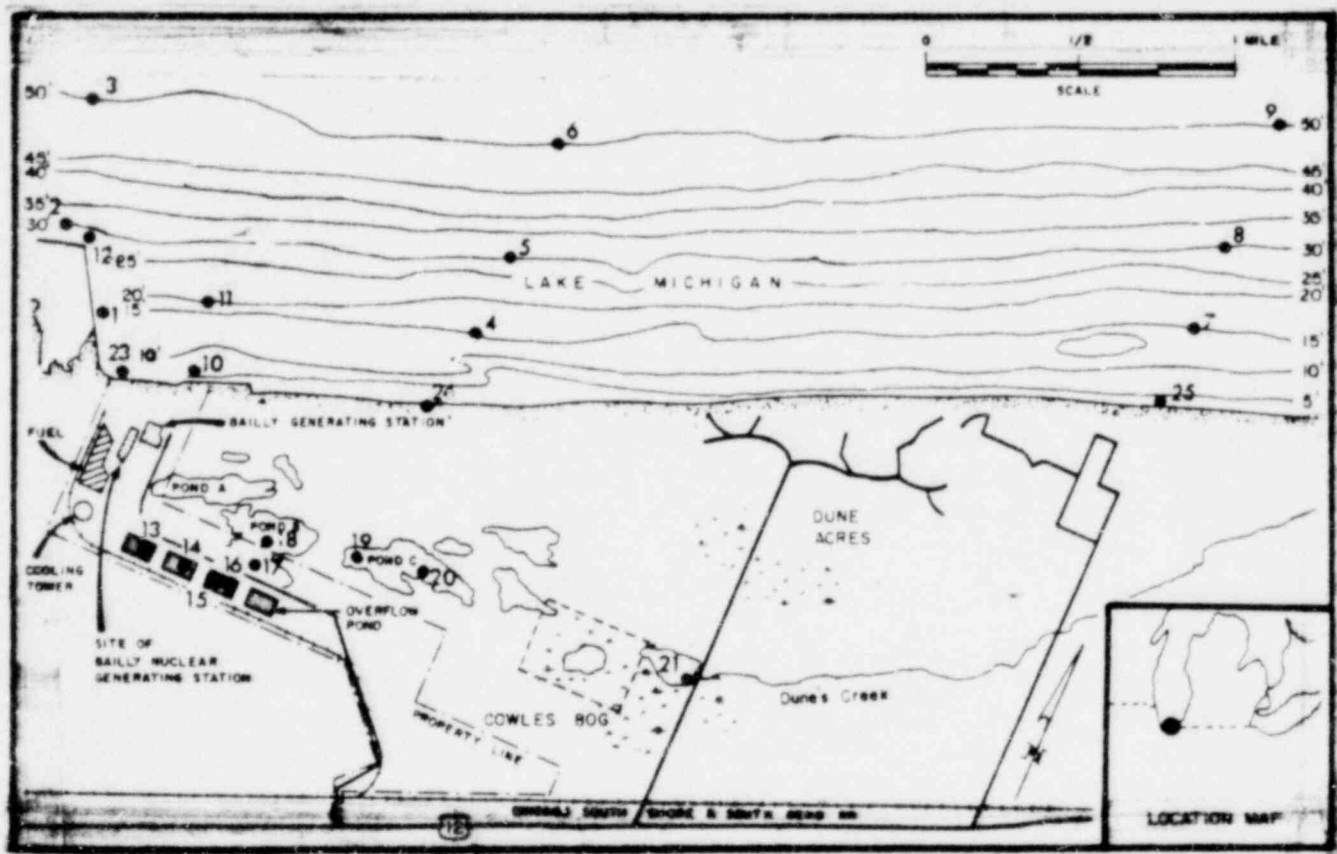


Figure 2-1. Aquatic Sampling Stations, NIPSCO Bailly Nuclear-1 Plant Site (Bailly Study Area)



Table 2-1

Aquatic Ecology Sampling Frequency, Bailly Study Area, April 1980-March 1981*

Parameter	Sampling Stations	1980										1981		
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Phytoplankton														
Identification, enumeration	1-10, 17-21	X		X		X			X					
Productivity	1-10, 17-21	X		X		X			X					
Chlorophyll <u>a</u>	1-10, 17-21	X		X		X			X					
Zooplankton														
Identification, enumeration	1-10, 17-21	X		X		X			X					
Periphyton														
Identification, enumeration	1,10,11,12,25,17,19,21	X		X		X			X					
Chlorophyll <u>a</u>	1,10,11,12,25,17,19,21	X		X		X			X					
Benthos	1-10, 17-21	X		X		X			X					
Fish (gill netting)	4,7	X		X		X			X					
Fish (beach seining)	23,24,25	X		X		X			X					
Fish (electrofishing)	18	X				X								
Fish food habits	4,7,23,24,25	← 300 fish per year →												
Ichthyoplankton	1-10**	X		X		*			X					
Water quality														
General water quality	1-22	X		X		X			X					
Aquatic nutrients	1-22	X		X		X			X					
Trace elements	13-21	X		X		X			X					
Indicators of industrial and organic contamination	13-21	X		X		X			X					
Sediments, trace elements	13-20	X				X			X		X			
Sediments, particle sizing	1-10, 17-21					X								
Aquatic macrophytes	17-21			X										

*Specific sampling dates are listed in Table 2.2.

**1-10 with zooplankton; 4 and 7 also collected with pump.



Table 2-2

Scheduled Dates and Purposes of All
Aquatic Field Trips, Bailly Study Area

<u>Date</u>	<u>Personnel</u>	<u>Parameters Sampled</u>
17 March	Ray Wronkiewicz	Periphyton (Samplers set)
14-20 April	Kendall Brown Ralph Feeny Jim Krueger	Phytoplankton Zooplankton Periphyton Benthos Fish Ichthyoplankton Water quality
15 May	Ralph Feeny	Periphyton (Samplers set)
9-17 June	Kendall Brown Joe Strube Ralph Feeny Dave Mueller	Phytoplankton Zooplankton Periphyton Benthos Fish Ichthyoplankton Water quality Aquatic macrophytes
16 July	Dave Mueller Stever Garbarino	Periphyton (Samplers set)
18-25 August	Kendall Brown Joe Strube Steve Garbarino	Phytoplankton Zooplankton Periphyton Benthos Fish Ichthyoplankton Water quality Sediments
20 October	Steve Garbarino	Periphyton (Samplers set)
15-22 November	Joe Strube Steve Garbarino David Ward	Phytoplankton Zooplankton Periphyton Benthos Fish Ichthyoplankton Water quality
30 January 1981	Joe Saga David Ward	Sediments, trace elements



Dredging activities were being conducted in the area of the intake and discharge during both June and August, which caused a noticeable discoloration of the water in this area out to a depth of about 30 feet. No samples were taken from pond stations 14 and 15 during either June or August or from pond stations 14, 15, 16, 17, and 18 during November because they were dry. Pond B water levels during June were noticeably lower than in April, resulting in about 10 to 15 feet of exposed shoreline and a drop of about 1 to 1.5 feet on the pond's emergent macrophytes. Pond B, viewed 16 July 1980, was dry in the area of stations 17 and 18 and contained only 2 to 4 inches of water in the northern portion. Pond B remained dry in August and November, so again no samples were taken at stations 17 and 18.

Sediment samples collected from pond stations 15 and 16 in January contained only large rocks and could not be appropriately analyzed.

2.1 AQUATIC FLORA

2.1.1 METHODOLOGY. Duplicate 2-liter samples were collected utilizing a 6-liter Van Dorn bottle at Lake Michigan stations 1 through 10 and interdunal pond stations 17 through 21 (Figure 2-1). Samples were collected quarterly during April, June, August, and November 1980. With the lowered water levels of Pond B after June, no samples were collected at stations 17 and 18. All samples were collected 1 meter below the surface. Prior to sampling, each 2-liter sample container was prepared with 20 milliliters of acid-Lugol's solution, a narcotizing, settling, and staining agent. After sampling, each container was supplemented with buffered formalin to a final concentration of 4 percent, and 3 to 5 drops of liquid detergent were added to facilitate sedimentation. Before processing, each sample was allowed to settle for 48 hours, at which point 1800 milliliters of supernatant were siphoned off with a membrane-covered siphon. The remaining 200 milliliters were spun on a laboratory centrifuge at 2000 rpm for 15 minutes to further concentrate the organisms. The supernatant was then filtered off and the "bead" of phytoplankton transferred to 12-dram vials.

In the laboratory, concentrated phytoplankton samples (10 milliliters) were thoroughly mixed, and three subsamples were placed in Palmer cells. The algae in 12 fields (four per subsample) were identified, enumerated, and measured at



400X magnification. In certain instances, scarcity of organisms in a sample necessitated extending the total field count to 24 fields. Biovolume (microliters per liter) was determined by attributing to the algae geometric shapes best suiting their morphology and calculating their appropriate volumes (Nauwerck 1963; Rodhe, Vollenweider, and Nauwerck 1958; Strickland 1960). Instead of developing an average volume per species based on a few representative organisms, dimensions of each organism enumerated were measured.

Phytoplankton productivity samples were taken at the same locations and at the same frequency as samples collected for identification, enumeration, and biovolume measurements. Duplicate samples were collected from 1 meter below the surface at each station using a 6-liter Van Dorn bottle. After all samples were collected, each was strained through a 333-micron mesh Nitex net to remove zooplankters and detrital materials that could be labeled by the carbon-14 material. The strained water of each sample was placed into a 2-liter flask to which four 1-milliliter ampules of 10 $\mu\text{Ci NaH}^{14}\text{CO}_3$ were added and thoroughly mixed. Time-zero samples consisting of one 0.5-milliliter subsample per sample were measured and placed into scintillation vials along with one drop of 6N sodium hydroxide. One 50-milliliter subsample per sample was removed and strained through Whatman GF/C filters at minimum vacuum pressure (<50 millimeters Hg differential across the filter) and the filters placed in scintillation vials to provide an estimate of background counts. Duplicate clear and darkened 300-milliliter BOD bottles were filled with the remaining sample. When all samples were prepared, they were suspended 1 meter below the surface at their stations for 4 hours. Following incubation, the bottles were retrieved and the contents of each preserved by adding 12 milliliters of buffered formaldehyde. Subsamples of 50 milliliters were removed from each bottle, filtered as previously described, and each was placed in a scintillation vial with enough tissue solubilizer to cover the filter pad. Activity counts were made using a liquid scintillation counter.

Phytoplankton productivity in milligrams of carbon fixed per liter was calculated for each replicate sample from the scintillation counts using the formula:

$$\begin{aligned} \text{mg carbon fixed/l} = & (\text{counting rate/total activity}) \times \text{total sample} \\ & \text{volume/subsample volume}) \times \text{alkalinity (mg/l)} \times \\ & 0.95 \times 12 \times 1.064 \end{aligned}$$



where

Total activity = amount of potentially available carbon-14 at time zero

Counting rate = clear bottle minus darkened bottle counts

Total sample volume = 300 milliliters

Subsample volume = 50 milliliters

1.064 = correction for the isotope effect

Phytoplankton chlorophyll a samples were collected from the same water sample from which regular phytoplankton samples were extracted (stations 1 through 10 and 17 through 21). To prepare phytoplankton samples for analysis, a measured volume of water was filtered through a 0.45-micron filter pad stabilized with magnesium carbonate. The filter pad was then frozen for shipment to the central laboratory, where it was extracted for 24 hours with acetone, ground for 30 seconds with a tissue grinder, centrifuged, and measured on a narrow-band spectrophotometer at 665- and 750-millimicron wavelengths before and after sample acidification. Periphyton samples were similarly processed, except that scrapings from natural (as available) or artificial substrates were used. All concentrations were calculated using the equation:

$$\text{Chlorophyll } \underline{a} \text{ (}\mu\text{g per sample)} = (D_b - D_a) [R/(R-1)] (V/l) (10^3/a_c)$$

which equals

$$11.9 \times [2.43 (D_b - D_a)] (V/l)$$

for these samples, where

D_a = optical density of sample after acidification = $D_{665} - D_{750}$
(acidified)

D_b = optical density of sample before acidification = $D_{665} - D_{750}$
(unacidified)

a_c = specific absorption coefficient for chlorophyll a (in gram per centimeter)

V = volume of solvent used to extract the sample (milliliters)



l = path length (centimeters)

$R = D_b/D_a$ for pure chlorophyll a = 84 according to Talling and Driver (1963)

To convert to micrograms per liter or micrograms per square centimeter, the above chlorophyll a value was divided by number of liters filtered or number of square centimeters scraped.

During this survey, periphyton samples were collected at five stations (1, 10, 11, 12, and 25) in Lake Michigan and at three pond stations (17, 19, and 21). Pond samples were collected using a modification of an artificial substrate sampler described by Patrick, Hohn, and Wallace (1954). This sampler suspends two racks of five glass slides each, with a surface area of 37.5 square centimeters per slide, just below the surface as a substrate for periphyton colonization. Colonization generally takes place in 2 to 4 weeks; thus the "incubation" time per sampler was 1 month. Qualitative lake samples were scraped from natural substrates found at each sampling station. When samples were collected, the slides (both sides) and substrate scrapings were placed into 8-dram vials and preserved with 6-3-1* solution. Two replicate slides were quantitatively analyzed per sample. Counts were made as described for the regular phytoplankton samples. Biovolume estimates were also generated for these data in the manner described for phytoplankton.

2.1.2 RESULTS. Results for numerical abundance, biovolume, chlorophyll a, and productivity of phytoplankton and periphyton sampling in 1980 have been included in relevant quarterly reports (Texas Instruments 1980b, 1980c, 1981a, 1981b). Tables 2-3 through 2-11 and Figures 2-2 through 2-16 summarize that data and provide comparisons with previous years' data.

2.1.3 DISCUSSION

2.1.3.1 Phytoplankton Density and Biovolume. In 1980, as in the previous sampling years (1974-1979), a multitude of phytoplankton taxa were collected in the Bailly study area (Table 2-3). This table shows species occurrence for

*6 parts water, 3 parts ethanol, and 1 part formalin.



Table 2-3

Phytoplankton Occurrence, Bailly Study Area, 1980

LAKE(1,2) PONDS(3,4,5)					LAKE(1,2) PONDS(3,4,5)				
LS	TAXA	SPR 12345	SUM 12345	FAL 12345	LS	TAXA	SPR 12345	SUM 12345	FAL 12345
0	CHODATELLA LONGISETA		2		0	UNIDENTIFIED ALGAE			
0	PSEUDOCLORELLA (LPIL)		12		0	CYANOPHYTA			
0	GEMINELLA INTERRUPTA		3		0	CHROOCOCCUS (LPIL)	1	1234	12
0	OEDOGONIUM (LPIL)	3 5			0	AGMENELLUM (LPIL)	4		
0	MOUGEOTIA (LPIL)	3	4		0	MICROCYSTIS (LPIL)	2	123	2
0	SPIROGYRA (LPIL)	5			0	GOMPHOSPHERA LACUSTRIS	12	123	12
0	CLOSTERIUM MONILIFERUM	3	4		0	APHANOTHECE (LPIL)		12	12
0	CLOSTERIUM (LPIL)	5	1234		0	CHAMAESIPHON (LPIL)		5	
0	COSMARIUM (LPIL)		1 3	1 4	0	PLEUROCAPSA (LPIL)		2	
0	EUASTRUM (LPIL)		4		0	OSCILLATORIA LIMNETICA	2	12	
0	STAUSTRUM (LPIL)	3	4	4	0	OSCILLATORIA AMPHIBIA		12	
0	EUGLENDOPHYTA				0	OSCILLATORIA (LPIL)	1 3 5	123	12
0	EUGLENA (LPIL)		34		0	LYNGBYA CONTORTA	1		
0	PHACUS LONGICAUDA		1		0	LYNGBYA LIMNETICA		2	
0	PHACUS (LPIL)		1		0	OSCILLATORIAEAE (LPIL)		1	
0	TRACHELOMONAS VOLVOGINA	4			0	ANABAENA (LPIL)	345	1 5	
0	TRACHELOMONAS (LPIL)	345	1 345		0	RAPHIDIOPSIS CURVATA	5	5	
0	XANTHOPHYTA				0	CHLOROPHYTA			
0	HETEROCOCCALES (LPIL)		2		0	CHLAMYDOMONAS (LPIL)	12 4	12 45	2 45
0	STIPITOCOCCUS (LPIL)		1	1	0	PANDORINA MORUM		4	
0	CHRYSOPHYTA				0	TETRASTORA (LPIL)		1	
0	MALLONONAS PSEUDOCORDATA		2		0	ELAKATOTHRIX (LPIL)	12	12	2 4
0	MALLAMONAS (LPIL)	1	123		0	SPHAEROCYSTIS SCHROETERI	1	1 3	1
0	CHRYSOCOCCUS (LPIL)	12345			0	SPHAEROCYSTIS (LPIL)		3	
0	SYNCRYPTEA (LPIL)	4			0	ANKISTRODESMUS CONVOLUTUS		1	
0	SYNURA (LPIL)	1	2 4		0	ANKISTRODESMUS FALCATUS	12 4	12 4	4
0	DINOBRYON SERTULARIA	34	4		0	CLOSTERIOPSIS LONGISSIMA		1	
0	DINOBRYON DIVERGENS	4	12 4	12 4	0	KIRSCHNERIELLA CONTORTA		4	
0	DINOBRYON SOCIALE	12	12		0	KIRSCHNERIELLA SUBSOLITARIA		1	
0	DINOBRYON (LPIL)	4	1 4	12	0	KIRSCHNERIELLA (LPIL)		3	
0	OCHROMONAS (LPIL)	4	12		0	ODOCYSTIS (LPIL)	3	12	12 5
0	EPIPYXIS UTRICULUS	34			0	MICRACTINIUM PUSILLUM		2	
0	KEPHYRION (LPIL)	34			0	DICTYOSPHAERIUM PULCHELLUM		12	1
0	CHRYSONOMADALES (LPIL)		12						
0	MONOSIGA (LPIL)		12						
0	STELIXOMONAS DICHOTOMA	12							
0	BACILLARIOPHYTA-CENTRIC								
0	MELOSIRA GRANULATA		1 5						
0	MELOSIRA VARIANS	5							
0	MELOSIRA DISTANS		1						
0	MELOSIRA (LPIL)	12 5	12						
0	CYCLOTELLA MENEGHINIANA		12						
0	CYCLOTELLA (LPIL)		12	1					
0	STEPHANODISCUS BINDERANA	12							
0	STEPHANODISCUS ASTRAEA		1						
0	STEPHANODISCUS NIAGARAE	12	12						
0	STEPHANODISCUS (LPIL)	12	2						
0	EUPODISCALES (LPIL)	12	12 5						

Legend

SPR = April Sampling
SUM = June and August Sampling
FAL = November Sampling

Location 1 = Nearfield stations 1-6 and 10
Location 2 = Farfield stations 7-9

Legend

SPR = April Sampling
SUM = June and August Sampling
FAL = November Sampling

Location 1 = Nearfield stations 1-6 and 10
Location 2 = Farfield stations 7-9
Location 3 = Pond B
Location 4 = Pond C
Location 5 = Cowles Bog



Table 2-3 (Contd)

LAKE(1,2) PONDS(3,4,5)					LAKE(1,2) PONDS(3,4,5)				
LS	TAXA	SPR 12345	SUM 12345	FAL 12345	LS	TAXA	SPR 12345	SUM 12345	FAL 12345
0	SCENEDESMUS ACUMINATUS				0	PYRRHOPHYTA-DINOPHYCEAE			
0	SCENEDESMUS ACUTUS	4			0	GYMNODINIUM (LPIL)		2	
0	SCENEDESMUS QUADRICAUDA	1 34	1 34	2	0	PERIDINIUM GATUNENSE		345	
0	SCENEDESMUS CARINATUS		1		0	PERIDINIUM INCONSPICUUM	2 45	2 4	
0	SCENEDESMUS EORNIS	34	2 4		0	PERIDINIUM CINCTUM	4	4	
0	SCENEDESMUS SPINOSUS	3	4	4	0	PERIDINIUM (LPIL)		2345	4
0	SCENEDESMUS ARMATUS		1 4		0	CERATIUM HIRCUS		4	
0	PEDIASTRUM DUPLEX	3	23		0	CERATIUM HIRUNDINELLA		34	
0	PEDIASTRUM TETRAS		1		0	CRYPTOPHYTA			
0	PEDIASTRUM BORYANUM		4		0	CRYPTOMONAS MARSSONII	1	12 45	4
0	TETRAEDRON CAUDATUM	3			0	CRYPTOMONAS REFLEXA	12		
0	TETRAEDRON MINIMUM		4		0	CRYPTOMONAS EROSA		2	
0	CRUCIGENIA QUADRATA		2		0	CRYPTOMONAS (LPIL)	1234	12345	12 45
0	CRUCIGENIA APICULATA		2		0	RHODOMONAS MINUTA	123	123	12 4
0	COELASTRUM MICROPORUM		4		0	CHRODOMONAS (LPIL)	1234	1 4	4
0	RHIZOSOLENIA ERIENSIS	12	12		0	CYANOMONAS (LPIL)	1		
0	BACILLARIOPHYTA-PENNATE								
0	ASTERIONELLA FORMOSA	12	12	12					
0	ASTERIONELLA (LPIL)		1						
0	DIATOMA TENUE	12	12						
0	FRAGILARIA CROTONENSIS	12 5	12	12					
0	FRAGILARIA CAPUCINA		1						
0	FRAGILARIA VAUCHERIAE		1						
0	FRAGILARIA (LPIL)	12345	5						
0	SYNEDRA ULNA		12 5						
0	SYNEDRA (LPIL)	5	123	4					
0	TABELLARIA FENESTRATA		12	12 4					
0	TABELLARIA FLOCCULOSA	234	1 5						
0	FRAGILARIALES (LPIL)	1							
0	EUNOTIA FLEXUOSA			4					
0	ACHNANTHES MINUTISSIMA	3	1						
0	ACHNANTHES (LPIL)	3	3 5						
0	COCCONEIS (LPIL)		1 3						
0	NAVICULA (LPIL)	1 5	1 5						
0	HEIDIUM (LPIL)	3 5							
0	PINNULARIA (LPIL)	12 5							
0	GOMPHONEMA (LPIL)	5	4						
0	AMPHORA (LPIL)	5							
0	CYMBELLA (LPIL)	1							
0	EPITHEMIA (LPIL)		5						
0	RHODOLODIA GIBBA	5							
0	NITZSCHIA ACICULARIS		5						
0	NITZSCHIA LONGISSIMA		5						
0	NITZSCHIA (LPIL)	1234	12345						
0	CYMATOPLEURA SOLEA	1							
0	SURTIRELLA (LPIL)	3							



Lake Michigan stations 1 through 6 and 10, lake stations 7 through 9, and pond stations 17 through 21. Table 2-4 shows the taxa collected during each of the seven years (1974-1980). A total of 127 taxa (including unidentified forms) were collected in Lake Michigan and nearshore interdunal ponds in 1980, and to date a total of 371 taxa has been collected in seven years of study (Table 2-4). Mean numerical abundance and biovolume of total phytoplankton by station are listed in Table 2-5. Table 2-6 indicates the percent composition of the major phytoplankton groups. Figures 2-2 and 2-3 summarize lake and pond changes in density and biovolume from April 1974 through November 1980.

In 1980, densities increased throughout the year (Figure 2-2). This increase was due to blue-green algae. The algae predominating during the 4 months of sampling were:

<u>April</u>	<u>June</u>
Blue-green	Blue-green
<u>Gomphosphaeria lacustris</u>	<u>Gomphosphaeria lacustris</u> (26%)
Diatom	<u>Oscillatoria amphibia</u> (11%)
<u>Asterionella formosa</u>	<u>Fragillaria crotonensis</u> (10%)
Cryptophyte	
<u>Rhodomonas minuta</u>	
<u>August</u>	<u>November</u>
Blue-green	Blue-green
<u>Gomphosphaeria lacustris</u> (21%)	<u>Gomphosphaeria lacustris</u> (20%)
<u>Aphanothece</u> sp. (68%)	<u>Aphanothece</u> sp. (68%)

(See Tables 2-4 and 2-6.)

Average phytoplankton densities in Lake Michigan have generally increased through time (1975-1980, Figure 2-2). Over the first 3 years of the study, the phytoplankton abundance was relatively uniform. In November 1977 and 1978, August 1979, and in June, August, and November 1980, large densities resulted from high abundances of blue-green algae. A summary of the average density trends for all Lake Michigan stations shown in Figure 2-2 reveals this general increase in phytoplankton density through time. A similar increase in blue-green algae for Lake Michigan has been attributed to depletion of silica in the epilimnion (Schelske 1977). Water quality data show that silica depletion has been ongoing in Lake Michigan (see Figure 2-38) and thus, since biovolume has not increased significantly, the fall increases in density of blue-green algae may not represent any change in the trophic status of Lake Michigan.



Table 2-4

Annual Occurrence of Phytoplankton, Lake Michigan and Nearshore Ponds, 1974 through 1980, Bailly Study Area

	1974		1975		1976		1977		1978		1979	
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Cyanophyta												
Unidentified Cyanophyta	Sp	F W	S F W	Sp*	Sp	S			S	S		
Chroococcaceae												
Unidentified Chroococcaceae	S F*	Sp* S* F	Sp F*	Sp S*	S F	S F			S F	S*	F*	Sp*
Aphanizomenon sp.	S F		Sp S	S*	S*	S	S F		S F	S*		
Aphanocapsa sp.	F*	S*	Sp	S	S							
Aphanothece sp.									Sp* S* F*	S*	Sp* S* F*	S
Chroococcus sp.	S* F W	S F	Sp F	Sp	Sp S F	Sp	Sp S F		F		Sp S F	Sp S F
C. prescottii	S											
C. tinnellii												
Plectosphaerula sp.	S F*	F*	Sp S F		S		F				S F	S
Dactylococcopsis sp.	S		Sp	F*							S*	
Gloeotheca sp.			S F		F		S*		Sp* F	S		
Gomphosphaeria sp.		S					F		F			
G. naegellianum							F		F*			
G. apotina							S F		Sp S*	S*	Sp S*	S
G. lacustris			Sp S F*	Sp* F	Sp S*	F*	Sp S*	F	Sp S*	S*	Sp S*	S
Microcystis sp.		F	Sp S F*	Sp* F	Sp S*	F*	Sp S*	F	Sp S*	S*	Sp S*	S
Rhabdoderma sp.	F											
Chamaesiphonaceae										S		
Chamaesiphon												
Pleurocapsaceae					S						S F	
Unidentified Pleurocapsaceae												
Oscillatoriaceae												
Unidentified Oscillatoriaceae	S F*	Sp*	Sp* S* F	S F	Sp* S*	F	Sp* S*	F	Sp* S*	F	Sp* S*	Sp*
Oscillatoria sp.	Sp* S* F W*	S	Sp* S* F	S F	Sp* S*	F	Sp* S*	F	Sp* S*	F	Sp* S*	Sp*
O. amphibia												
O. princeps					S	S*						
Pseudonitzschia sp.						S*			S	S*	S*	Sp F
Lyngbya sp.						S*						
Nostocaceae												
Unidentified Nostocaceae	S		Sp* S F	Sp F	S F		Sp S* F	S* F	S F	S	S* F	S F*
Anabaena sp.	S* F		Sp	Sp F								
A. circinalis			S*									
A. flos-aquae									S*			
Aphanizomenon sp.											Sp*	
A. flos-aquae						S*						
Cylindrospermum sp.				Sp								
Nodularia sp.												
Raphidiopsis sp.		S										
R. curvata												
Chlorophyta												
Unidentified Chlorophyta	Sp S* F W	S* W	Sp S*	S* F	Sp S* F	Sp S*			S F		Sp S F	S
Chaetophorales					Sp S	S	S					
Unidentified Chaetophorales			S									
Chlorosarcina sp.	F		S									
Pseudonitzschia sp.												
Chlorococcales												
Unidentified Chlorococcales	Sp S* F W	Sp S* F* W	Sp S F	Sp S F	S F	Sp S*	Sp S F	Sp* S F	S F	S	S	Sp* S
Actinastrum sp.												
Ankistrodesmus sp.	S F W	Sp* S F	Sp S* F	Sp S	S F	Sp S	Sp S F	Sp S	S	S	Sp S	Sp
A. convolvulus					Sp S F	Sp S	S	S	Sp S	S	Sp S F	Sp S
A. falcatus	Sp		Sp	Sp S	Sp S F	Sp S	Sp S	S	Sp S	S	Sp S F	Sp S
A. spiralis		F		S								

* Dominant taxa

Sp = spring, S = summer, F = fall, W = winter



Table 2-4 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Cyanophyta		
Unidentified Cyanophyta		
Chroococcaceae		
Unidentified Chroococcaceae		Sp
<i>Aphanellula</i> sp.		
<i>Aphanocapsa</i> sp.	S* F*	
<i>Aphanothera</i> sp.	Sp S F	S
<i>Chroococcus</i> sp.		
<i>C. prescottii</i>		
<i>C. thwaitesii</i>		
<i>Coelosphaerium</i> sp.		
<i>Dictyocapsa</i> sp.		
<i>Gomphonema</i> sp.		
<i>Gomphonema</i> sp.		
<i>G. naegottianum</i>		
<i>G. spongia</i>		
<i>G. taylorii</i>	Sp* S* F*	S*
<i>Microcystis</i> sp.	Sp S	S*
<i>Microcystis</i> sp.		
Chamaesiphonaceae		
Chamaesiphon		S
Pleurocapsaceae		
Unidentified Pleurocapsaceae		
Pleurocapsa sp.	S	
Oscillatoriaceae		
Unidentified Oscillatoriaceae	Sp S F*	Sp S*
<i>Oscillatoria</i> sp.	S*	
<i>O. amphibia</i>	Sp S	
<i>O. thwaitesii</i>		
<i>O. princeps</i>		
<i>Phormidium</i> sp.		
<i>Lynobia</i> sp.	Sp	
<i>L. contorta</i>		
<i>L. thwaitesii</i>		
Nostocaceae		
Unidentified Nostocaceae	S	Sp S
<i>Anabaena</i> sp.		
<i>A. circinalis</i>		
<i>A. flos-aquae</i>		
<i>Aphanizomenon</i> sp.		
<i>A. flos-aquae</i>		
<i>Cylindrocapsa</i> sp.		
<i>Nodularia</i> sp.		Sp S
<i>Raphidiopsis</i> sp.		
<i>R. curvata</i>		
Chlorophyta		
Unidentified Chlorophyta		
Chaetophorales		
Unidentified Chaetophorales		
<i>Chlorosarcina</i> sp.		
<i>Pseudonodularia</i> sp.		
Chlorococcales		
Unidentified Chlorococcales		
<i>Actinastrum</i> sp.		
<i>Ankistrodesmus</i> sp.		
<i>A. convolutus</i>	Sp S	Sp S F
<i>A. falcatus</i>		
<i>A. spiralis</i>		

* Dominant taxa

Sp = spring, S = summer, F = fall, W = winter



services group



Table 2-4 (Contd)

Taxa	Year 7 (1980)		
	Lake Michigan	Ponds	
Chlorophyta (Contd)			
Chlorococcales (Contd)			
Chodatella sp.			
C. ciliata			
C. citriformis			
C. longiseta	S		
C. quadrifida			
Chlorella			
Chlosteropsis sp.			
C. longissima	S		
Coelastrum sp.			
C. microporum	S		
C. cambricum			
Crucigenia sp.			
C. apiculata	S		
C. crucifera			
C. quadrata	S		
C. tetrapedia			
C. rectangularis			
Desmotractum			
Dictyosphaerium sp.			
D. ehrenbergianum	S	F	
D. pulchellum			
Didymocystis			
Francella sp.			
Golenkinia sp.			
G. radata			
Golenkinopsis sp.			S
Kirschneriella sp.			S
K. contorta			
K. lunaris			
K. obesa			
K. subciliata			
Micractinium sp.			
M. pusillum	S		
Myrionecta			
Nephrocystium sp.			
Dorvilia sp.	F*	Sp	F*
O. glomeratiformis			
O. pusilla			
Ourococcus			
Pediastrum sp.			
P. borrmannii			S*
P. duplex	S	Sp	S*
P. simplex			
P. tetras	S		
Pseudochlorella	S		
Quadrifida sp.			
Quadratella			
Scenedesmus sp.			
S. acuminatus	S		S
S. acutus		Sp	
S. arcuatus	S		S
S. armatus	S		
S. carinatus			
S. columnatus			
S. circumfusus			
S. denticulatus			
S. dimorphus			
S. ecoris	S	Sp	S
S. intermedius			
S. opoliensis			
S. quadricauda	Sp	S	F



Table 2-4 (Contd)

	1974		1975		1976		1977		1978		1979	
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Chlorophyta (Contd)												
Chlorococcales (Contd)												
<i>S. spinosus</i>	S	F	S	F	S	Sp	S	Sp	S	F	S	F
<i>Schroederia</i> sp.	F			F	S	S		S			S	
<i>Selenastrum</i> sp.			Sp					S	Sp			
<i>S. gracile</i>		S	F					S				
<i>S. minutum</i>			F					S				
<i>Sorastrum</i> sp.				S	F	S		F	S	F	S	F
<i>Sphaerocystis</i> sp.				S	F	S		S	S	F	S	F
<i>C. schroeteri</i>	S	F			S	S		S	S		S	F
<i>Tetradron</i> sp.	S	F						S				Sp
<i>T. caudatum</i>											S	
<i>T. muticum</i>											S	
<i>T. trigonum</i>							S			Sp		
<i>T. minimum</i>	F			S	S	F	S	F	S			Sp
<i>Tetrastrum</i> sp.		W	Sp	F	S	S		S	S			
<i>Treubaria</i> sp.				F	S	S						
<i>Westella</i> sp.							S					
Dedogonales												
<i>Dedogonium</i> sp.	F		Sp	F			S	F	S	F	Sp	S
<i>D. undulatum</i>				F				S				
<i>Bulbochaete</i> sp.								S				
Cladophorales												
<i>Cladophora</i> sp.								S				
Tetrasporales												
Unidentified Tetrasporales	S	F	W	S	Sp	S	S					
<i>Asterococcus</i> sp.			S					S				
<i>Elakatothrix</i> sp.		F						S	S	F	F	
<i>E. viridis</i>	Sp		S	F	Sp	S	F	S	S	F	S	F
<i>Gloeocystis</i> sp.			S	F	Sp	S	F	S	S	F	S	F
<i>G. gigas</i>		F						F				
<i>G. gelatinosa</i>												
Ulotrichales												
Unidentified Ulotrichales	S	F	W	S	F	Sp	F		S			Sp
<i>Geminella</i> sp.									S	F		
<i>Microspora</i> sp.												
<i>Ulothrix</i> sp.											S	
<i>Radioflum</i> sp.												
Volvocales												
Unidentified Volvocales	F	Sp	S	F	W	Sp	Sp	S	Sp	S	S	F
<i>Carteria</i> sp.			F				Sp	S	F	Sp	S	F
<i>Chlamydomonas</i> sp.	F		F		Sp	S	F	Sp	S	F	Sp	S
<i>Eudorina</i> sp.								S				
<i>E. elegans</i>									Sp		S	
<i>Gonium</i> sp.				Sp				S				
<i>Pandorina</i> sp.							Sp	Sp				
<i>Pedinnomonas</i> sp.					S	S						
<i>Spermatozopsis</i> sp.								S				
<i>Volvox</i> sp.									S			
Zygnematales												
Unidentified Zygnematales	F	Sp	S	F								S
<i>Arthrodesmus</i> sp.			S		Sp	S	F		S		Sp	
<i>Closterium</i> sp.	F		S	F		S	F		S		Sp	
<i>C. gracile</i>									S			
<i>C. kuetzingii</i>												S
<i>C. moniliferum</i>												
<i>C. setaceum</i>								F	S			
<i>Cosmarium</i> sp.	Sp	S	F	S	F	Sp	S		S		S	F
<i>C. botrytis</i>												



Table 2-4 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Chlorophyta (Contd)		
Chlorococcales (Contd)		
S. spinosus		Sp S F
Schroederia sp.		
Selenastrum sp.		
S. gracile		
S. minutum		
Sorastrum sp.		
Sphaerocystis sp.		S
S. schroeteri	Sp S F	S
Tetraedron sp.		
T. caudatum		Sp
T. muticum		
T. trigonum		
T. minimum		S
Tetrastrum sp.		
Treubaria sp.		
Westella sp.		
Oedogoniales		
Oedogonium sp.		Sp
O. undulatum		
Bulbochaete sp.		
Cladophorales		
Cladophora sp.		
Tetrasporales		
Unidentified Tetrasporales		
Asterococcus sp.		
Plakothrix sp.	Sp S F	F
P. striatis		
Planoecystis sp.		
P. glabra		
P. latiosa		
Tetraspora sp.	S	
Ulotrichales		
Unidentified Ulotrichales		
Geminella sp.		
G. interrupta		S
Microspora sp.		
Ulothrix sp.		
Radicalium sp.		
Volvocales		
Unidentified Volvocales		
Carteria sp.		
Phlamidomonas sp.	Sp S F	S F
Tudorina sp.		
T. elegans		
Gonium sp.		
Pandorina sp.		
P. morio		S*
Pedinomonas sp.		
Spermatozoopsis sp.		
Volvex sp.		
Zygnematales		
Unidentified Zygnematales		
Arthrodesmus sp.		
Closterium sp.	S	Sp S
C. gracile		
C. kuetzingii		
C. montiferum		Sp S
C. setaceum		
Cosmarium cosmetum		
Cosmarium sp.	S F	S F
C. botrytis		



Table 2-4 (Contd)

	1974		1975		1976		1977		1978		1979	
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Chlorophyta (Contd)												
Zygnematales (Contd)												
<i>Desmidiium</i> sp.				S		S*						
<i>E. aptogonium</i>		S										
<i>E. fallax</i>		S										
<i>E. swartzii</i>				S								
<i>E. vastrum</i> sp.								S				
<i>Gonatozygon</i> sp.				S				S		Sp	S	
<i>G. pilosum</i>												
<i>Hyallothece</i> sp.				S								
<i>H. mucosa</i>								S				
<i>Microsterias</i> sp.								S				
<i>M. ehrenbergii</i>								S				
<i>M. truncata</i>								S				
<i>Hougenotia</i> sp.	S*	S* F	F	Sp S F	S	Sp S F	S	Sp* S F	Sp	F	Sp	F*
<i>Pleurotaenium</i> sp.		S										Sp S F
<i>Spirogyra</i> sp.		Sp* S F		Sp	F	S*	S	S*				
<i>Spondyliolum</i> sp.				Sp				F				
<i>Taurastrum</i> sp.	S F W	S F W		Sp	F	S*			S F	Sp S*	S	S F
<i>T. arcticon</i>								S				
<i>T. dickiei</i>								S				
<i>T. megacanthum</i>								S				
<i>T. paradoxum</i>								S			S	
<i>T. radicans</i>								S				
<i>T. taurastrum</i> "J"								S*			S*	
<i>T. johnsonii</i>						S						
<i>T. gralatorum</i>						S						
<i>T. longiradiatum</i>				S								
<i>T. ophura</i>				S					F	S		
<i>T. tetracerum</i>				S		S						
Euglenophyta												
Unidentified Euglenophyta		S										
Euglenales												
Unidentified Euglenales	S F	S F		Sp S F	Sp	Sp S			Sp* S	Sp S	Sp S F	S F
<i>Euglena</i> sp.	F	F				Sp S						S F
<i>E. acus</i>		S										
<i>E. spirogyra</i>								S*				
<i>E. gracilis</i> sp.		F				S		S				
<i>Phacus</i> sp.		F	Sp		S	S		Sp S			Sp S	Sp S F
<i>Trachelomonas</i> sp.	Sp	F	Sp		S	S		Sp S F		Sp S	Sp S	Sp S F
Xanthophyta												
Unidentified Xanthophyta	F W											
Rhizochloridales												
Unidentified Rhizochloridales	S											
<i>Stipitococcus</i> sp.	S F		Sp S		Sp		S		S		S F	
<i>Buettneriopsis</i> sp.		Sp*										
Heterococcales												
Unidentified Heterococcales	F	F					S				Sp	
<i>Ophiocytium</i> sp.		S										
<i>Peroniella</i> sp.								S*	F			
Heterotrichales												
<i>Trichomena</i> sp.							S					
<i>T. affine</i>							S					
Chloramoebales												
Unidentified Chloramoebales					Sp	Sp						



Taxa	Lake Michigan	Ponds
Chlorophyta (Contd)		
Zygnematales (Contd)		
Desmidiium sp.		
<u>E. aptogonium</u>		
<u>E. galleyi</u>		
<u>E. swartzii</u>		
<u>E. quadratum</u> sp.		S
<u>Goniatocyon</u> sp.		
<u>G. pilosum</u>		
<u>Hyaliotheca</u> sp.		
<u>H. mucosa</u>		
<u>Microsterias</u> sp.		
<u>M. ehrenbergii</u>		
<u>M. truncata</u>		
<u>Muggeotia</u> sp.		Sp S
<u>PTeurotaenium</u> sp.		
<u>Retrogyra</u> sp.		Sp
<u>Spondylotium</u> sp.		
<u>Staurastrum</u> sp.		Sp S F
<u>S. arctifolium</u>		
<u>S. dickiei</u>		
<u>S. megaganthum</u>		
<u>S. radicum</u>		
<u>S. radiatum</u>		
<u>Staurastrum "j"</u>		
<u>S. johnsonii</u>		
<u>S. grallatorium</u>		
<u>S. longiradiatum</u>		
<u>S. ophiura</u>		
<u>S. tetracerum</u>		
Euglenophyta		
Unidentified Euglenophyta		
Euglenales		
Unidentified Euglenales		
<u>Euglena</u> sp.		S
<u>E. acus</u>		
<u>E. spirigyra</u>		
<u>Lepoclinea</u> sp.		
<u>Phacus</u> sp.	S	
<u>P. longicauda</u>	S	
<u>Trachelomonas</u> sp.	S	Sp S
<u>T. volvocina</u>		Sp
Xanthophyta		
Unidentified Xanthophyta		
Rhizochloridales		
Unidentified Rhizochloridales		
<u>Stipitococcus</u> sp.	S	F
<u>Bumilleriopsis</u> sp.		
Heterococcales		
Unidentified Heterococcales	S	
<u>Ophiocytium</u> sp.		
<u>Peroniella</u> sp.		
Heterotrichales		
<u>Tribonema</u> sp.		
<u>T. affine</u>		
Chloramoebales		
Unidentified Chloramoebales		



Table 2-4 (Contd)

	1974				1975				1976				1977				1978				1979				
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10		Year 11		Year 12		
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	
Chrysophyta																									
Unidentified Chrysophyta	Sp	S F W	Sp	S* F	Sp	S	Sp	S					Sp	S F	Sp	S		S			S		Sp		
Chrysomonadales																									
Unidentified Chrysomonadales	S	F W	S* F W*		Sp	S* F*	Sp*	S* F*	Sp	S F	Sp	S F	Sp	S F	Sp*	F		S		S F		S		Sp	S
Automonas sp.									Sp		Sp		Sp	S*											
Chromulina sp.					Sp*		Sp		Sp		Sp		Sp		Sp			Sp	S F	Sp	S				
Chrysocentrum sp.																									
C. parva																									
Chrysococcus sp.			F W		Sp	S	Sp	S* F			Sp	F	Sp	S	Sp*	S				Sp	S		Sp	S	
Cycloneis sp.					Sp*	F	Sp	F			Sp		Sp		Sp										
Minobryon sp.	S* F W		F W*		Sp*	S* F	Sp*	S	Sp	S F	Sp*	S F	Sp*		Sp*	F	Sp*	S	Sp*	F		S		Sp	
D. bavaricum									Sp		Sp		Sp												
D. -trum	S		F						Sp		Sp		Sp				Sp	S							
D. oliv.	S F				S F				Sp	F	Sp	F		S F			Sp	S		F*		Sp	S F	Sp	S F*
D. pediforme																									
D. sertularia	Sp						S F		Sp		Sp	F	Sp		Sp	F	Sp*	S	Sp*	F*	Sp		Sp	F	
D. sociale	S F		F		F				Sp	S	Sp*		Sp		Sp*		Sp*	S	Sp*		F*	Sp		Sp	
Kephyron sp.					Sp								S		Sp		Sp	S							
Mallomonas sp.		F		F	Sp	S F			Sp	F		F	Sp	S F	Sp*	S				Sp	S		S F		
Synura sp.			Sp	F											Sp		Sp								
S. uvella																	Sp							Sp	F
Ochromonas sp.													Sp		Sp										
Pseudokephyrion sp.									Sp		Sp		Sp		Sp	F	Sp	S							
Stylodrymon								S	Sp				Sp				Sp								
Monosthales																									
Strobelomonas dichotoma		W			Sp								Sp	F			Sp	F			Sp	F			
Monostiga					S																				
Astrosiga radiata																								S	
Chrysocapsales																									
Chrysocapsa sp.		F													Sp*										
Isochrysidales																									
Unidentified Isochrysidales													S				Sp								
Rhizochrysidales																									
Unidentified Rhizochrysidales	S	F	Sp	F			Sp	S F		F															
Chrysopyxis sp.		F																							
Lagynion sp.			S														S								
Salpingorhiza sp.																									
Hyalocylis sp.													S				S								
Stylodococcus sp.													S				S								
Bacillariophyta																									
Centrales																									
Unidentified Centrales	S	W			Sp	S		S			S		S	F		S F			S		Sp	S F	Sp	S F	
Attheya zachvatkini		F																							
Coscinodiscus																									
Cyclotella sp.	Sp*	S* F W*	Sp	S F	Sp*	S F*	Sp		Sp	S F*	S F		Sp	S	Sp	S	Sp	S F			Sp	S		S	
C. chaetoceras					Sp										Sp										
C. glomerata					Sp																				
C. meneghiniana																									
Nitzschia sp.	Sp	S F W		F	Sp	S F	S*		Sp*	S*			Sp	S F		S	Sp	F		S* F*	Sp*	S		S*	
N. islandica													Sp				Sp*	S							
N. varians							S						Sp			S					Sp			S	
N. italica																									
Skeltonema potamos		F			Sp	F			Sp				S F				Sp	S							
Rhizosolenia eriensis	Sp*	F W			Sp				Sp	S F			Sp	F			Sp	S F							
R. longiseta		S																							
R. sp.		S W			Sp*				Sp	S															
Stephanodiscus sp.	S F W		S F		Sp	S* F	Sp	S					Sp	S* F			Sp	S			Sp				
S. astraea					Sp								Sp	S F			Sp*	F			Sp			Sp	



Table 2-4 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Chrysophyta		
Unidentified Chrysophyte	Sp S F	Sp S*
Chrysomonadales		
Unidentified Chrysomonadales	S F	S* F*
Automonas sp.		
Chromulina sp.		
Chrysochromulina sp.		
C. parva		
Chrysococcus sp.	Sp	Sp
C. luteus sp.		
Dinobryon sp.	S F	S
D. bavaricum		
D. cylindricum		
D. divergens	S F	Sp S F
D. pediforme		
D. sertularia		Sp S*
D. sociale	Sp S	
Epipyxis utriculus		Sp
Kephyron sp.		Sp
Mallomonas sp.	Sp S	S
M. akrokomus	S	
Synchryta sp.		Sp
Synura sp.	Sp S	S
S. ovella		
Ochromonas sp.	S	Sp*
Pseudokephryton sp.		
Stylabryon sp.		
Monosigales		
Steleodermis dichotoma	Sp	
Monosiga sp.	S	
Astrosiga radiata		
Chrysocapsales		
Chrysocapsa sp.		
Isochrysidales		
Unidentified Isochrysidales		
Rhizochrysidales		
Unidentified Rhizochrysidales		
Chrysochloris sp.		
Euglenoid sp.		
Sphaerogobbia sp.		
Reticulata sp.		
Stylodiscus sp.		
Bacillariophyta		
Centrales		
Unidentified Centrales		
Attheya zachvatkini		
Coscinodiscus		
Kryptothella sp.	S F	
P. chaetoceras		
P. glomerata	S	
P. meneghiniana		
Melosira sp.	Sp S	Sp
M. islandica		
M. varians		Sp
M. italica	S	S
M. granulata	S	
M. distans		
Skeletonema potamos		
Rhizosolenia erlenbergii		
R. longiseta		
R. sp.	Sp S	
Stephanodiscus sp.	S	
S. astraea		



Table 2-4 (Contd)

	1974		1975		1976		1977		1978		1979	
Taxa	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)												
Centrales (Contd)												
<i>S. diadema</i>			Sp* S F				S F		Sp F		F	
<i>S. hantzschii</i>							F					
<i>S. niagarae</i>							F					
Rhizosoleniales												
<i>Rhizosolenia eriensis</i>											Sp S F	
Pennales												
Unidentified Pennales	Sp S F W	Sp S F W	Sp* S* F	Sp* S* F*	Sp S F	Sp S F*		Sp*		Sp S F	Sp S F	Sp S F
<i>Achnanthes</i> sp.	Sp	Sp S F		Sp F	Sp	Sp S		Sp S F	S	Sp S F		Sp S F
<i>Amphora</i> sp.												
<i>Amphipora</i> sp.					F	S						Sp S F
<i>A. ornata</i>							Sp	F				
<i>Amphipleura pellucida</i>			F						Sp			
<i>Anomoeoneis vitrea</i>												S
<i>A. sphaeropleura</i>												F
<i>Asterionella</i> sp.					S							
<i>A. formosa</i>	Sp S* F* W*	F	Sp* S F		Sp* S* F*	Sp F	Sp* S F	Sp	Sp* S F	S	Sp* S F*	F
<i>Cocconeis</i> sp.		F						F	S F	Sp S	Sp	
<i>Cymatopleura</i> sp.		F	F									
<i>C. solida</i>							Sp S F		Sp		Sp	
<i>Cymbella</i> sp.	Sp F	Sp* S F W		F			S		Sp			
<i>Diatoma</i> sp.			Sp S		Sp		S		Sp		Sp S	
<i>D. tenuis</i>			Sp S F	Sp	Sp* S*	S	Sp S F	S	Sp S	S	Sp F	
<i>D. tenuis</i> v. <i>elongatum</i>			Sp S	Sp	Sp							
<i>D. vulgare</i>					Sp S							
<i>Epithemia</i> sp.												S
<i>Eunotia</i> sp.		Sp S F W*	Sp	Sp F*			Sp* S		Sp S			Sp S F
<i>Fragilaria</i> sp.	Sp S F* W	Sp S F	Sp S F	Sp F*	Sp S F	S F*	Sp S F	Sp* S F	Sp S F	Sp S F	Sp S	Sp S F*
<i>F. capucina</i>		F					F		Sp		Sp	
<i>F. crotonensis</i>	Sp S* F* W	F	Sp* S F*	F	Sp* S* F*	F	Sp* S F	Sp F	Sp* S F*	Sp	Sp S* F*	Sp F
<i>F. glinnata</i>											Sp	
<i>F. vaucheria</i>						F			F*	F		
<i>Frustulia</i> sp.				F								
<i>F. rhomboides</i>												
<i>Gomphonema</i> sp.	Sp S F	Sp S F W		Sp* S* F*		F	Sp S F	Sp S	Sp S F	Sp S F	S	Sp S F
<i>G. acuminatum</i>				Sp F						F		S
<i>G. acuminatum</i> v. <i>coronata</i>		F										
<i>G. truncatum</i>									Sp			
<i>Gyrodinium</i> or <i>Pleurosigma</i>							S	S F			S	
<i>Gyrodinium</i>												
<i>Meridion circulare</i>							Sp		Sp	S		
<i>Hannaea arcus</i>		Sp										
<i>Hantzschia</i>										S		
<i>H. viticula</i> sp.	Sp		S		Sp		S F		Sp	Sp S* F	Sp	Sp F
<i>Neidium tridits</i>												
<i>Nitzschia</i> sp.	F W		Sp F	S	Sp S F	Sp	Sp S F	Sp S	Sp S F	Sp S F	Sp S	Sp S
<i>N. acicularis</i>	Sp S F W		F	Sp* S*	Sp S	Sp	Sp S F	Sp S	Sp S F	Sp S F	Sp S F	Sp S
<i>N. closterium</i>					S						Sp S F	
<i>N. linearis</i>									Sp			
<i>N. longissima</i>					Sp							
<i>N. holatice</i>	F		Sp				Sp	Sp	Sp		Sp F	
<i>N. scalares</i>												S F
<i>N. sigmoides</i>												
<i>Pinularia</i> sp.		W	F				F		Sp* S			
<i>Rhizosolenia</i> sp.			S									
<i>R. curvata</i>	F		Sp	Sp	S							
<i>Rhopalodia</i>								F				
<i>R. gibba</i>		S*							Sp	Sp S		
<i>Stauroneis</i> sp.				F								
<i>Surirella spiralis</i>	F											
<i>S. ovata</i>											Sp	
<i>Surirella</i> sp.		W							S	S		
<i>Synedra</i> sp.	Sp* S F W	Sp* S F W	Sp* S* F	Sp S F	Sp* S F	Sp F*	Sp* S F	Sp S F	Sp S	Sp S F	Sp S F	Sp* S
<i>S. acus</i>							Sp		Sp S		Sp	
<i>S. ulna</i>	F		S				Sp S F		Sp S	Sp*		
<i>S. ulna</i> v. <i>chaseana</i>	F											



Table 2-4 (Cont'd)

	1974		1975		1976		1977		1978		1979	
Taxa	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Cont'd)												
Pennales (Cont'd)												
Tabellaria sp.	M		F				Sp* S*	S	S		S	
T. fenestrata					Sp S	Sp	S		S			
T. flocculosa	S* F* W*	Sp* S F	Sp* S* F*	Sp F	Sp S F*	F	Sp* S* F	Sp S F	Sp S F*	Sp F*	Sp S F	Sp S F
Unidentified Fragillariaceae			Sp		Sp F		Sp S F		Sp S	S F	Sp	Sp
Unidentified Actinanthales						F						
Unidentified Naviculales					Sp	F	Sp F	Sp S	S	S		
Cryptophyta												
Unidentified Cryptophyta	Sp F W	S F*										
Cryptomonadales												
Unidentified Cryptomonadales	S F* W	S* F* W*	Sp S F	Sp* S F*	Sp S	Sp S	S F	Sp S F	Sp S	S		S
Chroomonas sp.	F*	F*	Sp S F	S F*	S	Sp S F	Sp S F	Sp S F	Sp S	Sp S	S*	Sp S F
Cryptomonas sp.	S* F* W	Sp* S* F W*	Sp S F*	Sp* F*	Sp S* F*	Sp* S* F*	Sp S F	F	Sp S F	Sp S* F*	Sp S F	Sp S F
C. merisomii									S	Sp S F	Sp	Sp
C. ovata	Sp									Sp S* F		Sp
C. reflexa								F				Sp
Rhodomonas sp.	S* F W	Sp S*	Sp* S F*	Sp* S* F*	Sp* S* F*	Sp S* F*			S F		Sp S	S
R. lacustris	S* F*	S F	Sp*		Sp							
R. lens					Sp							
R. minuta							S	S				
Cyanomonas							S*	S* F	Sp S F	Sp S F*	Sp S F	S F
Pyrrophyta												
Unidentified Pyrrophyta	W	S* W Sp					S	Sp				
Gymnodiniales												
Unidentified Gymnodiniales	S	F										
Gymnodinium sp.	F	S F		F	S	Sp S	Sp S	F	Sp S	Sp F	S	
Peridinales												
Unidentified Peridinales	S F	S F W	Sp		Sp S*	Sp S	S	Sp			S	S
Ceratium sp.					S*							
C. hirundinella	S F	S					S	S*	S*		S	
Glenodinium sp.		S*	Sp	Sp* S								
Gonyaulax sp.		F		F		S						
Peridinium sp.					S	S F*	Sp S*	Sp* S F	Sp S	Sp* S*	S F	F
P. cinctum												
P. gymnodinium							S	S				S
P. inconspicuum							S	S	S	S	Sp S	Sp S F
P. gatunense									S	S*		F
P. steinii												
Dinococcales												
Cystodinium sp.												S
Unidentified Algae			Sp S F	F	Sp						Sp S F	Sp S



Table 2-4 (Contd)

Taxa	Year 7 (1980)			
	Lake Michigan		Ponds	
Bacillariophyta (Contd)				
Pennales (Contd)				
<i>Tabellaria</i> sp.				
<i>T. fenestrata</i>		S F		F*
<i>T. flocculosa</i>	Sp S		Sp	F
Unidentified Fragilariaceae				
Unidentified Achnanthes				
Unidentified Naviculales				
Cryptophyta				
Unidentified Cryptophyta				
Cryptomonadales				
Unidentified Cryptomonadales				
<i>Cryptomonas</i> sp.	Sp S		Sp S F	
<i>Cryptomonas</i> sp.	Sp S		Sp S F*	
<i>C. erosa</i>		S		
<i>C. marssonii</i>	Sp S		S F	
<i>C. ovata</i>				
<i>C. reflexa</i>	Sp			
<i>Rhodomonas</i> sp.				
<i>R. lacustris</i>				
<i>R. lens</i>				
<i>R. minuta</i>	Sp* S		Sp S F	
<i>Cyanomonas</i> sp.	Sp			
Pyrrophyta				
Unidentified Pyrrophyta				
Gymnodinales				
Unidentified Gymnodinales				
<i>Gymnodinium</i> sp.	S			
Peridinales				
Unidentified Peridinales				
<i>Ceratium</i> sp.				
<i>C. hirundinella</i>			S	
<i>Glenodinium</i> sp.			S	
<i>Gonyaulax</i> sp.				
<i>Peridinium</i> sp.	S		S F	
<i>P. cinctum</i>			Sp S	
<i>P. gymnodinium</i>			Sp S	
<i>P. inconspicuum</i>	Sp S		Sp S	
<i>P. gatunense</i>				
<i>P. stenoii</i>				
Dinococcales				
<i>Cystodinium</i> sp.				
Unidentified Algae				



Table 2-5

Mean Phytoplankton Density (No./ml) and Biovolume ($\mu\text{l/l}$), Bailly Study Area, 1980

<u>Station</u>		<u>Apr</u>	<u>Jun</u>	<u>Aug</u>	<u>Nov</u>
Lake					
1	D*	9,397	8,646	40,421	12,359
	B	7.89	5.36	6.44	7.81
2	D	6,083	4,771	141,042	5,571
	B	7.48	4.63	7.19	2.80
3	D	4,431	7,133	53,872	67,767
	B	2.82	4.15	6.30	5.15
4	D	8,255	18,292	88,654	46,301
	B	2.92	14.32	7.53	12.11
5	D	3,187	5,736	39,896	15,940
	B	3.19	7.44	8.43	11.90
6	D	5,047	5,546	34,739	21,730
	B	4.36	4.20	5.98	3.40
7	D	3,108	26,057	447,122	28,178
	B	3.22	11.49	39.88	5.95
8	D	3,739	16,655	49,121	25,190
	B	3.64	8.67	6.57	3.96
9	D	8,712	8,451	37,986	93,214
	B	3.03	8.93	5.61	20.62
10	D	4,601	9,957	46,537	19,654
	B	6.64	5.63	6.52	6.87
Nearfield \bar{x} (1-6, 10)	D	5,578	8,888	59,804	41,343
	B	5.40	6.35	6.83	7.09
Farfield \bar{x} (7-9)	D	5,186	17,054	178,076	48,861
	B	3.30	9.70	17.35	10.17
Pond					
17	D	4,559	28,918	**	**
	B	3.93	47.05		
18	D	9,415	16,972	**	**
	B	6.14	7.75		
19	D	13,468	1,866	8,228	1,573
	B	9.66	29.78	20.52	11.97
20	D	26,513	4,985	7,834	1,755
	B	8.50	66.57	93.83	5.42
Cowles Bog 21	D	6,339	3,406	479	765
	B	37.73	8.12	0.79	0.45
Pond B \bar{x} (17, 18)	D	6,987	22,945	**	**
	B	5.03	27.42		
Pond C \bar{x} (19, 20)	D	19,990	3,425	8,031	1,664
	B	9.08	48.15	57.17	8.70

* D = Density; B = Biovolume.

** Pond B was dry; no samples collected.



Table 2-6

Percent Composition of Major Phytoplankton Groups, Bailly Study Area, 1980

Station	Taxon	Apr		Jun		Aug		Nov	
		Density	Biovolume	Density	Biovolume	Density	Biovolume	Density	Biovolume
Lake (1-10)	Cyanophyta	33.7	1.2	58.4	10.0	94.1	22.5	94.5	14.5
	Chlorophyta	7.5	17.3	6.0	4.2	3.9	11.3	0.6	2.6
	Bacillariophyta-Centric	18.0	25.0	2.5	8.4	0.7	10.1	0	0.3
	Bacillariophyta-Pennate	23.0	42.9	23.1	62.8	1.0	53.3	4.5	81.0
	Total %	82.2	86.4	90.0	85.4	99.7	97.2	99.6	98.4
	No. Taxa	43	43	61	61	47	47	24	24
Pond (17-21)	Cyanophyta	8.7	0.2	46.0	0.2	3.9	0.4	0	0
	Chlorophyta	12.6	25.6	37.3	5.3	40.6	7.5	41.1	55.9
	Bacillariophyta-Centric	0.6	1.5	1.6	0.4	0	0	0	0
	Bacillariophyta-Pennate	12.1	52.2	8.4	2.9	1.5	0.8	35.5	30.9
	Total %	34.0	78.5	93.3	8.8	46.0	8.7	76.6	86.8
	No. Taxa	51	51	47	47	25	25	18	18

Density continued to exhibit seasonal changes without apparent consistent trends within the nearshore ponds (Figure 2-3). However, through 1979 there had been a trend of increasing densities each year. During 1980, densities in the ponds were lower than during 1979 and ended the trend toward increasing density. Highest density and biovolume were observed in April and August, respectively. The ponds contained mostly green algae (33 percent), while the biovolume was comprised primarily of green algae and pennate diatoms.

The density and biovolume peaks during 1974, 1975, and 1976 coincided quite well; however, Cladophora sp. in Pond C caused larger biovolume in relation to cell density in August 1977. In April 1978, large desmids and diatoms caused the same disparity, whereas the inverse (high cell densities with low biovolume) occurred in August 1978 due to a bloom of the blue-green algae Microcystis sp. and Aphanothece sp. During 1980, the biovolume-density disparities in June and August were due to an abundance of the large dinoflagellates Peridinium gatu-nense and Ceratium hirundinella (June) and Peridinium cinctum and Ceratium hircus (August). No association between these abundance or biovolume variations and plant operation is suspected.

During April the chrysophyte, Ochromonas sp. made up 47 percent of the density but was only present in Pond C. In June, Gomphosphaeria lacustris and Microcystis sp. made up 21 percent and 22 percent, respectively, of the pond densities but these were present only in Pond B. August samples showed large

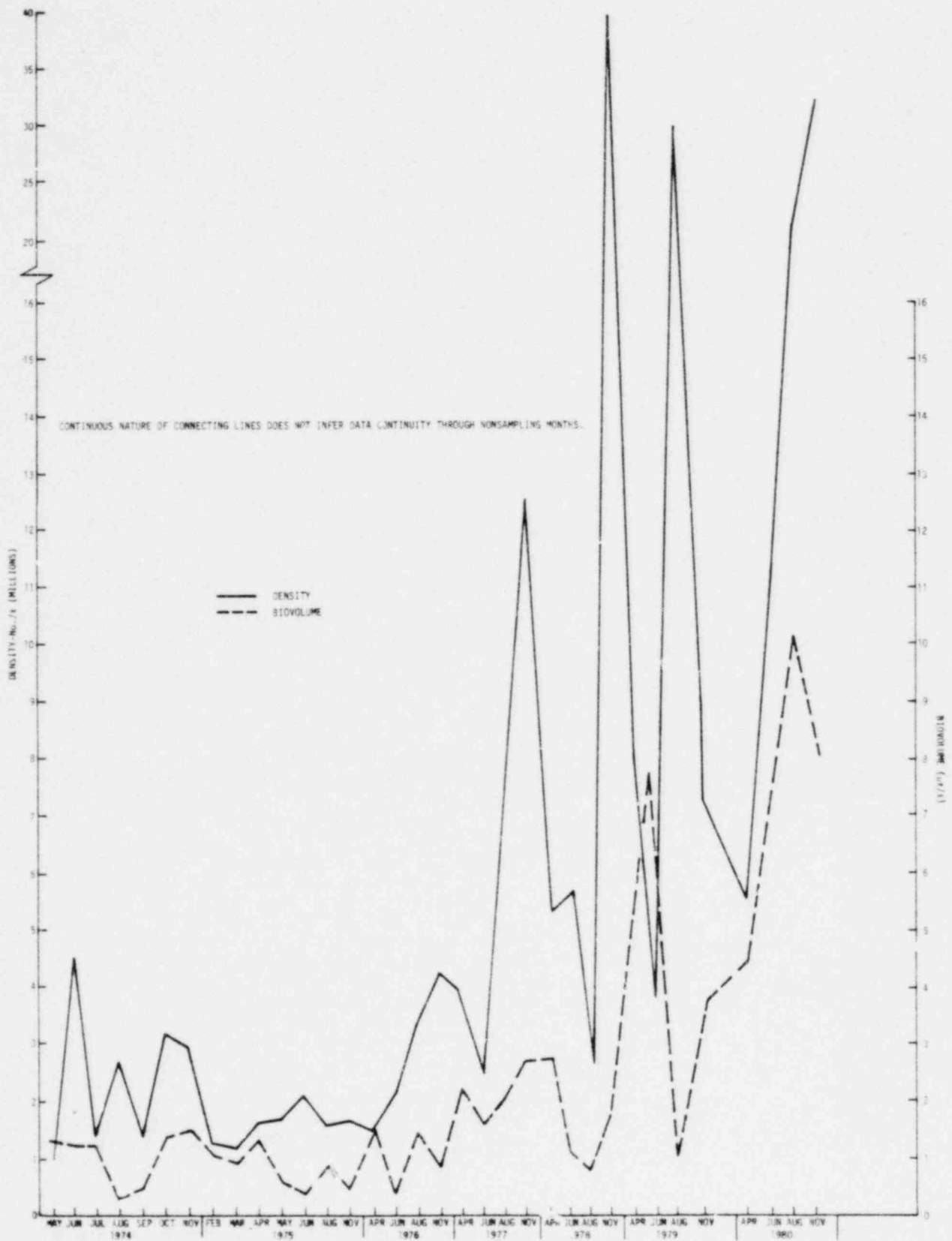


Figure 2-2. Mean Phytoplankton Density and Biovolume,
Lake Michigan, Bailly Study Area, 1974-1980



densities of Pediastrum boryanum (22 percent) and Dinobryon sertularia (38 percent) but these only occurred in Pond C (Pond B was dry). Tabellaria fenestrata (26 percent) and Cryptomonas sp. (16 percent) were the predominant organisms, occurring almost solely in Pond C. These data indicate that each pond (bog), although sharing geographic proximity, functions as an individual system.

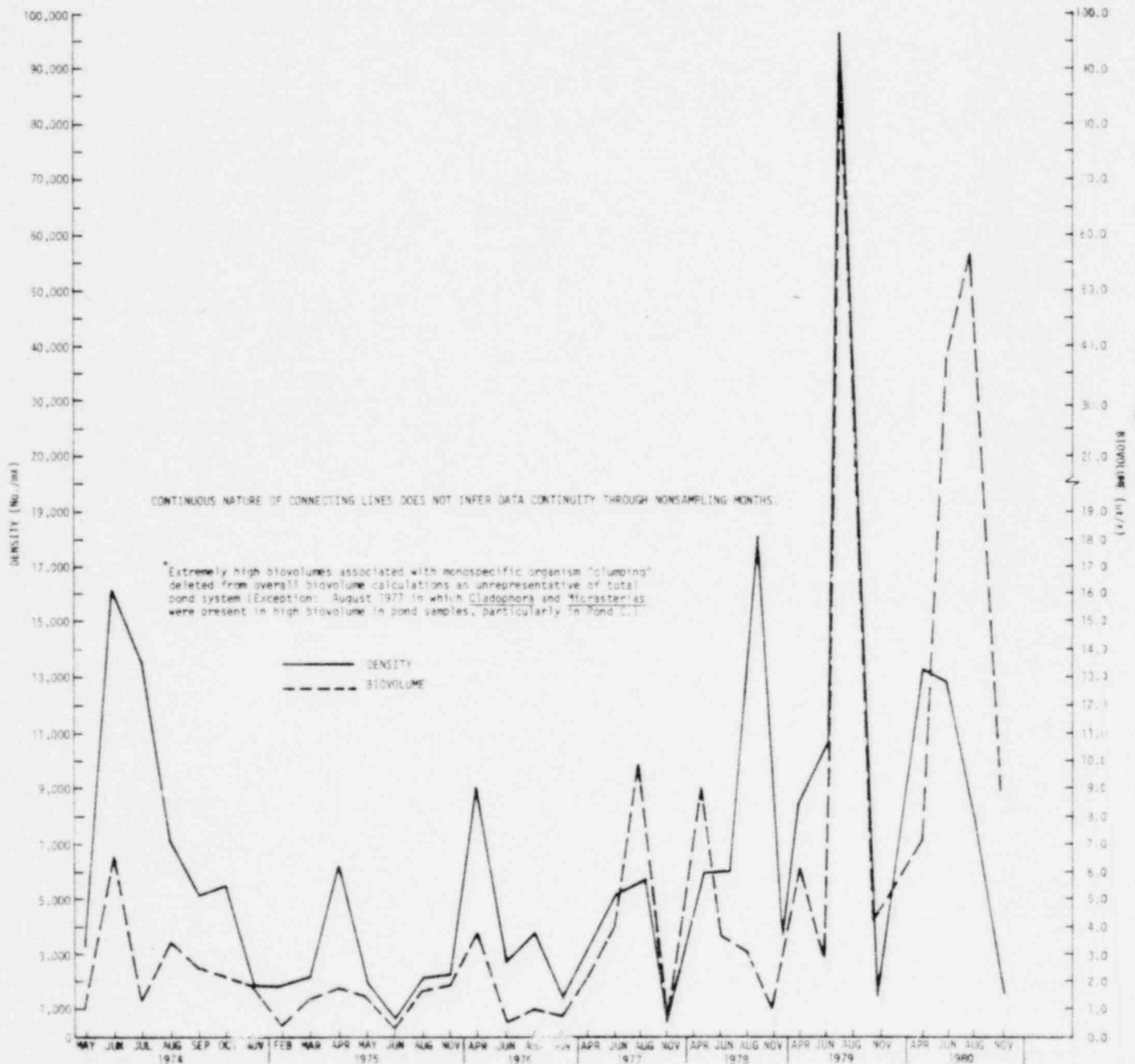


Figure 2-3. Mean Phytoplankton Density and Biovolume, Nearshore Ponds, Bailly Study Area, 1974-1980



Average densities at each depth contour within Lake Michigan indicate small and variable differences among the 15-, 30-, and 50-foot depth contours from 1975 through 1979 (Figure 2-4). In 1980, marked differences were noted with the nearshore samples generally having higher densities except in November when offshore densities were higher. Phytoplankton density increased through time, marked by autumn peaks of increasing magnitude in 1976, 1977, 1978, and 1980. During 1980, highest abundance occurred in August. The dominant group of organisms contributing to this August peak were the blue-green algae.

In August 1980 there was a large bloom of blue-green algae (Table 2-6), composed of Aphanothece sp. and Gomphosphaeria lacustris as was the case in 1979. The 15-ft contour had a higher density (192 million cells per liter) than the 30- and 50-ft contours. This occurrence may be due to a correlation between abiotic and biotic factors, although the data do not provide sufficient information to define such a correlation.

Density and biovolume for depth contours averaged over six years are presented in Figures 2-5 and 2-6. There are no apparent density differences with distance from shore even though differences are quite apparent during 1980. Overall average density in August 1978 is decreased relative to the 1977 summary, reflecting slightly decreased density of blue-green algae in August 1978; blue-green algae densities increased in August 1979 and again in August 1980. The six-year summary data (Figure 2-5) also indicate an overall density increase in November at the two offshore stations.

Phytoplankton biovolume (Figures 2-6 and 2-7) reflects the limiting effect of available nutrients. While densities fluctuated greatly with changes in cell size of dominant species, the seasonally averaged phytoplankton biomass for the monitoring period, 1975 to 1980 (Figure 2-6), showed only slight fall and spring increases. The spring increase may be attributed in part to replenishment of epilimnion nutrients during winter mixing. During stratification (summer and fall), mixing takes place to a depth of 10 meters (Figure 2-4) and nearshore transects (15-ft and 30-ft) support more biovolume than the 50-ft stations.

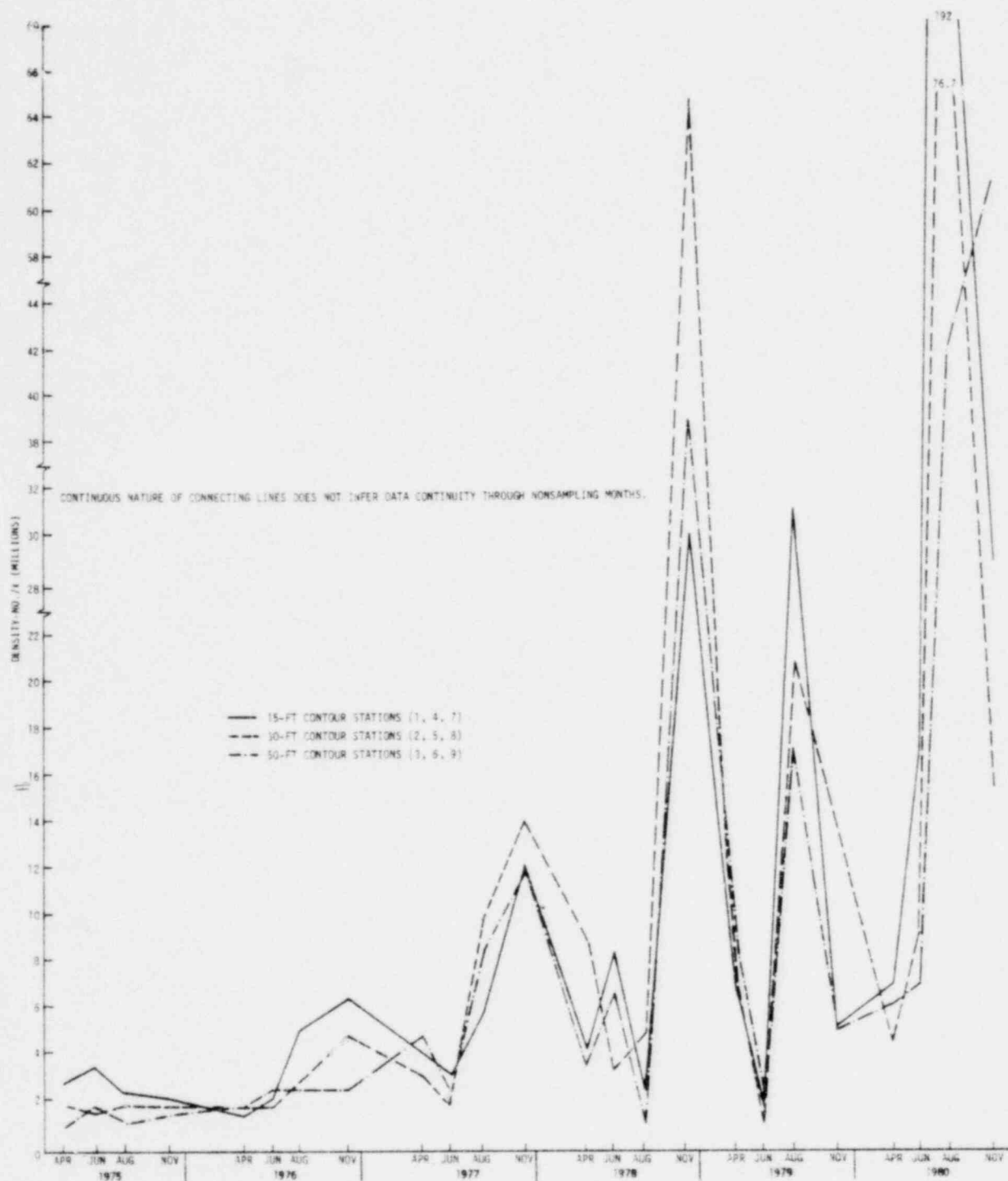


Figure 2-4. Phytoplankton Density, Lake Michigan Stations, Bailly Study Area, 1975-1980

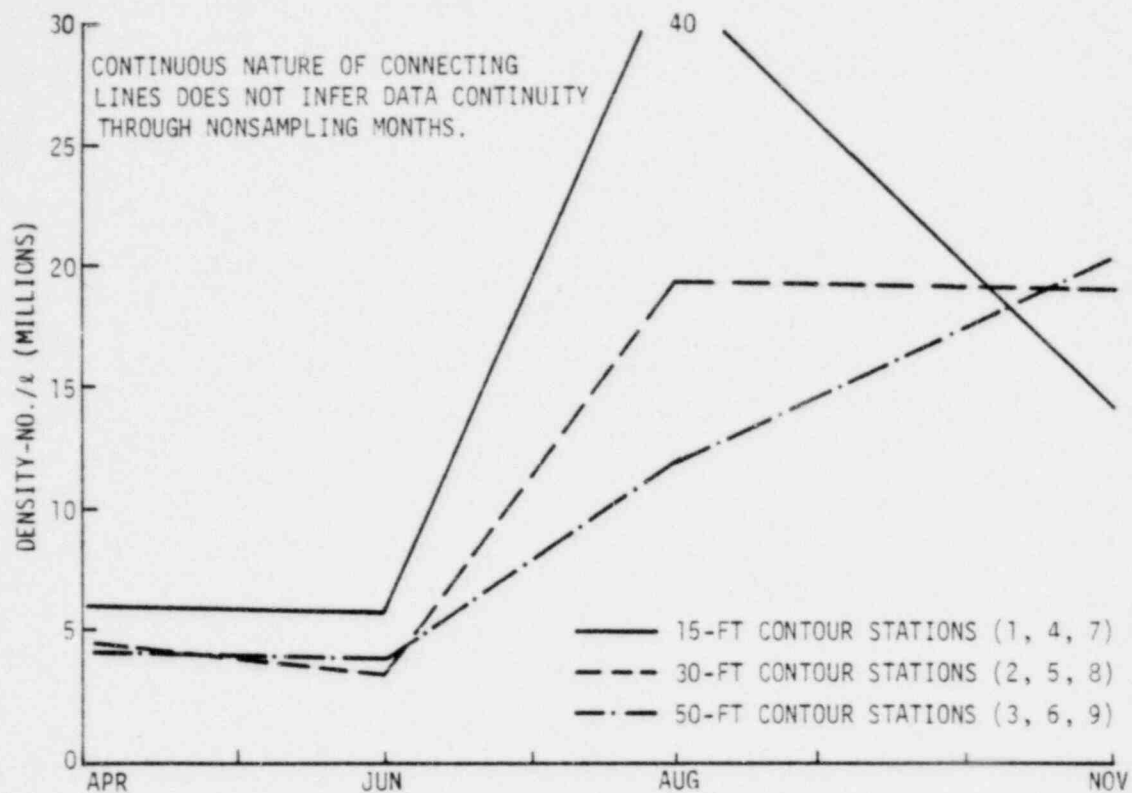


Figure 2-5. Mean Phytoplankton Density at Lake Michigan Stations, Bailly Study Area Summed over 1975-1980

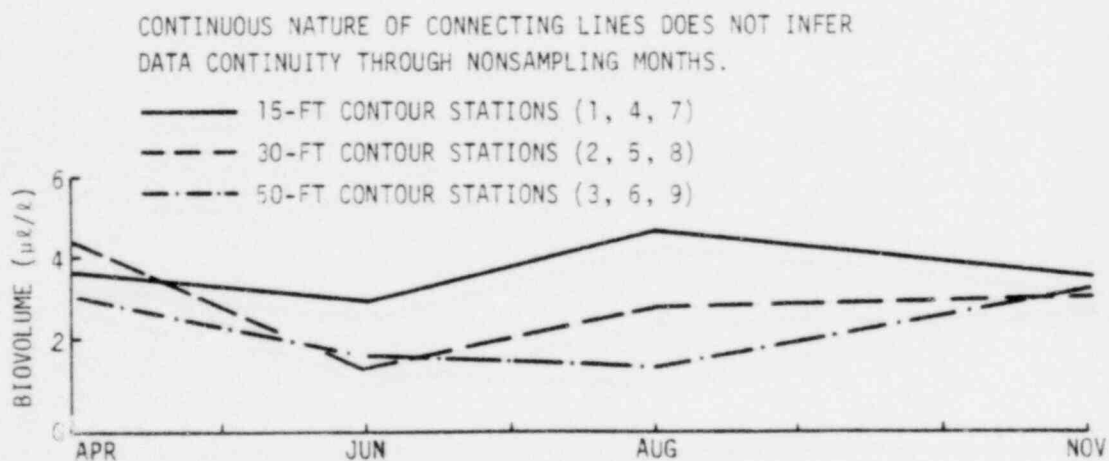


Figure 2-6. Mean Phytoplankton Biovolume at Lake Michigan Stations, Bailly Study Area Summed over 1975-1980

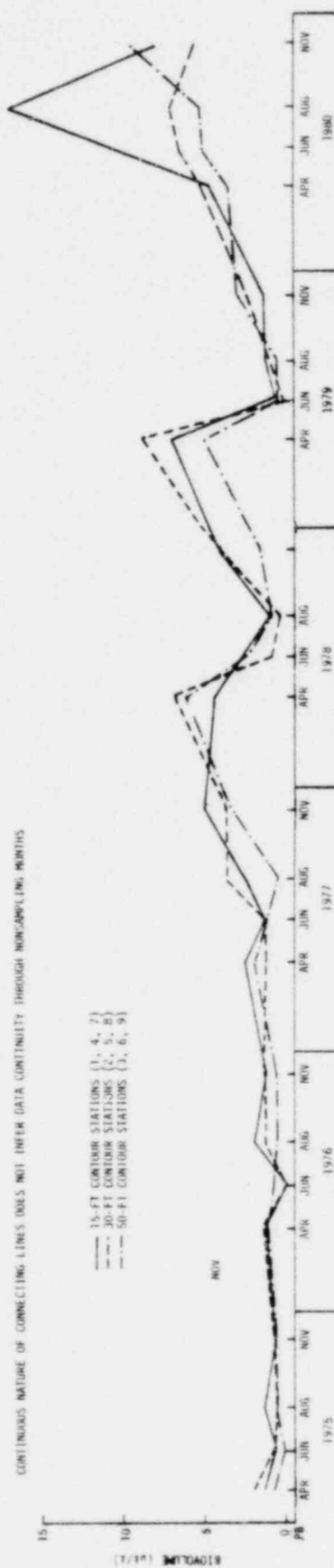


Figure 2-7. Phytoplankton Biovolume, Lake Michigan, Bailly Study Area, 1975-1980



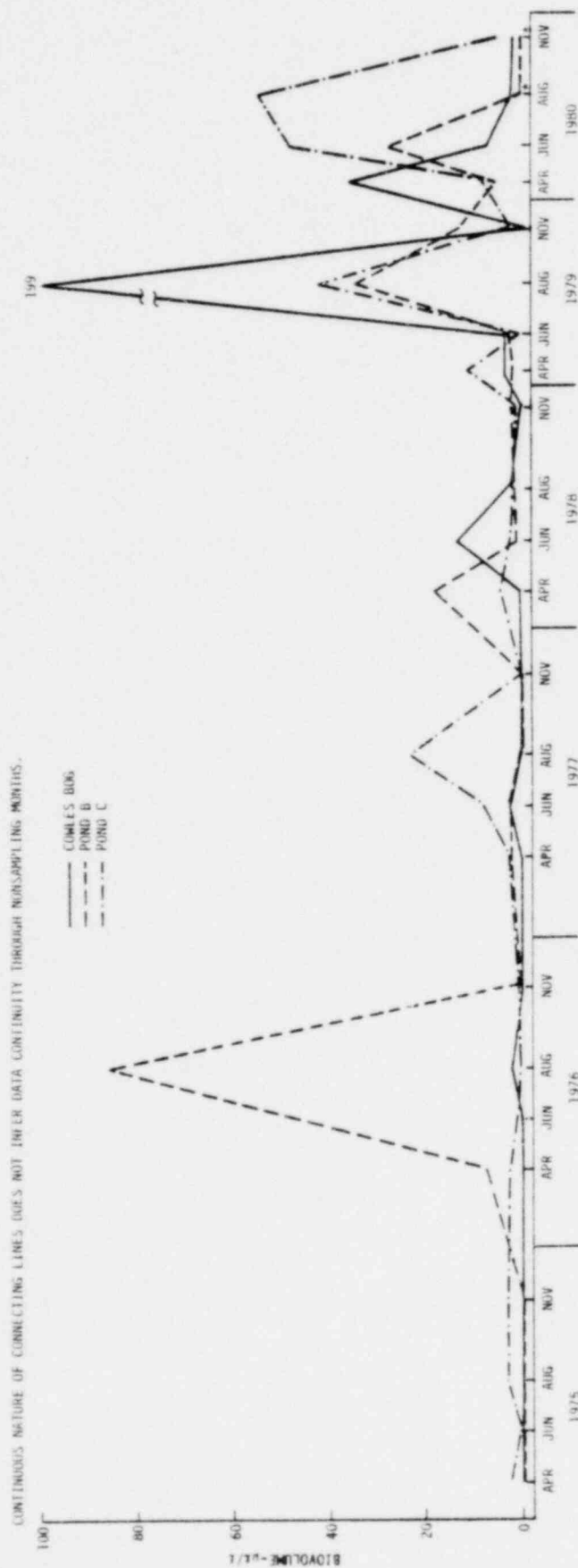
This annual cycle is seen in Figure 2-7, where slight increases are apparent each April, and somewhat larger peaks occurred in the fall of 1977, 1978, 1979, and 1980. Stations along the nearshore contour (1, 4, and 7) generally had yielded higher biovolume concentrations during late summer and fall than the stations along the 50-ft contour. This was true for August 1980 but during November, the large diatom Tabellaria fenestrata was relatively abundant at the deep water contour and very scarce near shore. Tabellaria fenestrata comprised a large part of the November biovolume.

Phytoplankton biovolume in the ponds was highly variable (Figure 2-8). The highest peak for 1980 occurred during August on Pond C and was due to large species of dinoflagellates. Cowles Bog had a high biovolume (37.73 $\mu\text{l/l}$) in April due to large amounts of Spirogyra sp. and Pinnularia sp., a green algae and a diatom, respectively.

Peaks recorded in ponds B and C during 1976 and 1977 (Figure 2-8) were the result of algal clumps which did not disperse homogeneously. These individual results are reflected in the 7-year summary (Figure 2-9) as biovolume peaks for ponds B and C in August, even though high densities for these stations occurred in April and August (Figures 2-10 and 2-11). Over the 7-year monitoring period, Cowles Bog showed the highest peaks overall in August for both mean density (Figures 2-10 and 2-12) and mean biovolume (Figure 2-10).

An organic pollution index was devised by Palmer (1969) based on a rating of pollution-tolerant algae. The scheme was synthesized by Palmer from 269 reports by 165 authors. An index was established for the top 20 genera and/or species thus identified. An organism is called "present" in a sample if there are 50 or more individuals per milliliter. A total of 20 points (out of 44 possible if all 20 genera are found or 51 if all 20 species are found) or more for a sample is interpreted as evidence of high "organic loading," and 15 to 19 points is probable evidence of considerable "organic loading."

In August 1980, the Palmer index was 18 for Lake Michigan and 27 for the interdunal ponds. The score for Lake Michigan was higher than in 1979 and resulted from nearshore species dominance.



* Pond B was dry in August and November 1980.

Figure 2-8. Phytoplankton Biovolume, Nearshore Ponds, Bailly Study Area, 1975-1980

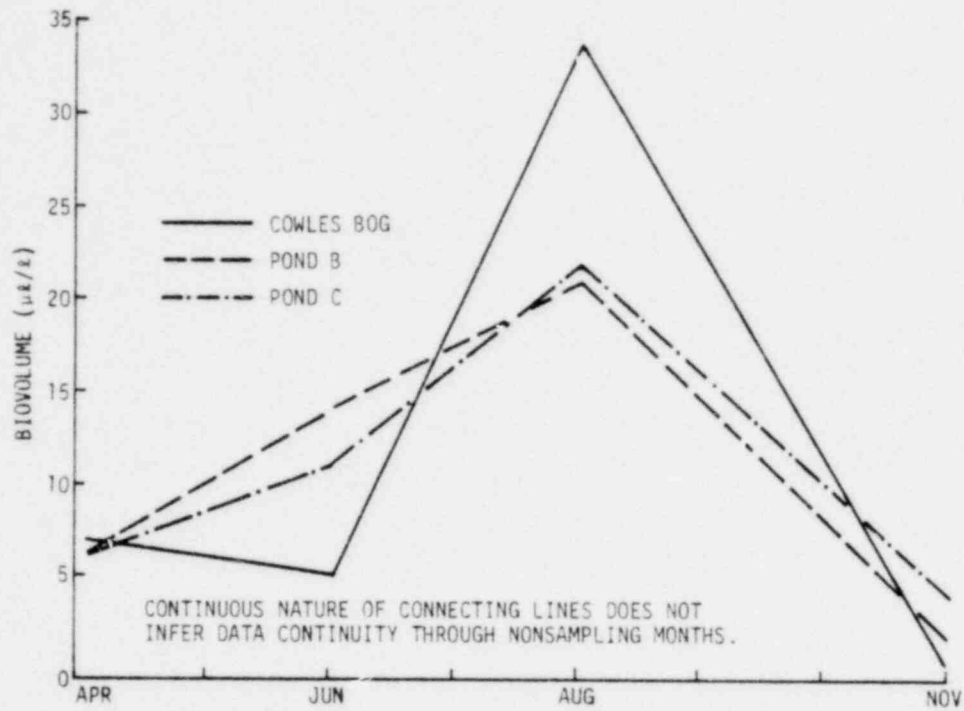


Figure 2-9. Mean Phytoplankton Biovolume, Nearshore Ponds, Bailly Study Area, Summed over 1975-1980

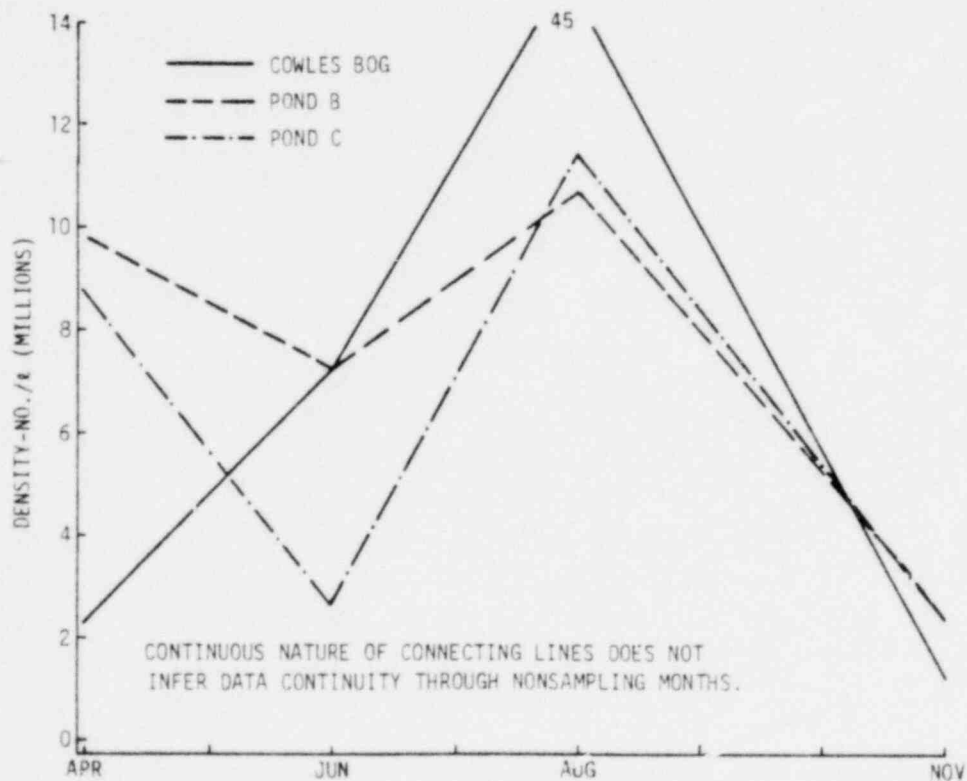
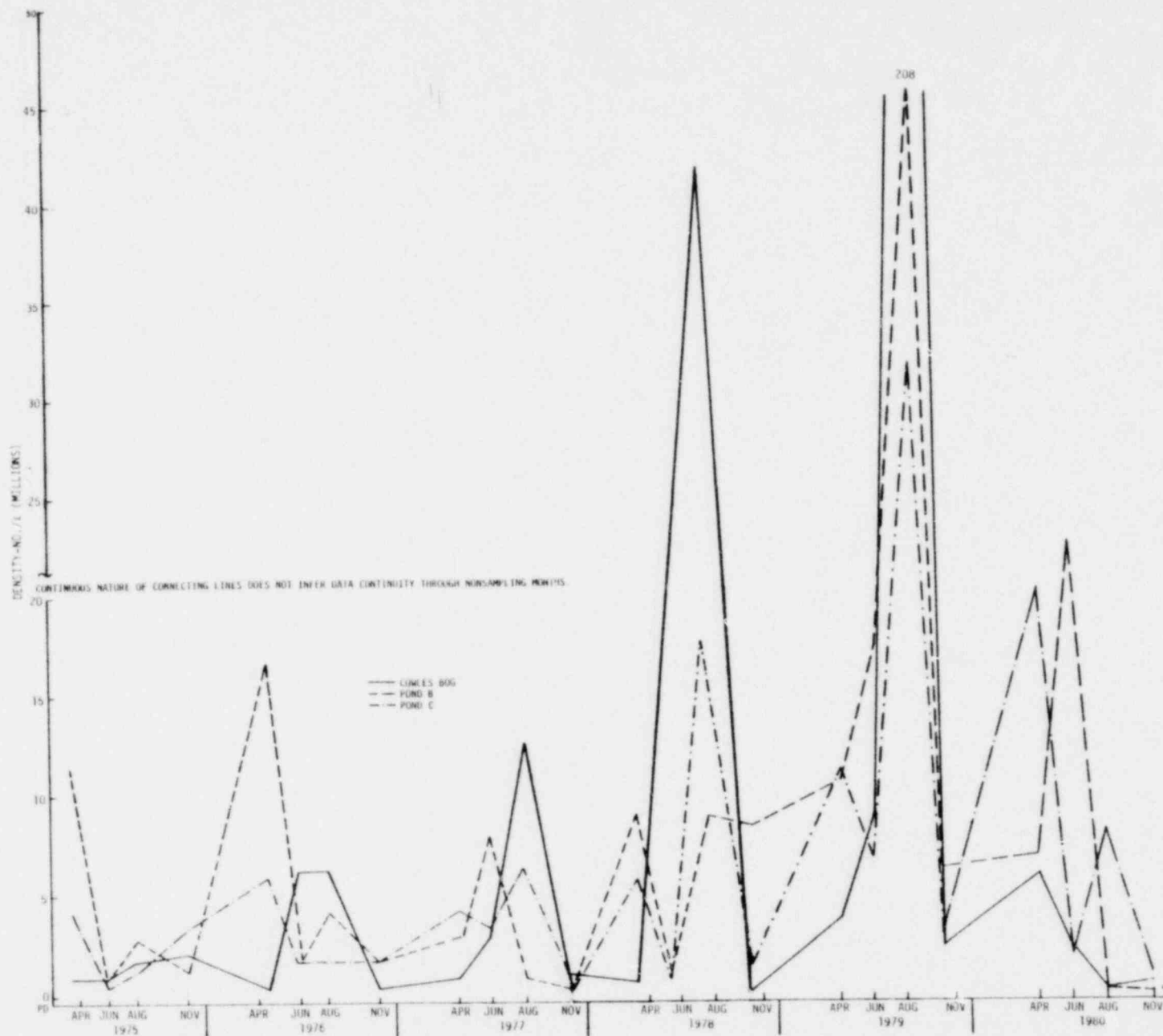


Figure 2-10. Mean Phytoplankton Density, Nearshore Ponds, Bailly Study Area, Summed over 1975-1980



* Pond B was dry to August and November 1980.

Figure 2-11. Phytoplankton Density, Nearshore Ponds, Bailly Study Area, 1975-1980



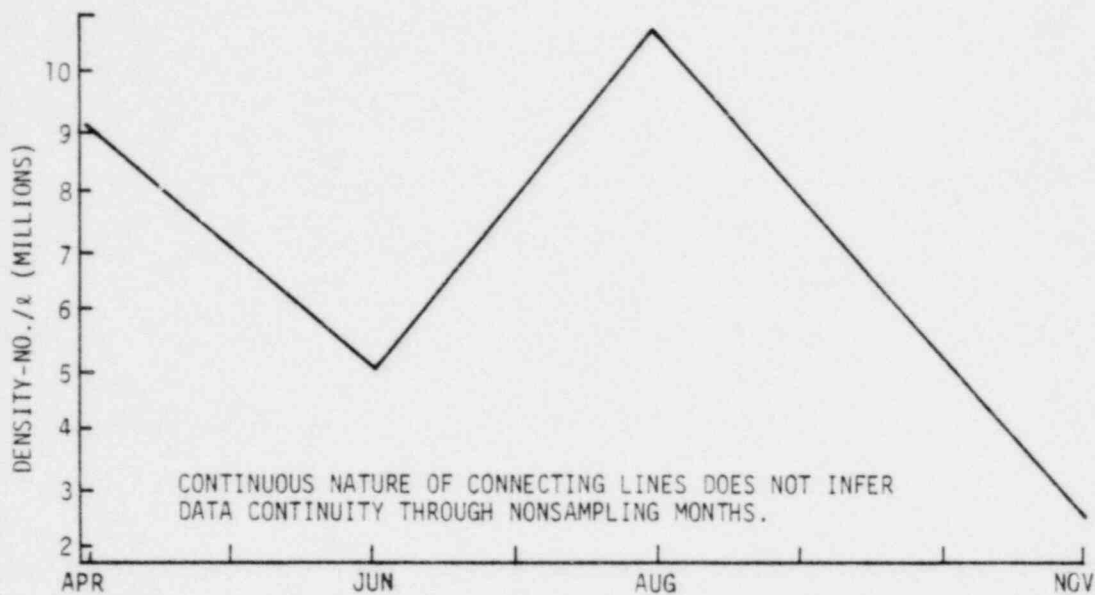


Figure 2-12. Mean Phytoplankton Density at Nearshore Pond Stations, Bailly Study Area Summed over 1975-1980

2.1.3.2 Phytoplankton Chlorophyll *a* and Productivity. Chlorophyll *a* and productivity levels are shown for sampling years 1-6 in Figure 2-13 and 2-14. Primary production and levels of chlorophyll *a* were lower than those observed in 1979. Lake Michigan had peak levels of chlorophyll *a* in November 1980 and lowest levels in June. Chlorophyll *a* degradation was noted in some of the lake samples which may be the reason for the overall low values.

The ponds exhibited highest chlorophyll *a* concentrations in April 1980 and lowest in August (Figure 2-13). The values are among the lowest for the 6-year period of study. The loss of Pond B samples as a result of low water after June and the overall low rainfall year may have been a factor in the species composition changes and relatively low quantity of chlorophyll *a* extracted.

During 1980, the Lake Michigan primary production was also very low, similar to the levels noted in 1974 (Figure 2-14). Highest productivity, much lower than the 1979 peak, was in April with lowest phytoplankton primary production in August (Figure 2-14). The ponds exhibited somewhat higher production than did Lake Michigan during April and June with lowest in August (Figure 2-14). No consistent seasonal trends in primary production have been observed from 1974-1980 in the ponds; however, Lake Michigan had exhibited high production in November during four of the prior 6 study years (Figure 2-14); this did not occur in 1980.

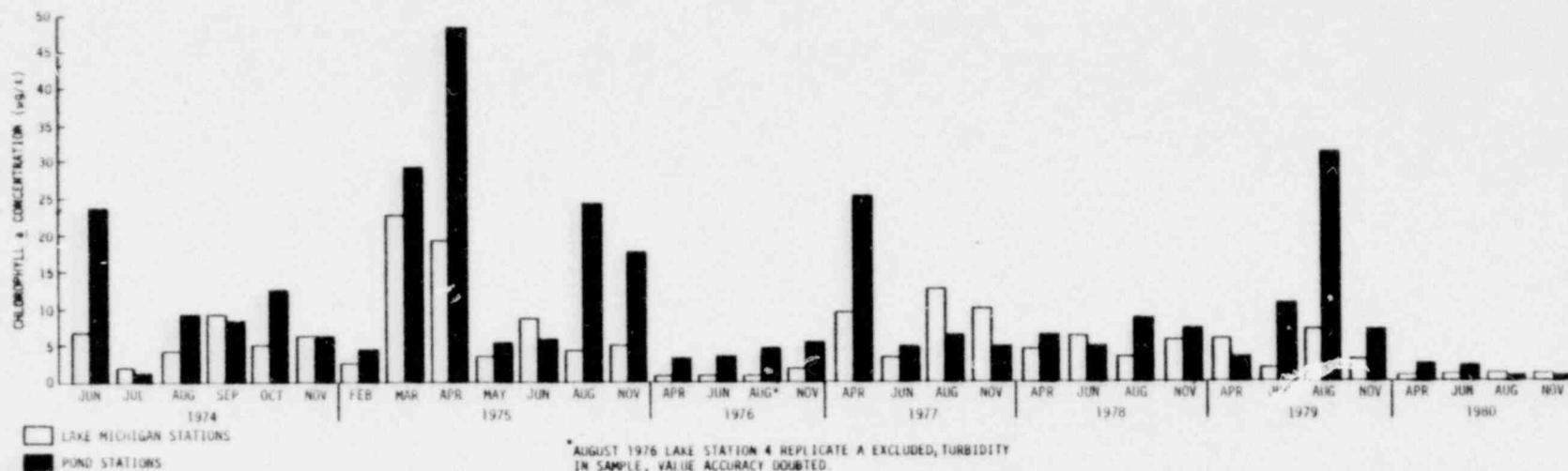


Figure 2-13. Phytoplankton Chlorophyll *a* Concentrations, Bailly Study Area, 1974-1980

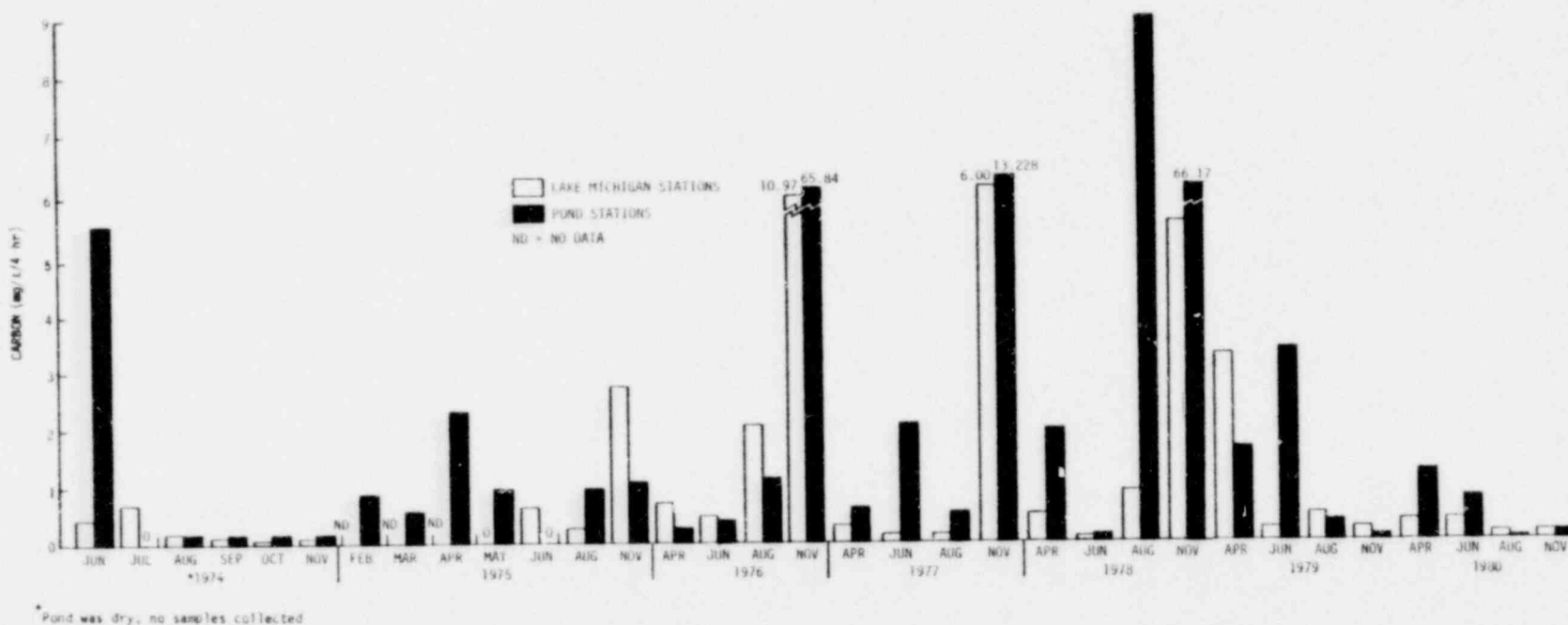


Figure 2-14. Phytoplankton Productivity Levels, Bailly Study Area, 1974-1980



2.1.3.3 Phytoplankton Statistical Analysis

2.1.3.3.1 Methodology. The following statistical methodology was applied not only to phytoplankton density and biovolume but also to zooplankton density and benthos density. For all samples, the analysis of variance procedure (ANOVA) was used to determine differences between factors of interest. Significant effects were further analyzed using Newman-Keuls multiple range tests (Winer 1971). The analysis was performed on log-transformed data. Zero values were adjusted to the minimum detectable levels. These levels were zooplankton density (1), benthos density (1), phytoplankton density (19), and phytoplankton biomass (0.01).

Two ANOVA models were used. The first compared data from the 1980 sampling season only. The second considered data from 1975 through 1979 as well.* Month and year effects were considered to be random while station effects were treated as fixed, the effects tested, and the error terms used as shown below.

<u>1980 Only</u>	<u>1975-1980</u>
Month	Year
Station	Month
Station 10 vs rest	Station
Row (linear)	Year x month
Row (quadratic)	Year x station
Column	Month x station
Row (linear) x column	Month x station x year
Row (quadratic) x column	Replication (residual)
Station x month	
Replication (residual)	

The two factors, year x station and month x station, were tested. When one proved nonsignificant, it was possible to use the other as the denominator for the F-test of station effects.

2.1.3.3.2 ANOVA Results and Discussion. ANOVA results are shown in Table 2.7. For Lake Michigan, monthly densities were significantly different during 1980 and among years. Biovolume did not show significant monthly differences

* 1974 phytoplankton, zooplankton, or benthos data were not considered because of the lack of April data in that year.



in 1980 but differences were noted for the month-station interaction, indicating that station differences were not consistent from month to month. The significant year-month interaction of density and biovolume over all years reflects the nonparallel changes in density and biovolume during like months in different years. Station densities and biovolumes were not significantly different when averaged over years.

Table 2-7
Phytoplankton ANOVA Results, Bailly Study Area, 1980

	<u>Phytoplankton Density</u>			<u>Phytoplankton Biovolume</u>	
	Degrees of Freedom	Sum of Squares	F-Value	Sum of Squares	F-Value
<u>1980 Single Year Comparisons</u>					
<u>Lake Stations</u>					
Month	3	66.4454	21.57*	2.5522	1.84
Station	9	10.5144	1.14	4.7654	1.14
10 vs rest	1	0.1341	0.13	0.1699	0.04
Row (linear)	1	1.9595	1.91	1.6856	3.64
Row (quadratic)	1	0.2415	0.24	0.0115	0.02
Column	2	3.5899	1.75	1.1014	1.19
Row (linear) x column	2	2.8200	1.38	0.4144	0.45
Row (quadratic) x column	2	1.7695	0.86	1.5355	1.66
Month x station	27	27.6604	1.32	12.5051	1.76*
Residual	40	31.1141		10.4972	
<u>Pond and Bog Stations</u>					
Month	3	18.6662	3.57	15.2239	1.70
Station	4	10.9721	1.57	26.1305	2.19
Pond vs bog	1	9.8097	5.62*	7.6335	2.56
Pond B	1	0.0208	0.01	2.8675	0.96
Pond C	1	0.8502	0.49	0.3892	0.13
B vs C	1	0.0762	0.04	9.4308	3.16
Month x Station	8	13.9626	4.80*	23.9010	3.47*
Residual	16	5.8124		13.7904	
<u>1975-1980 Multiyear Comparisons</u>					
<u>Lake Stations</u>					
Year	5	292.6276	4.68*	288.9305	6.12*
Month	3	62.5436	1.67	99.6659	3.52
Year x Month	15	187.5761	13.62*	141.5792	12.41*
Station	9	10.2371	0.83	14.0412	1.42
Year x Station	45	60.5205	1.23	49.1994	0.99
Month x Station	27	30.1876	1.02	18.4233	0.62
Year x Month x Station	135	148.0050	1.19	148.6151	1.45*
Residual	230	211.1964		174.9341	
<u>Pond and Bog Stations</u>					
Year	5	43.1141	2.73	166.8958	4.80*
Month	3	53.5293	5.65*	50.9147	2.44
Year x Month	15	47.3748	4.47	104.3114	6.56*
Station	2	3.7937	0.35	22.1657	4.64*
Year x Station	10	9.2577	0.87	19.4140	0.81
Month x Station	6	32.9708	5.14*	25.2556	1.76
Year x Month x Station	30	32.074	1.51	71.6336	2.25*
Residual	60	48.0043		72.0719	

* Significant at $\alpha \leq 0.05$



During 1980, Station 10 did not have significantly different density or biovolume than the mean of all other stations. No monthly density differences were noted for the ponds during 1980, but all densities in Cowles Bog were significantly different from the ponds (Table 2-7). As with Lake Michigan the significant month-station interaction indicated inconsistent station differences. Comparison of yearly mean densities and biovolumes yielded significant differences among the pond stations for biovolume only. Differences were observed in the station means; in the time of year (month) when peak values were observed and where (station) peak values occurred as indicated by the significant month and month x station for density; and significant year x month, station, and year x month x station interactions for biovolume.

The yearly mean biovolume for 1980 was significantly higher than the mean biovolume observed during past years; however, the densities were not significantly different. This increase in phytoplankton biovolume probably is not related to power plant influences, but more likely was due to natural yearly variations in type and number of organisms. Peak or high density/biovolume populations may have been missed during some years because of the seasonal sampling schedule.

2.1.3.4 Periphyton Numerical Abundance and Composition. Most of the material discussed in the previous subsections (particularly 2.1.3.1) deal solely with phytoplankton studies. Any periphytic algae mentioned are mainly tycho-planktonic (i.e., forms of the littoral community occurring accidentally in the plankton) and usually are not important components of the phytoplankton. Examples of algae which usually are strictly periphytic are the genera Chamaesiphon, Cladophora, Stigeoclonium, and Navicula. These genera and all other taxa collected on artificial and natural substrate by season in the NIPSCO Bailly Station study area are summarized in Table 2-8. Dominant taxa (≥ 4 percent of either density or biovolume) are designated by an asterisk. Samples were collected from natural substrates at the Lake Michigan stations and from artificial substrates at the pond stations. The reader is referred to Texas Instruments quarterly reports for numerical abundance data.



Table 2-8

Annual Occurrence of Periphyton, Lake Michigan and Nearshore Ponds, 1974 through 1980, Bailly Study Area

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Cyanophyta										
Chamaesiphonales										
Unid. Chamaesiphonaceae			S*							
Chamaesiphon sp.	S				S* F					
Chroococcales										
Amenellam sp.					S F					S
Aphanotheca							F	F	S	S
Chlorogloea sp.					F					
Chroococcus sp.		S				S		F	S F Sp	S
Chroococcus varius									S	
Dactylococcopsis sp.				F						
Gomphospharia lacustris										S
Merismopedia sp.	S									
Microcystis sp.			S F Sp*	S F			F	F	S	Sp F*
Unid. Chroococcales	S	Sp			Sp					
Pleurocapsaceae										
Chroococcopsis							Sp			
Pleurocapsa							Sp		S F*	
Dermocarpales										
Cyanocystis sp.										
Unid. Dermocarpaceae			F							F
Oscillatoriales										
Lyngbya sp.	S F*		S* F*	S* F	F* Sp* S*		Sp* S* F* Sp S F*	Sp* S* F* Sp* S*		
L. epiphytica					S		Sp			
L. limnetica					S					
L. martiniana					S					
Oscillatoria sp.	S* F*	S* F* Sp*	S* F*	S* F* Sp	S* F*	S*	Sp* S* F* Sp		Sp* S F Sp S*	
O. amoena					S					
O. amphibia					S					
O. splendida					S					
Phormidium sp.	S*	S*	Sp* S*		S* F					
Schizothrix sp.									Sp* S* F*	
Symploca sp.	Sp*									
Unid. Oscillatoriales	Sp S*	Sp*								
Rivulariales										
Calothrix sp.			F		S F*		Sp* S		S* F*	
Unid. Rivulariales	Sp									
Nostocaceae										
Anabaena sp.					S F	S		Sp F		Sp F
Aphanizomenon flos-aquae					S					
Nostoc sp.					S	Sp				
Chlorophyta										
Volvocales										
Chlamydomonas sp.				F	S	F			S S F*	Sp S F
Eudorina elegans										
Spermatozopsis sp.			S							
Unid. Volvocales	S	F Sp	S F	F		S				
Tetrasporales										
Elakatothrix sp.	S									
Gloeocystis sp.			Sp S		S Sp			F		S
Unid. Tetrasporales	S				S					
Chlorococcales										
Ankistrodesmus sp.	S		S	S	S			Sp		
A. convolutus			Sp S							
A. falcatulus						S F Sp	Sp S			F
Characium ambiguum										
Coelastrum sp.		S		S*		F				

*Dominant taxa.

Sp = April

S = June and/or August

F = November



Table 2-8 (Contd)

Taxa	Year 7 (1980)		
	Lake Michigan	Ponds	
Cyanophyta			
Chamaesiphonales			
Unid. Chamaesiphonaceae			
Chamaesiphon sp.			
Chroococcales			
Aphanocapsa sp.		Sp	
Aphanocapsa sp.			
Chlorogloia sp.			
Chroococcus sp.			
Chroococcus varius			
Dactylococcopsis sp.			
Geoplosphaeria leucostria		S	
Merismopedia sp.			
Microcystis sp.		sp	
Unid. Chroococcales			
Pleurocapsaceae			
Chroococcopsis sp.			
Pleurocapsa sp.	Sp*	F	
Dermocarpales			
Cyanocystis sp.			
Unid. Dermocarpaceae			
Oscillatoriales			
Lyngbya sp.	Sp*	S*	F*
L. epiphytica			
L. lineatica	Sp*	S*	F Sp*
L. marteniana			
Oscillatoria sp.	Sp	S	F*
O. anserina			
O. anserina			
O. splendida			
O. lineatica		S	S*
O. agardhii		S	
Phormidium sp.			
Schizothrix sp.			
Synedra sp.			
Unid. Oscillatoriales			
Rivulariales			
Calothrix sp.	Sp*	S*	F*
Unid. Rivulariales			
Musciaceae			
Arabaena sp.	Sp	Sp	S
Aphanizomenon flos-aquae			
Nostoc sp.			
Chlorophyta			
Volvocales			
Chlamydomonas sp.	S		
Eudorina elegans		S	
Spermatocopsis sp.			
Unid. Volvocales			
Tetrasporales			
Elakathrix sp.			
Gloeocystis sp.			
Unid. Tetrasporales			
Chlorococcales			
Ankistrodesmus sp.			
A. convolutus	S		
A. falcatus	S		
Characium ambiguum			
Colelestrum sp.			

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services group



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Chlorophyta (Contd)										
Chlorococcia (Contd)										
<i>Coelastrum microporum</i>										S
<i>Crucigenia apiculata</i>					S					
<i>Desmettracium</i> sp.					S					
<i>Klaernerella</i> sp.				Sp	Sp					
<i>K. lunaris</i>						S				
<i>K. obesa</i>					S					
<i>Micractinium pusillum</i>							Sp			
<i>Nephrocystium</i> sp.				S						
<i>Oocystis</i> sp.					F	S		Sp		S
<i>Oocystis borgei</i>										Sp
<i>Pediastrum boryanum</i>				F	S			Sp		
<i>Pediastrum duplex</i>									S	
<i>Pediastrum tetras</i>		Sp					F			
<i>Quadrigula</i> sp.										
<i>Scenedesmus</i> sp.	S	Sp S	Sp S	Sp S F		Sp S F			S	
<i>S. acuminatus</i>					S	Sp S				
<i>S. acutus</i>		S*						Sp S	S	
<i>S. arcuatus</i>						S				
<i>S. armatus</i>										S
<i>S. bicaridatus</i>						S				
<i>S. carinatus</i>								Sp		
<i>S. dimorphus</i>		Sp								
<i>S. eicornis</i>					S	S	S F		S	Sp S F
<i>S. quadricauda</i>	S	S	S		S	Sp* S F	S	S		Sp S F
<i>S. spinosus</i>				F	S F	Sp* S F		Sp S		Sp S F
<i>Selenastrum</i>								Sp		
<i>Sorastrum</i>								Sp		
<i>Sphaerocystis</i> sp.	S							F		
<i>Sphaerocystis schroeteri</i>										
<i>Tetraedron</i> sp.					F			F	S	S F*
<i>T. minimum</i>						S				
<i>Tetrastrum</i>				Sp						
<i>Staurogoniaformis</i>										
Unid. Chlorococcales		Sp			Sp	Sp F*				
Cladophorales										
<i>Cladophora</i> sp.	S* F*		S* F*	S*			S F		F	
<i>Rhizoclonium</i> sp.						S	Sp		S	
Chaetophorales										
<i>Chaetophora</i>								Sp		
<i>Chaetosphaeridium</i>						S				
<i>globosum</i>										
<i>Protoderma</i> sp.										Sp
<i>Stigeoclonium</i> sp.	Sp* S*		S F				F		S*	Sp F*
<i>Coleochaete</i>								F		
Unid. Chaetophorales		F*		F	S F	F				
Oedogoniales										
<i>Bulbochaete</i> sp.							F*			F
<i>Oedogonium</i> sp.		Sp* S*		Sp* S* F*		Sp* S* F*		Sp S F		Sp S F*
<i>O. undulatum</i>		S		S						S
Trentepohliales										
Unid. Trentepohliaceae					F					
Ulotrichales										
<i>Cylindrocapsa geminella</i>						S				
<i>Geminella</i> sp.								F		S
<i>Geminella interrupta</i>										S
<i>Hormidium</i> sp.			Sp*							
<i>Microspora</i> sp.		S								
<i>Schizomeris</i> sp.									F	F*
<i>Ulothrix</i> sp.	Sp* S* F		S F	S*	Sp	F*		Sp S F Sp	S	
<i>O. tenerima</i>					S					
<i>O. verrucosa</i>										
<i>O. zonata</i>			S*	S*			Sp*	F Sp	S	
<i>Oronema</i> sp.		S								
Unid. Ulotrichales	Sp*		Sp S*		Sp					



Table 2-8 (Contd)

Taxa	Year 7 (1985)	
	Lake Michigan	Ponds
Chlorophyta (Contd)		
Chlorococcales (Contd)		
<i>Coelastrum microporum</i>		S
<i>Crucigenia spiculata</i>		S
<i>Desmarestia</i> sp.		
<i>Eichneriella</i> sp.		
<i>E. lunaris</i>		S*
<i>E. obesa</i>		
<i>Microactinium pusillum</i>		
<i>Nephrocystum</i> sp.		
<i>Oocystis</i> sp.		
<i>Oocystis burgei</i>		
<i>Pediastrum boryanum</i>		
<i>Pediastrum duplex</i>		S
<i>Pediastrum tetras</i>		S
<i>Quadrifida</i> sp.		
<i>Scenedesmus</i> sp.		
<i>S. acuminatus</i>		
<i>S. acutus</i>		S
<i>S. arcuatus</i>		
<i>S. armatus</i>		
<i>S. bicaudatus</i>		
<i>S. carinatus</i>		
<i>S. dimorphus</i>		S
<i>S. ecuris</i>	Sp	S
<i>S. quadricauda</i>		S
<i>S. spinosus</i>		
<i>Selenastrum</i>		
<i>Sorastrum</i>		
<i>Sphaerocystis</i> sp.		
<i>Sphaerocystis schroeteri</i>		S
<i>Tetraedron</i> sp.		
<i>T. minimum</i>		
<i>Tetrastrum</i>		
<i>T. staurogoniaformis</i>		
Unid. Chlorococcales		
Cladophorales		
<i>Cladophora</i> sp.	Sp	S
<i>Rhizoclonium</i> sp.		
Chaetophorales		
<i>Chaetophora</i>		
<i>Chaetosphaeridium</i>	S	S
<i>Stobosus</i>		
<i>Proteridema</i> sp.		
<i>Stigeoclonium</i> sp.	Sp	S
<i>Colochaete</i>		
<i>Longirostra</i>		F*
Unid. Chaetophorales		
Oedogoniales		
<i>Bulbochaete</i> sp.		S
<i>Oedogonium</i> sp.	Sp	S* F
<i>O. undulatum</i>		S
Trentepohliales		
Unid. Trentepohliaceae		
Ulotrichales		
<i>Cylindrocapsa geminella</i>		
<i>Geminella</i> sp.		
<i>Geminella interrupta</i>		S*
<i>Homidium</i> sp.		
<i>Microspora</i> sp.		
<i>Schizomeris</i> sp.	Sp	
<i>Oothrix</i> sp.		S
<i>O. tenerima</i>		
<i>O. verrucosa</i>		
<i>O. zonata</i>		S*
<i>Oronema</i> sp.		
Unid. Ulotrichales		



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Chlorophyta (Contd)										
Zygnematales										
Clusterium sp.				Sp		Sp				S
C. keutzingii						S				
C. nonififerum						S				
Cosmarium sp.		Sp		F	S			S	Sp	S F
Desmidiium sp.		S				S				
Euastrum sp.						S				
Haugetia sp.	S	Sp* S F	Sp* S* F		S F* Sp* S F*		F Sp F		S Sp S F	
Pleurotaenium sp.		Sp*								
Spirogyra sp.		S		S*		Sp S				S S F
Staurastrum sp.				S				S		S
Staurastrum dilatatum										S
Unid. Desmidiaceae		S								
Unid. Zygnematales		S								
Unid. Chlorophyta	Sp S F Sp*	S	Sp S*	S*		Sp			Sp S F	
Euglenophyta										
Unid. Euglenaceae				Sp						
Trachelomonas sp.						S		Sp	S	Sp S
Euglena sp.		S								
Phacus sp.										
Xanthophyta										
Heterotrichales										
Unid. Tribonemataceae		S								
Chrysophyta										
Chrysomonadales										
Chrysococcus sp.	S				Sp		Sp	Sp		
Derepals sp.				F						
Dinobryon sp.		F			Sp	F Sp	F			
D. divergens					S					Sp
D. sertularia							F			F*
Epiplys sp.										Sp F*
Epiplys utriculus							F	Sp		F
Pseudokephyrion sp.										Sp F
Kephyrion sp.										F
Unid. Chrysomonadales	Sp	Sp F* Sp				F	F			
Unid. Rhizochrysidales			Sp							
Unid. Chrysophyta		Sp								
Unid. Chroomonadales					Sp	Sp				
Unid. Chrysocapsales					Sp					
Bacillariophyta										
Centrales										
Actinocyclus normanii						S		S		
Coscinodiscus lacustris							Sp			
Coscinodiscus sp.		S					Sp			
Cyclotella sp.	Sp S F Sp	F Sp S F Sp	S F Sp S F Sp	S F Sp	S F Sp			S	Sp S F S	
C. atomus						S		S F		
C. bodanica										
C. comensis			F*							
C. compta						S				
C. glomerata				S F	S Sp S F		Sp S F		S F	
C. keutzingiana	S			S F	S F	S F	S F Sp S		Sp S F S	F
C. meneghiniana		S		S F	S F	S F	S F Sp S		Sp S F S	
C. oxellata	S F			S F		S				
C. perpusilla						S				
C. prostrata				S						
C. pseudostelligera			Sp							
C. stelligera			Sp			Sp		S		
C. striata										
Melosira sp.	S F Sp S F*		S	S	Sp S	S F		Sp*	F S F	
M. ambigua				S		S			S	
M. binderana				S						
M. granulata						S	Sp S			



Table 2-8 (Contd)

Taxa	Year 7 (1980)			
	Lake Michigan	Ponds		
Chlorophyta (Contd)				
Zygnematales				
Dosterium sp.				
Kuetzingii				
montiferum				
Cosmarium sp.		S		
Desmidiium sp.				
Gastrum sp.	S*	Sp	S	F
Pseudococconeis sp.				
Pseudococconeis sp.				
Spirogyra sp.	S		S	
Staurastrum sp.			S	
Staurastrum dilatatum				
Unid. Desmidiaceae				
Unid. Zygnematales				
Unid. Chlorophyta				
Euglenophyta				
Unid. Euglenaceae				
Trachelomonas sp.				
Euglena sp.				
Phacus sp.				
Phacus curvicauda		S		
Xanthophyta				
Heterotrichales				
Unid. Tribonemataceae				
Chrysophyta				
Chrysomonadales				
Chrysococcus sp.				
Derepaxys sp.				
Dinobryon sp.				
D. divergens				
D. sertularia		Sp		
Eliopaxys sp.		Sp*		
Eliopaxys utriculus				
Pseudococconeis sp.				
Kephyrion sp.		Sp		
Scheuchzeria		Sp		
Synura				F
Unid. Chrysomonadales				
Unid. Rhizochrysidales				
Unid. Chrysophyta				
Unid. Chromulinales				
Unid. Chrysocapiales				
Bacillariophyta				
Centrales				
Actinocyclus normanii				
Coscinodiscus lacustris				
Coscinodiscus sp.				
Cyclotella sp.				
C. atomus				
C. bodanica				
C. comensis				
C. curta				
C. omerata				
C. kuetzingiana				
C. meneghiniana				
C. ocellata				
C. perpusilla				
C. prostrata				
C. pseudostelligera				
C. stelligera				
C. striata				
C. elostira sp.				
C. ambigua				
C. binderana				
C. granulata	S			



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)										
Centrales (Contd)										
<i>M. hercynii</i>			S							
<i>M. islandica</i>			Sp	S	Sp	S	Sp	S	Sp*	S
<i>M. italic</i>			Sp	S	Sp	S	Sp	S	Sp	S
<i>M. varians</i>			Sp	S	Sp	S	Sp	S	Sp	S
<i>Stephanodiscus</i> sp.	Sp	S	Sp	S	Sp	S	Sp	S	Sp*	S
<i>S. astraea</i>	Sp	S	Sp	S	Sp	S	Sp	S	Sp*	S
<i>S. binderana</i>			S							
<i>S. hantzschii</i>			S		Sp*	F	S		S	F*
<i>S. inconstans</i>					S				S	F
<i>S. niagarae</i>							S		S	F
<i>Thalassiosira fluviatilis</i>										
Unid. Centrales	Sp	S	S	S	Sp	S	F	Sp	F	S
Pennales										
<i>Achnanthes</i> sp.	Sp*	S	Sp*	S*	Sp*	S*	Sp*	S*	Sp*	S*
<i>A. affinis</i>					S		S		S	
<i>A. clevei</i>			S				S*		S	
<i>A. exigua</i>	S		Sp	S	S	F			S	S
<i>A. hauckiana</i>					S	F				
<i>A. hungarica</i>			Sp	S	F		F			S*
<i>A. hustedi</i>										F
<i>A. lanceolata</i>			Sp	S	Sp	S*	S	F	S	S*
<i>A. linearis</i>	Sp	S*	Sp	S*	Sp	S	Sp*	S	Sp*	S*
<i>A. microcephala</i>	S		Sp	S	S		S*	F	Sp	S*
<i>A. minutissima</i>	Sp	S*	Sp	S*	Sp	S	S*	F	Sp*	S*
<i>Amphipleura</i> sp.			Sp		S	F	Sp*	S*	Sp*	S*
<i>A. pellucida</i>			S		S	F	Sp	S	Sp	F
<i>A. rutilans</i>					S	F				
<i>Amphiphora ornata</i>			Sp	S	S		Sp	S	F	Sp
<i>Amphora</i> sp.	S		Sp	S	S		Sp	S	S	S
<i>A. calumetica</i>			Sp	F	Sp	F	Sp	S	S	S
<i>A. coffeiformis</i>			Sp	F	Sp	F	Sp	S	S	S
<i>A. lybica</i>	S	F	Sp	F	S	F	Sp	S	S	S
<i>A. ovalis</i>			Sp	F	S	F	Sp	S	S	S
<i>A. perpusilla</i>			Sp	F	S	F	Sp	S	S	S
<i>Anomoeoneis</i> sp.	S		S	F	S	F	Sp	S	S	S
<i>A. varians</i>	S		S*		S	F	Sp	S	S	S
<i>A. vitrea</i>	S		Sp	S*	S	F	Sp	S	S	S
<i>Asterionella formosa</i>	Sp	S	Sp	S	Sp	S	Sp	S	Sp	S
<i>Bacillaria paradoxa</i>			Sp	S	Sp	S	Sp	S	Sp	S
<i>Caloneis</i> sp.			Sp	S	S	F	Sp	S	S	S
<i>C. bacillum</i>					S	F	Sp	S	S	S
<i>C. lewisii</i>					S	F	Sp	S	S	S
<i>C. ventricosa</i>					S	F	Sp	S	S	S
<i>Cocconeis</i> sp.	S	F	Sp	S	Sp	S	Sp	S	S	S
<i>C. disculus</i>	S	F	Sp	S	S	F	Sp	S	S	S
<i>C. pediculus</i>	S	F	Sp	S	S	F	Sp	S	S	S
<i>C. placentula</i>	S	F	Sp	S	S	F	Sp	S	S	S
<i>Cymatopleura</i> sp.					S	F	Sp	S	S	S
<i>C. elliptica</i>					S	F	Sp	S	S	S
<i>C. solida</i>					S	F	Sp	S	S	S
<i>Cymbella</i> sp.	Sp	S	Sp	S*	Sp	S	Sp	S	Sp	S
<i>C. affinis</i>	S	F	S	F	S	F	Sp	S	S	S
<i>C. amphicephala</i>									Sp	S
<i>C. amphioxys</i>									Sp	S
<i>C. aspera</i>									Sp	S
<i>C. caespitosa</i>	S								Sp	S
<i>C. cistula</i>									Sp	S
<i>C. lunata</i>									Sp	S
<i>C. microcephala</i>			Sp	S	S*	F	Sp	S	Sp	S
<i>C. minuta</i>									Sp	S
<i>C. naviculiformis</i>									Sp	S
<i>C. prostrata</i>	Sp	S*	Sp	S	Sp	S	Sp	S	Sp	S
<i>C. sinuata</i>									Sp	S
<i>C. sphaerophora</i>									Sp	S



Table 2-8 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
<u>Bacillariophyta (Contd)</u>		
<u>Centrales (Contd)</u>		
<i>M. herzogii</i>		
<i>M. islandica</i>		S
<i>M. italica</i>		
<i>M. varians</i>		P
<i>Stephanodiscus</i> sp.		
<i>S. astraea</i>		
<i>S. binderana</i>		
<i>S. hantzschii</i>		
<i>S. invictatus</i>		
<i>S. niagarae</i>		
<i>Thalassiosira fluviatilis</i>		
<u>Unid. Centrales</u>		
<u>Pennales</u>		
<i>Achnanthes</i> sp.	S	S
<i>A. affinis</i>		
<i>A. clevei</i>		
<i>A. exigua</i>		
<i>A. hauckiana</i>		
<i>A. hungarica</i>		
<i>A. hustedi</i>		
<i>A. lanceolata</i>		
<i>A. linearis</i>		
<i>A. microcephala</i>		
<i>A. minutissima</i>		F Sp
<i>Amphipleura</i> sp.	S	
<i>A. pellucida</i>		
<i>A. rutilans</i>		
<i>Amphiphora ornata</i>		
<i>Amphora</i> sp.		S
<i>A. calumetica</i>		
<i>A. coffeiformis</i>		
<i>A. typica</i>		
<i>A. ovalis</i>		
<i>A. perpusilla</i>		
<i>Anomoeoneis</i> sp.		
<i>A. seriata</i>		S*
<i>A. vitrea</i>		
<i>Asterionella formosa</i>	Sp	
<i>Bacillaria paradoxa</i>		S
<u>Catoneis</u>		
<i>C. bacillum</i>		
<i>C. lewisii</i>		
<i>C. ventricosa</i>		
<i>Cocconeis</i> sp.	Sp S	
<i>C. disculus</i>		
<i>C. pediculus</i>		
<i>C. placenta</i>		
<i>C. matopieura</i> sp.		F
<i>C. elliptica</i>		
<i>C. soleea</i>		
<i>C. umbellata</i> sp.	S F Sp	
<i>C. affinis</i>		
<i>C. amphicephala</i>		
<i>C. amphioxys</i>		
<i>C. aspera</i>		
<i>C. caespitosa</i>		
<i>C. cistula</i>		
<i>C. lunata</i>		
<i>C. microcephala</i>		
<i>C. minuta</i>		
<i>C. naviculiformis</i>		
<i>C. prostrata</i>		
<i>C. sinuata</i>		
<i>C. sphaerophora</i>		



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)										
Pennales (Contd)										
<i>C. tumida</i>					S					
<i>C. turgida</i>						Sp	S			
<i>C. ventricosa</i>	S	Sp	S	F	Sp	S	F	S	Sp	S
<i>C. ventricosa v. minuta</i>					S					
<i>Diatoma</i> sp.	Sp*	S*	F*	Sp	S		Sp	S*	F*	Sp
<i>D. anceps</i>					S*		S*		S	
<i>D. hiemale</i>									S	
<i>D. tenue</i>	S		S	Sp	S*	F	S	F	Sp	S
<i>D. tenue v. elongatum</i>	S		S	Sp			Sp	S*	F	Sp
<i>D. tenue v. tenue</i>	Sp	S								
<i>D. vulgare</i>	Sp	S	F*	Sp		F	Sp*	S	F*	Sp
<i>D. vulgare v. ovales</i>			F	Sp*	S	F	Sp	S	F	Sp*
<i>Denticula</i> sp.					Sp	F		F	Sp	S
<i>D. tenuis</i>										
<i>Diptoneis</i> sp.		F			S		S			
<i>D. smithii</i>	S					F				
<i>Epithemia</i> sp.										Sp
<i>E. reicherti</i>					S			F		
<i>E. turgida</i>							S*	F		
<i>E. diadon</i>										
<i>E. notia</i> sp.	Sp	S	F	Sp*	S	F		Sp	S	F
<i>E. curvata</i>			Sp	S	F			Sp	S	F
<i>E. diadon</i>					Sp	S	F		Sp	S*
<i>E. elegans</i>			S		Sp		S			S
<i>E. exigua</i>			S		S					
<i>E. fallax</i>			S							
<i>E. flexuosa</i>			S	Sp	Sp		Sp	F	S	S
<i>E. flexuosa v. eurycapala</i>			S					S	F	Sp
<i>E. notia gracilis</i>							F			
<i>E. hexaglyphis</i>			S							
<i>E. incis</i>			S	Sp	Sp	S		S	F	Sp
<i>E. major</i>										
<i>E. microcephala</i>					F			S	F	S
<i>E. naevellii</i>		Sp	S					S	F	
<i>E. pectinatis</i>	S		S*	F	S	F		S	F*	F
<i>E. praerupta</i>			S				S	S		Sp
<i>E. rhomboides</i>							S	F		S
<i>E. septentrionalis</i>			S							
<i>E. tenella</i>					S		Sp	S		
<i>E. valida</i>							Sp			
<i>E. vanheurkii</i>	S		S		S	F				
<i>Fragilaria</i> sp.	Sp*	S	F	Sp*	S	F	Sp	S	F	Sp*
<i>F. brevistriata</i>				S	Sp	S*	Sp	S	F	Sp*
<i>F. capucina</i>		Sp			Sp	S	Sp			
<i>F. capucina v. mesolepta</i>			S	Sp		F		F	Sp	S
<i>F. constricta</i>					Sp	S				
<i>F. construens</i>	S	F	Sp		Sp	S	F	Sp	S	F
<i>F. crotonensis</i>	Sp	S	F	Sp	S	F*	Sp*	S	F*	Sp*
<i>F. leptostauron</i>					S					
<i>F. minutissima</i>				Sp						
<i>F. pinnate</i>				Sp	S	F	Sp	S	F	S
<i>F. vaucheriae</i>	Sp*	S*	F*	S	F*	Sp*	S*	F*	Sp*	S*
<i>Frustulia</i> sp.										
<i>F. rhomboides v. crassimera</i>			S							
<i>F. rhomboides v. saxonica</i>			S							
<i>F. rhomboides</i>										
<i>Gomphonema</i> sp.	Sp	S	F	Sp	S	F	Sp	S	F	Sp*
<i>G. acuminatum</i>			Sp	S			Sp	S*	F*	Sp*
<i>G. acuminatum v. coronatum</i>	Sp		Sp	S			Sp	S		Sp
<i>G. affine</i>							F		Sp*	



Table 2-8 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Bacillariophyta (Contd)		
Pennales (Contd)		
<i>C. tumida</i>		
<i>C. turgida</i>		
<i>P. ventricosa</i>		
<i>P. ventricosa</i> v. <i>minuta</i>		
<i>Diatoma</i> sp.		
<i>D. anceps</i>		
<i>D. klemkei</i>		
<i>D. tenue</i>	S	F
<i>D. tenue</i> v. <i>elongatum</i>		
<i>D. tenue</i> v. <i>tenue</i>		
<i>D. vulgare</i>	Sp	S F*
<i>D. vulgare</i> v. <i>ovales</i>		
<i>Denticula</i> sp.		
<i>D. tenuis</i>		
<i>Diploneis</i> sp.		
<i>D. smithii</i>		
<i>Epithemia</i> sp.		
<i>E. reichardtii</i>		
<i>E. turgida</i>		
<i>E. diadon</i>		
<i>Eunotia</i> sp.		
<i>E. curvata</i>		
<i>E. diadon</i>		
<i>E. elegans</i>		
<i>E. exigua</i>		
<i>E. fallax</i>		
<i>E. flexuosa</i>		
<i>E. flexuosa</i> v. <i>flexuosa</i>		
<i>Eurycephala</i>		
<i>G. gracilis</i>		
<i>G. hexaglyphis</i>		
<i>G. incisa</i>		
<i>G. major</i>		
<i>G. microcephala</i>		
<i>G. megellii</i>		
<i>G. pectinatis</i>		
<i>G. praeputia</i>		
<i>G. rhomboides</i>		
<i>G. septentrionalis</i>		
<i>G. tenuis</i>		
<i>G. valida</i>		
<i>G. vanheurnii</i>		
<i>G. fragilis</i> sp.	S	Sp S F
<i>G. brevistriata</i>		
<i>G. capucina</i>		
<i>G. capucina</i> v. <i>mesolepta</i>		
<i>G. constricta</i>		
<i>G. construens</i>		
<i>G. crotonensis</i>		F
<i>G. leptostauron</i>		
<i>G. minutissima</i>		
<i>G. pinnata</i>		Sp
<i>G. vaucheriae</i>	S	
<i>Frustulia</i> sp.		
<i>F. rhomboides</i> v. <i>crassierica</i>		
<i>F. rhomboides</i> v. <i>saxonica</i>		
<i>F. rhomboides</i>	S F	Sp S F
<i>Gomphonema</i> sp.		
<i>G. acuminatum</i>		
<i>G. acuminatum</i> v. <i>coronatum</i>		
<i>G. affine</i>		



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)										
Pennales (Contd)										
<i>P. angustatum</i>	S	Sp	S	Sp	S	F*	F	Sp*	F	Sp*
<i>P. constrictum</i>		S				F	Sp	S	F	Sp*
<i>P. gracile</i>							S	F		S
<i>P. instabile</i>							S			
<i>P. intracatum</i>	F			Sp			S		Sp	
<i>P. lanceolatum</i>			S	S						
<i>P. longiceps</i>	S	F	S	F	Sp	S	Sp			
<i>P. longiceps</i> v. <i>sub-</i>			S							
<i>P. clavata</i>							S			
<i>P. montanum</i>										
<i>P. olivaceoides</i>							S			
<i>P. olivaceum</i>	Sp*	S	F	Sp	S	F	Sp	S	F	Sp*
<i>P. parvulum</i>	Sp	S	Sp	S	Sp	S	Sp	S	F	Sp*
<i>P. subclavatum</i>							S			F
<i>P. subtile</i>									S*	S
<i>P. tenellum</i>										S
<i>P. truncatum</i>							F	S		S
<i>Gomphonema hurculeana</i>	S	F	S				S	S	S*	S
<i>G. cyrocloma</i> sp.										
<i>G. scitense</i>			S			F				S
<i>Hantzschia amphioxys</i>										S
<i>Neridion</i> sp.	S									
<i>N. circulare</i>		Sp	S				Sp	S	Sp	S
<i>N. zula</i> sp.	Sp	S	F	Sp	S	F	Sp	S	F	Sp*
<i>N. accommoda</i>	S	F	S							S
<i>N. anglica</i>				Sp						
<i>N. bacillum</i>							Sp	S	F	S
<i>N. capitata</i>			Sp	Sp	S		S	Sp	F	
<i>N. capitata</i> v. <i>capitata</i>	Sp									
<i>N. costulata</i>	S								Sp*	S
<i>N. cryptocephala</i>		F	Sp	Sp	S	S		Sp	F	S
<i>N. cryptocephala</i> v.				S					Sp*	S
<i>N. veneta</i>										
<i>N. cuspidata</i>				Sp			Sp		S	F
<i>N. decussis</i>									S	S
<i>N. dystrophica</i>							S			
<i>N. elginensis</i>							F	S	F	S
<i>N. e. lina</i>					S				S	S
<i>N. godlandica</i>										
<i>N. groenlandica</i>	F		F		Sp	S	F	Sp		F
<i>N. halophila</i>		S						S		
<i>N. hambergii</i>	S					F	Sp	F		
<i>N. hantzschii</i>				Sp			Sp		S	
<i>N. integra</i>						S				
<i>N. laevissima</i>				Sp	S					
<i>N. lanceolata</i>			Sp							
<i>N. lafens</i>	S									
<i>N. luzonensis</i>	S									
<i>N. maculata</i>		S								
<i>N. miniculus</i>	S									
<i>N. niuima</i>										S*
<i>N. nutica</i>							F	F		
<i>N. navicula</i>				Sp						
<i>N. notha</i>				Sp				S	S	
<i>N. obdurata</i>					F					
<i>N. oblonga</i>									Sp	
<i>N. placentula</i>										
<i>N. platystoma</i>					S	F		F		
<i>N. pseudoreinhardtii</i>										
<i>Navicula punctulatae</i>										
<i>N. pupula</i>	S	S	F	F	Sp	S	F	S	Sp	S
<i>N. pyramis</i>						Sp	S	F		
<i>N. radiosa</i>	S	F	S	F	Sp	S		S	F	S
<i>N. radiosa</i> v. <i>tenella</i>	S	S					S	F		S*



Table 2-8 (Contd)

Taxa	year 7 (1980)			
	Lake Michigan		Ponds	
<u>Bacillariophyta (Contd)</u>				
<u>Pennales (Contd)</u>				
<i>angustatum</i>				
<i>constrictum</i>				
<i>gracile</i>				
<i>instabile</i>				
<i>intricatum</i>				
<i>lancoletum</i>				
<i>longiceps</i>				
<i>longiceps</i> v. <i>sub-</i>				
<i>clavata</i>				
<i>montanum</i>				
<i>officinalis</i>				
<i>officinalis</i>				
<i>parvum</i>	Sp	S	Sp	F
<i>subclavatum</i>				
<i>subtile</i>				
<i>tenellum</i>				
<i>truncatum</i>				
<i>Gomphonema hirculeana</i>				
<i>Gomphonema</i> sp.		F		
<i>G. scitense</i>				
<i>Hantzschia amphioxys</i>				
<i>Meridion</i> sp.				
<i>N. circulare</i>			Sp	S
<i>Navicula</i> sp.	S	F	S	F
<i>N. accomoda</i>				
<i>N. amplic</i>				
<i>N. bacillata</i>				
<i>N. capitata</i>				
<i>N. capitata</i> v. <i>capitata</i>				
<i>N. costulata</i>				
<i>N. cryptocephala</i>				
<i>N. cryptocephala</i> v.				
<i>veneta</i>				
<i>N. cuspidata</i>				
<i>N. decussis</i>				
<i>N. dystrophica</i>				
<i>N. elglnensis</i>				
<i>N. exigua</i>				
<i>N. gotthardica</i>				
<i>N. graciloides</i>				
<i>N. halophila</i>				
<i>N. hambergii</i>				
<i>N. heufferi</i>				
<i>N. integra</i>				
<i>N. laevissima</i>				
<i>N. lanceolata</i>				
<i>N. lafens</i>				
<i>N. luzonensis</i>				
<i>N. maculata</i>				
<i>N. minisculus</i>				
<i>N. minima</i>				
<i>N. nitica</i>				
<i>N. navicula</i>				
<i>N. notha</i>				
<i>N. obdurate</i>				
<i>N. oblonga</i>				
<i>N. placenta</i>				
<i>N. platystoma</i>				
<i>N. pseudoreinhardtii</i>				
<i>N. punctulata</i>				
<i>N. pupula</i>				
<i>N. pygmaea</i>				
<i>N. radiosa</i>				
<i>N. radiosa</i> v. <i>tenella</i>				



Table 2-8 (Contd)

Taxa	Year 2 (1975)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979) *	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)										
Pennales (Contd)										
<i>N. rhynchocephala</i>		S								
<i>N. salinarum</i>			S		S	F	S		F	S
<i>N. secunda</i>										S*
<i>N. species "S"</i>					S*				S	S*
<i>N. subhamulata</i>							S			
<i>N. tripunctata</i>			Sp	S	F		Sp	S	F	
<i>N. viridula</i>			S		S					
<i>N. alium</i> sp.	Sp	S*	F	S	F				S	
<i>N. affinis</i>		Sp		F				S		
<i>N. apiculatum</i>					S*					
<i>N. bisulcatum</i>										S
<i>N. dubium</i>					S					
<i>N. frig.</i>			F							
<i>N. Kozlovii</i>				S		S		S	F	Sp
<i>Nitzschia</i> sp.	Sp	S*	F	Sp	S	F	Sp	S	F	Sp
<i>N. acedens</i>					S*	F	Sp	S	F	Sp
<i>N. acicularis</i>	Sp	S			Sp		Sp	F		S
<i>N. acuta</i>				Sp	S	F			F	Sp
<i>N. affinis</i>			Sp		Sp					
<i>N. amphibia</i>		Sp	F	S	Sp	S	F		S	F
<i>N. amphioxys</i>					S		Sp	S	F	Sp
<i>N. angularis</i>			Sp							
<i>N. angustata</i>			Sp	S	F		Sp	S	F	
<i>N. batanensis</i>					Sp				S	
<i>N. dissidua</i>	Sp*	S	F							
<i>N. dissipata</i>			Sp*	S	F	Sp	S		S	F
<i>N. flitiformis</i>					Sp	S	F	Sp		
<i>N. fonticola</i>	S	F		Sp	S	F		Sp	S	F
<i>N. frustulum</i>		S			Sp	S		Sp	S	F
<i>N. gracilis</i>			Sp	F	Sp		Sp		S	S*
<i>N. hantzschia</i>			F							S*
<i>N. ignorata</i>							S			
<i>N. kutzingiana</i>			Sp	S	F	Sp		Sp	S	
<i>N. lanceolata</i>	S				Sp		Sp	S		F
<i>N. linearis</i>		F		S	F	Sp		S		
<i>N. microcephala</i>					S					
<i>N. obtusa</i>										
<i>N. palea</i>	S	F*	Sp	S	F	Sp	S	F		S*
<i>N. palacea</i>					S	F*	Sp	S	F	
<i>N. recta</i>						F			S	F
<i>N. romana</i>			Sp	F	S	F				
<i>N. scolaris</i>			Sp							
<i>N. sloma</i>			Sp	S		S	F	Sp		
<i>N. strombolidea</i>					S	F				
<i>N. subtilis</i>										S
<i>N. thermalis</i>		S		F						
<i>N. tryblionella</i>					S	F				
<i>Opephora martyi</i>			Sp	S	F	Sp	S		S	
<i>Pinnularia</i> sp.	Sp	S		S			Sp		S	Sp
<i>P. abaujensis</i>		S					F	Sp		S*
<i>P. acrosphaeria</i>									S	S
<i>P. appendiculata</i>		F						S	F	S
<i>P. blaps</i>										Sp
<i>P. borealis</i>										
<i>P. braunii</i>						F		S	F	
<i>P. brevicostata</i>						S			F	
<i>P. flexuosa</i>				S						
<i>P. gentilis</i>		S								S
<i>P. legumen</i>									F	
<i>P. major</i>										
<i>P. major v. pulchella</i>		S				S				Sp
<i>P. microstauron</i>		S								
<i>P. medusa</i>		S				S	F			
<i>P. obscura</i>		S								



Table 2-8 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Bacillariophyta (Contd)		
Pennales (Contd)		
N. rhynchocephala		
N. salinarum		
N. secura		
N. species "S"		
N. subannulata		
N. tripunctata		
N. viridula		
N. idium sp.		
N. affine		
N. apiculatum		
N. bisulcatum		
N. dubium		
N. frigidis		
N. Kozlowii		
Nitzschia sp.	S F	S F
N. accedens		
N. acicularis		S
N. acuta		
N. affinis		
N. amphibia		
N. amphioxys		
N. angularis		
N. augustata		
N. baltica		
N. dissidua		
N. dissipata		
N. filiformis		
N. fonticola		
N. frustulum		
N. gracilis		
N. lanizschie		
N. ignorata		
N. kutzlingiana		
N. lanceolata		
N. linearis		
N. microcephala		
N. obtusa		
N. palea		
N. palaceae		
N. recta		
N. romana		
N. scalaris		
N. sigma		
N. signoides		
N. subtilis		
N. thermalls		
N. tryblionella		
Omphora maritima		
Pinnularia sp.		S
P. abaujensis		
P. acropachaeria		
P. appendiculata		
P. biceps		
P. bornalis		
P. braunii		
P. brevicostata		
P. flexuosa		
P. gentilis		
P. legumen		
P. major		
P. major v. pulchella		
P. microstauron		
P. nodosa		
P. obscure		



Table 2-8 (Contd)

Taxa	Year 2 (1970)		Year 3 (1976)		Year 4 (1977)		Year 5 (1978)		Year 6 (1979)	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Bacillariophyta (Contd)										
Pennales (Contd)										
<i>P. streptoraphe</i>		S								
<i>P. subcapitata</i>		S		S F		Sp S F			F S	
<i>P. subtomatophora</i>				F						
<i>P. sulcata</i>		S								
<i>P. viridis</i>		S F				Sp S	Sp S			Sp S
<i>Plagiosirois</i>										
<i>Rhizosolenia curvata</i>	Sp S F*	S F	Sp S* F*	S F	Sp S* F	Sp S F	Sp S F*	S F	Sp* S* F*	S F
<i>Rhopalodia gibba</i>						Sp S F	Sp S F	S F		S F
<i>Rhopalodia</i> sp.						Sp S				S
<i>Stauronella</i> sp.		S	Sp S			Sp				
<i>S. acuta</i>										
<i>S. anceps</i>					F S	S				Sp
<i>S. fluminea</i>										
<i>S. phoenicenteron</i>	Sp S			S			F			
<i>S. kriegeri</i>										Sp S F
<i>Stenopterobia intermedia</i>				Sp						
<i>Surirella</i> sp.	Sp		S		Sp S F		S		F	S
<i>S. augustata</i>			S F		S F					
<i>S. ovata</i>					S		S		S	
<i>Synedra</i> sp.	S	Sp S F	Sp S	Sp* S F*	Sp S F*	Sp S F*	Sp S	Sp S F	S	Sp S F
<i>S. acus</i>										
<i>S. amphicephala</i>				F	Sp S	F	Sp S			Sp S F
<i>S. applanata</i>					F	Sp S	F Sp			
<i>S. capucina</i>					S	S			S	Sp S
<i>Synedra cyclopus</i>				Sp		Sp S				
<i>S. delicatissima</i>		S		S		F Sp		S		S* F*
<i>S. demerarae</i>										
<i>S. fasciculata</i>				Sp					S	
<i>S. fasciculata v.</i>		S							F	Sp*
<i>S. tabulata</i>										
<i>S. fasciculata v.</i>		S								
<i>S. truncata</i>										
<i>S. gallitoni</i>										
<i>S. incisa</i>					Sp S	Sp			F S	
<i>S. parasticta</i>										
<i>S. pulchella</i>		S F								Sp
<i>S. radicans</i>		S	Sp	Sp	F* Sp* S	Sp* F Sp	Sp			
<i>S. rumpens</i>		S	Sp		Sp S	Sp				
<i>S. tenera</i>				S						
<i>S. filiformis</i>				S	Sp					
<i>Synedra ulna</i>		S	Sp	Sp S F*	S	Sp S F	Sp S F	Sp S F	Sp S F	Sp* S
<i>Skeletonema</i> sp.		S								
<i>Tabellaria</i> sp.	S	S F	S F	S	Sp S	Sp S	Sp S			
<i>T. fenestra</i>		F	F Sp S	Sp* S	Sp S F	Sp S F	Sp S F	Sp S F	Sp S F	Sp* S*
<i>T. flocculosa</i>	Sp S F	Sp* S F*	S S F	Sp* S*	Sp S*	Sp S*	Sp S*	Sp S*	Sp S*	Sp* S*
Unid. Achnanthes										
Unid. Epithemiales										
Unid. Fragilariales										
Unid. Naviculales	S	S	Sp S F	Sp S	Sp S F	Sp S F	Sp S F	Sp S F	Sp S F	Sp S F
Unid. Pennales	Sp S F*	Sp* S F*	Sp* S F	Sp S*	Sp S*	Sp S*	Sp S*	Sp S*	Sp S*	Sp S*
Cryptophyta										
Cryptomonadales										
<i>Cryptomonas</i> sp.										
<i>Rhodomonas</i> sp.										
<i>R. minuta</i>		F Sp S F		S F			F Sp			S
Unid. Cryptomonadales	S									
Pyrrophyta										
Unid. Peridinales										
<i>Ceratium hirundinella</i>				Sp						
<i>Peridinium</i> sp.										
<i>P. inconspicuum</i>						S				
Rhodophyta										
Bacillariophyceae										
Nautilales										
Unid. Algae			S	Sp		S F	F			S



Table 2-8 (Contd)

Taxa	Year 7 (1980)	
	Lake Michigan	Ponds
Bacillariophyta (Contd)		
Pennales (Contd)		
<i>P. streptorapha</i>		
<i>P. subcapitata</i>		
<i>P. subtomatophora</i>		
<i>P. subtelica</i>		
<i>P. viridis</i>		
<i>P. viridis</i>		
<i>P. viridis</i>		
<i>Rhopalodia gibba</i>	Sp	F
<i>Rhopalodia sp.</i>		
<i>Rhopalodia sp.</i>		
<i>Rhopalodia sp.</i>		
<i>S. acuta</i>		
<i>S. anceps</i>		
<i>S. fluviatilis</i>		
<i>S. phoenocenteron</i>		
<i>S. kriegeri</i>		
<i>Stenopterobia intermedia</i>		
<i>Surirella sp.</i>		
<i>S. angustata</i>		
<i>S. ovata</i>		
<i>Synedra sp.</i>	S	Sp S F
<i>S. acus</i>		
<i>S. amphicephala</i>		
<i>S. capitata</i>		
<i>S. capucina</i>		
<i>S. cyclops</i>		
<i>S. delicatissima</i>		
<i>S. demerarae</i>		
<i>S. fasciculata</i>		
<i>S. fasciculata v.</i>		
<i>S. tabulata</i>		
<i>S. fasciculata v.</i>		
<i>S. truncata</i>		
<i>S. galli</i>		
<i>S. incisa</i>		
<i>S. parviflora</i>		
<i>S. pulchella</i>		
<i>S. radians</i>		
<i>S. rumpens</i>		
<i>S. tenera</i>		
<i>S. filiformis</i>		
<i>Synedra ulna</i>	F	S F
<i>Skeletonema sp.</i>		
<i>Tabellaria sp.</i>		
<i>T. fenestra</i>	S F	S F*
<i>T. flocculosa</i>		Sp F
Unid. Achnanthes		
Unid. Epithemiales		
Unid. Fragilariales		
Unid. Naviculales		
Unid. Pennales		
Cryptophyta		
Cryptomonadales		
<i>Chroomonas</i>		Sp
<i>Cryptomonas sp.</i>		
<i>Rhodomonas sp.</i>		
<i>R. minuta</i>		
Unid. Cryptomonadales		
Pyrrophyta		
Unid. Peridinales		
<i>Ceratium hirundinella</i>		
<i>Peridinium sp.</i>		
<i>P. inconspicuum</i>		S
Rhodophyta		
Bangiophyceae		
Bangiales		
Unid. Algae		



In 1980, 40 taxa of periphyton were observed in the lake and 60 taxa in the ponds. The majority were blue-green algae, green algae, and pennate diatoms. The low number of taxa was due in part to the "12 fields on 3 chambers" counting technique where the dominant organisms tend to obscure the rare forms. Had more detailed counts been made, greater numbers of taxa probably would have been observed. Cyanophyta (blue-green algae) was the most numerous phytoplankton group throughout the year in Lake Michigan (Table 2-9). Lyngbya limnetica and Lyngbya sp. were the most abundant blue-green algal taxa, and these occurred at most stations in the lake through the year. Other abundant blue-green algae were Oscillatoria sp., Calothrix sp., and Pleurocapsa sp.

Table 2-9
Percent Composition of Major Periphyton Groups, Bailly Study Area, 1980

Station	Taxon	Apr		Jun		Aug		Nov	
		Density	Biovolume	Density	Biovolume	Density	Biovolume	Density	Biovolume
Lake Michigan (1, 10, 11, 12, 25)	Cyanophyta	89.0	4.4	58.5	0.1	85.0	2.1	65.5	5.1
	Chlorophyta	6.5	84.8	23.4	99.2	13.2	97.3	0.0	0.0
	Bacillariophyta-Centric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bacillariophyta-Pennate	4.5	10.8	18.0	0.7	1.4	0.6	34.5	94.9
	Total Percent	100.0	100.0	99.9	100.0	99.6	100.0	100.0	100.0
	No. Taxa	16	16	25	25	14	14	19	18
Nearshore Pond (17, 19, 21)	Cyanophyta	29.2	2.0	10.1	3.7	21.6	0.2	11.6	0.2
	Chlorophyta	32.2	28.9	29.0	42.1	27.8	76.5	17.4	14.6
	Bacillariophyta-Centric	0.0	0.0	0.0	2.3	0.0	0.0	0.6	2.0
	Bacillariophyta-Pennate	15.0	52.8	10.1	50.9	49.5	9.2	62.7	78.4
	Total Percent	76.4	83.7	99.2	99.0	98.9	85.9	92.3	95.2
	No. Taxa	24	24	36	36	14	14	19	18

The density of Chlorophyta (green algae) in Lake Michigan was relatively low. The green algae reached a peak density in June 1980 with high abundance (greater than 10,000 per square millimeter) of Ulothrix zonata.

Chlorophyta (green algae) dominated the periphyton biovolume during all months except November, when Bacillariophyta (pennate diatoms) represented more than 95 percent of the total periphyton biovolume (Table 2-9). In June, the green alga Ulothrix zonata made up 99 percent of the biovolume while only comprising 23 percent of the total density. In August, Ulothrix zonata was completely replaced by other species and Lyngbya limnetica (a blue-green) comprised 79 percent of the density while the green alga Cladophora sp. made up 80 percent of the biovolume. During November all Lyngbya made up 30 percent of the density while Diatoma vulgare comprised 47 percent of the biovolume.



The pond stations showed seasonal fluctuations during 1980. Cyanophyta (Lyngbya sp.) and an unidentified alga dominated total density in the first quarter, a bloom of green algae (Geminella interrupta) occurred in June, the blue-green, Oscillatoria limnetica and the diatom Anomoeoneis vitrea were dominant in August, and blue-green algae and pennate diatoms dominated density measurements in the last quarter.

No one alga or group of algae dominated periphyton density over 1980, green algae and diatoms dominated biovolume (Table 2-9). Green algal species were most abundant in ponds B and C. Diatoms dominated biovolume estimates in Cowles Bog, but Tabellaria fenestrata and Synedra uina were the only diatom dominants in ponds B and C. No blue-green contributed significant biovolume to the total during 1980.

Evaluation of the abundant diatom species present at each of the stations can indicate differences in water quality that influence the biota. Most of the dominant (≥ 4 percent relative abundance) diatom species exhibited no consistent high or low relative abundance at any station (Table 2-10). The relative abundance of Cyclotella kutzingiana and Stephanodiscus astrea generally exhibited higher relative abundances at the thermal plume station (Station 10) than at other stations, and Achnanthes minutissima usually had lower relative abundances at Station 10 than at other stations. Nitzschia dissipata seemed to show the effects of thermal stimulation in April and June at Station 10. Other diatoms generally showed variable changes through time and among stations with little evidence of thermal stimulation or suppression. No periphyton species exhibited abundances at nuisance levels in the plume area.

Diatom composition in ponds B and C was similar, but as expected, differed somewhat from that in Cowles Bog (Table 2-11). Although some of the water quality data indicate a possibility of leaching from ash-settling ponds into Pond B (Texas Instruments 1980a), this change in water quality does not appear to have influenced the periphyton community. After lining the ash-settling ponds, Pond B has dried, indicating that seepage was occurring. No samples were collected from Pond B after June 1980.



Table 2-10

Percent Composition of Dominant* Periphyton Diatoms in Lake Michigan, Bailly Study Area, 1980

Taxon	Station:	Apr					Jun					Aug					Nov				
		1	10	11	12	25	1	10	11	12	25	1	10	11	12	25	1	10	11	12	25
<i>Cyclotella comensis</i>												2.2	24.0	9.8	0.9	36.9	0.5	25.0	8.5		
<i>Cyclotella glomerata</i>															1.4	4.4					
<i>Cyclotella kuetzingiana</i>							0.7					1.3	1.3	2.1		6.0					
<i>Cyclotella menes Indiana</i>			3.0	2.0			1.6	6.3	0.2				0.6					0.5			
<i>Stephanodiscus astrea</i>			19.3			2.9		0.8			1.7		0.4	0.4		0.5		1.5	1.0		
<i>Stephanodiscus astrea minutula</i>								10.5	3.3	2.4	0.3										
<i>Achnanthes linearis</i>					2.3		0.9	7.1											1.0		1.4
<i>Achnanthes minutissima</i>	15.8	4.0	4.1			60.9	0.9	10.8	8.0	4.7	5.2	2.6	3.0	50.5	10.1		0.5	3.0		9.0	2.0
<i>Achnanthes</i> sp.	5.0																				
<i>Anomoeoneis vitrea</i>								0.5					0.4	7.0				0.5			1.0
<i>Asterionella formosa</i>	4.8	1.3		0.5	2.2		0.5	3.6	1.3		2.5										
<i>Cocconeis pediculus</i>				2.5	0.4				4.0		2.0	2.4			1.8				2.5	0.5	
<i>Cymbella affinis</i>	4.25																			2.5	
<i>Cymbella minuta</i>							4.5	0.5	4.4	2.6	0.3									2.0	2.0
<i>Diatoma tenue</i>	0.5					0.5	50.0	4.5	21.3	45.5	35.8						0.5	0.5		1.5	2.0
<i>Diatoma vulgare</i>	2.5	3.3		0.4			3.4	0.5	5.05	3.1				0.2			25.5	1.0		29.5	5.0
<i>Fragilaria crotonensis</i>		1.0				4.0		2.0	0.9	0.4								0.5			0.5
<i>Fragilaria vaucheriae</i>	61.3	12.0	83.7	31.6	24.4		18.6	16.8	30.2	18.4	24.8	43.5	43.6	15.7	18.9	38.7	18.5	10.0	4.5	16.5	7.5
<i>Gomphonema olivaceum</i>				1.4	3.3		3.6	2.1	4.9	12.9	19.4	3.6		0.4	15.7			1.5	1.5	1.0	
<i>Gomphonema parvulum</i>	0.5											36.2	7.3		21.8	0.7	0.5	4.0			17.0
<i>Gomphonema</i> sp.							0.4	2.3	2.4	1.4	0.4	0.2	6.9								
<i>Navicula cryptocephala</i>		0.7			1.0			0.8	0.9								2.0	2.5	5.0	5.0	2.0
<i>Navicula graciloides</i>								1.0					1.1	0.5				8.0	0.5		32.0
<i>Navicula tripunctata</i>		1.5	0.4					0.4	0.9				0.4					2.5	6.0	0.5	1.5
<i>Nitzschia dissipata</i>		30.75	1.0					6.5	0.7	1.4							16.6	2.5	14.0	18.0	5.0
<i>Nitzschia fonticola</i>		1.7							0.4							0.5	0.5	5.0	2.0		3.0
<i>Nitzschia</i> sp.	1.5	5.0		1.1				0.2	0.5		3.6	0.5	0.2		0.5	3.5	0.5	1.0			0.5
<i>Rhoicosphenia curvata</i>	0.8	1.0	2.1	54.1	1.0		0.9		0.5	2.4		5.4			27.7	0.5	31.0	6.5	46.5	8.0	
<i>Synedra incisa</i>														7.6	0.8						
<i>Synedra rumpens</i>							1.5	7.3	3.5	2.1	1.3	0.5	3.4	1.0		2.9					
<i>Tabellaria fenestrata</i>								1.7			0.7						0.5	6.5	4.0		3.5

* Equal to or greater than 4 percent at any station.



Table 2-11

Percent Composition of Dominant* Periphyton Diatoms, Nearshore Ponds, Bailly Study Area, 1980

Taxon	Apr			Jun			Aug			Nov		
	Pond B	Pond C	Cowles Bog	Pond B	Pond C	Cowles Bog	Pond B**	Pond C	Cowles Bog	Pond B**	Pond C	Cowles Bog
<i>Melosira islandica</i>			3.1			17.1			1.2			
<i>Achnanthes exigua</i>						2.5			4.5			
<i>Achnanthes lanceolata</i>						6.5			10.7			
<i>Achnanthes linearis</i>				4.7		0.6		2.0				
<i>Achnanthes minutissima</i>	68.1	35.6	0.4	42.7	23.0	1.8		1.2	0.9		6.0	1.5
<i>Achnanthes</i> sp.						6.5		0.4				
<i>Anomoeoneis serians</i>	7.0	4.5		1.8	1.4			2.3				
<i>Anomoeoneis vitrea</i>	2.0	1.4			19.0		88.0				0.5	0.5
<i>Cymbella microcephala</i>	0.5	2.3		2.8	5.2							
<i>Diatoma tenue</i>	1.0			9.0				0.2				
<i>Eunotia curvata</i>			0.9		1.2	5.7		0.4	0.4		1.5	
<i>Fragilaria capucina</i>	1.0		54.75	0.4	1.2	8.7			4.6		5.5	1.0
<i>Fragilaria crotonensis</i>	8.5	14.5									4.5	1.0
<i>Fragilaria vaucheria</i>				2.3	3.4	2.0					12.5	1.0
<i>Gomphonema angustatum</i>			4.0			0.6			1.8		4.5	
<i>Gomphonema parvulum</i>			2.2			1.8			4.3		16.0	11.0
<i>Gomphonema</i> sp.			7.0	0.4	0.7	0.7						
<i>Meridion circulare</i>			8.5			1.3			0.9		0.5	1.5
<i>Navicula graciloides</i>					0.9	2.2					16.0	12.5
<i>Navicula pupula</i>		0.4				0.4			16.1			
<i>Navicula rhynchocephala</i>			0.4						7.6			
<i>Navicula tantula</i>									8.4			
<i>Nitzschia obtusa</i>	4.0	0.5										
<i>Nitzschia palea</i>				0.9	0.9	6.0		1.6	0.4			
<i>Nitzschia</i> sp.			1.9			1.6		1.3	14.4		2.5	0.5
<i>Synedra delicatissima</i>		10.3	1.7	1.4							1.0	1.0
<i>Synedra radians</i>											12.5	
<i>Synedra rumpens</i>				4.7	2.7	3.3			1.4			
<i>Synedra ulna</i>		2.8	8.2	1.8	0.7	1.5					3.5	10.0
<i>Tabellaria fenestrata</i>				5.8	16.5						10.5	25.5
<i>Tabellaria flocculosa</i>	11.1	17.7		5.3	12.1			1.0			10.5	2.0

* Equal to or greater than 4 percent at any station.

** Pond B was dry; no samples collected.



2.1.3.5 Periphyton Chlorophyll a. Spring periphyton chlorophyll a values in Lake Michigan were higher than in 1979 but lower than in 1978 (Figure 2-15). Highest values had occurred in August during all prior years but were highest in November 1980. Differences among years are probably due to natural variation and because the seasonal samples collect algae from different growth phases each year. Pond chlorophyll a values were highest in August as in 1979. In years prior to 1979, August had provided the lowest values. There is no apparent reason for this change, although the periphyton samples during August 1979 and 1980 were observed to have unusually large "clumps" of algae.

2.1.3.6 Periphyton Statistical Analysis. Due to the heterogeneity of the substrates at the lake stations, statistical comparisons between data cells were deemed invalid. Qualitative comparisons involving relative abundance and dominant taxa were discussed previously. Comparisons have also been made using a similarity index (Odum 1971), which is calculated as follows:

$$S = \frac{2C}{A + B}$$

where

S = similarity index

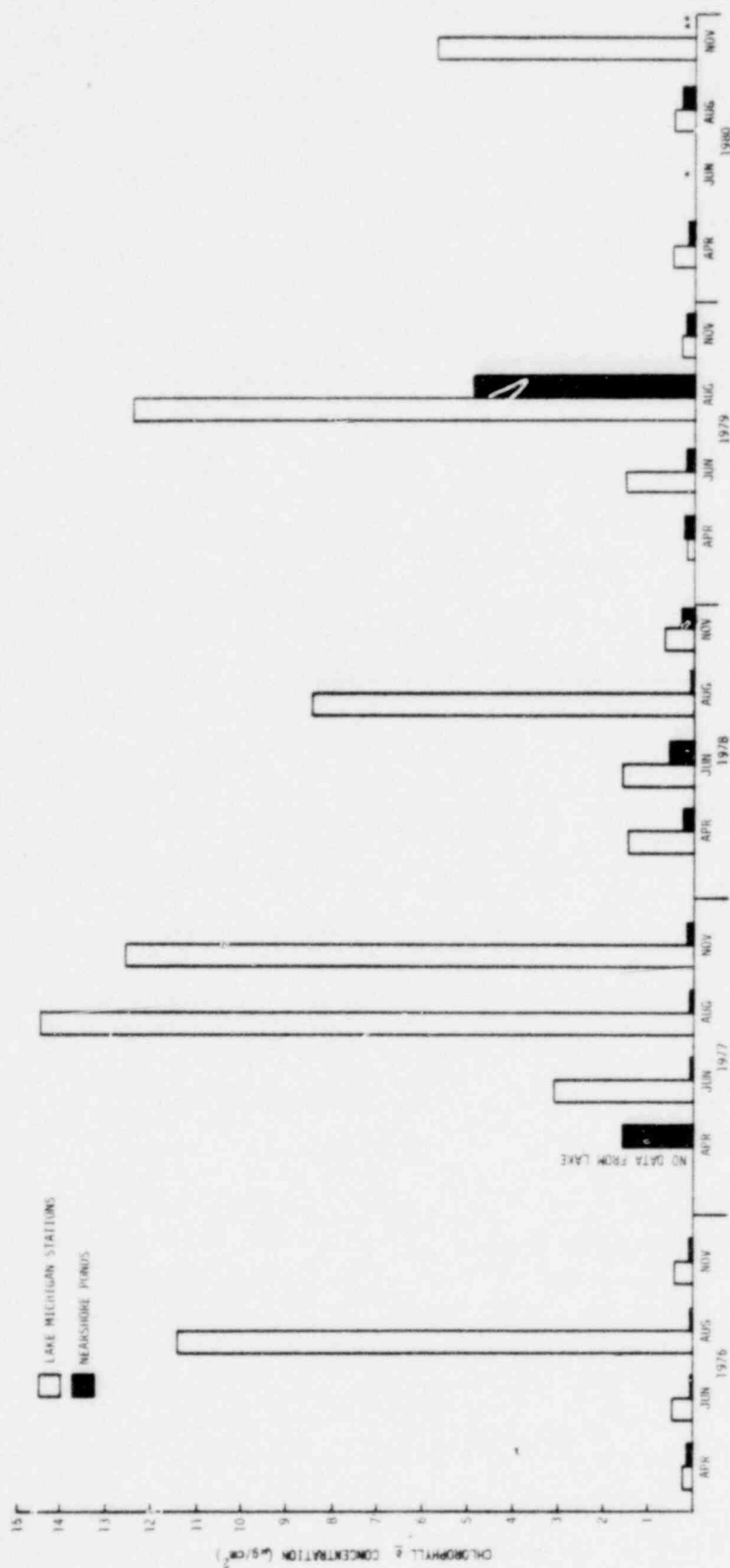
A = number of species in sample A

B = number of species in sample B

C = number of species common to both samples

The limits of the similarity index are 0 to 1, where 0 indicates complete dissimilarity and 1 equals equivalence.

The similarity index between 1979 and 1980 Lake Michigan species was 0.39. The similarity index for the ponds was 0.35. In both the lake and the ponds there were more species collected in both years than the number collected in only one year. The species that were collected in 1979 were generally those that were collected in low densities and because of bloom-like conditions encountered during the 1980 sampling the "rare" taxa were not enumerated.



* Samples lost during analysis.

** Only two samples obtained, no mean reported.

Figure 2-15. Periphyton Chlorophyll a Concentrations, Bailly Study Area, 1976-1980



2.2

ZOOPLANKTON

2.2.1 INTRODUCTION. The present survey represents the seventh year of baseline data accumulation designed to determine and document existing ecological conditions at the site and in the immediate vicinity of the Bailly Generating Station in order to assess any possible alterations in the zooplankton community.

As early as the late 1800s, information describing this component of the Lake Michigan ecosystem was being compiled. In recent years, the quantity and quality of this work has increased. Since 1966, synoptic sampling in Lake Michigan has intensified, producing more information on zooplankton distribution and abundance (Robertson 1966; Beeton 1970; Roth and Stewart 1973; Watson 1974; Beeton, Torke, Brooks, and Bowers 1975; Gannon 1974; and Evans and Stewart 1977). Much additional information describing zooplankton population dynamics and regulatory mechanisms affecting community structure in Lake Michigan has been published (McNaught 1966, Norden 1968, Wells 1970, Patalas 1972, and Gannon 1972).

The following subsections present data describing seasonal and annual fluctuations in zooplankton abundance, composition, and species occurrence. Spatial distribution is also described for zooplankton at ten Lake Michigan stations (1-10) and five stations (17-21) located in nearshore, interdunal ponds (Pond B, Pond C, and Cowles Bog). Pond B was dry and was not sampled after June 1980.

2.2.2 METHODOLOGY. Zooplankton were sampled regularly once during April, June, August, and November 1980, at each of ten lake stations and at each of five stations in three ponds (Table 2-1). Lake samples were collected by the vertical haul of a No. 25 mesh, 0.5-meter-diameter plankton net and pond samples were collected with a 6-liter Van Dorn sampler. During 1980, 240 zooplankton samples were collected.

All samples were processed as previously described (Texas Instruments 1975). In sum, four replicate samples per station were transferred from the net or the Van Dorn bottle to 1-liter polyethylene bottles, narcotized with a Lugol's rose bengal dye solution, and subsequently fixed with buffered formalin.



A minimum of 200 organisms (EPA 1973) was enumerated as representative of the sample. If 200 organisms were encountered midway through analysis of a subsample, the remaining subsample was completed. If zooplankton in a sample were sparse, the entire sample was analyzed.

Reference keys and pertinent literature used in establishing field and laboratory procedures and taxa identifications included Wilson (1932), Pennak (1953, 1963, 1978), Usinger (1956), Ward and Whipple (1959), Brooks (1957), and UNESCO (1968).

Statistical analyses were performed on zooplankton data according to the methodology presented in subsection 2.1.3.3.

2.2.3 RESULTS AND DISCUSSION

2.2.3.1 Introduction. The data presented and discussed in this report represent parameters chosen to characterize the zooplankton community in the Bailly study area of Lake Michigan from April 1980 to November 1980. A checklist of zooplankton occurrences seasonally during 1980 and annually from 1974 through 1980, as well as figurative and tabular data characterizing seasonal variations in the relative numerical abundance of zooplankton, appears in Tables 2-12 through 2-15 and Figures 2-17 through 2-24.

2.2.3.2 Zooplankton Occurrence. Through the three seasons [spring (April), summer (June and August), and fall (November)] of 1980, 68 taxa were identified from Lake Michigan and 76 from the interdunal ponds (Table 2-12). Previous years (1974-1979) yielded 69, 55, 49, 44, 50, and 63 taxa, respectively, for Lake Michigan stations (Table 2-13). The interdunal ponds (Pond B, Pond C, Cowles Bog) yielded 96, 93, 87, 57, 69, and 73 taxa, respectively, for years 1974 through 1979 (Table 2-12). During 1980, the most abundant organisms, the bosminid cladocerans and immature (copepodid) copepods, represented more than 50 percent of the population during all sampling periods in Lake Michigan (Table 2-13). Diaptomid copepods represented 24 percent of the total during April. Thirteen taxa were greater than 2 percent abundant during one or more of the sampling periods in Lake Michigan. Seventeen taxa from the ponds attained greater than 2 percent relative abundance.



Table 2-12

Zooplankton Occurrence, Bailly Study Area, 1980

NET(LAKE) & BOTTLE (POND)				
LAKE(1,2) PONDS(3,4,5)				
LS	TAXA	SPR 12345	SUM 12345	FAL 12345
9	CNIDARIA (TOTAL)			
19	HYDRA (LPIL)	12	345	1 45
0	PLATYHELMINTHES (TOTAL)			
0	NEMATODA (TOTAL)			
0	OLIGOCHAETA (TOTAL)			
1	CHAETOGASTER (LPIL)	1 4		4
1	NAIDIDAE (LPIL)	12 45	1 45	
0	HIRUDINEA (TOTAL)			
0	ANNELIDA (TOTAL)			
0	GASTROPODA (TOTAL)			
1	LYMNAEIDAE (LPIL)		5	
0	ARACHNIDA (TOTAL)			
1	HYDRACARINA (TOTAL)			
19	HYDRACARINA (LPIL)	12	345	
0	CLADOCERA (TOTAL)			
1	BOSMINA LONGIROSTRIS		1	
1	BOSMINIDAE (LPIL)	1234	12345	12 45
1	ALONA			
1	ALONA RECTANGULA	1 34	12345	4
1	ALONA AFFINIS	3	12345	4
1	ALONA COSTATA	1 3	5	
1	ALONA QUADRANGULARIS		1	
1	ALONA INTERMEDIA	3		
1	ALONA GUTTATA		1 34	4
1	ALONA (LPIL)	1 4	1 345	4
1	CAMPTOCERCUS RECTIROSTRIS		34	4
1	CHYDORUS			
1	CHYDORUS SPHAERICUS		2	
1	CHYDORUS (LPIL)	1 345	12345	45
1	KURZIA LATISSIMA		45	
1	EURYCERCUS LAMELLATUS	1	12	
1	ALONELLA (LPIL)	1	3	
1	GRAPTOLEBERIS TESTUDINARIA		3	
1	LEYDIGIA QUADRANGULARIS		1 34	
1	PLEUROXUS DENTICULATUS	34	345	45
1	PLEUROXUS PROCURVUS	3 5	3 5	
1	PLEUROXUS (LPIL)			45
6	CHYDORIDAE (LPIL)		1 3	1
1	DAPHNIA AMBIGUA		3	
1	DAPHNIA GALEATA MENDOTAE		12	12
1	DAPHNIA LONGIREMUS		2	
1	DAPHNIA RETROCURVA		12	12 4
1	DAPHNIA PULEX	2		1
6	DAPHNIA (LPIL)	123	123	12
1	SIMOCEPHALUS (LPIL)		345	45
1	CERIODAPHNIA LACUSTRIS		12	
1	CERIODAPHNIA (LPIL)		1 345	
1	SCAPHOLEBERIS KINGI			5

Legend:

LS = Life stage
 0 = Summary level
 1 = Adult
 2 = Larva
 6 = Immature
 13 = Nymph
 14 = Copepodid
 19 = Undetermined
 20 = Mixed

Spring = April sampling
 Summer = June and August sampling
 Fall = November sampling

Location 1 = Near-field stations 1-6 and 10
 Location 2 = Far-field stations 7-9
 Location 3 = Pond B
 Location 4 = Pond C
 Location 5 = Lowles Bog



Table 2-12 (Contd)

LS	TAXA	SPR 12345	SUM 12345	FAL 12345
1	SCAPHOLEBERIS (LPIL)		5	45
1	HOLOPEDIDUM GIBBERUM		1	12
1	LEPTODORA KINDTII		1	
1	ILYOCRYPTUS SORDIDUS		1 4	
1	ILYOCRYPTUS SPINIFER			4
6	ILYOCRYPTUS (LPIL)	1		
1	MACROTHRIX ROSEA		4	
6	MACROTHRIX (LPIL)		4	
1	BUNOPS SERRICAUDATA		4	
1	POLYPHEMUS PEDICULUS		1	
6	DIAPHANOSOMA (LPIL)	4	34	
6	SIDIDAE (LPIL)		3	
0	OSTRACODA (TOTAL)			
0	COPEPODA (TOTAL)			
1	DIAPTOMUS OREGONENSIS	2	1 34	12
1	DIAPTOMUS ASHLANDI	12	12	12
1	DIAPTOMUS CLAVIPES		1	
1	DIAPTOMUS SICILOIDES			1
1	DIAPTOMUS PALLIDUS	1 3	34	1
1	DIAPTOMUS SICILIS	12	12	12
1	DIAPTOMUS MINUTUS	12	1	12
1	DIAPTOMUS (LPIL)	1	4	
1	EURYTEMORA AFFINIS		12	1
1	LIMNOCALANUS MACRURUS	12	1	
1	EPISCHURA LACUSTRIS			12
14	CALANOIDA (LPIL)	1234	12345	12 4
1	CYCLOPS BICUSPIDATUS THOMASI	12 4	12	12
1	CYCLOPS VARICANS RUBELLUS		5	
1	CYCLOPS VERNALI	1 34	12345	45
1	CYCLOPS BICUSPIDATUS		1	
1	CYCLOPS CAROLINIANUS		5	
1	EUCYCLOPS AGILIS	1	345	45
1	EUCYCLOPS PRIONOPHORUS	1		
1	EUCYCLOPS SPERATUS	1 4		4
1	MACROCYCLOPS ALBIDUS		4	45
1	MESOCYCLOPS EDAX		1 34	
1	MESOCYCLOPS LEUKARTI	4	4	
1	PARACYCLOPS FIMBRIATUS POPPEI		5	
1	TROPOCYCLOPS PRASINUS MEXICANA	2	1 3	12
14	ERGASILUS (LPIL)		1	
1	ORTHOCYCLOPS MODESTUS			5
1	ECTOCYCLOPS PHALERATUS		5	
14	CYCLOPOIDA (LPIL)	12345	12345	12 45
1	LONGIPEDIA HELGOLANDICA		3	
14	MACROSETELLA GRACILIS		1	
1	HARPACTICOIDA (LPIL)	12345	12345	45
0	AMPHIPODA (TOTAL)			
1	PONTOPOREIA			
1	PONTOPOREIA AFFINIS	1		
0	COLLEMBOLA (TOTAL)			
0	EPHEMEROPTERA (TOTAL)			
13	CAENIDAE (LPIL)	3	3	
0	ODONATA (TOTAL)			
0	COLEOPTERA (TOTAL)			
0	TRICHOPTERA (TOTAL)			
0	DIPTERA NEMATOCERA (TOTAL)			
2	CERATOPOGONIDAE (LPIL)	1	45	
2	CHIRONOMIDAE (LPIL)	1 345	1 345	45
9	DIPTERA (TOTAL)			

Zooplankton Occurrence, Lake Michigan and Nearshore Ponds, Bailly Study Area, 1974-1980

♀all Mountain Lake.
 ♀mountain Lake.
 No winter samples collected in Lake Michigan.
 No winter samples collected in nearshore ponds during 1975.
 ♀p = spring (April); ♀s = summer (June, August); ♀f = fall (October or November); ♀w winter (February or March).

[illegible]



As in previous years, basic habitat differences between lake and pond stations were manifest in the respective community structures. Certain littoral species of Macrothricidae cladocerans were strictly limited to the shallow, enclosed habitats of the pond stations. Also more prevalent in the weedy, shallower pond habitats were the various chydorid cladocerans. The large limnetic copepod Limnocalanus macrurus was only found in the deeper, more open waters characteristic of the lake stations.

The Index of Similarity (Odum 1971) is useful in comparing one community with another, either spatially or temporally; it makes maximum use of information contained in species occurrence data by comparing the number of taxa in community A (A) with the number of taxa in community B (B) and the number of taxa common to both (C) by the following relationship:

$$S (\text{similarity}) = \frac{2C}{A + B}$$

The index ranges from 0 to 1, and any value greater than 0.5 indicates that the two communities were more similar than dissimilar. A comparison of Lake Michigan and nearshore pond zooplankton communities of 1974 through 1980 is illustrated in Figure 2-16.

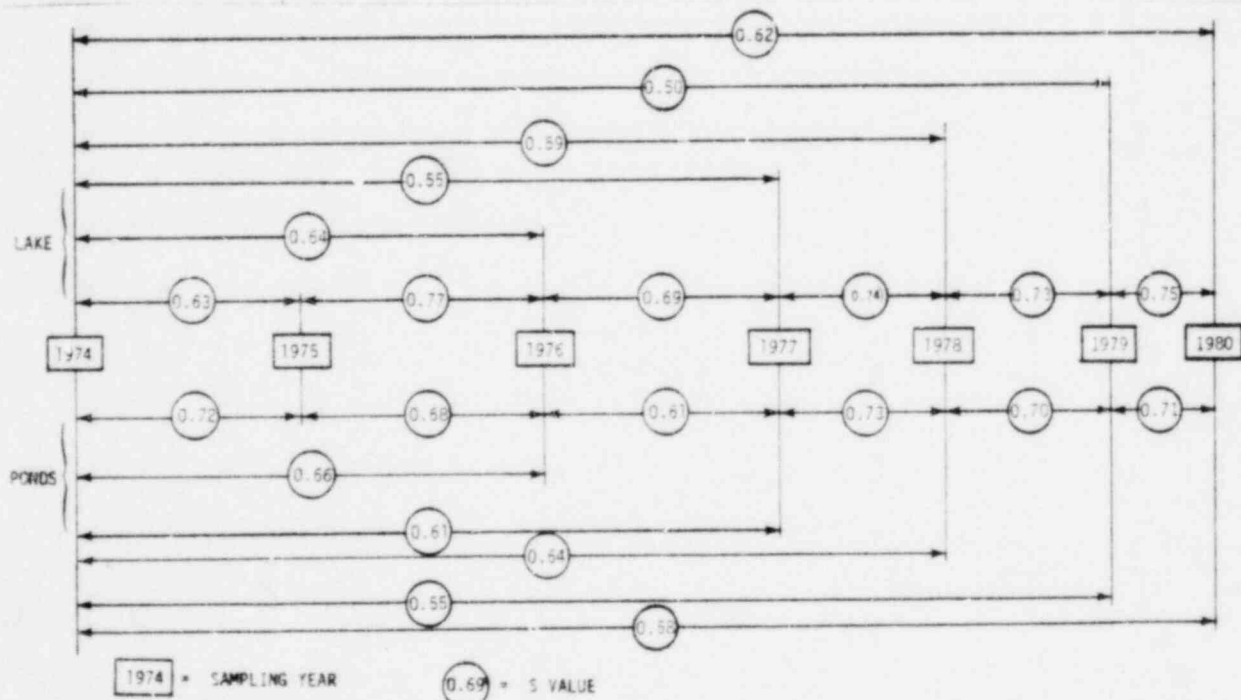


Figure 2-16. Index of Similarity for Zooplankton Communities, Bailly Study Area, 1974-1980



The data suggest that the zooplankton communities are similar from year to year, but the degree of similarity fluctuates somewhat. A trend of decreasing similarity of the lake zooplankton community from 1974 to 1980 was evident from similarity calculations on pond samples; however, similarity increased in the lake. The variation observed in the zooplankton communities is due primarily to the variable nature of collecting low abundance species, principally cladocerans and copepods. Many of the less abundant taxa collected intermittently are species associated with the bottom substrates, and therefore are not collected in abundance with plankton sampling techniques. No shifts in major community components are apparent from 1974 to 1980.

2.2.3.3 Numerical Abundance. Zooplankton abundance in Lake Michigan reflected different seasonal patterns between nearfield stations (1-6 and 10) and farfield stations (7-9) (Table 2-14). Zooplankton densities peaked in August at both the nearfield and farfield stations with bosminid cladocerans the most numerous. Density values ranged from a low of 464 per cubic meter at Station 1 in April to a high of 69,770 per cubic meter at Station 5 in August (Table 2-14). This range is similar to that observed in most previous years but somewhat higher than in 1979. The maximum observed density was 214,722 per cubic meter in 1978 (Texas Instruments 1979).

Table 2-14
Zooplankton Density (No./m³) for Lake Michigan Stations 1-10
and Interdunal Pond Stations 17-21, Bailly Study Area, 1980

	Station	Apr	Jun	Aug	Nov
Lake Michigan Stations	1	464	13,824	53,925	33,542
	2	670	16,822	32,863	31,465
	3	646	13,642	22,342	18,470
	4	761	11,851	22,750	21,121
	5	646	16,934	69,770	22,539
	6	605	17,157	29,786	16,664
	7	817	6,468	49,083	36,405
	8	787	15,071	27,710	27,146
	9	764	12,861	22,523	24,490
	10	2,967	17,520	34,115	13,623
Lake Michigan Stations	Nearfield \bar{x} 1-6,10	966	15,393	37,979	22,489
	Farfield \bar{x} 7-9	783	11,467	33,105	29,347
Pond Stations	17	88	984	*	*
	18	45	332	*	*
	19	135	502	102,093	2,210
	20	68	160	108,236	5,302
	Cowles Bog 21	239	5	16,667	120
	Pond C \bar{x} 17-18	67	658	*	*
	Pond C \bar{x} 19-20	102	331	105,164	3,756

* No samples collected because pond was dry.



CONTINUOUS NATURE OF CONNECTING LINES DOES NOT IMPLY DATA CONTINUITY THROUGH NONSAMPLING MONTHS.

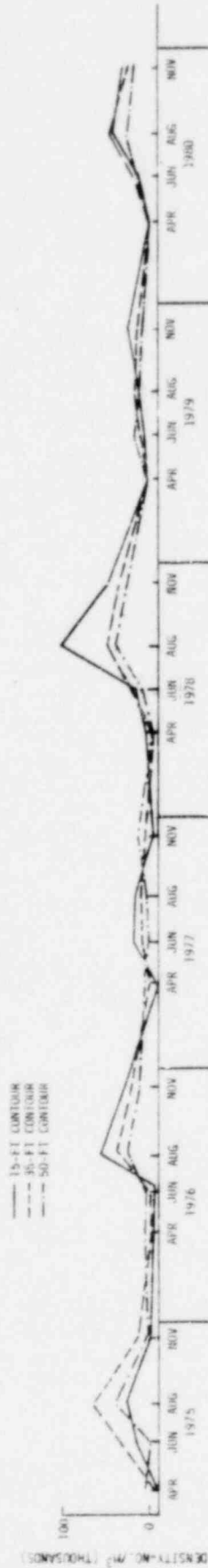


Figure 2-17. Zooplankton Density, Lake Michigan Stations, Bailly Study Area, 1975-1980



As in previous years, highest pond densities were significantly higher than lake zooplankton density and lowest pond densities were generally lower (Table 2-14, Figure 2-18). Values ranged from a low of 5 per cubic meter in April in Cowles Bog to a high of 108,236 per cubic meter at Station 20 in August. Densities in the ponds peaked in August (Figure 2-19). Densities in Cowles Bog were generally lower than those observed in ponds B or C as in previous years, although Pond B was dry and not sampled after June (Table 2-20). Low densities in 1980 continued a trend begun in 1979. No biotic or abiotic condition, with the exception of low rainfall, was found which could have caused the low densities. Average density evaluations over all years remained relatively unchanged (Figure 2-20). The short-term decrease in pond zooplankton may simply be the result of slight changes in population peaks and seasonal and sampling relationships.

Comparison of 1980 seasonal density distribution patterns in Lake Michigan with previous years indicated that peak densities usually occurred in August with varying annual intensities (Figure 2-18). Annual maximum density (lake mean) steadily declined from 1974 through 1977, increased considerably in 1978, and returned to levels similar to 1977 in 1979. A slight, but continuing increase was noted also for 1980, with an August peak. The data in Figure 2-18 suggest a seasonal pattern characterized by a steady increase in density from April to August with a subsequent decline in November. This trend is similar to that described for adjacent areas within Lake Michigan (Roth and Stewart 1973).

Temporal density variations in the ponds reflected much greater annual fluctuation than in Lake Michigan (Figure 2-19). Data collapsed over the past six years (Figure 2-20) indicate a seasonal pattern of increasing densities from April to June with relatively high densities through November. In 1980, pond mean densities followed a pattern similar to that noted in Lake Michigan, peaking in August and declining in November.

2.2.3.4 Percent Composition. Defining community structure and monitoring temporal variations in the community are essential in characterizing the ecosystem. Figures 2-21 and 2-22 indicate temporal changes in relative (percent) abundance of major taxa in Lake Michigan and nearshore ponds during this and previous studies in the Bailly study area. Table 2-15 presents relative abundance (percent) values for the major taxa during 1980.

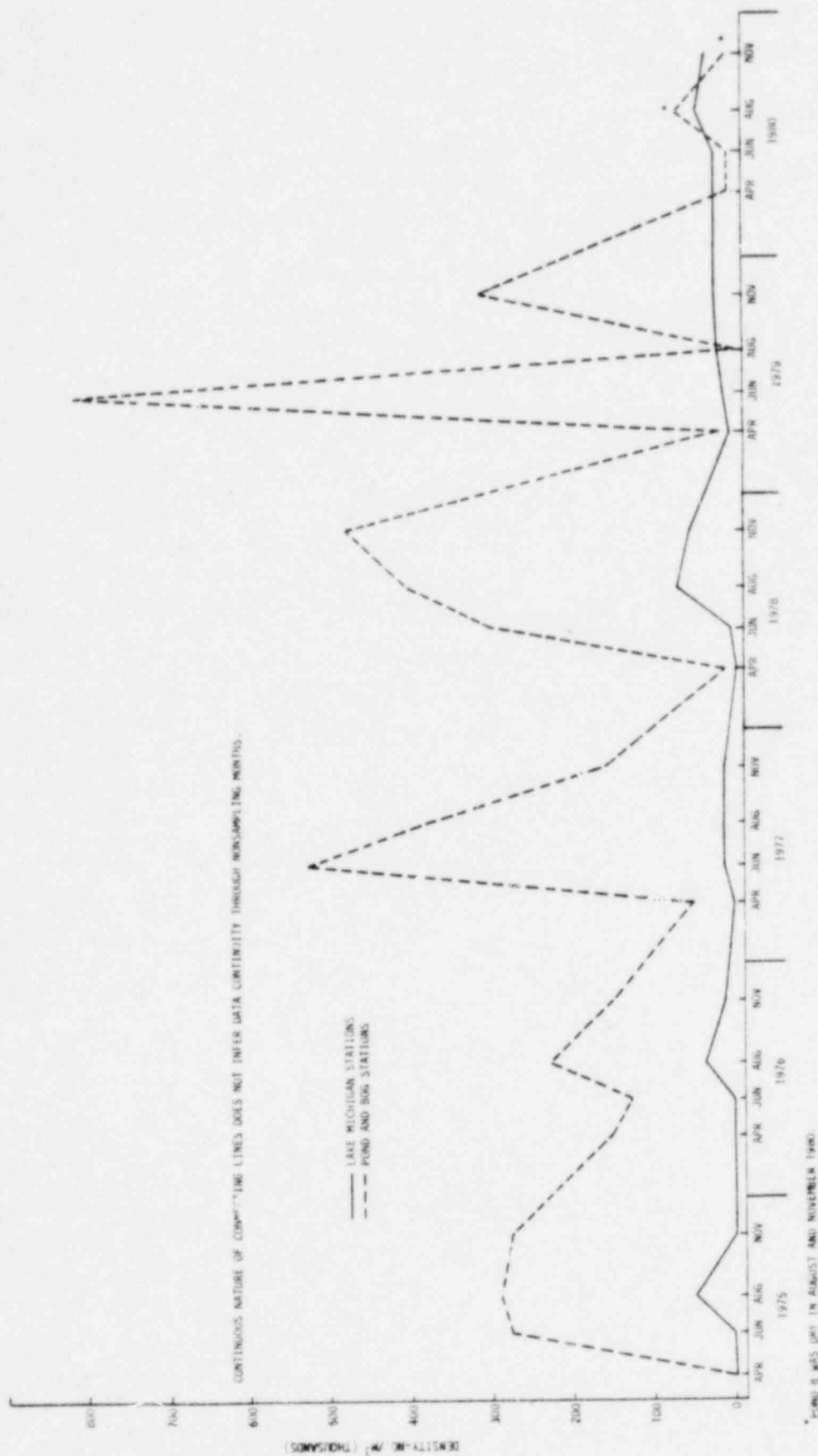


Figure 2-18. Zooplankton Density, Bailly Study Area, 1975-1980

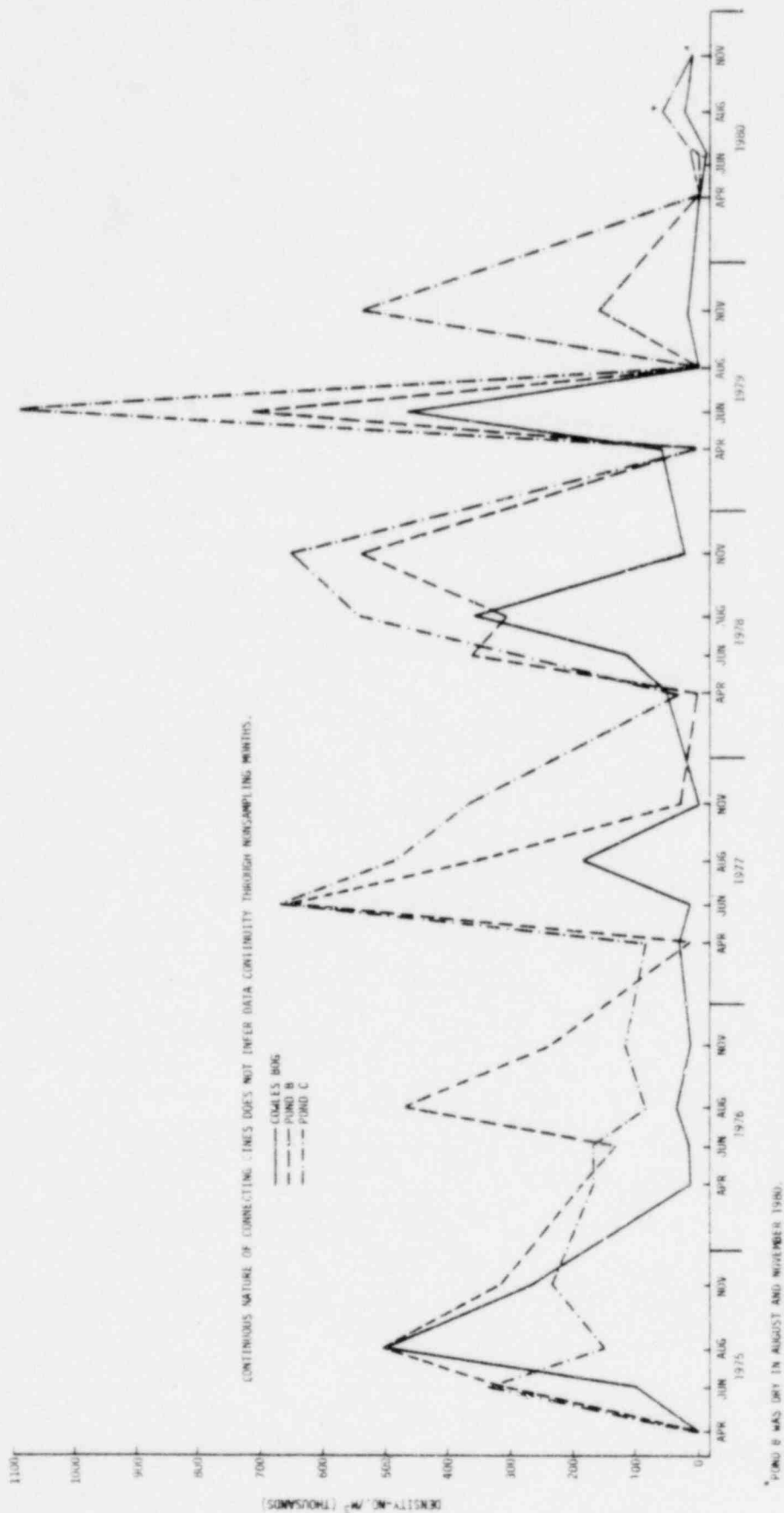


Figure 2-19. Zooplankton Density, Nearshore Ponds, Bailly Study Area, 1975-1980



Zooplankton seasonal succession in Lake Michigan during 1980 generally displayed a similar pattern to previous years with bosminid cladocerans, and cyclopoid copepodids as the most numerous organisms. In previous years, diaptomid copepods often had been quite numerous but in 1980 they represented a relatively small part of the population. Calanoid and cyclopoid copepodids dominated April and June 1980 fauna along with diaptomid copepods in April and bosminid cladocerans in June (Table 2-15). Bosminids, cyclopoid, and calanoid copepodids shared dominance during August and November.

The pond zooplankton community also exhibited seasonal fluctuations in community structure. Harpacticoid copepods dominated in April, followed by chydorid and bosminid cladocerans and *Ceriodaphnia* (Cladocera) in June. Ostracods, calanoid copepods, bosminids, and chydorids shared dominance in August, and chydorid cladocerans were dominant in November (Table 2-15; Figure 2-22). The most taxa were reported from the ponds in June.

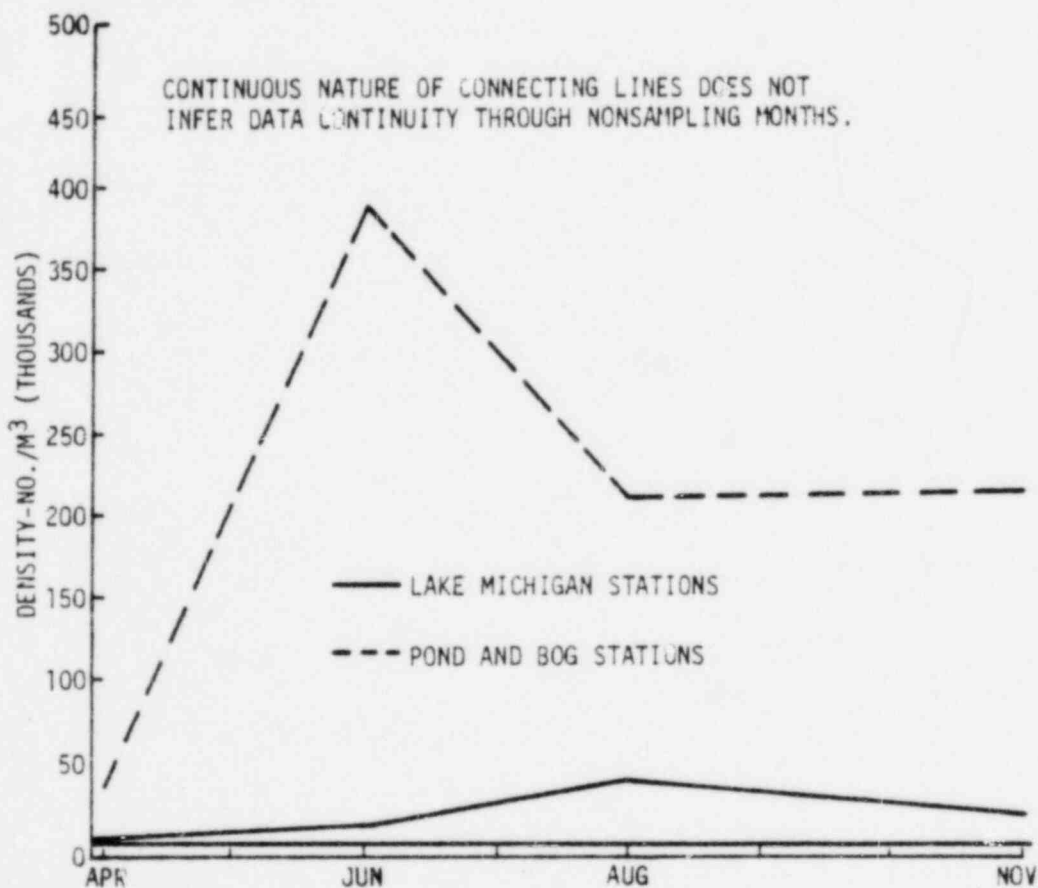


Figure 2-20. Average Zooplankton Density, Lake Michigan and Nearshore Pond Stations, Bailly Study Area, Summed over 1975-1980

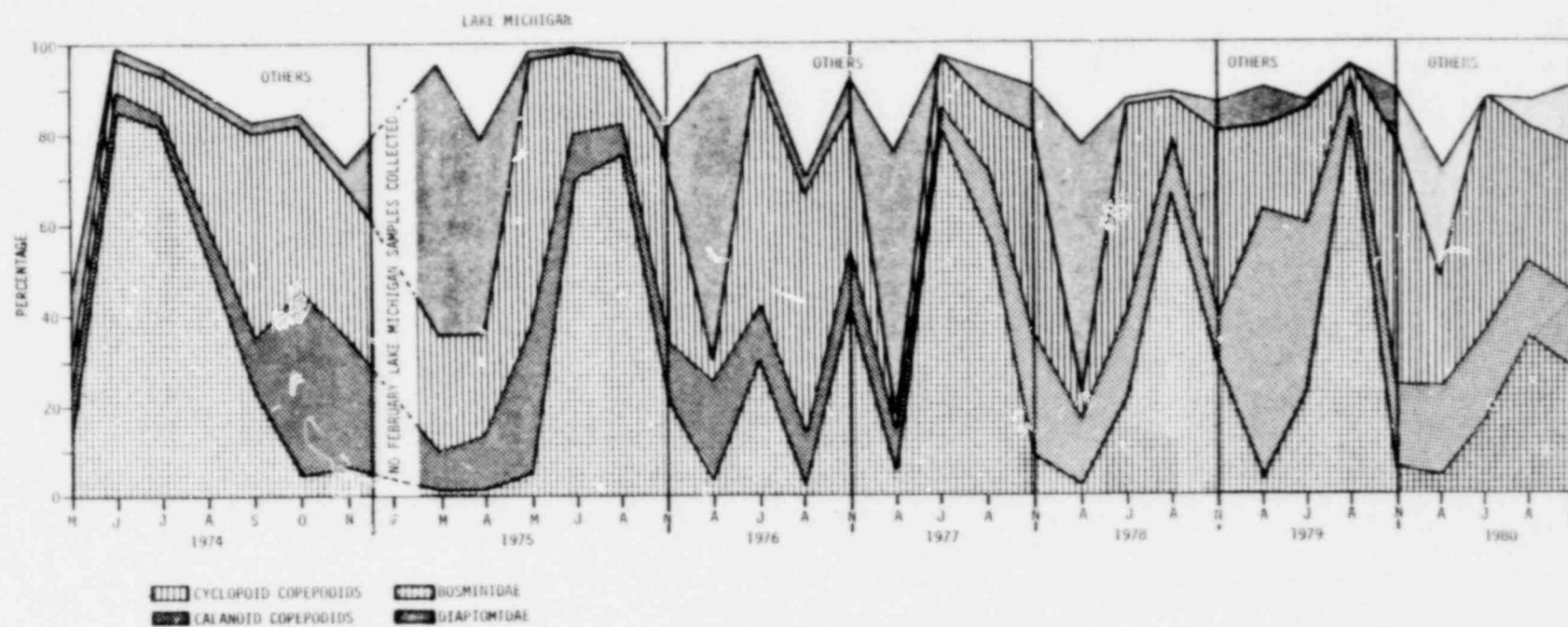


Figure 2-21. Percentage Composition of Important Zooplankton Forms, Lake Michigan, Bailly Study Area, 1974-1980

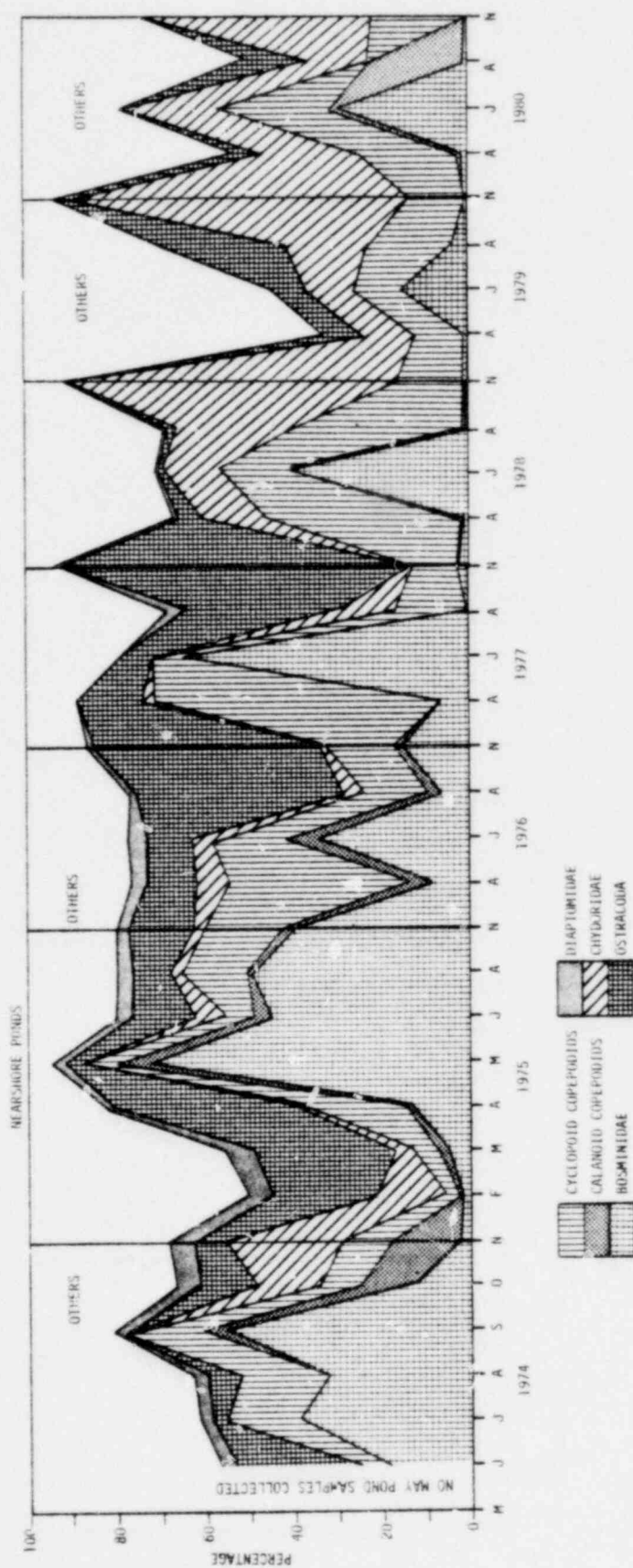


Figure 2-22. Percentage Composition of Important Zooplankton Forms, Nearshore Ponds, Bailly Study Area, 1974-1980



Table 2-15

Percent Composition of Major Zooplankton Forms in Lake Michigan
and Interdunal Ponds, Bailly Study Area, 1980

Taxon	Apr		Jun		Aug		Nov	
	Lake	Ponds	Lake	Ponds	Lake	Ponds	Lake	Ponds
Chydoridae	1	22	<1	23	6	13	<1	51
Bosminidae	4	<1	24	30	35	0	28	<1
Ceriodaphnia sp.	0	0	1	17	<1	22	0	0
Cyclopoid copepodids	25	22	51	7	30	<1	32	21
Calanoid copepodids	20	2	20	2	17	22	17	<1
Diaptomidae	24	<1	<1	1	5	<1	13	0
Harpacticoida	2	40	<1	<1	0	3	0	2
Ostracoda	0	5	<1	1	0	11	0	2
Total %	76	91	95	81	93	71	90	76
No. Taxa	38	28	32	50	40	37	23	35

Compared with previous years, 1980 Lake Michigan zooplankton community dynamics were similar to seasonal succession patterns observed in prior years, being most like the 1976 sampling year since it exhibited high relative abundance of cyclopoid copepodids and somewhat lower abundance of bosminid cladocerans throughout the year (Figure 2-21). As was observed in 1979, there was a slightly higher abundance of calanoid copepods than in most prior years (Figure 2-21). The seasonal succession pattern observed for this survey has been generally described for southern Lake Michigan by Roth and Stewart (1973).

Seasonal succession patterns in the nearshore ponds may be indicative of changes in the trophic condition within these ponds. Comparisons of seasonal succession patterns over the past 7 years indicate several significant trends (Figure 2-22). Periods of peak bosminid dominance have decreased since 1975, no longer lasting until August as observed in 1974 and 1975. Concurrently, chydorid cladocerans have steadily increased in percent composition since 1974 with chydorids occurring most heavily after the bosminids' short summer peak. Calanoid copepod relative abundance had diminished noticeably from 1974 through 1979, but a population resurgence was noted this year. The relative abundance of cyclopoid copepodids generally has remained uniform since 1976. Gliwicz (1969) noted that smaller species are more abundant in Polish lakes since they feed on smaller food particles that are more prevalent in eutrophic conditions.



The general trend in the nearshore ponds indicated increasing numbers of smaller forms, most notably the chydorid cladocerans. Gannon (1972) indicates that Chydorus sphaericus often appears as a common plankter in eutrophic waters accompanying blue-green algal blooms. It should be emphasized, however, that while shifts in species composition of crustacean zooplankton may be indicative of changes in the degree of eutrophy, similar shifts in species composition, and especially size-related shifts, can also be attributable to size-selective fish predation. Gannon (1972) states that it would be difficult to separate shifts in species composition due to size-selective predation or eutrophication. However, more blue-green algae are present in the ponds than occurred in 1974.

The more stable community structure observed in the lake suggests, as in previous years, that plant operation has a negligible influence on the major zooplankton components in Lake Michigan. Zooplankton community dynamics in the nearshore ponds indicate that shifts in major community components are occurring that may reflect increased eutrophication and/or fish predation. The degree (if any) to which plant operation is influencing this trend cannot be assessed at this time; however, similar trends observed in the literature suggest that this phenomenon is more related to natural limnological processes than plant operation. Lining of the ash-settling ponds and the subsequent cessation of seepage into Pond B and possibly into Pond C and Cowles Bog should provide information as to what effects seepage has had. The 1981 studies should provide some of this information.

2.2.3.5 Trophic Relationships. Although other factors are often influential, food availability is important in regulating zooplankton community structure. In general, much information regarding the trophic interrelationships of zooplankton can be gained by observing those of the phytoplankton; normally, zooplankton abundance depends almost entirely on phytoplankton levels and reacts accordingly, but the system can exist only when the zooplankton abundance is free to fluctuate greatly and is not rigorously limited by predation (O'Brien and deNoyelles 1974). In a study by Lane and McNaught (1970) involving a mathematical analysis of Lake Michigan zooplankton niches, food was considered the dominant factor in niche separation. While temperature controls crustacean



growth and hatching rates (Elster 1954; Eichhorn 1957, as cited in Patalas 1972), food availability affects the fertility of females (Edmondson 1965; Comita and Anderson 1959, as cited in Patalas 1972).

Trends described earlier for Lake Michigan zooplankton in which densities have decreased during the 1975-1977 period may be closely related to phytoplankton community dynamics rather than interactions from higher trophic levels. Figure 2-23 presents zooplankton and phytoplankton densities from 1975 through 1980 and indicates a steady increase in phytoplankton density concomitant with what appears to be relatively stable zooplankton abundance; however, zooplankton and phytoplankton abundance increased in 1978 and again in 1980 indicating factors other than total phytoplankton abundance may be influencing zooplankton abundance. Levels of blue-green algae have increased steadily from 1974 through 1980 accounting for the major portion of the phytoplankton community during peak periods (see Phytoplankton, subsection 2.1.3.1). Blue-greens are generally considered undesirable as a food source for invertebrates, especially cladocerans (Arnold 1971), but apparently there is sufficient phytoplankton to support the zooplankton population since zooplankton densities do not seem to have changed significantly since the beginning of the study. During 1980 the zooplankton and phytoplankton changed concomitantly with both reaching higher peaks than during 1979.

While size-selective predation on zooplankton by alewives has been indicated for Lake Michigan (Gannon 1974), predatory pressure from tertiary trophic levels does not appear to be a major mechanism affecting zooplankton community dynamics in this area. In general, no major size-related shifts in the zooplankton community have been observed during the 6 years of study.

Phytoplankton-zooplankton relationships in the ponds during 1977 were more direct in that zooplankton density generally followed the pattern established by the phytoplankton (Figure 2-24). This was not entirely true during 1978, 1979 and 1980 although zooplankton community dynamics were more closely related to phenomena occurring in lower trophic levels than to any major predatory stress higher in the food chain. Zooplankton density was lower in 1980 than in previous years. This was primarily a result of the drying of Pond B with no samples collected after June when lining of the ash-settling ponds was underway. The densities in Pond B were typically high and the loss of these numbers decreased the "pond mean."

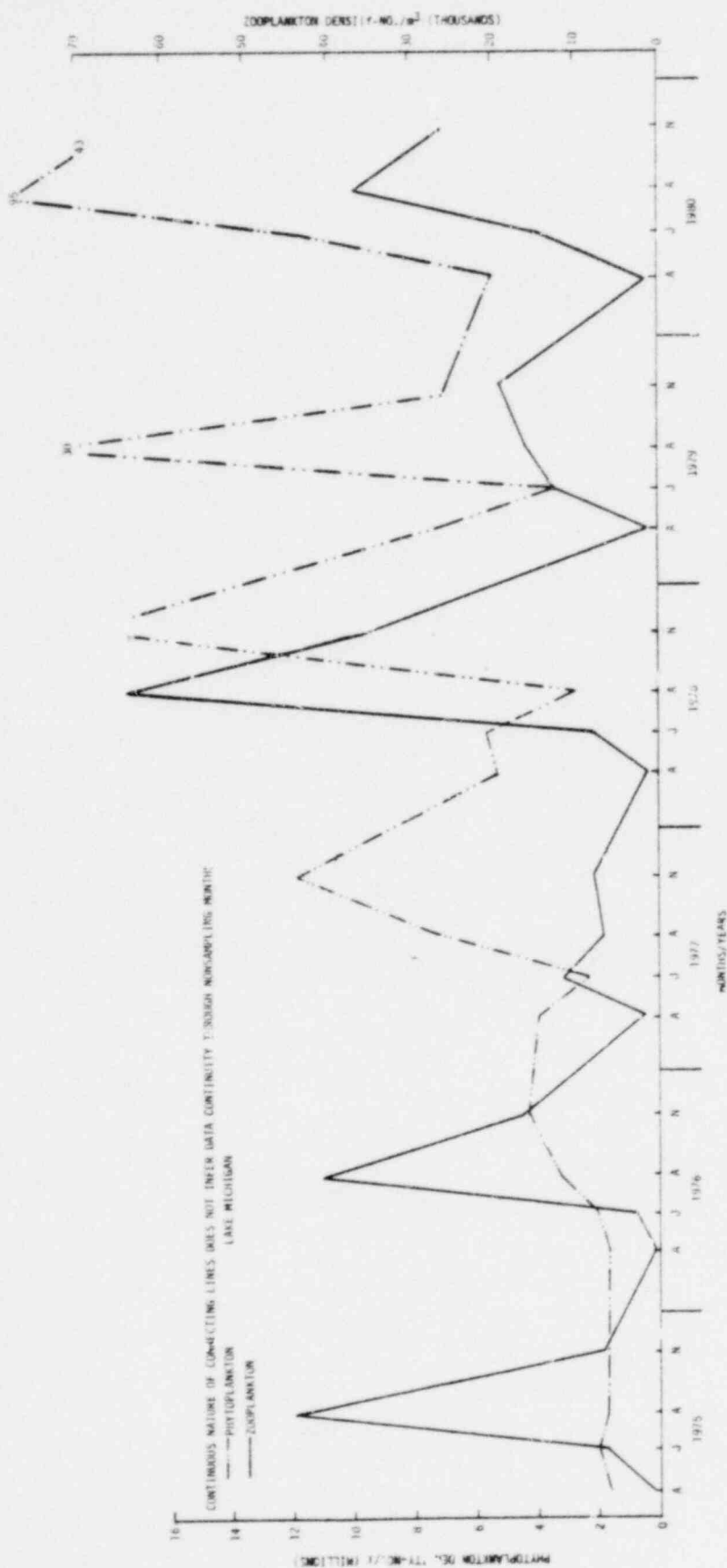
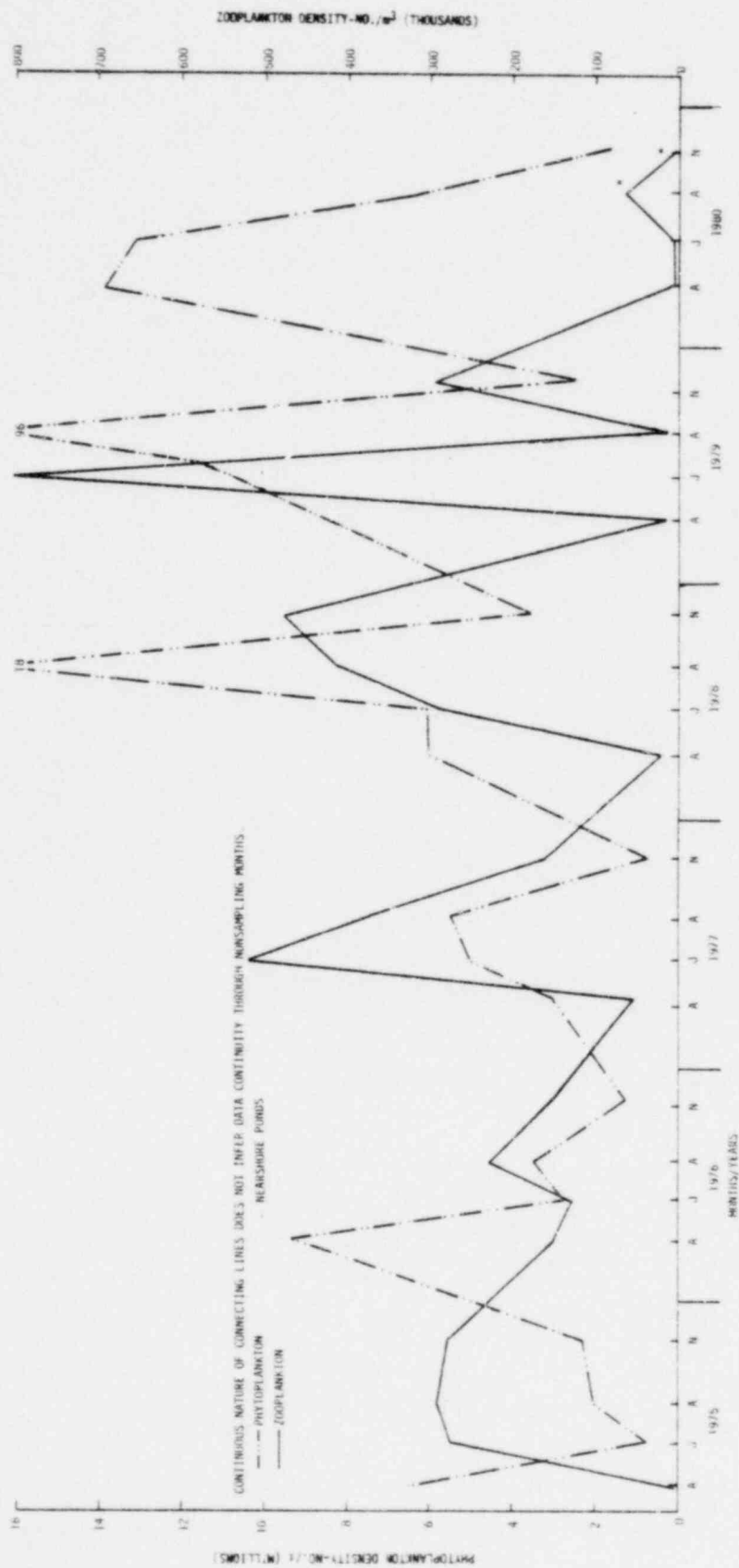


Figure 2-23. Comparison of Phytoplankton Density and Zooplankton Density, Lake Michigan, Bailly Study Area, 1975-1980



* POND B WAS DRY IN AUGUST AND NOVEMBER 1980.

Figure 2-24. Comparison of Phytoplankton Density and Zooplankton Density, Nearshore Ponds, Bailly Study Area, 1975-1980



2.2.3.6 Statistical Analysis

2.2.3.6.1 Lake Michigan. Total zooplankton densities of Lake Michigan were subjected to an analysis of variance. To stabilize variance, the data values were logarithmically transformed. Months (seasons) were considered as random effects and stations as fixed effects. A complete description of statistical analysis methodology is presented in subsection 2.1, Phytoplankton. The summary analysis of variance can be tabulated as shown below, with significant F-statistics marked with an asterisk ($\alpha \leq 0.05$).

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
1980 ANOVA Results, Lake Stations			
Month	3	347.9194	182.4*
Station	9	3.6283	0.63
10 vs rest	1	1.4225	2.24
Row (linear)	1	0.4109	0.65
Row (quadratic)	1	1.0040	1.58
Column	2	0.0409	0.03
Row x column	2	0.5424	0.43
Row x column	2	0.2075	0.16
Month x station	27	17.1667	7.24*
Residual	120		

1975-1980 ANOVA Results across Years

Year	3	224.1485	1.54
Month	3	2309.8980	26.49*
Year x month	15	436.0268	381.93*
Station	9	13.5198	1.15
Year x station	45	58.6425	1.39
Month x station	27	22.9696	.91
Year x month x station	135	126.8979	12.35*
Residual	720	54.7986	

* Significant at ≤ 0.05 .

As one would expect, the seasonal effect (months) for 1980 data was significant, with August density highest and April the lowest. Generally, stations 1-10 were fairly uniform in terms of density distribution with no significant differences in mean density ($\alpha \leq 0.05$). The contour (15 ft, 30 ft, and 50 ft) means were not significantly different.

The significant month x station factor indicates the spatial pattern of densities was not uniform across all months. The 35-foot contour stations exhibited high densities relative to other stations during April and August, while during April and November the 35-foot contour stations had low-to-medium



densities relative to other stations. The abundance of zooplankton at Station 10 (thermally influenced station) was similar to abundances at other nearshore stations.

Across-year comparisons of zooplankton data indicate that while no significant year-to-year differences were observed, seasonal (monthly) variations were significant as observed in the 1980 ANOVA ($\alpha \leq 0.05$). Year x month and year x month x station interactions were also significant, indicating that there were significant changes in the spatial pattern of zooplankton density across months and years. Although changes in spatial distributions occurred throughout the 5-year period when averaged over time, the densities at each station were not different, nor were the yearly means different. This indicates natural variation in abundance but no apparent overall change in zooplankton abundance. These evaluations were the same as noted during 1979. None of the variations in total zooplankton density appear to be related to NIPSCO Bailly Station influences.

2.2.3.6.2 Ponds and Bog. Analysis of variance was performed also on total zooplankton densities in the ponds and bogs, and the density data were transformed logarithmically to help stabilize variances. In the analysis of variance, months (seasons) were considered as random effects and stations as fixed effects. The station sum of squares was partitioned with orthogonal contrasts for specific tests. The summary analysis of variance can be tabulated as follows, with significant F-statistics marked with an asterisk ($\alpha \leq 0.05$):

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
1980 ANOVA Results, Pond Stations			
Month	3	430.9690	22.60*
Station	4	54.4490	2.14
Pond vs bog	1	50.5404	7.95*
Pond B	1	2.6885	0.42
Pond C	1	0.0665	0.01
B vs C	1	0.5975	0.09
Month x station	8	50.8287	6.47*
Residual	48	47.1661	
1975-1980 ANOVA Results across Years			
Year	5	509.5529	0.83
Month	3	180.7516	0.49
Year x month	15	1833.0443	166.56*
Station	2	127.5517	3.91*
Year x station	10	46.9099	1.93
Month x station	6	84.3395	5.78*
Year x month x station	30	72.9089	3.31*
Residual	216	158.4783	

*Significant at ≤ 0.05 .



Seasonal (monthly) effects were found to be significant for zooplankton density within the ponds, as would be expected. Highest zooplankton densities were found during August, followed by November, August, and June. Mean zooplankton densities in 1980 for all stations were found not to be significantly different. The abundance patterns among the stations changed from one month to another, causing significant month x station interaction. The most evident changes were: 1) Cowles Bog exhibited lowest densities of all stations during all months except in April (as in 1979) when Cowles Bog had higher densities than all other stations, and 2) Pond C usually had highest zooplankton densities in August. Cowles Bog had significantly lower zooplankton densities than the ponds.

Comparisons across years for zooplankton pond density revealed that while annual density differences were not statistically different, year x month, month x station, and year x month x station interactions were significant. These significant interactions indicate seasonal abundance patterns among years and station abundance patterns among months are not always the same. Stations were also significantly different, probably as a result of the very low densities noted in Cowles Bog. Consideration of zooplankton densities for months across years indicates April usually has the lowest density, while June, August, and November exhibit variably high densities. The largest portion of the month x station interaction was due to changes in densities relative to other pond stations. None of the significant variations in total zooplankton density appear to be related to NIPSCO Bailly Station influences.

2.3 BENTHOS

2.3.1 INTRODUCTION. Benthic studies of the open waters of the Great Lakes have largely emphasized numerical distribution in relation to sediment characteristics and depth and the significance of particular organisms as indicators of water quality (Eggletton 1937, Powers and Alley 1967, Mozley and Garcia 1972, Mozley and Alley 1973, and Mozley and Winnell 1975). A recent study by Mozley (1975) describes benthic community responses to power plant effluents in the Great Lakes. In addition, several studies have been conducted which concentrated upon specific major taxa groups such as amphipods (Alley 1964, Kidd 1970, and Mozley and Garcia 1972), molluscs (Hensen and



Herrington 1965), and oligochaetes (Stimpson et al 1975). Several studies describing species associations of benthic macroinvertebrates in the Great Lakes have also been conducted (Cook and Powers 1964, Hiltunen 1967, Brinkhurst et al 1968, and Johnson and Brinkhurst 1971).

This survey of the benthic community was designed to characterize the spatial and temporal variation in composition and abundance in the Bailly study area. This report contains the results of the seventh year of continuous monitoring effort and also draws comparisons among the study years 1974-1980. A general discussion of certain groups as they function as organic pollution indicators is also provided for comparison with data collected in this study.

2.3.2 **METHODOLOGY.** Benthic macroinvertebrate samples were collected at ten lake stations (1-10) and five pond stations (17-21) during April and June 1980. In August and November 1980, all lake stations and three pond stations (19-21) were sampled. Pond stations 17 and 18 could not be sampled as Pond B was dry. Sediment-size analysis at all benthos lake and pond stations except Pond B (17 and 18) was scheduled and conducted during August 1980.

Lake station samples consisted of duplicate quantitative samples collected with a 9-inch by 9-inch Ponar grab sampler. This particular sampler was chosen for its ability to sample a variety of substrates. The Ekman grab is better for sampling fine substrates at shallow depths, but the Ponar grab is more effective on firm substrate samples in deeper water (Hudson 1970, Howmiller 1971, and Lewis 1972) such as are found in Lake Michigan.

Ponar grab samples were taken at each station until duplicate valid samples were collected. A valid grab haul was defined as one containing substrate within the completely closed jaws of the sampler. Invalid haul contents were discarded. Replicate samples were placed in separate containers, labeled, and preserved to a final concentration of 4 percent buffered formalin. Rose-bengal dye (0.5 percent solution) was added as a stain to aid in rapid detection of the organisms during separating processes.

Each sample was washed through a No. 30 U.S. standard sieve and examined, using white enamel pans and 10X illuminated magnifying lenses. The brightly stained organisms were distinguished easily in the sediment-laden samples. Specimens were sorted by taxon, enumerated, and placed in appropriately labeled



vials containing 70 percent ethanol. Specimens were examined using dissection and compound microscopes; principal reference keys used in identification included: Johannsen (1934, 1935, 1937); Ross (1944); Burks (1953); Wiggins (1977); Pennak (1953, 1978); Usinger (1956); Roback (1957); Ward and Whipple (1959); Mason (1973); Edmunds et al (1976); and Brinkhurst and Jamieson (1971). These references were supplemented as necessary with specific monographs.

Benthic samples were collected in the ponds with a 9-inch by 9-inch Ekman dredge. This grab was chosen because of its ability to sample areas where the sediment is primarily silt, clay and detrital material (APHA 1971). Pond samples were collected, preserved, and analyzed in the same manner as the lake samples.

Sediment grain-size analysis was performed on separate benthic samples collected concurrently with biotic analysis samples at lake stations 1-10 and pond stations 19-21 during August 1980. Pond stations 17 and 18 were not sampled as Pond B was dry. Subsamples were withdrawn from each sample, pooled for each station, and then wet-sieved through U.S. Standard sieve series comprised of No. 5, 10, 18, 35, 60, 120, and 230. The fine sediments suspended in water which passed through the 230 sieve were collected in a flask and dried to constant weight at 110°C to obtain a measure of the clay fraction contribution. All other sediment fractions were removed directly from the sieves and dried to constant weight in glass crucibles at 110°C. The weight of each fraction then was used as the basis for calculating percentage composition for each grain-size interval. Particle sizes were classified according to Wentworth scale as follows:

<u>Sediment Size (mm)</u>	<u>Scale</u>
≥4	Pebble
2-4	Granule
1-2	Very coarse sand
0.500-1	Coarse sand
0.250-0.500	Medium sand
0.125-0.250	Fine sand
0.062-0.125	Silt
<0.062	Clay



2.3.3 RESULTS AND DISCUSSION

2.3.3.1 Numerical Abundance. Density of benthic organisms in Lake Michigan varied widely across time and space during the 1980 sampling program (Table 2-16). The highest densities for the year were recorded at Station 3 in June (9289 organisms/m²) and at Station 6 in August (8029 organisms/m²). In general, the 50-foot contour stations (3, 6, and 9) consistently displayed the highest values for the study area (Figure 2-25). These high density values were all associated with the active reproduction and growth of tubificid oligochaete populations.

Table 2-16
Benthic Invertebrate Density (No./m²), Bailly Study Area, 1980

	Station	Apr	Jun	Aug	Nov
Lake Michigan Stations	1	38	221	856	423
	2	558	250	2,163	404
	3	1,394	9,289	5,606	1,298
	4	221	317	577	10
	5	548	904	2,721	0
	6	3,250	3,913	8,029	827
	7	125	1,481	1,663	38
	8	202	1,404	10	558
	9	29	1,817	712	1,567
	10	337	153	67	1,317
	Nearfield \bar{x} 1-6,10	907	2,150	2,860	611
	Farfield \bar{x} 7-9	119	1,567	795	721
Pond Stations	17	14,990	385	*	*
	18	1,486	1,673	*	*
	19	5,865	1,856	1,288	1,808
	20	3,990	2,135	31,808	4,692
	Cowles Bog 21	6,231	8,856	12,490	6,663
	Pond B \bar{x} 17-18	8,418	1,209	*	*
	Pond C \bar{x} 19-20	4,928	1,995	16,548	3,250

* No samples collected; Pond B dry.

The increasing density with increasing depth phenomenon observed in previous years (Texas Instruments 1975, 1976, 1977, 1978, 1979) and also documented by other authors (Mozley and Garcia 1972, Ayers and Seible 1973, and Stimpson et al 1975) was again observed (Figure 2-26). A comparison of nearfield stations (1 to 6 and 10) with farfield stations (7 to 9) indicates that mean densities

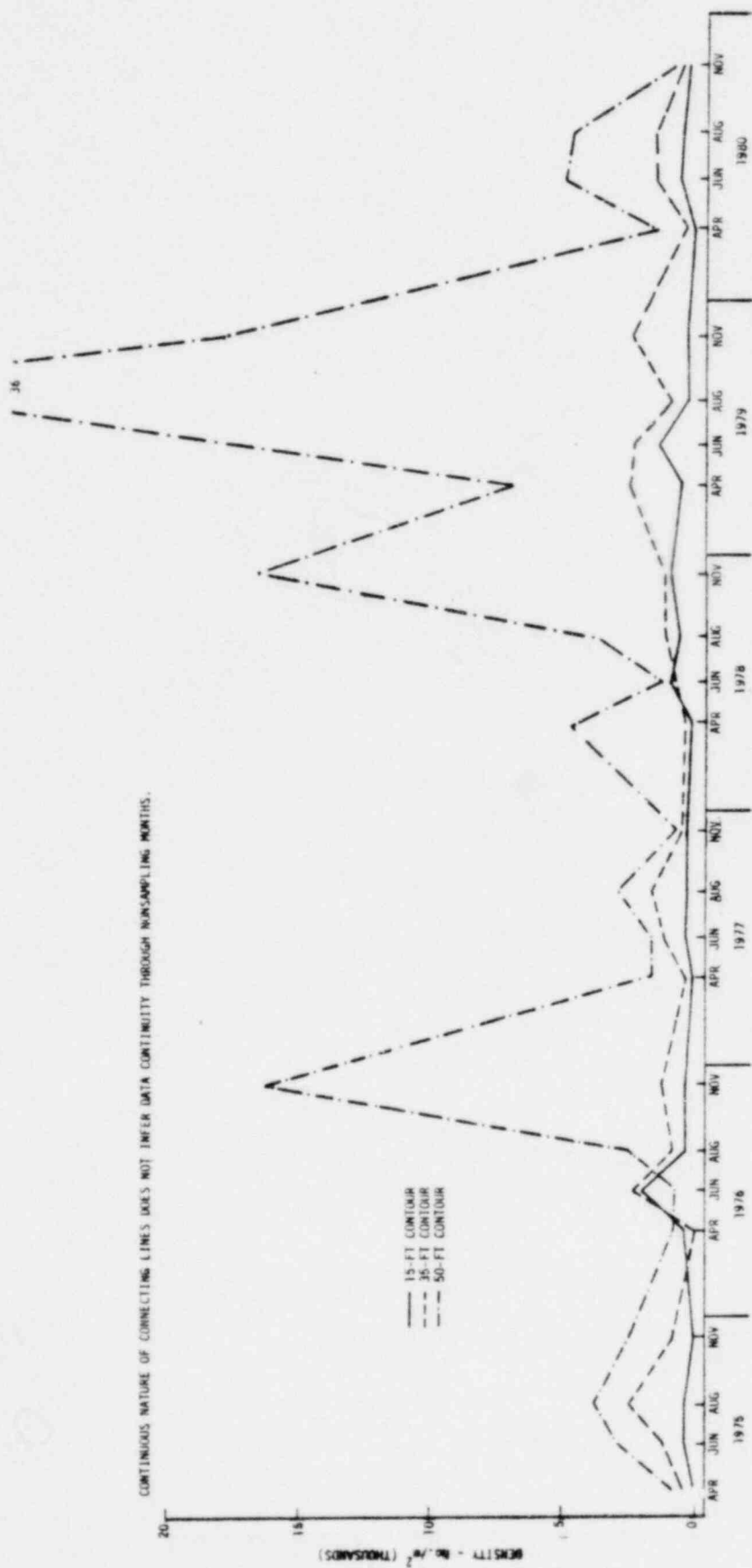


Figure 2-25. Benthic Invertebrate Density, Lake Michigan Stations, Bailly Study Area, 1975-1980



CONTINUOUS NATURE OF CONNECTING LINES DOES NOT INFER DATA CONTINUITY THROUGH NONSAMPLING MONTHS.

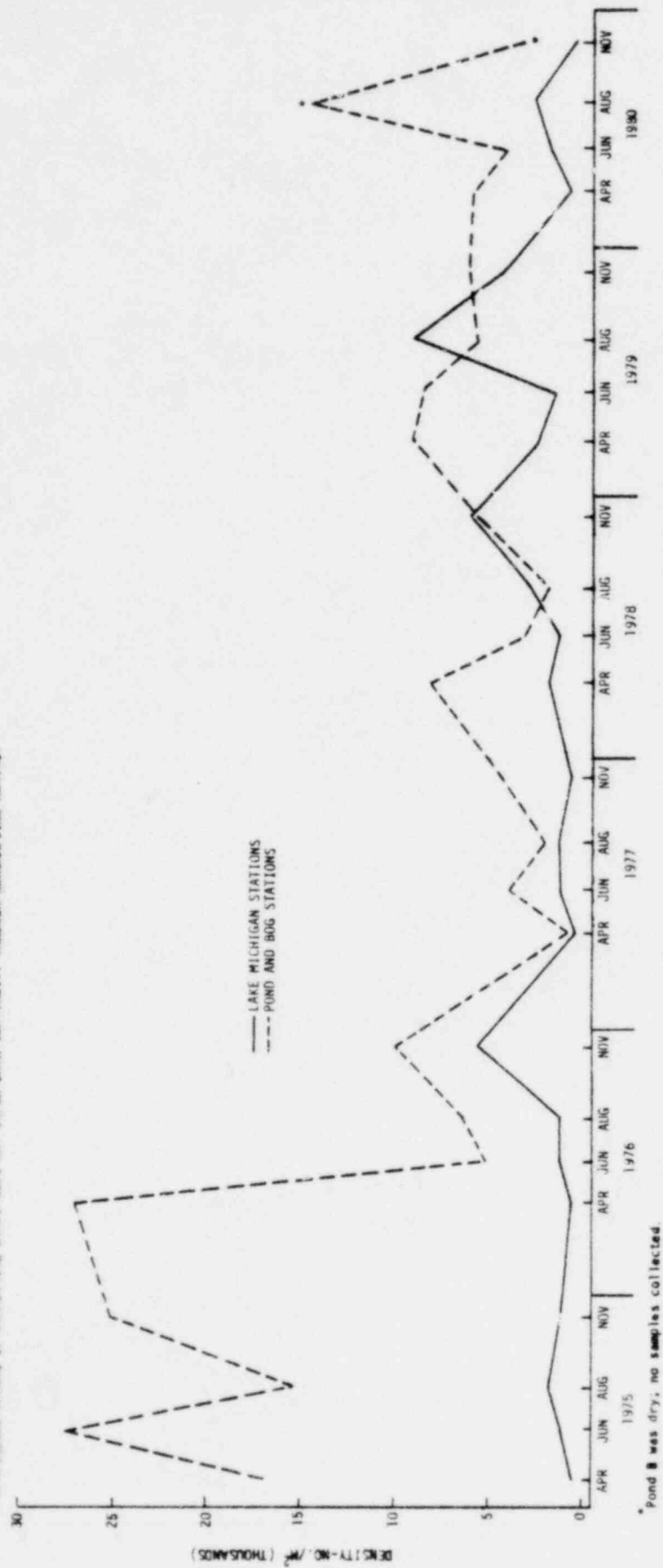


Figure 2-26. Benthic Invertebrate Density, Bailly Study Area, 1975-1980

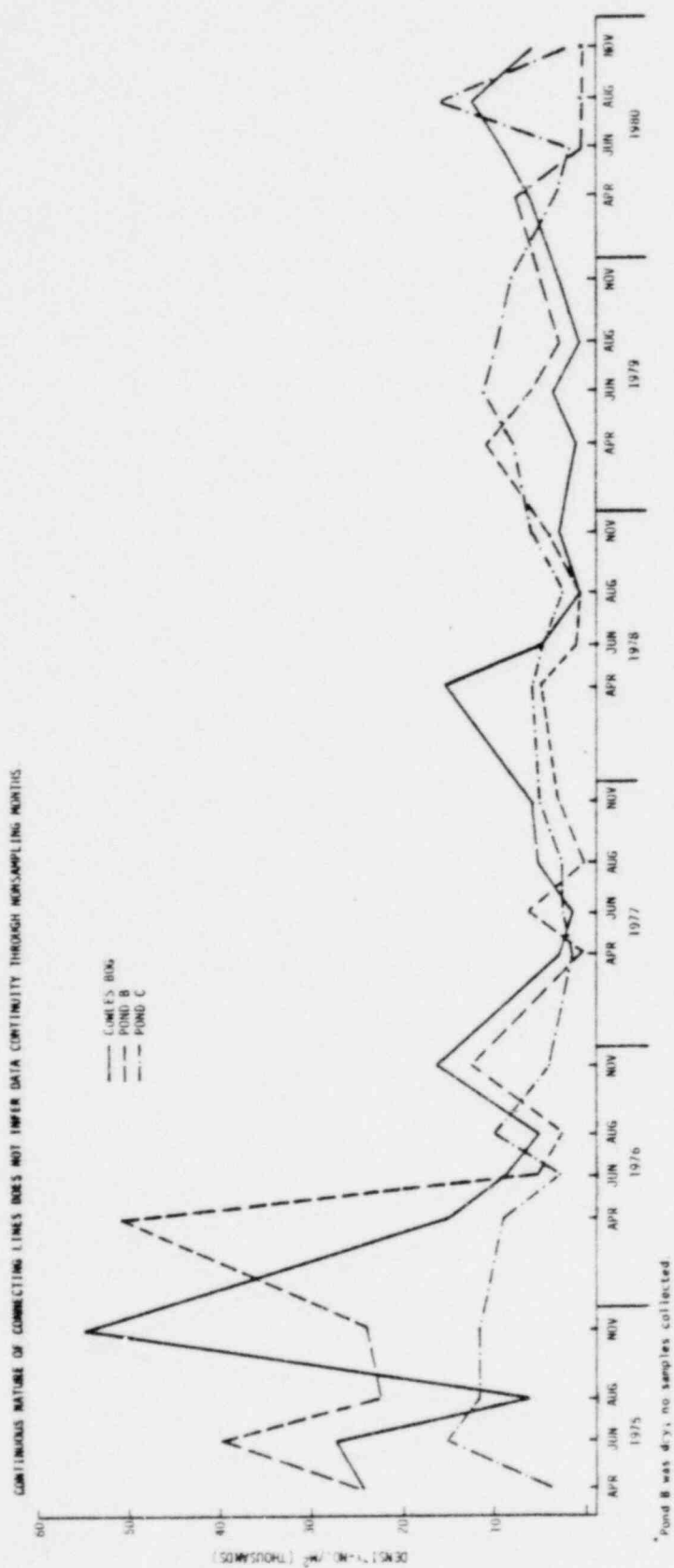


Figure 2-27. Benthic Invertebrate Density, Nearshore Ponds, Bailly Study Area, 1975-1980



were higher at the nearfield stations (Table 2-16). Density values at Station 10 (discharge) were low as has been observed in the past. However, the comparability and overlap of density values within depth contours for each sampling period at the nearfield and farfield stations, including the discharge station, indicate that plant operation may affect total densities or that variability may be due to natural factors (e.g., wave action).

As with previous data, the nearshore ponds in 1980 generally yielded much higher average densities than observed in the lake (Table 2-16, Figure 2-26), although differences in sampling gear (Ponar vs Ekman grab) preclude a strict comparison between lake and pond densities. Cowles Bog (Station 21) displayed much higher densities in 1980 than 1979 due to large increases in the number of tubificid oligochaetes. The highest density in the nearshore ponds was recorded in Pond C (Station 20) during August (31,808 organisms/m²) while the lowest density was recorded in Pond B (Station 17) during June (385 organisms/m²).

A pattern noted in past years has been the low total density in the ponds for the years 1976-1979 relative to the values reported for 1975 (Figure 2-26). The loss of water in Pond B exaggerated this trend in the 1980 results (Figure 2-27). Cowles Bog returned to levels observed in 1976 and 1978 samples but did not approach the levels attained in spring and fall 1975 samples. The variability exhibited in these data may be attributed to fluctuating water levels accompanied by changes in water quality conditions over the course of the program. The natural variability in abundance within the ponds was also highlighted by the August 1980 results for Pond C. Station 19 in the northwestern arm of the pond yielded only 1288 organisms/m² while Station 20 in the south central area produced 31,808 organisms/m².

2.3.3.2 Species Composition. Determining the temporal and spatial variations in benthic species composition can provide information concerning the effects of subtle environmental changes not always discernible by instantaneous physicochemical testing. Lake Michigan samples were dominated by tubificid worms throughout the year (Table 2-17; Figure 2-28). The amphipod Pontoporeia affinis was also abundant followed by chironomids and naidid worms. Hydra, a freshwater coelenterate, was abundant in November collections at the discharge



station (10). The highest relative abundance occurred in April for Chironomidae, June for Amphipoda, August for Naididae, and June for Tubificidae (Table 2-17).

Table 2-17

Percent Composition of Abundant Benthic Organisms, Bailly Study Area, 1980

Station	Taxon	Apr	Jun	Aug	Nov
Lake(1-10)	Amphipoda	17	22.0	7.2	6
	Tubificidae	55	60.5	43.9	32
	Chironomidae	22	8.0	19.6	15
	Naididae	0	1.0	15.0	8
	Bivalvia	4	2.0	8.4	8
	Cnidaria	0.0	0.0	0.0	27
	Hirudinea	<1	3.3	2.4	2
	Total %	98	96.5	96.5	99
	No. Taxa	21	28	27	26
Pond(17-21)*	Naididae	59	10.9	38.8	16
	Tubificidae	19	69.7	35.7	52
	Amphipoda	<1	<1	0.0	<1
	Ephemeroptera	<1	<1	1.2	0.0
	Chironomidae	9	12.7	16.5	24.0
	Bivalvia	6	2.5	0.9	5.0
	Nematoda	1.3	<1	1.3	<1
	Isopoda	<1	<1	<1	1
	Trichoptera	<1	0.0	<1	1
	Total %	94.3	96.6	94.4	93
	No. Taxa	40	31	39	29

* No samples collected from Pond 3 (17,18) during August and November because pond was dry.

The nearshore pond benthic fauna was dominated throughout the year by tubificid and naidd worms and chironomids (Table 2-17). The prevalent chironomids in the ponds during 1980 were Chironomus sp., Dicrotendipes sp., and Tanytarsus sp. (Table 2-18). Other commonly encountered although not dominant taxa were Hyalella azteca (Amphipoda), Sphaerium sp. (Bivalvia), Caenis sp. (Ephemeroptera), and Ablabesmyia sp. (Diptera: Chironomidae) (Tables 2-18 and 2-19).



Table 2-18

Benthic Organisms in Lake Michigan and Nearshore Ponds, Bailly Study Area, 1974-1980

	1974				1975				1976				1977				1978				1979						
Taxa	Lake Michigan		Ponds		Lake Michigan		Ponds		Lake Michigan		Ponds		Lake Michigan		Ponds		Lake Michigan		Ponds		Lake Michigan		Ponds				
Celenterata (Hydroids)																											
Hydra sp.	S	F	S	F	W	Sp	S	F	Sp	F	Sp	S	F	S	F	Sp	F	F	F	S	F*	Sp	S	F	F		
Cordylophora lacustris																		F				Sp	S	F			
Turbellaria (Flatworms)																											
Dugesia sp.					W																						
Unid. Turbellaria					W*		S		Sp	S	F			F	Sp	S	F	Sp	S	F	Sp	S	F	Sp*	S	F	
Nematoda (Roundworms)	S	F		F*	W*		S*	F	Sp	S*	F		S	F	Sp	S	F	Sp	S	F	Sp	S	F	Sp*	S	F	
Nemertea					W																						
Bryozoa (Moss animalcules)												F															
Lophopodidae																											
Lophopodella sp.		F																						S			
Plumatellidae									S												F						
Fredericella sultana																							S		Sp		
Cristatellidae																											
Cristatella sp.		F					S																				
C. mucida																							Sp	S			
Unid. Statoblast													S												F		
Endopocera																											
Umatella gracilis																							S	F			
Amelita (Segmented worms)							S						S														
Oligochaeta (Aquatic worms)						W	Sp																				
Naididae																											
Unid. Naididae	S	F*	S*	F*			S*	F*	Sp	S*	F*		S*	F	S*	F*	Sp	S	F	Sp	S*	F	Sp	S*	F*	S*	F*
Polychaeta sp.					S								S		Sp	S	F			S			S	Sp	S	F	
Chaetogaster sp.	S		S	F	W*		S		Sp*	S	F*		S		Sp*	S	F			S		F*	S		Sp	S	F
Nais sp.						Sp																					
Pristina sp.																											
Stylaria lacustris	S		S	F	W				Sp	S	F																
Lumbricidae																											
Lumbriculus sp.					W																						
Tubificidae																											
Unid. Tubificidae	S*	F*	S*		W*	Sp*	S*	F*	Sp*	S*	F*	Sp*	S*	F*	Sp*	S*	F*	Sp*	S*	F*	Sp*	S*	F*	Sp*	S*	F*	
Peloscoides sp.																											
Hirudinea (Leeches)																											
Glossiphoniidae																											
Glossiphonia sp.					W				Sp		F																
Helobdella stagnalis	S		S			Sp	S	F	Sp	S			S	F	Sp	S	F	Sp	S	F	Sp	S*	F	F	Sp	S	F
Helobdella sp.		F		F	W				Sp	S			S		S												
Placobdella sp.																											
Unid. Glossiphoniidae					W					S	F															S	
Unid. Hirudinea																								Sp			
Piscicolidae																									Sp	S	
Piscicola sp.	S								Sp	S																	
Erythrodellidae																											
Erythrodella sp.																											
Cladocera					W				Sp																		
Leptodoridae																											
Leptodora kindtii	S	F	S										S					F									
Bosminidae																											
Unid. Bosminidae**											F																
Bosmina sp.**		F*				Sp																					
Cydoridae					F																						
Cydorus sp.																											
Eurytemora sp.							S	F																			
E. tenellatus	S																										
Daphnidae																											
Daphnia sp.		F		F	W	Sp		F	Sp	S	F																
Simonephalus sp.																											

*Dominant taxa.

**A1 Bosmina and Eubosmina species now classified under Bosminidae.

Note:

No samples in Lake Michigan February 1975. Station 21 dry; no samples taken August 1977.

Sp = spring (April); S = summer (June, August); F = fall (October or November); W = winter (February or March).



Table 2-18 (Contd)

Taxa	1980	
	Lake Michigan	Ponds
Ctenophora (Hydroids)		
Hydra sp.	F*	Sp S
Cordylophora lacustris	Sp	
Turbellaria (Flatworms)		
Dugesia sp.		
Unid. Turbellaria	S F	Sp
Nematoda (Roundworms)	Sp S F	Sp S F
Nemertea		
Bryozoa (Moss animalcules)		
Lophopodidae		
Lophopodia sp.		
Plumatellidae		
Fredericea sultana		
Cristatellidae		
Cristatella sp.		
E. mucedo	S	
Unid. Statoblast		
Endoprocta		
Ornatella gracilis		
Amelidae (Segmented worms)	S	
Oligochaeta (Aquatic worms)	F	F
Naididae		
Unid. Naididae	S* F*	Sp* S* F*
Aulophorus sp.		
Chaetogaster sp.		S
Nais sp.		
Pristina sp.		
Stylaria lacustris		
Lumbricidae		
Lumbriculidae		
Tubificidae		
Unid. Tubificidae	Sp* S* F*	Sp* S* F*
Poloscolex sp.		
Hirudinea (Leeches)		
Glossiphoniidae		
Glossiphonia sp.	F	
Helobdella stagnalis	S F	
Helobdella sp.	S F	
Placobdella sp.		
Haemaphys		Sp
Unid. Glossiphoniidae	S	Sp
Phricolidae		
Phricola sp.		
Erpobdellidae		
Erpobdella sp.		S F
Unid. Erpobdellidae		
Unid. Hirudinea	Sp S	
Cladocera		
Leptodoridae		
Leptodora kindtii		
Bosminidae		
Unid. Bosminidae		
Bosmina sp.**		
Chydoridae		
Chydorus sp.		
Eurycerus sp.		
E. lamellatus		
Daphnidae		
Daphnia sp.		
Simoccephalus sp.		
Holopedidae		
Holopedium sp.		
R. gibberum		
Macrothricidae		
Ilyocryptus sp.		
Sididae		
Unid. Sididae		
Latona setifera		



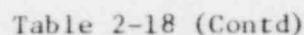
Table 2-18 (Contd)

	1975		1976		1977		1978		1979	
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Cladocera (Contd)										
Holopediidae										
Holopedium sp.	F									
H. gibberum			F				F			
Macrothricidae										
Thyocryptus sp.	S	S	W							
Sididae										
Unid. Sididae			S	S						
Ladona setifera	S									
Copepoda										
Cyclopoida				Sp S F						
Cyclops sp.		S F	Sp S F	Sp* S F	Sp	Sp S F	Sp	F		
Calanoida			Sp S	Sp						
Unid. Calanoida										
Diaptomus sp.	F	S F								
Harpacticoida	S F	S F*	W	Sp S F	S		Sp			
Isopoda										
Asellus sp.			W	S	Sp					
A. intermedius		S			S	Sp F		Sp S		Sp F S F
Lirceus sp.										
Mysidae										
Mysis relicta	F				Sp			F		
Amphipoda										
Talitridae										
Hyalina azteca		S F W	S*	Sp S*	F		S	Sp S F		Sp S F*
Haustoriidae										
Pontoporeia affinis	S* F	S F	Sp* S F*		Sp* S* F	Sp S F*	Sp* S* F*	S	Sp* S*	F Sp* S* F*
Gammaridae										
Gammarus sp.				Sp S	Sp		S			Sp S F
G. fasciatus								F	S F	
Crangonycidae										
Crangonyx sp.										S
Unid. Amphipoda										Sp S
Ostracoda (Seed shrimp)			F* W	Sp S F		F Sp S F				
Hydracarina (Water mites)	S* F	S F W	Sp S F	Sp S F	Sp S	Sp S F		Sp S		Sp S F
Unid. Arachnida										
Collembola (Springtails)										
Unid. Collembola							Sp	S	Sp S F	S
Entombyridae										
Entombyra sp.	S				S					
Ephemeroptera (Mayflies)								Sp		
Unid. Ephemeroptera			W	Sp						S
Ephemera sp.					F					F
Caenis sp.	S*	F* W		Sp* S F*		F Sp* S* F*		Sp S F		Sp* S* F
Neotoma sp.	S									
Odonata (Dragon flies, damselflies)										
Unid. Odonata				Sp S F	S	S			F	
Aeschnidae										
Aeschna sp.	S					S				
Libellulidae										
Unid. Libellulidae			W	Sp	F				S	
Cellithemis sp.				Sp						
Cordulia sp.		F								
Epicordulia sp.		F								
Erythemis sp.					F					
Helicordulia sp.	S									
Ladona sp.										
Leucorrhinia sp.				Sp			Sp S F		Sp S F	Sp S
Libellula sp.				Sp		Sp S F				
Wathysia sp.	S					Sp				
Pachydiplax sp.				Sp					F	
Platthemis sp.					F					F
Polydia										
Synpsectrum sp.				Sp		Sp	Sp S F			
Tamnetrum sp.										
Coenagrionidae										
Unid. Coenagrionidae	S F W		Sp S F*		Sp S F		Sp S F		Sp S F	F
Coenagrion sp.										
Enallagma sp.		F W		Sp					Sp	Sp S F
Ischnura sp.				Sp				F		
Leestes sp.					S					
Cordulegasteridae Unid.	S	W								
Plecoptera										
Unid. Plecoptera										S



Table 2-18 (Contd)

Taxa	1980	
	Lake Michigan	Ponds
Copepoda		
Cyclopoida		
Cyclops sp.		
Calanoida		Sp
Unid. Calanoida		
Diatomus sp.		
Harpacticoida		Sp
Isopoda		
Asellus sp.	S	Sp S F
A. intermedius		
Myrsidea		
Mytilis relicta		
Amphipoda		
Talitridae		
Mytilis relicta	S	Sp S F
Naustoriidae		
Pontoporeia affinis	Sp S*	
Pontoporeia sp.	Sp*	
Gammaridae		
Gammarus sp.		F
G. fasciatus		
Crangonycidae		
Crangonyx sp.		
Unid. Amphipoda	F	Sp
Ostracoda (Seed shrimp)		
Hydracarina (Water mites)		
Arachnida		
Prostigmata		
Hydracarina	S	
Prostigmata	S	
Unid. Arachnida		
Collembola (Springtails)		
Unid. Collembola		
Entombyridae		
Entombyra sp.		
Ephemeroptera (Mayflies)		
Unid. Ephemeroptera		
Heptagenia sp.		S
Caenis sp.		Sp S F
Neotrichia sp.		
Hexagenia limbata	Sp	
Eph. zettia		S
Odonata (Dragon flies, damselflies)		
Unid. Odonata		S
Aeschnidae		
Aeschna sp.		
Libellulidae		
Unid. Libellulidae		F
Leucthemis sp.		
Cordulia sp.		
Epicordulia sp.		
Erythemis sp.		
Helocordulia sp.		
Ladona sp.		
Leucorrhinia sp.		
Libellula sp.		F
Mythimna sp.		
Pachydiplax sp.		
Plathemis sp.		
Polydia		
Symptetrus sp.		
Tarnetia sp.		
Coenagrionidae		
Unid. Coenagrionidae		Sp
Coenagrion sp.		
Enallagma sp.		
Ischnura sp.		F
Lestes sp.		
Orthocentrus sp.		



services group



Table 2-18 (Contd)

Taxa	1980	
	Lake Michigan	Ponds
Plecoptera		
Unid. Plecoptera		
Hemiptera (Bugs)		
Belostomatidae		
Belostomatidae sp.		
Corixidae		S
Psephenidae		
Psephenus striola		
Tenobius sp.		
Neuroptera		
Climaciidae		
Corydalidae		
Chauliodes sp.		
Trichoptera (Caddis flies)		
Unid. Trichoptera	Sp	S
Hydropsychidae		
Putanella flava		
Hydropsychidae		F
Agrilus sp.		
Hydropsychidae sp.		
Orthotrichia sp.		Sp S
Oxyethira sp.		
Paraponyx sp.		
Leptoceridae		
Leptocella sp. (Nectopsyche sp.)		
Nystacides sp.		
Oecetis sp.		Sp S
Ceratomyx sp.		
Polycentropus sp.		
Limnephilidae		
Limnephilus sp.		
Pycnops? he sp.		
Mocosa? sp.		F
Phryganeidae		
Banksiola velina (Agrypnia sp.)		
Banksiola sp.		F
Agrypnia sp.		
Agrypnia vettita		
Phryganea sp.		
Banksiola crotchii (Phryganea A.)		
Prilostomis sp.		F
Psychomyiidae		
Neureclipsis		
Rhyacophiliidae		
Rhyacophila sp.		
Beraeidae		
Unid. Beraeidae		
Lepidoptera (Aquatic caterpillars)		
Unid. Lepidoptera		
Unid. Pyralidae		
Coleoptera (Beetles)		
Chrysomelidae		
Dunalia sp.		
Curculionidae		
Dermaptera		
Dytiscidae		
Amblyderus sp.		
Elmidae		
Helophoridae		S
Halophilus sp.		
Helophoridae		
Hydrophilidae		
Berosus sp.		S
Unid. Coleoptera		
Diptera (Flies, mosquitoes, midges)		
Culicidae		
Chironomus sp.		



Table 2-18 (Contd)

	1974		1975		1976		1977		1978		1979	
Taxa	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Diptera (Flies, mosquitoes, midges) (Contd)												
Tendipedidae (Chironomidae) (Contd)												
Corynoneura sp.			W	Sp	S				S	Sp		
Cricotopus sp.	S	F	W	Sp	S	F	Sp	S	F	Sp	S	F
Cryptochironomus sp.			Sp* S*	Sp	S		Sp* S*	F*	Sp	S	F	Sp
Cryptocladopelma sp.									Sp*	S*	F	Sp
Diamesa sp.		S		Sp	S	F			S	Sp	S	F
Dicrotentipes sp.		S	F*	Sp	S	F		Sp	S	F		Sp*
Elmfeldia sp.			F									S*
Endochironomus sp.			W		F		S		S	F		Sp
Eukiefferiella sp.			W									S
Glyptotendipes sp.	S	S		Sp			Sp	S			Sp	S
Gouldichironomus sp.												S
Harnischia sp.	S*	S	F	S	Sp	S	Sp	S	Sp	S*	S	S
Heterotrissocladius sp.	S	S		Sp					Sp	S	Sp	S
Kiefferulus sp.			W	Sp								
Lauterborniella sp.			F									Sp
Metriocnemus sp.	S	S										
Microspectra sp.				S*					S		F	Sp
Microtentipes sp.		F	F	W			S	F	Sp	F		S
Monodiamesa sp.				Sp	S		Sp	S			Sp	S
Nilotanytus sp.									Sp	S		S
Orthocladius sp.	S	S		Sp	S	F						Sp
Parachironomus sp.			S	F	Sp	S	F		S		Sp	S
Paracadopelma sp.							Sp	S	F		Sp	S
Paralauterborniella sp.	S											S
Paratendipes sp.				Sp			F*					
Pentaneura sp.				S								
Phaenopsectra sp.			W	Sp			Sp	S	F			Sp
Polypedium sp.	S	S	F	W	S		Sp	S	F		S	Sp
Potthastia sp.				Sp	S				S			S
Procladius sp.	S	F	S*	F*	W*	Sp	S	F	Sp*	S*	F*	Sp
Prodiamesa sp.	S	F					Sp	S	F	Sp	S	F
Psectrocladius sp.	S	S	F	W	S		Sp	S	F		S	Sp
Psectrotanytus sp.			F						S	F		S
Pseudochironomus sp.									S			Sp
Rheotanytarsus sp.			F*									
Saetheria sp.											Sp	S
Tanytus sp.			F	W*	Sp	F	Sp*	S*	F*		F	Sp
Tanytarsus sp.	S		F	W*	Sp	F	Sp*	S*	F*		Sp	S
Tendipedinae	S	F	F	W	Sp							
Tendipes sp.												
Thienemannella sp.												Sp
Tribeus sp.		S	W						S			
Trichocladius sp.	S			S			F					
Trissocladius sp.												
Salixia sp.			W									
Stenochironomus sp.				Sp								Sp
Orthocladinae (unus A)												Sp
Unid. Chironomidae		S	F	Sp	S	F*	S	Sp	S		S	Sp
Unid. Tanyptidae				Sp					S	Sp	S	F
Ceratopogonidae												Sp
Alivandomyia sp.		S	W*				Sp*	S*	F*			Sp
Palpomyia sp.		S	F*						S	F	Sp	S
Bullchopodidae												
Ephydriidae												
Ephydra sp.											S	
Unid. Ephydriidae												
Notophila sp.				Sp	S							
Scomyzidae												
Sepedon sp.											S	
Stratiomyidae												
Euparyphus sp.				Sp	S	F	S	Sp				
Psecticus sp.									Sp			
Tabanidae												
Chrysops sp.	S	W		Sp	F		Sp	S		F	Sp	
Tipulidae												
Polynema sp.		F			S				F		Sp	
Tipula sp.							F					
Trinicia sp.							F					
Unid. Diptera			W		Sp	S						



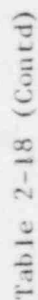
Table 2-18 (Contd)

Taxa	1980	
	Lake Michigan	Ponds
Diptera (Contd)		
Tendipedidae (Chironomidae)		
Ablabesmyia sp.		Sp S
Anatopynia sp.		
Brillia sp.		
Calopsectra sp.		
C. varella		
Cardiocladius sp.		
Chironomus sp.	Sp S F	Sp S F*
Coelotanytus sp.		
Corynoneura sp.		
Cricotopus sp.	S F	Sp
Cryptochironomus sp.	Sp* S* F*	Sp
Cryptocladopelma sp.		F
Diamesa sp.		
Dicrotendipes sp.	F	Sp S* F*
Finefella sp.		
Endochironomus sp.		Sp S F
Eukiefferiella sp.		
Clyptotendipes sp.		
Guedichironomus sp.		
Harnischia sp.	S* F	S
Heterotrissocladius sp.		
Kiefferulus sp.		
Lauterborniella sp.		
Metriornis sp.		
Microsestra sp.		F
Microtendipes sp.		
Minodiamesa sp.	Sp S F	
Nilotanytus sp.		S
Orthocladius sp.		S
Parachironomus sp.		
Paracladopelma sp.	Sp	
Paralauterborniella sp.		
Paratendipes sp.		Sp
Pentaneura sp.		
Phaenopsectra sp.		Sp
Polypedilum sp.	S	Sp F
Potthastia sp.		
Procladius sp.	Sp S	Sp S F
Procladius sp.		
Psectrocladius sp.	S	Sp S
Psectrotanytus sp.		
Pseudochironomus sp.		
Rheotanytus sp.		
Saetheria sp.		S
Tanytus sp.		Sp S* F*
Tanytus sp.		
Tendipedinae		
Tendipes sp.		
Thienemannella sp.		Sp
Trilobos sp.		
Trichocladius sp.	Sp S	Sp
Trissocladius sp.		
Smittia sp.		
Stenochironomus sp.		
Orthocladinae Genus A		
Unid. Chironomidae	S F	Sp S
Unid. Tanyptodinae		
Ceratopogonidae	S	Sp* S F
Allaudomyia sp.		
Palpomyia sp.		
Dolichopodidae		
Ephydriidae		
Ephydra sp.		
Unid. Ephydriidae		
Notophila sp.		
Sciomyzidae		
Sepedon sp.		



Table 2-18 (Contd)

Taxa	1974		1975		1976		1977		1978		1979	
	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds	Lake Michigan	Ponds
Gastropoda (Unid.)				Sp S F						S	Sp S F Sp S	
Lymnaeidae												
Lymnaea sp.		W	S	Sp S F		F Sp F	S F S F Sp	Sp		Sp	F	
Ancylidae												
Ferrisia sp.		S F W		Sp S		S F						Sp F
Ancylotidae												
Ancylus sp.	S F		S	Sp S		S F		S F	Sp S F		Sp	F
Physidae												
Physa sp.	F S F W			Sp S	Sp S	S F	S	Sp S F			S	F
Planorbidae												
Gyraulus sp.	S	S F W		Sp S F	S F Sp S F			S* F	Sp S F		Sp S	F
Helisoma sp.		S F W		Sp S F		S* F		Sp S* F	Sp S* F			
Planorbis sp.		F W		Sp S								
Valvatidae												
Valvata sp.			S			F	S	Sp	Sp S F		Sp S F	
Viviparidae												
Unid. Viviparidae						S						
Bivalvia (Unid.)										S		F
Sphaeriidae												
Pisidium sp.	S F S* F		Sp S	S F Sp S	S F Sp S* F*	Sp S* F Sp S* F*	Sp S F Sp S* F	Sp S F Sp S* F	Sp S F Sp S* F	Sp S* F*	S F	
Sphaerium sp.	S F S* F* W		Sp S	S F Sp S* F*	Sp S* F Sp S* F*	Sp S F Sp S* F	Sp S F Sp S* F	Sp S F Sp S* F	Sp S F Sp S* F	Sp S* F*	S F	
Unidentified invertebrate eggs				S*								
Unidentified invertebrates				S*								
Fish Eggs				S								
Fish Larvae				S								
Annelidae egg				Sp								



services group

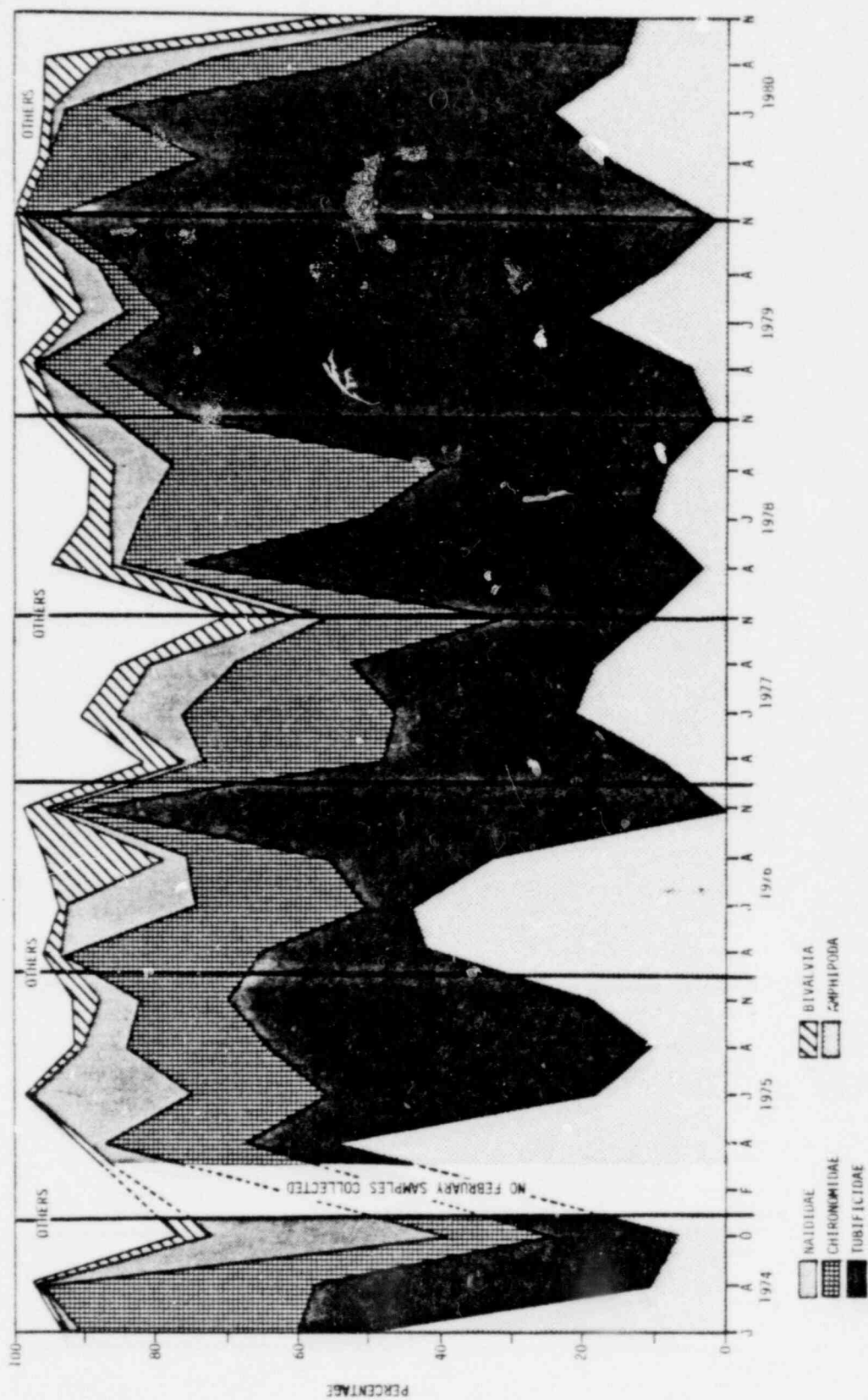


Figure 2-28. Percentage Composition of Abundant Benthic Organisms, Lake Michigan, Bailly Study Area, 1974-1980



Table 2-19

Benthic Invertebrate Occurrence (Presence/Absence), Bailly Study Area, 1980

LAKE(1,2) PONDS(3,4,5)

LS	TAXA	SPR 12345	SUM 12345	FAL 12345	LS	TAXA	SPR 12345	SUM 12345	FAL 12345
0	CHIDARIA (TOTAL)				0	HEMIPTERA (TOTAL)			
1	HYDRA (LPIL)	3	34	1	10	COXIXIDAE (LPIL)		4	
11	CORDYLOPHORA LACUSTRIS	1			0	COLEOPTERA ADEPHAGA (TOTAL)			
0	PLATYHELMINTHES (TOTAL)				2	HAEMIPUS (LPIL)		45	
1	TURBELLARIA (LPIL)	3 5	1	2	0	COLEOPTERA (TOTAL)			
0	NEMATODA (TOTAL)				0	TRICHOPTERA (TOTAL)			
0	OLIGOCHAETA (TOTAL)				2	ORTHOTRICHIA (LPIL)	3	4	
1	CHAETOGASTER (LPIL)		3		3	HYDROPTILIDAE (LPIL)			4
1	NAIDIDAE (LPIL)	345	12345	12 45	2	BANKSIOLA (LPIL)			4
1	TUBIFICIDAE (LPIL)	12345	12345	12 45	2	PTILOSTOMIS (LPIL)			5
0	HIRUDINEA (TOTAL)				2	ONOCOSMOEUS (LPIL)			5
1	HELOBDELLA STAGNALIS		12	12	2	OECETIS (LPIL)	34	4	
5	HELOBDELLA (LPIL)		12	1	0	DIPTERA NEMATOCERA (TOTAL)			
1	GLOSSIPHONIA (LPIL)			2	2	CERATOPOGONIDAE (LPIL)	345	1 45	4
1	GLOSSIPHONIIDAE (LPIL)	4	1		2	CHIRONOMUS (LPIL)	12345	12345	12 4
1	ERPOBDELLA (LPIL)		4	5	2	CRYPTOCHIRONOMUS (LPIL)	123	12	12
1	HAEMOPIS	5			2	CRICOTOPUS (LPIL)	3	12 4	2
0	ANNELIDA (TOTAL)				2	TANYTARSUS (LPIL)	345	345	4
0	GASTROPODA (TOTAL)				2	DICROTENDIPES (LPIL)	345	345	1 45
1	ANCYLIDAE (LPIL)		3		2	POLYPEDILUM (LPIL)	345	1 45	4
5	LYMNAEIDAE (LPIL)			1 5	2	ABLABESMYIA (LPIL)	345	345	
1	AMNICULA (LPIL)		1		2	MICROTENDIPES (LPIL)		4	4
1	PHYSA (LPIL)		2	5	2	PROCLADIUS (LPIL)	1 345	12345	4
5	PHYSIDAE (LPIL)		4						
1	GYRAULUS (LPIL)		45						
1	HELISOMA (LPIL)		4						
1	PLANORBIDAE (LPIL)		45						
1	VALVATA (LPIL)		2	2 4					
0	BIVALVIA (TOTAL)								
5	SPHAERIUM (LPIL)	12345	12 45	12 5					
1	PISIDIUM (LPIL)	123 5	12345	12					
5	SPHAERIIDAE (LPIL)	123	12 45	1					
0	MOLLUSCA (TOTAL)								
0	ARACHNIDA (TOTAL)								
1	HYDRACARINA (LPIL)		12						
1	PROSTIGMATA (LPIL)		2						
0	OSTRACODA (TOTAL)								
0	COPEPODA (TOTAL)								
1	CALANOIDA (LPIL)	3							
1	HARPACTICOIDA (LPIL)	4							
0	ISOPODA (TOTAL)								
1	ASELLUS (LPIL)	45	2 5	5					
0	AMPHIPODA (TOTAL)								
1	GAMMARUS (LPIL)			1					
1	PONTOPOREIA AFFINIS	1	12	12					
1	PONTOPOREIA (LPIL)	12							
1	HYALELLA AZTECA	34	1 3	4					
0	EPHEMEROPTERA (TOTAL)								
10	BAETIDAE (LPIL)		3						
10	EPHEMERELLA (LPIL)		4						
10	CAENIS (LPIL)	345	34	4					
10	HEXAGENIA LIMBATA	1							
4	ODONATA (TOTAL)								
10	LIBELLULA (LPIL)			4					
10	LIBELLULIDAE (LPIL)			4					
10	ISCHNURA (LPIL)			4					
10	COENAGRIONIDAE (LPIL)	3							

LS = Life Stage
 0 = Summary Level
 1 = Adult
 2 = Larva
 3 = Pupae
 5 = Immature
 8 = Statoblast
 11 = Colony
 12 = Undetermined

Spr = April Sampling
 Sum = June and August Sampling
 Fal = November Sampling

Location 1 = Nearfield Stations 1-6 and 1
 Location 2 = Farfield Stations 7-9
 Location 3 = Pond B
 Location 4 = Pond C

LS = Life Stage
 0 = Summary Level
 1 = Adult
 2 = Larva
 3 = Pupae
 5 = Immature
 8 = Statoblast
 11 = Colony
 12 = Undetermined

Spr = April Sampling
 Sum = June and August Sampling
 Fal = November Sampling

Location 1 = Nearfield Stations 1-6 and 10
 Location 2 = Farfield Stations 7-9
 Location 3 = Pond B
 Location 4 = Pond C
 Location 5 = Cowles Bog



Table 2-19 (Contd)

LAKE(1,2) PONDS(3,4,5)		SPR	SUM	FAL
	TAXA	12345	12345	12345
15	PARACHIRONOMUS (LPIL)		4	
2	HARNISCHIA (LPIL)		1234	1
2	PHAENOPSECIRA (LPIL)	4		
2	EUKIEFFERIELLA (LPIL)		4	
2	THIENEMANNIELLA (LPIL)	3		
2	TANYPUS (LPIL)		4	
2	PSECTROCLADIUS (LPIL)	345	1 4	
2	PARATENDIPES (LPIL)	4		
2	PARACLADOPELMA (LPIL)	1		
2	HETEROTRISOCLADIUS (LPIL)		12	
2	ENDOCHIRONOMUS (LPIL)	3	4	4
2	MONODIAMESA (LPIL)	1	12	12
2	NILOTANYPUS (LPIL)		3	
2	TRICHOCLADIUS (LPIL)	1 3	1	
2	CRYPTOCLADOPELMA (LPIL)			4
2	CHIRONOMIDAE (LPIL)	1 345	12345	12 4
0	DIPTERA BRACHYCERA (TOTAL)			
2	NEMOLETUS	3		
2	EUPARYPHUS	5		
2	CHRYSOPS (LPIL)	34	4	
2	EMPIDIDAE (LPIL)		5	
0	DIPTERA (TOTAL)			
0	ECTOPROCTA (TOTAL)			
8	CRISTATELLA MUCEDO		12	



Annual trends observed in the ponds (Figure 2-29) reflect the variable percent composition that has been characteristic of the pond and bog stations since the onset of field sampling in 1974. Tubificid worms displayed a larger contribution to percent composition in 1980, similar to that observed in 1977. This tubificid increase coincided with a marked decrease in Naididae relative abundance from levels observed at the end of 1979 and spring 1980. Chironomids generally exhibited lower relative abundance in 1980 than 1979. However, relative abundance was similar to that displayed during the summer months in previous years (1975-1978) (Figure 2-29).

The predominant midges (Diptera: Chironomidae) in Lake Michigan were Cryptochironomus sp., Chironomus sp., and Harnischia sp. Tubificid relative abundance was similar to 1979 and dominated the majority of lake stations across the year. Pontoporeia affinis has displayed declining relative abundance values since 1975 and 1976; however, since total invertebrate densities have also changed, the density of P. affinis has been variable but not steadily declining. P. affinis continued to be a dominant taxon in all seasons at both near-field and farfield stations (Table 2-18). The relative abundance of chironomids stabilized in 1980 relative to values observed in 1979 (Figure 2-28).

The predominance of the amphipod Pontoporeia affinis in the lake has been described previously by several authors. In a comparative survey of the Lake Michigan benthos (Robertson and Alley 1966), the structure of this community was compared with a prior description by Eggleton (1936, 1937). Both surveys indicated the abundance of Pontoporeia affinis and oligochaetes.

In another survey by Mozley and Garcia (1972) Pontoporeia affinis was the dominant organism, occurring in greater densities at deeper stations. The occurrence of tubificids as a dominant taxon is also consistent with trends described in the literature, as Mozley (1975) indicates that tubificids are the most numerous whenever the substrate is primarily silt or sand (as in southeastern Lake Michigan).

2.3.3.3 Zonation

2.3.3.3.1 Physical Zonation (Sediment Analysis). A description of substrate composition is essential to identify accurately the distributional mechanisms



Table 2-20

Mean Sediment Particle Size (Percent Composition), Bailly Study Area, 1980

Location	Station	Gravel >4 mm No. 5*	Very Coarse Sand 2-4 mm No. 10	Coarse Sand 1-2 mm No. 18	Medium Sand 0.5-1 mm No. 35	Fine Sand 0.25-0.5 mm No. 60	Very Fine Sand 0.125-0.25 mm No. 160	Silt 0.062-0.125 mm No. 230	Clay <0.062 mm No. 230
Lake	1	0.00	0.03	0.58	0.91	11.75	77.64	7.54	0.86
	2	0.02	0.27	0.67	2.98	14.00	69.98	7.30	0.68
	3	0.00	0.12	0.15	0.79	3.75	76.24	18.48	1.16
	4	0.00	0.29	0.60	25.06	23.02	44.33	3.30	1.00
	5	0.00	0.11	0.17	0.33	4.66	66.64	27.10	1.43
	6	0.00	1.06	0.74	4.05	26.34	61.38	3.72	1.83
	7	0.00	0.43	0.68	1.84	8.42	80.38	8.00	1.06
	8	29.61	11.56	4.35	4.21	2.35	0.66	1.18	47.66
	9	12.36	17.27	4.04	2.60	3.24	5.50**	2.79**	44.90**
	10	13.68	16.96	26.55	23.30	11.81	10.78	2.60	0.66
Lake mean		5.57	4.81	3.85	6.61	10.93	49.35	8.20	10.12
Shallow	1,4,7	0.00	0.25	0.62	9.27	14.40	67.45	6.28	0.97
Mid-lake	2,5,8	9.88	3.98	1.73	2.51	7.00	45.76	11.86	16.59
Deep	3,6,9	4.12	6.15	1.64	2.48	11.11	47.71	8.33	15.96
Ponds	17	No Samples Collected***							
	18	No Samples Collected***							
	19****	0.00	0.00	9.70	19.70	13.03	11.3	24.71	15.64
	20****	0.00**	0.87**	2.00**	3.00**	17.00**	57.3 **	7.90**	11.40**
	21	0.00	1.8	15.46	13.38	15.06	41.58	7.70	8.62

* U.S. Standard sieve mesh number.

** Data include only one replicate rather than two.

*** Pond was dry.

**** ASTM dry sieve method D 422-63 was used because the high organic content would not sieve properly using the wet sieve method.



of the benthic community inhabiting a particular area. The Wentworth particle-sizing analysis conducted during August 1980 indicated that the predominant size fraction throughout the lake sediments was in the 0.062- to -0.25 millimeter (silt and very fine sand) range (Table 2-20) which compares favorably with the predominant fraction described in the five previous yearly surveys (Figure 2-30). In terms of depth distribution, the shallow (15-foot) and mid-depth (30-foot) stations were dominated by silt to fine sand (0.062 to 0.5 millimeter) while the deepest (50-foot) stations were composed predominantly of a sand/very fine sand/silt/clay mixture. A comparison of previous years' data (Figure 2-30) indicates that the lake substratum is relatively stable through time as the major sediment components (fine/very fine sand) have persisted with only moderate annual variations in percent composition.

In the ponds, substrate type was primarily of similar-sized material, although more coarse and medium sand substrates were also major components of each station in the ponds (Table 2-20). In comparison with Lake Michigan, the near-shore ponds have more variable substrate composition (Figure 2-30) and have higher amounts of organic detritus.

2.3.3.3.2 Faunal Zonation. Benthic faunal distribution at the lake stations was closely related to both physical zonation (sediment characterization) and depth. The 50-foot contour represented by stations 3, 6, and 9 generally exhibited the highest density values in the study area during 1980, as it did in previous years. Sediment composition along this contour also displayed the highest percentages of very fine sand, silt, and clay; such a substrate condition is particularly conducive to colonization and growth of dense Tubificidae populations. Although shallow-water stations along the 15-foot contour also exhibit finely divided substrate characteristics, it is probable that wave action precludes the establishment of dense populations at this depth range in most instances. The stability of benthic faunal density distribution patterns during 1974-1980 can be attributed to relatively stable substrate composition at the various depth contours.

Distinct faunal zonation patterns among the ponds are not readily discernible. Similarities in substrate composition among the ponds have led to the establishment of relatively similar distributions of benthic invertebrates in each of the ponds.

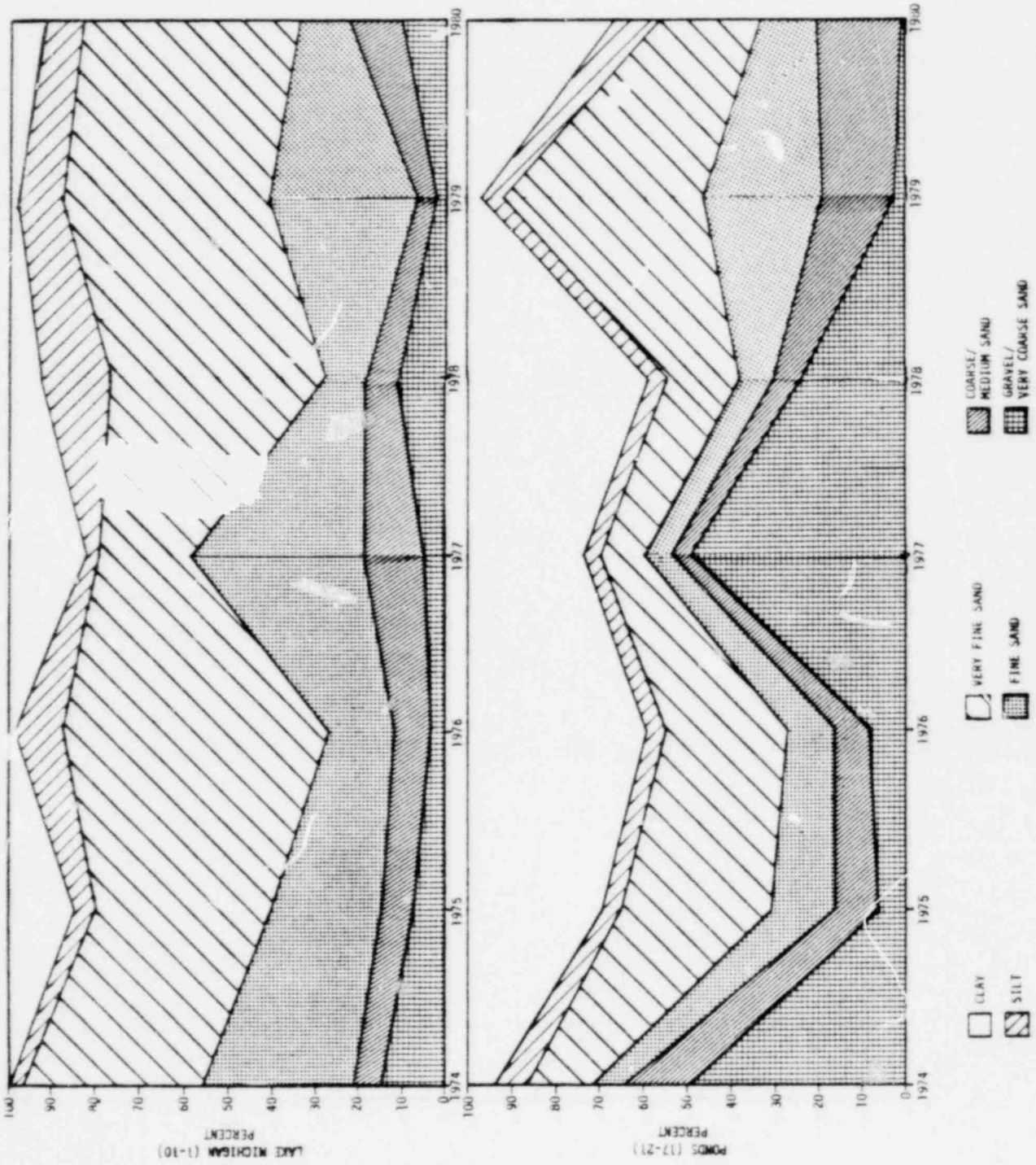


Figure 2-30. Sediment Particle Size Distribution, Bailly Study Area, 1974-1980



2.3.3.4 Benthic Indicator Organisms. Biological indicators of environmental conditions are shown to be of great value in monitoring subtle changes in the aquatic ecosystem. To compare these data with some standard, Table 2-21 was prepared from several sources (Borror and DeLong 1971, Pennak 1953 and 1978, Usinger 1971, EPA 1973, Merritt and Cummins 1978). The table is designed to elucidate the trophic positions, habitats, and tolerances of some of the benthic organisms collected in the vicinity of Bailly Generating Station.

The tolerance indications presented in Table 2-21 are those of EPA (1973), and caution should be taken in applying and interpreting this technique in describing environmental conditions based on this indicator-organism scheme. (This scheme is simply based on an organism's tolerance or intolerance to organic contamination based on descriptions found in the literature.) The three classifications used in this system are:

- Tolerant, meaning frequently associated with higher levels of organic contamination
- Facultative, meaning a wide range of tolerance frequently associated with moderate levels of organic contamination
- Intolerant, meaning not found even at moderate levels of organic contamination and generally intolerant of moderate reductions in dissolved oxygen (EPA 1973)

This technique is limited in that it can only provide positive evidence of clean water, and then only when intolerant forms are collected (EPA 1973). In addition, the presence or absence of an organism may reflect qualities of the physical environment other than contamination, including current or substrate type. Describing the faunal zonation with respect to substrate composition has hopefully eliminated this problem.

The identified organisms — most of which are Chironomidae, Tubificidae, or Naididae — are listed by the EPA (EPA 1973) as tolerant or facultative and are so classified here. These organisms reflected the broadest representation in the ponds during this survey and are indicative of a more nutrient-rich state in the ponds than in the lake. Certain other taxa (i.e., Hydracarina, Hyallela azteca, and some of the Ephemeroptera) are forms termed facultative to intolerant of pollution.



Table 2-21

Food, Habitats, and Tolerance Limits of Common Groups of Benthic Invertebrates

Classification	Common Name	Description	Adult	Immature		Habitat	Tolerance
			Food	Description	Food		
Hydrozoa	Hydroids, Jellyfish	Radially symmetrical; main body is elongated cylinder with circlet of tentacles on distal end and pedal disk on proximal end	Carnivore, feeding on metazoans in- cluding cladocerans, copepods, insects, and annelids	Asexual budding	Same as adults	Sessile on rock, plants, and debris	F
Turbellaria	Flatworms	Elongate with exterior end differentiated to resemble "head"; eye- spot usually present on exterior end	Usually living on dead or crushed animal matter in- cluding protozoans, rotifers, nematodes	Similar to adults	Same as adults	Under ob- jects or in debris	F
Nematoda	Roundworms	< 1 cm long; body slightly tapered and round with terminal mouth	Detritus feeders and herbivorous and carnivorous; carni- vores prey on pro- tozoans, oligochaetes, rotifers, and other nematodes	Eggs; imma- ture form similar to adult	Same as adults	In sand, mud, debris, or vegetation	F
Bryozoa	Bryozoans	Unit of organisms more or less cylindri- cal zooid or polypide similar to hydra	Algae, protozoa, micrometazoa, detritus	Bud (stato- blast) re- leased to generate new colony	Same as adults	Colonies occur on underside of logs and stones or on twigs and other objects where light is dim	T F I
Oligochaeta	Aquatic worms	Segmented worms with length ranging from 1-30 mm. Prostomium projects in roof-like fashion above mouth; most segments have chitinous setae ar- ranged in bundles	Bacteria	Cocoons; similar to adults Asexual budding	Same as adults	Common in mud and debris or in masses of filamentous algae	T F



Table 2-21 (Contd)

Classification	Common Name	Description	Adult Food	Immature Description	Immature Food	Habitat	Tolerance
Amphipoda	Scuds	Body 5-20 mm long, laterally compressed, and consisting of cephalothoracic segments, 6-segmented abdomen, and small terminal telson	Omnivorous scavengers	Eggs hatch to forms similar to adult	Similar to adults	Hide under rocks, vegetation, and debris	F
Hydracarina	Water Mites	Appear to be minute spiders	Carnivorous feeding on worms and small insects	Eggs hatch to larval forms	Parasitic on other aquatic insects such as plecopterans, odonates, dipterans, and hemipteran immature forms	On algae, decaying vegetation, and rooted aquatics	I
Ephemeroptera	Mayflies	Medium-sized terrestrial insects with delicate many-veined, transparent wing; held vertically when at rest	None	Nymph similar to adult Eggs hatch to have elongated bodies, larval head with well-developed mandibulate mouth parts, stout legs; larvae, compound eyes and large lateral or dorsal gills on abdominal segments	Herbivorous and carnivorous; deposit and filter feeders	Adult terrestrial, usually clinging to vegetation; nymph in water under stones and in vegetation; may burrow in mud or debris	F I
Odonata	Dragonflies and Damselflies	Medium-large insects having long slender abdomen and two pairs of long, narrow, net-veined wings; head mobile and bearing large compound eyes	Predaceous on mosquitoes, gnats, and other pests	Eggs hatch to aquatic nymphs; body robust or rough and bears spines; large labium	Predaceous on other aquatic insects and small fish	Adults terrestrial on submerged vegetation and on rocks in sand or silt	F I



Table 2-21 (Contd)

Classification	Common Name	Adult	Food	Immature	Food	Habitat	Tolerance
		Description		Description			
Polychaeta	—	Head 3-5 mm long bears two large lateral lophophorelike structures having long tentacles; paired eyes near midline.	Deposit and filter feeders; carnivorous and herbivorous	Similar to adults	Same as adults	Mud and sand in littoral and backwater areas	F I
Hirudinea	Leeches	Segmented; dorso-ventrally flattened body having oral and caudal sucker; usually one or more eyespots	Parasites on fish or crustaceans or snails, chironomids, and oligochaetes	Cocoons; similar to adults	Same as adults	In warm protected shallows where plants, stones, and debris afford concealment	T F
Cladocera	Water Fleas	0.2-3.0 mm long with thoracic and abdominal region covered by carapace; head has large compound eyes	Bacteria, algae, protozoa, and organic detritus	Eggs carried by adult; young similar to adult	Same as adults	Littoral and limnetic in aquatic vegetation	F
Copepoda	—	Elongated body 0.3-3.2 mm and divided into head thorax and abdomen head fused with first two segments of thorax; five pairs of appendages	Protozoans, algae, and organic debris	Eggs hatch to to nauplius forms; metamorphosis development	Similar to adults and in some instances parasitic on fish	Limnetic; bottom debris and sand	F
Ostracoda	Seed Shrimp	Body 1-3 mm long covered by opaque bivalve shell	Bacteria, molds, algae, and fine detritus	Eggs hatch to to nauplius; metamorphosis development	Similar to adults	In algae, decaying vegetation, rooted aquatics, mud and gravel where there is little current	F T
Isopoda	Aquatic Sow Bug	Body 5-20 mm long and strongly flattened dorso-ventrally; six pairs of abdomen appendages	Scavengers feeding on live-dead animals and plants	Eggs hatch to to forms similar to adults	Similar to adults	Hide under rocks, vegetation, and detritus	T F I



Table 2-21 (Contd)

Classification	Common Name	Adult		Immature		Habitat	Tolerance
		Description	Food	Description	Food		
Hemiptera	Bugs	Terrestrial and semiaquatic; mouth parts greatly modified to form jointed piercing sucking beak; anterior wings leathery at base and membranes apical	Predaceous on small terrestrial and aquatic insects	Eggs hatch to nymphs similar to adult	Omnivorous and carnivorous on protozoans, algae and other aquatic invertebrates	Adults terrestrial, semi-aquatic, and aquatic (on beach areas); nymphs aquatic around rock and vegetation	T
Trichoptera	Caddisflies	Head with long, thicklike antennae; mandibles; vestigial; two pairs of wings held roof-like over body and covered with hairlike setae	Feeding not common	Eggs hatch to larvae with head and thorax heavily sclerotized, abdomen soft; most build protective cases	Omnivorous and carnivorous feeding on algae, higher plants, crustaceans, annelids, and insect larvae	Adults terrestrial near lakes and streams; larvae under stones in debris and vegetation	F I
Lepidoptera	Aquatic Caterpillars (butterflies and moths)	Terrestrial butterflies and moths; body and wings covered with scales; long antennae	Feed on plants	Eggs hatch to larvae having long slender body with blood gills; mandibles are large; flattened; teeth arranged in flat plane	Feed on algae and diatoms	Adults terrestrial; found along stems on brush or trees	F
Coleoptera	Beetles	Terrestrial and aquatic; small to large; forewings modified into leathery elytra	Carnivorous and herbivorous	Eggs hatch to larvae having well developed head and three well developed legs on thoracic segments	Carnivorous and herbivorous	Around stems and vegetation	T F I



Many of the forms just described are present in both the lake and ponds. It therefore is thought that the lake can be classified as relatively oligotrophic to mesotrophic (based on numbers of organisms intolerant to pollution), while the ponds contain greater loads of decomposable organic material. Water quality data and data from other flora and fauna further substantiate this description.

The benthic data from this study indicate that, although the area in the vicinity of Station 10 (discharge) may be adversely affected by the discharge through scouring, the Bailly Generating Station does not contribute significantly to eutrophication in this area.

2.3.3.5 Benthic Statistical Analysis

2.3.3.5.1 Lake Michigan. Total benthic macroinvertebrate densities of Lake Michigan were subjected to an analysis of variance. In order to stabilize variance, the data values were transformed logarithmically. Months (seasons) were considered as random effects and stations as fixed effects. A complete description of statistical analysis methodology is presented in subsection 2.1.3.3 (Phytoplankton). The summary analysis appears on the following page and is tabulated with significant F-statistics marked with an asterisk ($\alpha \leq 0.05$).

Across-year comparisons reflected the relatively stable temporal density distribution described previously, as no significant differences among years were observed (Table 2-22). Significant differences were observed among the 1975-1980 mean densities at each of the stations. Newman Keul's multiple range test results illustrate which stations were significantly different. A horizontal bar drawn beneath station numbers, as shown below, indicates those stations that were not statistically different from one another on the basis of total densities.

Lake station numbers: 10 7 4 9 1 2 8 5 3 6

Group similarities: _____

Density distribution: lowest \longleftrightarrow highest



Table 2-22

1975-1980 across-Year ANOVA Results for Lake Michigan
Benthic Macroinvertebrate Total Densities

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
Years	5	143.81	2.70
Month	3	119.11	3.72*
Station	9	411.64	5.05*
Years x month	15	149.99	10.56*
Years x station	45	370.57	1.58*
Month x station	27	221.77	1.58*
Month x station x year	135	702.12	5.15*
Replication	240	242.38	-

* Significant at $\alpha < 0.05$ level.

Station 10, the discharge area, exhibited the lowest densities. The remaining stations were generally grouped together by depth contour (1, 4, 7; 2, 5, 8; and 3, 6, 9). Exceptions were noted at Station 9 which exhibited significantly lower densities than stations 3 and 6 and at Station 1 which displayed significantly higher densities than stations 4 and 7.

Months and stations were a significant source of variation during 1980 (Table 2-23). For most stations, November densities were lower than in other months; and, in most months, Station 10 reflected significantly lower density. Significant differences were not observed among stations 1 through 9; however, densities generally increased with depth (significant row effect). The significant station x month interaction indicates spatial patterns of density were different from month to month. Generally, densities increased with increasing depth during each of the months; however, during November Station 10 exhibited high abundances, whereas during the other months Station 10 had low abundances relative to other stations.



Table 2-23

1980 ANOVA Results for Lake Michigan Benthic Macroinvertebrate Total Densities

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
Months	3	48.30	2.64
Stations (1-10)	9	109.58	2.00
Stations (10 vs 1-9)	1	4.46	0.73
Stations			
Row (linear contour)	1	53.83	8.83*
Row (quadratic contour)	1	4.94	0.81
Column	2	15.78	1.25
Row (linear) x column	2	29.91	2.45
Row (quadratic) x column	2	0.66	0.05
Stations x month	27	164.64	4.15*
Replication	40	58.82	-

* Significant at $\alpha \leq 0.05$ level.

2.3.3.5.2 Ponds and Cowles Bog. Analysis of variance was performed on total benthos density for 1980 and for the 6-year period 1975-1980 (Tables 2-24 and 2-25). The data values were logarithmically transformed to stabilize variances. In the analysis of variance, months (seasons) were considered random effects and stations were considered fixed effects. Pond B was not considered in the multiple-year analysis because of the absence of observations for the August and November periods during 1980.

Table 2-24

1980 ANOVA Results for Nearshore Ponds Benthic Macroinvertebrate Total Densities

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
Months	3	8.87	1.41
Stations (17-21)	4	9.50	1.14
Pond B (17 vs 18)	1	0.03	0.01
Pond C (19 vs 20)	1	3.69	1.77
Pond B vs Pond C	1	0.90	0.43
Ponds vs Bog	1	5.65	2.71
Station x month	8	16.71	4.06*
Replication	16	8.24	-

* Significant at $\alpha < 0.05$ level.



Table 2-25

1975-1980 across-Year ANOVA Results for Nearshore Ponds
Benthic Macroinvertebrate Total Densities

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>F-Value</u>
Years	5	49.33	5.37*
Month	3	2.64	0.48
Station	2	11.85	1.82
Years x month	15	27.57	3.84
Years x station	10	32.53	2.88*
Month x station	6	8.42	1.24
Month x station x year	30	33.94	2.36*
Replication	72	34.45	-

*Significant at $\alpha \leq 0.05$ level.

The summary analysis-of-variance tables for benthos density (Tables 2-24 and 2-25) lists significant ($\alpha \leq 0.05$) F-statistics marked with an asterisk.

Results from 1980 data analysis indicate that seasonal and station density variations were not significant sources of variation among the pond and Cowles Bog stations for the spring and early summer sampling periods. Cross-year comparisons reflected the dynamic nature of this system as annual community fluctuations were a significant source of variation. Densities in the ponds were generally uniform from 1977 through 1980 with the 1975 densities significantly higher than those observed from 1977 through 1980 and the 1976 densities significantly higher than those observed in 1977 and 1978.

Year x station and month x station x year interactions were also significant; however, seasons (month) or stations were not significant sources of variation. Monthly and station density estimates averaged across 6 years indicate no statistically significant differences in total density among stations or months for the Pond C and Cowles Bog stations (19, 20, and 21).

2.4 AQUATIC MACROPHYTON

2.4.1 METHODOLOGY. During the 1980 sampling, aquatic macrophytes were collected on 15 June at all pond sampling locations. Pond B samples were taken in the vicinity of stations 17 and 18, Pond C samples in the vicinity of stations 19 and 20, and Cowles Bog samples in the vicinity of Station 21.



Pond B macrophytes were sampled at five randomly selected stations along two transects: one for Station 17 and one for Station 18. Along Transect 17 the stations were numbered from 1 to 5 from the south shore northward out into the pond. Along Transect 18, stations were randomly established from the east shore (Station 5) westward into the pond in descending numerical order to Station 1 at the end of Transect 17. In Pond C, two transects were established (transects 19 and 20). Transect 19 extended from shore northward into the pond, and Transect 20 extended in an east-west direction through Station 20. Five stations were randomly established along each transect. At Transect 19, stations were numbered from 1 to 5 from shore out into the pond. At Transect 20, stations were numbered from 1 to 5 from east to west. Samples in Cowles Bog were taken in a fashion similar to those in the other two ponds, but along a single transect extending southward from the road. Stations were numbered from 1 to 5 starting at the road.

At each of the transects, representative specimens were collected using a 9-inch by 9-inch dredge at five randomly selected points along each transect. The transects were as close as possible to those of previous years. Extent of coverage was estimated in terms of grams blotted-wet weight per 81 square inches of sampler.

2.4.2 RESULTS AND DISCUSSION. Table 2-26 presents the results of June 1980 sampling. Figure 2-31 illustrates some of the common aquatic macrophytes and Table 2-27 is a generalized key to the common aquatic macrophytes.

Pond B water levels during June 1980 were noticeably lower than during the April 1980 sampling. Pond B was dry when the August sampling effort was made. Water lines on various emergent vegetation were about 1 to 1.5 feet above the water surface and about 10 to 15 feet of shoreline was exposed, leaving the macrophytes on the exposed shore on dry or moist substrate. Macrophytes observed in the pond but possibly not collected for dry-weight biomass in large quantities include Lotus sp. (about 75-foot diameter patch east of Transect 17 and south of Transect 18), scattered Brasenia schreberi, cattail along the shore, Polygonum sp., Chara sp., and some Ceratophyllum sp.



Table 2-26

Macrophyte Composition, Bailly Study Area, June 1980

	Station	Common Name	Scientific Name	Density (g/81 in. ²)
Pond B	17-1	Pondweed	Potamogeton sp.	<1.0
	17-2	Pondweed	Potamogeton sp.	58
	17-3	Bullhead lily	Nuphar sp.	290
	17-4	Pondweed	Potamogeton sp.	52
	17-5	Bullhead lily	Nuphar sp.	50
	18-1	Pondweed	Potamogeton sp.	113
	18-2	Pondweed	Potamogeton sp.	49
		Eelgrass	Vallisneria sp.	<1.0
	18-3	Water-shield	Brasenia schreberi	1.0
		Pondweed	Potamogeton sp.	39
Pond C	18-4	Pondweed	Potamogeton sp.	247
	18-5	Pondweed	Potamogeton sp.	70
	19-1	Coontail	Ceratophyllum sp.	106
	19-2	Bullhead lily	Nuphar sp.	23
		Coontail	Ceratophyllum sp.	10
	19-3	Bullhead lily	Nuphar sp.	33
	19-4	Bullhead lily	Nuphar sp.	63
		Coontail	Ceratophyllum sp.	31
	19-5	Bullhead lily	Nuphar sp.	2
		Coontail	Ceratophyllum sp.	31
Cowles Bay	20-1	Coontail	Ceratophyllum sp.	26
	20-2	Bullhead lily	Nuphar sp.	<1
		Coontail	Ceratophyllum sp.	43
	20-3	Bullhead lily	Nuphar sp.	16
		Coontail	Ceratophyllum sp.	32
	20-4	Bullhead lily	Nuphar sp.	8
		Coontail	Ceratophyllum sp.	49
	20-5	Bullhead lily	Nuphar sp.	52
	21-1	Duckweed	Lemna sp.	<1
		Eelgrass	Vallisneria sp.	9
Cowles Bay	21-2	Swamp loosestrife	Decodon sp.	2
		Duckweed	Lemna sp.	<1
		Unidentified grass	Poaceae	<1
			Unknown	7
	21-3	Arrow arum	Peltandra sp.	236
		Bur-reed	Sparganium sp.	23
	21-4	Arrow arum	Peltandra sp.	61
	21-5	Arrow arum	Peltandra sp.	88
		Bur-reed	Sparganium sp.	14

Greater biomass of pondweed and bullhead lily were collected during 1980 than in 1979. Eelgrass and water-shield were collected in 1980 but not in 1979. No pickerel-weed, water milfoil, smartweed, or cattail was collected in 1980 but had been collected in 1979. The low water levels in 1980 may have caused the change in macrophytes present.

Pond C water levels appeared to be normal with water present in the forepond and in the pond proper. Nuphar sp. was by far the most prominent emergent macrophyte and Ceratophyllum sp. and Utricularia sp. were the most prominent submergent macrophytes, although no Utricularia was specifically collected.



Button bush was a prominent feature along the shore. Some cattail and round-stem sedge were present. No unusual observations were noted in Pond C during June 1980. Conditions were generally similar to 1979 although no cattail, bladderwort, or water-milfoil were specifically collected.

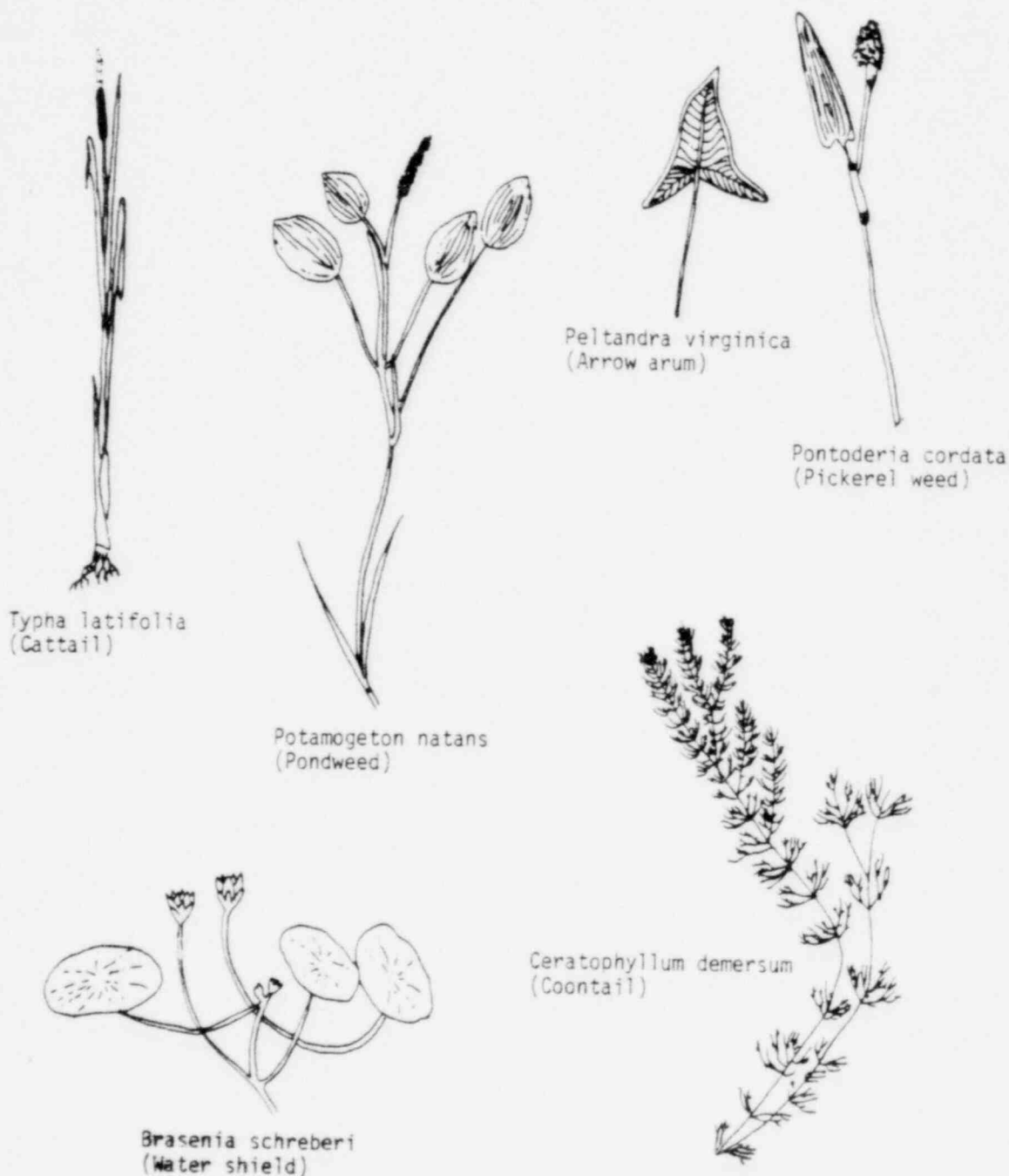


Figure 2-31. Some Common Macrophytes Found in Pond Areas, Bailly Study Area



Table 2-27

Generalized Key to Common Nearshore Pond Macrophyte Flora
Collected in Bailly Study Area

- A. Free floating, without roots or with roots pendant in water.
- I. At surface, upper part of plant ordinarily dry
Lemnaceae - Lemna minor (duckweed)
- II. Below surface, plant entirely submerged, floating at mid-depths.
- a. Leaves capillary with traps (utricularids)
Lentibulariaceae - Utricularia (bladderwort)
- b. Leaves capillary in whorls, without traps, roots absent but stems sometimes become buried (ceratophyllids).
Ceratophyllaceae - Ceratophyllum (coontail)
- B. Rooted in sediment (rhizophytes)
- I. Part of vegetative structure emerging above water for most of year.
- a. Elongate emergent stems with long cylindrical or narrow flat leaves.
Sparaganiaceae Sparganium (bur-reed)
Cyperaceae Carex (sedge)
Dulichium arundinaceum (3-way sedge)
Eleocharis (spike rush)
Scirpus (bulrush)
Typhaceae Typha (cattail)
- b. Leaf-bearing stem emerging well above water with air leaves that are usually lanceolate, elliptical, or compound above water.
Polygonaceae Polygonum (smartweed)
Haloragaceae Proserpinaca (mermaid-weed)
- c. Foliose, petiole extending above water so that the leaf rather than the whole shoot is emergent; flower stalk or inflorescence ordinarily emerges above water; emergent leaf cordate, sagittate, or lanceolate.
Pontederiaceae Pontederia cordata (pickerel weed)
Araceae Peltandra virginica (arrow arum)
- II. Leaves, or at least some of them, floating but not usually emergent.
- a. Floating leaves cordate, circular, or elongate-oblong.
Nymphaeaceae Nymphaea (water lily)
Nuphar (water lily)
Cabombaceae Brasenia (water-shield)
- b. Floating leaves lanceolate
Potamogetonaceae Potamogeton (pondweed)
- III. Plant, except flower or inflorescence, submerged, perennially or during most of the growing season.
- a. Vittate, long stems or creeping rhizomes with long flexible branches.
- (1) Small leaves
Hydrocharitaceae Elodea (waterweed)
- (2) Leaves megriophyllord, greatly divided
Haloragidaceae Myriophyllum (milfoil)
- b. Stem very short, leaves in a rosette.
Hydrocharitaceae Vallisneria (eelgrass)



The water level at Cowles Bog appeared normal in the vicinity of Station 21 (about 0.5 meter). The substrate was loosely consolidated silt and decomposing organic material. Duckweed was prominent but could not be separated from other macrophytes in the sample. Spurge, Carex sp., marsh rose, arrow arum, wild iris, Decodon sp., Vallisneria sp., and Parthenocisis quinquefolia were all present in this area. Pondweed and cattail had been collected in 1979 and although they were not collected in 1980 these plants were present in the bog.

2.5 FISHERIES STUDIES

2.5.1 INTRODUCTION. The fish community is one of the more important components of the Lake Michigan aquatic system from ecological, commercial, and recreational viewpoints. Fish represent the higher consumer levels in the aquatic ecosystem and provide the basis for the sport and commercial fishing industries. Additionally, fish are excellent indicators of aquatic environmental quality, since changes in environmental conditions often affect changes in the resident fish community. Fish communities inhabiting a disturbed portion of a water body may differ in some respects (i.e., species composition, growth rates and condition, incidence of parasitism/disease) from the fish community in an undisturbed area of similar habitat.

The objective of the fisheries portion of this ongoing study is to obtain data on the fish community in potentially disturbed (experimental) and undisturbed (control) nearshore areas of Lake Michigan in the vicinity of an existing fossil-fueled electric generating plant and a planned nuclear-fueled electric generating plant. These data are being used to evaluate changes, if any, in the Lake Michigan nearshore fish community within and outside an area potentially affected by the combined thermal discharges of these two plants, as well as fish community changes in a natural pond (Pond B) potentially affected by water seepage from existing ash-settling basins. This subsection represents the seventh in a series of fishery study reports characterizing the ecology of the nearshore Lake Michigan fishery in the study area and the fish community inhabiting Pond B.



Adult and juvenile fish samples were collected in Lake Michigan during April, June, August, and December 1980 to determine species occurrence, composition, and spatial/temporal distribution, as well as condition and degree of external parasitic infestation. Because of the drying of Pond B with lining of the ash-settling ponds, samples could only be taken in April. Additionally, food habits were determined for a number of important species [spottail shiner, salmonids (salmon and brown trout combined), alewife and yellow perch]. Similar determinations (except food habits) were performed on fish samples collected in April from Pond B. Fish eggs and larvae were sampled from Lake Michigan to evaluate the extent and temporal/spatial distribution of spawning, both within and outside the areas of potential thermal effects. Subsequently, these data were compared with the fishery data base (Texas Instruments 1975, 1976, 1977, 1978, 1979, and 1980) in order to discern any changes in the resident fish community.

2.5.2 **METHODOLOGY.** Adult and juvenile fish were sampled at control and experimental stations in nearshore Lake Michigan with experimental gill nets and beach seines; Pond B samples were collected by backpack electrofishing. All captured fish were identified, counted, weighed (grams), measured for total length (millimeters), and examined for external parasites. Young-of-the-year fish and smaller species were immediately preserved, and later taken to the laboratory for length and weight measurements; larger fish were processed in the field.

2.5.2.1 Experimental Gill Nets. The experimental gill nets were 91.4 meters (300 feet) long, 3.0 meters (10 feet) deep, and contained six 15.2-meter (50-foot) panels. The square panels, as measured from knot to knot, ranged from 25.4 to 88.9 millimeters (1.0 to 3.5 inches). Gill nets were set perpendicular to the shore across the 4.6-meter (15-foot) depth contour at stations 4 and 7 (Figure 2-1) during each sampling month. Generally, the nets were set in the late afternoon and retrieved the following morning. The nets were anchored at each end with concrete blocks attached to the leadlines and buoyed with polyethylene floats attached to the floatlines.



2.5.2.2 Beach Seine. Shore-zone samples were collected during daylight at stations 23, 24, and 25 (Figure 2-1) during each sampling month with a 15.2-meter (50-foot) long, 1.2-meter (4-foot) deep beach seine, having 3.1-millimeter (0.125-inch) square mesh webbing. Samples were taken by wading to a depth of 0.9 meter (3 feet), drawing the seine parallel to the shoreline, and hauling both ends of the net simultaneously shoreward. Caution was exercised to ensure that the net was stretched its entire length and that the leadline was hauled slightly ahead of the floatline. Following net retrieval, samples were concentrated in the center of the seine, removed, and immediately preserved in 10-percent buffered formalin.

2.5.2.3 Electrofishing Unit. A Coffelt Model BP-2 backpack electrofishing unit was used to collect duplicate electrofishing samples in April at pond stations 17 and 18 (Figure 2-1). The duplicate samples were of 5-minute duration each. The fish collected during each sample were bagged separately and immediately preserved in 10-percent buffered formalin.

2.5.2.4 Benthic Pump. Ichthyoplankton samples were taken immediately above the substrate, using a Gorman-Rupp water pump with reinforced neoprene intake and discharge hoses during daylight at stations 4 and 7 in April, June, and November 1980. The stream of water from the pump was directed into a conical hoop net, with 80-micron mesh netting, suspended in the water column. Fish eggs and larvae contained in the volume of water strained in 15 minutes (3.41 cubic meters) constituted a single sample, and four samples were collected at each station. Ichthyoplankton samples were stained with Lugol's iodine and rose bengal solutions and preserved in 4-percent buffered formalin. Fish eggs and larvae were removed from the samples and identified and enumerated under magnification using standard freshwater identification keys and other relevant literature.

2.5.2.5 Hoop Net. Zooplankton samples (subsection 2.2) netted during daylight at stations 1 through 10 also were examined for ichthyoplankton during each sampling month. Fish eggs and larvae were removed from each sample and identified and enumerated.



2.5.2.6 Food Habits. Food habits of 50 individuals (25 juveniles and 25 adults, when sufficient numbers were collected) of each selected species [alewife, yellow perch, spottail shiner, and all salmonids (salmon and trout combined)] were determined from fish collected by gill net and beach seine. Smaller fish were injected with buffered formalin to halt gastric digestion and preserved whole; only the stomachs of larger fish were preserved.

Stomach contents were teased out into a petri dish and the food items identified to the lowest practical taxon and enumerated. Quantitative data were used to determine each taxon's frequency of occurrence and percentage with respect to total number of organisms counted. Qualitative estimates of stomach fullness and degree of digestion were also recorded for each fish examined. To more accurately represent each food item's importance, percent estimated importance (Importance Index) was determined by multiplying the individual percentage volume of each food item by the percent fullness of each individual stomach; thus, a food organism representing 60 percent of the volume in a stomach would be rated at 42 percent in a 70-percent full stomach (i.e., $0.060 \times 0.70 = 0.420$). The percent estimated importance values of all food items encountered in each species were added together, and each food item's importance was expressed as a percentage of the total food values in all stomachs.

2.5.2.7 Data Analysis. Catch per unit effort (C/f) was the principal criterion used to determine spatial and temporal distribution patterns of fish, and was defined for gill net catches as the number of fish collected in a single overnight gill net set and, for beach seines, as the number of fish collected per seine haul. Catch per unit effort was tabulated for each species and an average value calculated for various time periods (i.e., month, year, study to date) and for each sampling location.

Condition factors (Lagler 1956) were calculated for individual fish using the equation

$$K = \frac{W \times 10^5}{L^3}$$



where

K = condition factor

W = weight in grams

L = length in millimeters

Additionally, monthly and yearly averages were calculated for each species.

Densities (number per cubic meter) of each ichthyoplankton taxon collected by zooplankton hoop net and epibenthic pump were calculated for each sample using the following equation:

$$\text{Density of eggs or larvae of taxa} = \frac{x}{f} \cdot \frac{s}{v}$$

where

x = number of eggs or larvae of taxa within aliquot analyzed

f = total volume of aliquot

s = volume of sample

v = total volume of lake water sampled

Mean densities of eggs and/or larvae of individual taxa were calculated for each set of four replicate samples collected at each station using the following equation:

$$\text{Mean density of eggs or larvae of taxa at a specific location} = \frac{(d_1 + d_2 + d_3 \dots d_x)}{r_x}$$

where

d = density of eggs or larvae of taxa in an individual replicate

r = number of replicates

2.5.3 RESULTS AND DISCUSSION

2.5.3.1 Species Composition. Sixteen species were identified from the 2611 fish collected in the Bailly Study Area during 1980 (Table 2-28). In general, the species composition observed in 1980 samples was similar to the composition



Table 2-28

Common and Scientific Names of Fish Collected in Bailly Study Area, 1974-1980

Name*		May 1974- Feb 1975	Mar 1975- Feb 1976	Mar 1 Feb 1977	Mar 1977- Feb 1978	Mar 1978- Feb 1979	Mar 1979- Feb 1980	Mar 1980- Feb 1981
Common	Scientific							
Herrings	Clupeidae							
Alewife	<u>Alosa pseudoharengus</u>	X	X	X	X	X	X	X
Gizzard shad	<u>Dorosoma cepedianum</u>	X	-	X	X	X	X	-
Trouts and Salmon	Salmonidae							
Brown trout	<u>Salmo trutta</u>	X	X	X	X	X	X	X
Steelhead trout	<u>S. gairdneri</u>	X	X	-	X	X	X	-
Lake trout	<u>Salvelinus namaycush</u>	X	X	X	X	X	X	X
Chinook salmon	<u>Oncorhynchus tshawytscha</u>	X	X	X	X	X	X	X
Coho salmon	<u>O. kisutch</u>	X	X	X	X	X	-	X
Lake whitefish	<u>Coregonus clupeaformis</u>	X	-	-	-	-	-	-
Lake herring	<u>C. artedii</u>	-	-	-	-	-	X	-
Smelts	Osmeridae							
Rainbow smelt	<u>Osmerus mordax</u>	X	-	X	-	X	X	X
Mudminnows	Umbriidae							
Central mudminnow**	<u>Umbra limi</u>	X	-	-	-	-	-	-
Minnows and Carps	Cyprinidae							
Emerald shiner	<u>Notropis antherinoides</u>	X	X	-	-	-	X	X
Spottail shiner	<u>N. hudsonius</u>	X	X	X	X	X	X	X
Carp	<u>Cyprinus carpio</u>	X	X	X	X	-	-	-
Suckers	Catostomidae							
White sucker	<u>Catostomus commersoni</u>	-	X	-	X	-	X	-
Shorthead redhorse	<u>Axostoma macrolepidotum</u>	-	-	-	X	-	-	-
Longnose sucker	<u>Catostomus catostomus</u>	-	-	-	-	-	X	-
Freshwater catfish	Ictaluridae							
Channel catfish	<u>Ictalurus punctatus</u>	-	X	-	-	X	-	-
Black bullhead**	<u>A. nebulosus</u>	X	X	X	X	X	X	X
Sunfish	Centrarchidae							
Bluegill***	<u>Lepomis macrochirus</u>	-	X	X	-	-	-	-
Green sunfish**	<u>L. cyanellus</u>	X	-	-	-	-	X	X
Rock bass	<u>Ambloplites rupestris</u>	-	X	-	-	-	-	-
Perch	Percidae							
Yellow perch	<u>Perca flavescens</u>	X	X	X	X	X	X	X
Trout-perch	<u>Percopsis omiscomaycus</u>	-	-	-	-	-	X	-

* American Fishery Society. 1970. Spec. Pub. No. 6, 3rd ed.

** Taken only in nearshore ponds.

*** Taken in nearshore pond and in Lake Michigan.



observed in previous years; however, some differences were noted. Thirteen species collected in previous years were not collected in 1980; however only four of these species, carp, white sucker, steelhead trout, and coho salmon, were collected in more than 2 of the past 6 years. No new species were collected during 1980.

Lake trout was the dominant fish collected by gill net (41.8 percent) while yellow perch was dominant in beach seines (99.9 percent) at Lake Michigan stations during 1980. Other abundant species taken by these gear included alewife and spottail shiner. Black bullhead and green sunfish were the only fish species collected in Pond B during 1980.

2.5.3.2 Gill Net Sampling. Gill net sampling accounted for 194 of the 2611 fish collected during 1980 in the study area (Table 2-29). Lake trout was the dominant species collected, followed by alewife, coho salmon, and yellow perch. This apparent shift in species composition from previous years was due to large catches of lake trout which had not been collected in abundance in gill nets prior to 1980.

Table 2-29
Number and Percent Composition of Fish Collected by Gill Net,
Bailly Study Area, 1974-1980

Common Name	1974		1975		1976		1977		1978		1979		1980	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Alewife	68	17.9	285	54.8	123	66.8	18	15.0	576	72.1	124	23.9	80	41.2
Brown trout	11	2.9	9	1.7	7	3.8	2	1.7	23	2.9	8	1.5	7	3.6
Carp	4	1.1	4	0.8	3	1.6	5	4.2	-	-	-	-	-	-
Channel catfish	-	-	2	0.4	-	-	-	-	1	0.1	-	-	-	-
Chinook salmon	14	3.7	2	0.4	2	1.1	29	24.2	14	1.8	13	2.5	5	2.6
Coho salmon	2	0.5	47	9.0	1	0.5	8	6.7	23	2.9	-	-	13	6.7
Emerald shiner	-	-	-	-	-	-	-	-	-	-	101	19.5	-	-
Gizzard shad	1	0.3	-	-	1	0.5	1	0.8	2	0.2	1	0.2	-	-
Lake herring	-	-	-	-	-	-	-	-	-	-	1	0.2	-	-
Lake trout	134	35.3	53	10.2	5	2.7	16	13.3	110	13.8	8	1.5	81	41.8
Lake whitefish	1	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Longnose sucker	-	-	-	-	-	-	-	-	-	-	1	0.2	-	-
Rainbow smelt	1	<0.1	-	-	1	0.5	-	-	6	0.7	2	0.4	-	-
Rock bass	-	-	1	0.2	-	-	-	-	-	-	-	-	-	-
Shorthead redhorse	-	-	-	-	-	-	2	1.7	-	-	-	-	-	-
Spottail shiner	-	-	-	-	-	-	-	-	-	-	223	43.1	-	-
Steelhead trout	37	9.7	3	0.6	-	-	1	0.8	8	1.0	3	0.6	-	-
Trout-perch	-	-	-	-	-	-	-	-	-	-	1	0.2	-	-
White sucker	-	-	2	0.4	-	-	1	0.8	-	-	1	0.2	-	-
Yellow perch	108	28.4	112	21.5	41	22.3	37	30.8	36	4.5	31	6.0	8	4.1
Total	381	-	520	-	184	-	120	-	799	-	518	-	194	-



Typically, apparent shifts in species composition (consisting primarily of alewife, yellow perch, and salmonids) during previous study years (1974-1978) were related to fluctuations in alewife and salmonid populations. State and federal fish stocking programs largely govern the size of salmonid populations in the study area, while alewife population levels may still be adjusting, following their relatively recent (1949) invasion of Lake Michigan and the salmonid introductions designed to curb their population levels.

The total gill net catch (all species combined) for 1980 was lower than all prior years except 1977 (Table 2-30). Gill net catches were highest in August and lowest in November. The high August catch was due to a large catch of lake trout and alewife. This is the first year that August gill net catches have been the highest for the year.

Spatial distribution during 1979 (Table 2-30) was characterized by only slightly higher catch per unit effort (25 vs 23.5) at the down-lake control station (Station 7) than at the warm-water station (Station 4). The 1974-1978 catch-per-unit-effort (C/f) values were generally slightly higher at Station 4, indicating that fish usually prefer this area over the area at Station 7, although this was not the case in either 1979 or 1980.

2.5.3.3 Beach Seine Sampling. Beach seine sampling during 1980 produced 2407 fish consisting of five species: alewife, emerald shiner, yellow perch, rainbow smelt, and spottail shiner (Table 2-31). Numbers of fish collected by beach seine during 1980 were intermediate in numbers compared to numbers collected during most previous years (1974-1979). Species composition, although not strictly comparable because of reduced sampling frequency in 1975, had shifted from a shore-zone community dominated by alewife and spottail shiner during 1974, 1975, and 1976 to a community dominated primarily by spottail shiner and yellow perch during 1977. The return to a spottail shiner- and alewife-dominated community during 1978 was due primarily to substantial increases in the catch for these two species. In 1979 most fish collected were spottail shiner. During 1980 spottail shiner and yellow perch were again the dominant species. These changes in relative abundance were probably not related to Bailly Generating Station operation or Bailly Nuclear-1 construction activities. Spottail shiner generally had been the most numerous species collected throughout the 1974-1979 study period. However, yellow perch were



Table 2-30

Spatial and Temporal Distribution of Total Catch (All Species Combined)
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4 Catch	Station 7 Catch	Total Catch	Total Samples	C/f
1974					
May 26	9	46	55	2	27.5
Jun	15	7	22	2	11.0
Jul	79	34	113	2	56.5
Aug	3	6	9	2	4.5
Oct 4	24	48	72	2	36.0
Oct 24	41	20	61	2	30.5
Nov 18	37	12	49	2	24.5
Total fish	208	173	381		
Total samples	7	7		14	
C/f*	29.7	24.7			27.2
1975					
Mar	**	**	**	0	**
Apr 17	150	134	284	2	142.0
May 22	13	16	29	2	14.5
Jun 18	35	19	54	2	27.0
Aug 8	26	30	56	2	28.0
Nov 3	59	38	97	2	48.5
Total fish	283	237	520		
Total samples	5	5		10	
C/f	56.6	47.4			52.0
1976					
Apr 7	82	42	124	2	62.0
Jun 6	5	9	14	2	7.0
Aug 12	9	28	37	2	18.5
Nov 19	7	2	9	2	4.5
Total fish	103	81	184		
Total samples	4	4		8	
C/f	25.3	20.3			23.0
1977					
Apr 14	35	31	66	2	34.0
Jun 11	7	4	11	2	5.5
Aug 26	21	17	38	2	19.0
Nov 23	1	2	3	2	1.5
Total fish	64	56	120		
Total samples	4	4		8	
C/f	16.0	14.0			15.0
1978					
Apr 23	308	255	563	2	281.5
Jun 17	43	26	69	2	34.5
Aug 21	67	12	79	2	39.5
Nov 19	45	43	88	2	44.0
Total fish	463	336	799		
Total samples	4	4		8	
C/f	115.8	84.0			99.9
1979					
May 5	108	38	146	2	73.0
Jul 15	*	254	254	1	254.0
Aug 18	40	73	113	2	56.5
Dec 6	3	2	5	2	2.5
Total fish	151	367	518		
Total samples	3	4		7	
C/f	50.3	91.5			70.9
1980					
Apr 18	28	10	38	2	19.0
Jun 12	22	34	56	2	28.0
Aug 20	32	42	74	2	37.0
Nov 20	12	14	26	2	13.0
Total fish	94	100	194		
Total samples	4	4		8	
C/f	23.5	25			24.25
1974-1980					
Total fish	1366	1350	2716		
Total samples	31	32		63	
C/f	44.1	42.2			43.1

*Catch per overnight set.

**No sample collected.



dominant in 1980. Changes in the relative abundance of spottail shiner have usually been due to the variable numbers of alewife collected during each year. Possible reasons for variable numbers of alewife included natural variations in abundances and that alewives may have been in deeper water during the 1979 and 1980 sampling periods. The large catches of yellow perch in beach seines indicate a strong year-class. Large numbers of yellow perch also were observed in and around the thermal discharge of the power plant.

Table 2-31

Number and Percent Composition of Fish Collected by Beach Seine,
Bailly Study Area, 1974-1980

Common Name	1974		1975		1976		1977		1978		1979		1980	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Alewife	1762	84.0	1232	32.2	2033	51.2	1	0.4	140	5.5	-	-	51	2.2
Bluegill	-	-	1	0.1	6	0.2	-	-	-	-	-	-	-	-
Brown trout	12	0.6	-	-	-	-	-	-	-	-	1	0.1	-	-
Chinook salmon	10	0.5	5	0.1	-	-	3	1.2	7	0.3	-	-	-	-
Coho Salmon	-	-	-	-	-	-	-	-	-	-	-	-	1	<0.1
Emerald shiner	1	<0.1	3	0.1	-	-	-	-	-	-	-	-	1	<0.1
Gizzard shad	4	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Spottail shiner	282	13.5	2563	67.0	1928	48.6	220	89.8	2361	93.3	783	99.9	824	34.3
Steelhead trout	1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
White Sucker	-	-	-	-	-	-	1	0.4	-	-	-	-	-	-
Yellow perch	19	0.9	21	0.5	-	-	20	8.2	16	0.6	-	-	1525	63.5
Rainbow smelt	-	-	-	-	-	-	-	-	8	0.3	-	-	5	<0.1
Total	2091	-	3825	-	3967	-	245	-	2532	-	784	-	2407	-

Beach seine catches were highest during August (2401)* and were dominated by sub-adult fish. Highest beach seine catches during previous years (1974-1978) occurred during August and were dominated by young-of-the-year fish through 1977 and sub-adult fish in 1978. Zero, or extremely low seine catches have occurred during April sampling since 1975; this trend continued during April 1980. Additionally, zero or near-zero catches occurred at all stations during November 1980, which was often the case in previous years.

Spatial distribution of total catch (all species combined) during 1979 was characterized by moderate catches at Station 24 (experimental or warm-water station) and low catches at Station 23 (control station) (Table 2-32). During most of the previous years (1974-1979), yearly catch values were usually highest at Station 24. However, higher catches usually varied by sample date from Station 24 to 25, indicating that fish may prefer the area of one beach seine station over the other during certain times of the year.

*However, no samples were analyzed for June.



Table 2-32

Spatial and Temporal Distribution of Total Catch (All Species Combined)
Collected by Beach Seine, Bailly Study Area, 1974-1980

Date	Station 23 Catch	Station 24 Catch	Station 25 Catch	Total Catch	Total Samples	C/f
1974						
May 24	8	82	0	90	3	30.0
Jun 28	0	14	0	14	3	4.7
Jul	2	77	461	540	3	180.0
Aug 26	1	738	102	841	3	280.3
Sep 21	0	0	10	10	3	3.3
Nov 7	233	20	0	253	3	84.3
Nov 7	329	14	0	343	3	114.3
Total fish	573	945	573	2091		
Total samples	7	7	7		21	
C/f*	81.9	135.0	81.9			99.6
1975						
Mar 27	0	0	0	0	3	0.0
Apr 17	1	0	0	1	3	0.3
May 19	102	0	50	152	3	50.7
Jun 13	214	595	12	821	3	273.7
Aug 8	497	991	1363	2851	3	950.3
Nov 2	0	0	0	0	3	0.0
Total fish	814	1586	1425	3825		
Total samples	6	6	6		18	
C/f	135.7	264.3	237.5			212.5
1976						
Apr 10	1	0	0	1	3	0.3
Jun 8	7	1596	31	1634	3	544.7
Aug 11	0	638	1698	2331	3	777.0
Nov 16	0	1	0	1	3	0.3
Total fish	8	2235	1724	3967		
Total samples	4	4	4		12	
C/f	2.0	558.8	431.0			330.6
1977						
Apr	0	0	0	0	3	0.0
Jun 10	2	19	2	23	3	7.7
Aug 26	8	39	172	219	3	73.0
Nov 20	0	1	2	3	3	1.0
Total fish	10	59	176	245		
Total samples	4	4	4		12	
C/f	2.5	14.8	44.0			20.4
1978						
Apr 18	0	0	0	0	3	0.0
Jun 16	32	2276	18	2326	3	775.3
Aug 18	8	47	87	142	3	47.3
Nov 18	0	64	0	64	3	21.3
Total fish	40	2387	105	2532		
Total samples	4	4	4		12	
C/f	10.0	596.8	26.3			211.0
1979						
May 5	0	0	0	0	3	0.0
Jul 15 and 23	0	717	66	783	3	261.0
Aug 16	0	0	0	0	3	0.0
Dec 4	1	0	0	1	3	0.3
Total fish	1	717	66	784		
Total samples	4	4	4		12	
C/f	0.3	179.3	16.5			65.3
1980						
Apr 18	0	4	1	5	3	1.7
Jun 12	0	0	0	0	0	**
Aug 21	105	249	2047	2401	3	800.3
Nov 20	0	1	0	1	3	0.3
Total fish	105	254	2048	2407		
Total samples	4	4	4		12	
C/f	26.3	63.5	512			200.6
1974-1980						
Total fish	1551	8183	6117	15,851		
Total samples	33	33	33		99	
C/f	47	248	185.4			160.1

*Catch per seine haul.

**Samples were lost during analysis.



2.5.3.4 Electrofishing. Electrofishing in Pond B during only April 1980 produced 8 black bullhead and 12 green sunfish (Table 2-33). Black bullhead has dominated each of the previous years' collections except during 1974, when only one black bullhead was collected and qualitative dip net samples documented the presence of central mudminnow and green sunfish. Green sunfish were the dominant fish collected in 1974 as in 1980. The black bullheads ranged from 118 to 127 millimeters in total length and from 0.74 to 1.36 condition factor (K). The green sunfish ranged from 29 to 89 millimeters in total length and from 1.23 to 1.73 condition factor (K).

Table 2-33

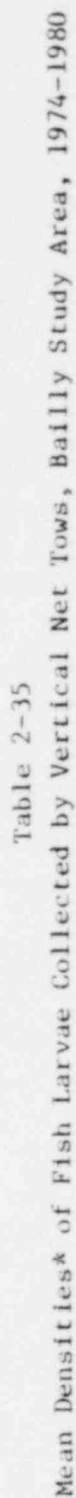
Number and Percent Composition of Fish Collected by Electrofishing,
Bailly Study Area, 1974-1980

Common Name	1974*		1975		1976		1977		1978		1979**		1980	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Black bullhead	1	3.6	10	90.9	42	100	2	100	22	100	3	75	8	40
Bluegill	-	-	1	0.1	-	-	-	-	-	-	-	-	-	-
Central mudminnow	1	3.6	-	-	-	-	-	-	-	-	-	-	-	-
Green sunfish	26	92.9	-	-	-	-	-	-	-	-	-	-	12	60
Sunfish	-	-	-	-	-	-	-	-	-	-	1	25	-	-
Total	28		11		42		2		22		4		20	

* Qualitative dip net samples taken in September; electrofishing produced no fish.

** Samples collected only during August.

2.5.3.5 Ichthyoplankton. Fish eggs collected during 1980 included alewife and cyprinid (probably carp) (Tables 2-34, 2-36 and 2-38). Only alewife and spottail shiner larvae were collected during 1980 (Tables 2-35 and 2-38). Alewife eggs and larvae have been the dominant ichthyoplankton collected during previous years. Alewife egg densities in 1980, an indication of alewife spawning in the Bailly area, were slightly higher than 1974, 1975, 1977, 1978, and 1979 concentrations, but were lower than densities found in 1976 samples (Table 2-34). Alewife eggs were collected only in June 1980, a month when peak egg densities were observed during previous years; concentrations were higher at stations 2 and 10 than at other sampling locations.

[illegible]

* Mean number per cubic meter.



Alewife and spottail shiner larvae were collected only during June 1980; concentrations were highest at stations 8 and 9 (Table 2-35). Alewife larval densities were similar to previous years and actual numbers indicate the similar usage of these sampling locations as a nursery area. Based on the presented data (1974-1980), no consistent yearly differences in egg or larval concentrations were evident between sampling stations. No eggs or larvae were collected in nearshore ponds.

The effect of the warm-water discharge on the nearshore spawning and nursery areas in the Bailly vicinity was further determined by sampling fish eggs and larvae with an epibenthic pump during April and November at a warm-water station (Station 4) and a control station (Station 7). No fish eggs or larvae were collected with the epibenthic pump during 1980 (Tables 2-36 and 2-37). Based on the presented data (1974-1980), no consistent yearly differences in ichthyoplankton concentrations were shown between the two sampling locations. Samples have been collected during November to detect salmonid spawning; however, no salmonid eggs or larvae have been collected from 1974 to 1980.

Table 2-36

Mean Densities* of Fish Eggs Collected by Benthic Pump, Bailly Study Area, 1974-1980

Station	Taxon	1974				1975				1976			1977***			1978			1979			1980			
		May**	Jun	Jul	Nov	Apr	May	Jun	Jul	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov
4	Alewife	0.31	-	-	-	-	-	-	0.51	-	-	-	-	0.29	-	-	-	-	-	-	-	-	-	-	-
7	Alewife	0.14	-	-	-	-	-	-	4.25	-	-	0.90	-	0.07	-	-	-	-	-	-	2.97	-	-	-	-
	Unidentified	-	-	-	-	-	-	-	11.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Alewife	-	-	-	-	-	-	27.27	-	-	-	18.50	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unidentified	-	-	-	-	-	2.00	0.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Mean number per cubic meter.

**Collections at stations 4 and 7 made with 0.5-meter (1.6-foot) epibenthic sled having net with 333-micron mesh aperture.

***Epibenthic pump replaced by hoop net at Station 10 during 1977.

*Samples lost during analysis.

Table 2-37

Mean Densities* of Fish Larvae Collected by Benthic Pump, Bailly Study Area, 1974-1980

Station	Taxon	1974				1975				1976			1977 ***			1978			1979			1980			
		Apr**	Jun	Jul	Nov	Apr	May	Jun	Jul	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov	Apr	Jun	Nov
4	Alewife	0.01	-	-	-	-	-	0.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unidentified	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Alewife	-	-	-	-	-	-	1.78	0.25	-	-	-	-	0.22	-	-	-	-	-	0.11	-	-	-	-	-
	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cyprinidae	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-
10	No catch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Mean number per cubic meter.

**Collections at stations 4 and 7 made with 0.5-meter (1.6-foot) epibenthic sled having net with 333-micron mesh aperture.

***Epibenthic pump replaced by hoop net at Station 10 during 1977.

*Samples lost during analysis.



Incidental ichthyoplankton observations from Ponar dredge samples are shown in Table 2-38. Although not all samples contained eggs, those which did yielded from 1 to approximately 1500 eggs per Ponar grab sample. The vertically hauled zooplankton net yielded fewer eggs, indicating net samples probably underestimate egg density in this area of Lake Michigan.

Table 2-38
Incidental Ichthyoplankton Observations from Ponar Grab Samples,
Bailey Study Area, 1980

Date*	Station	Species	Life Stage	No.	No./m ²
Jun 1980	2A	Alewife	Egg	6	115
	3A	Alewife	Egg	524**	10,024
	3B	Alewife	Egg	36**	689
	4A	Alewife	Egg	2**	38
	4B	Alewife	Egg	1**	19
	5A	Alewife	Egg	59**	1,129
	5B	Alewife	Egg	30	574
	6A	Alewife	Egg	7	134
	6B	Alewife	Egg	4	77
	7A	Alewife	Egg	5**	96
	7B	Alewife	Egg	5**	96
		Cyprinidae	Egg	1	19
	8A	Alewife	Egg	13	249
	8B	Alewife	Egg	51	976
	9A	Alewife	Egg	8**	153
	9B	Alewife	Egg	40**	765
	10A	Alewife	Egg	377	7,212
		Cyprinidae	Egg	53	1,014
	10B	Alewife	Egg	115**	2,200
		Cyprinidae	Egg	11**	210

* No ichthyoplankton observed in April, August, and November, 1980.

** Estimated that less than 50 percent of the eggs were viable at collection time.

2.5.4 SPECIES DISCUSSION. The following species discussion addresses spatial and temporal distribution, reproduction in the study area, condition, and external parasitism for each species collected during 1980. Food habits will also be discussed for selected species [alewife, salmonids (salmon and trout), spottail shiner, and yellow perch].



Table 2-39

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Alewives
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4			Station 7			Total Catch	Total Samples	C/f
	Catch	Length \pm SE	Weight \pm SE	Catch	Length \pm SE	Weight \pm SE			
1974									
May 26	4	200.5 \pm 12.9	53.0 \pm 11.4	44	204.3 \pm 9.9	63.5 \pm 9.7	48	2	24.0
Jun	7	192.7 \pm 38.9	75.9 \pm 58.6	4	189.6 \pm 31.5	37.0 \pm 11.7	11	2	5.5
Jul	6	162.7 \pm 66.9	46.5 \pm 15.2	2	207.5 \pm 10.6	40.0 \pm 4.2	8	2	4.0
Aug	0	-	-	0	-	-	0	2	0.0
Oct 4	1	190.0 \pm 0.0	61.0 \pm 0.0	0	-	-	1	2	0.5
Oct 24	0	-	-	0	-	-	0	2	0.0
Nov 8	0	-	-	0	-	-	0	2	0.0
Total fish	18			50			68		
Total samples	7			7				14	
C/f**	2.6			7.14					4.9
1975									
Mar	***			***			***	0	***
Apr 17	11	202.8 \pm 10.0	66.3 \pm 8.2	116	202.2 \pm 7.5	67.9 \pm 4.4	233	2	116.5
May 22	9	203.0 \pm 11.9	63.7 \pm 13.0	14	207.9 \pm 14.8	65.1 \pm 13.0	23	2	11.5
Jun 18	11	202.2 \pm 19.0	53.6 \pm 12.4	6	194.6 \pm 14.3	46.2 \pm 8.6	17	2	8.5
Aug 8	6	196.1 \pm 10.3	51.0 \pm 12.3	3	180.0 \pm 30.0	39.0 \pm 21.9	9	2	4.5
Nov 3	3	203.0 \pm 0.0	62.0 \pm 9.2	0	0	0	3	2	1.5
Total fish	146			139			285		
Total samples	5			5				10	
C/f	29.2			27.8					28.5
1976									
Apr 7	76	202.9 \pm 1.0	64.0 \pm 1.2	37	205.1 \pm 1.2	68.9 \pm 1.0	113	2	56.5
Jun 6	2	207.5 \pm 2.5	55.5 \pm 4.5	8	194.0 \pm 8.8	52.3 \pm 6.9	10	2	5.0
Aug 12	0	-	-	0	-	-	0	2	0.0
Nov 19	0	-	-	0	-	-	0	2	0.0
Total fish	78			45			123		
Total samples	4			4				8	
C/f	19.5			11.3					15.4
1977									
Apr 14	9	214.6 \pm 7.63	65.0 \pm 6.22	6	210.8 \pm 11.02	56.3 \pm 9.63	15	2	7.5
Jun 11	1	208.0 \pm 0	57.0 \pm 0	2	198.0 \pm 9.00	86.5 \pm 3.50	3	2	1.5
Aug 26	0	-	-	0	-	-	0	2	0
Nov 23	0	-	-	0	-	-	0	2	0
Total fish	10			8			18		
Total samples	4			4				8	
C/f	2.5			2.0					2.3
1978									
Apr 23	283	203.1 \pm 1.01	69.1 \pm 0.85	246	203.3 \pm 1.09	68.8 \pm 0.93	529		264.5
Jun 17	30	201.0 \pm 2.14	66.2 \pm 1.62	16	199.4 \pm 3.36	67.6 \pm 2.89	46	2	23.0
Aug 21	0	-	-	0	-	-	0	2	0.0
Nov 19	0	-	-	1	197.0 \pm 0.0	67.0 \pm 0.0	1	2	0.5
Total fish	313			263			576		
Total samples	4			4				8	
C/f	78.3			65.8					72.0
1979									
May 5	94	203.6 \pm 0.76	63.0 \pm 0.84	26	202.3 \pm 1.53	62.7 \pm 1.28	120	2	60.0
Jul 15	***			4	210.3 \pm 5.9	62.3 \pm 4.31	4	1	4.0
Aug 18	0	-	-	0	-	-	0	2	0.0
Dec 6	0	-	-	0	-	-	0	2	0.0
Total fish	94			30			124		
Total samples	3			4				7	
C/f	31.3			7.5					17.7
1980									
Apr 18	24	198.9 \pm 4.03	59.3 \pm 1.51	4	201.2 \pm 3.75	59.8 \pm 4.01	28	2	14.0
Jun 12	17	206.6 \pm 2.92	62.4 \pm 2.91	33	204.0 \pm 2.29	66.9 \pm 2.10	40	2	20.0
Aug 20	0	-	-	2	178.5 \pm 13.50	40.0 \pm 12.00	2		1.0
Nov 20	0	-	-	0	-	-	0		0.0
Total fish	41			39			70		
Total samples	4			4				8	
C/f	10.3			9.8					8.8
1974-1980									
Total fish	700			566			1266		
Total Samples	17			32					
C/f	21.9			17.7					19.9

*Total length in millimeters; weight is in grams.

**Catch per overnight set.

***No sample collected.



2.5.4.1 Alewife

2.5.4.1.1 Introduction. The alewife is a small, exotic fish that has become established in all five of the Laurentian Great Lakes (Scott and Crossman 1973). Its invasion of Lake Michigan was first detected in May 1949, when a single adult was taken in a gill net set off South Manitou Island (Miller 1957). Since that time, it has become the most abundant and widely distributed species in the lake, occupying all areas of the lake and its tributaries, estuaries, and bays during different seasons of the year (Smith 1968). The alewife has a strong competitive advantage over the other planktivorous species because of its efficient filter-feeding behavior and its characteristic of forming dense schools (Smith 1968). Because dense schools of alewife occupy different portions of the lake during different seasons of the year, they can influence all other fish species (Smith 1968).

2.5.4.1.2 Spatial and Temporal Distribution. Gill net catches of alewife were highest during May and lowest during April and June 1980 (Table 2-39). Gill net catches of alewife in April 1980 were higher at Station 4 (warm-water station) than at Station 7 (control or unaffected station). Gill net catches during previous years showed no consistent yearly preference for area (station) although overall catch rate (1974-1980) for the two gill net stations was highest at Station 4 (22.6 per set at Station 4, 17.7 per set at Station 7). Alewife catches were lower during 1980 than in 1978 or 1979. Mean lengths and weights of alewife (Table 2-39) were similar at the two gill net stations during April and June (when numbers permitted comparison). All fish compared were adults. Several authors (Norden 1968, Wells 1968, and Brown 1972) reported that alewife overwinter in deep water, initiate shoreward spawning migrations led by larger fish during March, and become most abundant in near-shore areas in late April and May. After spawning, alewife gradually move back to the deeper water.

Alewife were collected by beach seining during August 1980 (Table 2-40). All fish were young-of-the-year with densities highest at Station 25. Overall catch records (1974-1980) show that greater numbers of alewife (usually young-of-the-year) have been seined at Station 25 ($C/f = 79.8$), decreasing in a westward direction to a low at Station 23 ($C/f = 32.3$).



Table 2-40
Catch per Unit Effort (C/f) and Mean Lengths and Weights of Alewives
Collected by Beach Seine, Bailly Study Area, 1974-1980

Date	Station 23			Station 24			Station 25			Total Catch	Total Samples	C/F
	Catch	* Length \pm SE	* Weight \pm SE	Catch	* Length \pm SE	* Weight \pm SE	Catch	* Length \pm SE	* Weight \pm SE			
1974												
May 24	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 28	0	---	---	2	161.0 \pm 12.7	39.00 \pm 1.84	0	---	---	2	3	0.7
Jul	0	---	---	8	10.8 \pm 1.6	0.1 \pm *	461	25.4 \pm 2.1	0.1 \pm ***	469	3	156.3
Aug 26	1	25.0 \pm 4.0	0.13 \pm 0.00	665	34.2 \pm 6.9	0.28 \pm 0.27	36	32.2 \pm 9.1	0.36 \pm 0.53	702	3	234.0
Sep 21	0	---	---	0	---	---	0	---	---	0	3	0.0
Nov 7	233	37.9 \pm 6.9	1.73 \pm 0.18	17	46.4 \pm 5.4	0.90 \pm 0.32	0	---	---	250	3	83.3
Nov 7	326	34.0 \pm 8.9	1.46 \pm 0.79	13	44.3 \pm 7.6	0.82 \pm 0.42	0	---	---	339	3	113
Total fish	560			705			497			1762		
Total samples	7			7			7				21	
C/F**	80.0			100.7			71.0					83.9
1975												
Mar 27	0	---	---	0	---	---	0	---	---	0	3	0.0
Apr 17	0	---	---	0	---	---	0	---	---	0	3	0.0
May 19	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 13	0	---	---	0	---	---	0	---	---	0	3	0.0
Aug 6	497	12.3 \pm 3.3	0.10 \pm ***	401	29.8 \pm 3.3	0.21 \pm 0.09	334	30.2 \pm 1.2	1.09 \pm 0.23	1232	3	410.7
Nov 12	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	497			401			334			1232		
Total samples	6			6			6				18	
C/F	82.8			66.8			55.7					68.4
1976												
Apr 10	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 8	0	---	---	82	81.0 \pm 0.8	1.10 \pm 0.10	0	---	---	82	3	27.3
Aug 11	0	---	---	259	27.6 \pm 0.4	0.16 \pm ***	1692	26.6 \pm 0.3	0.22 \pm ***	1951	3	650.3
Nov 16	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	0			341			1692			2033		
Total samples	4			4			4				12	
C/F	0.0			85.3			423.0					169.4
1977												
April	0	---	---	0	---	---	0	---	---	0	3	0
Jun 10	0	---	---	0	---	---	0	---	---	0	3	0
Aug 26	0	---	---	0	---	---	0	---	---	0	3	0
Nov 20	0	---	---	1	35 \pm 0	1.2 \pm 0	0	---	---	1	3	0.3
Total fish	0			1			0			1		
Total samples	4			4			4				12	
C/F	0			0.3			0					0.1
1978												
Apr 23	0	---	---	0	---	---	0	---	---	0	3	0
Jun 16	0	---	---	3	133.8 \pm 22.4	12.1 \pm 7.83	0	---	---	3	3	1.7
Aug 18	0	---	---	0	---	---	71	45.6 \pm 0.89	0.71 \pm 0.04	71	3	23.7
Nov 18	0	---	---	64	50.3 \pm 1.13	1.23 \pm 0.11	0	---	---	0	3	
Total fish	0			69			71			140		
Total samples	4			4			4				12	
C/F	0			17.2			17.8					11.7
1979												
May 5	0	---	---	0	---	---	0	---	---	0	3	0.0
Jul 15 and 23	0	---	---	0	---	---	0	---	---	0	3	0.0
Aug 16	0	---	---	0	---	---	0	---	---	0	3	0.0
Dec 4	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	0			0			0			0		
Total samples	4			4			4				12	
C/F	0.0			0.0			0.0					0.0
1980												
Apr 18	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 12	0	---	---	0	---	---	0	---	---	0	0	***
Aug 11	10	31.6 \pm 0.62	0.22 \pm 0.01	3	44.3 \pm 8.67	0.9 \pm 0.47	38	44.9 \pm 2.07	0.8 \pm 0.08	51	3	17.0
Nov 20	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	10			3			38			51		
Total sample	4			4			4				12	
C/F	2.5			0.8			9.5					4.25
1974-1980												
Total fish	1067			1520			2632			5219		
Total sample	33			33			33				99	
C/F	32.3			46.1			79.8					52.7

* Total length in millimeters; weight is in grams.
 ** Catch per seine haul.
 *** No standard error calculated.
 **** Sample missed.



2.5.4.1.3 Food Habits. Adult alewife collected in the Bailly vicinity during 1979 fed primarily on zooplankton (predominantly calanoid copepods) (Table 2-41). Presence of these organisms indicates that alewife probably fed in open water and along the lake bottom. Zooplankton were the most important food items as determined by frequency of occurrence, although most of the volume was digested matter). Based on the importance index (subsection 2.5.2.6), calanoid copepods were the second most important food item, with digested matter the most important.

Table 2-41
Food Habits of Adult Alewife, Bailly Study Area, 1980

Length Range - 165-223 millimeters
Stomachs Examined - 25
Stomachs Empty - 2

Food Item	Occurrences		Abundance		Importance Index
	No.	%	No.	%	
Algae					
Filamentous algae	3	13.05	0	0.0	2.79
Terrestrial vegetation	4	17.39	0	0.0	3.36
Zooplankton					
Bosminidae	9	39.13	86	3.08	1.32
Chydoridae	3	13.04	12	0.43	0.10
Cladocera	10	43.48	160	5.73	2.24
Calanoida	9	39.13	1858	66.52	23.89
Cyclopoida	3	13.04	98	3.51	0.85
Harpacticoida	2	8.70	14	0.50	0.12
Copepoda	10	43.48	553	19.80	6.43
Pontoporeia affinis	2	8.70	2	0.07	1.24
Insects					
Corixidae nymph	1	4.35	2	0.07	0.59
Cryptochironomus (larvae)	3	13.04	3	0.11	0.47
Saetheria sp. (larvae)	3	13.04	5	0.18	0.55
Aquatic insect remnants	1	4.35	0	0.0	0.04
Other					
Digestive matter	22	95.65	0	0.0	55.89
Sand grains	3	13.04	0	0.0	0.12

Data from previous years (1974-1979) indicated that alewife fed primarily on zooplankton (Texas Instruments 1975, 1976, 1977, 1978, and 1979); however, Webb and McComish (1974) and Rhodes et al (1974) reported that fish eggs and larval alewife were important food items of Lake Michigan alewife during late summer and early fall, a time period when few alewives have been collected in the Bailly study.

Of the 25 juvenile alewife stomachs examined, only 1 was empty (Table 2-42). Copepods were found in all 24 stomachs and were the most important organisms ingested. The next most important food was chydorid cladocerans, 11.7 percent (Table 2-42). The fact that virtually all food was zooplankton is characteristic of alewife in general and juveniles in specific.



Table 2-42

Food Habits of Juvenile Alewife, Bailly Study Area, 1980

Length Range - 30-61 millimeters
Stomachs Examined - 25
Stomachs Empty - 1

Food Item	Occurrences		Abundance		Importance Index
	No.	%	No.	%	
Zooplankton					
Bosminidae	22	91.67	677	12.10	7.18
Chydoridae	23	95.83	895	16.00	11.70
Daphnia sp.	21	87.50	320	5.74	4.73
Cladocera (unid.)	22	91.67	278	4.97	3.04
Calanoida	20	83.33	350	6.26	5.00
Copepoda	24	100.00	3070	54.89	56.35
Insects					
Chironomidae (larvae)	2	8.34	2	0.04	0.29
Other					
Digestive matter	2	83.33			11.53
Sand grains	5	20.83			0.18

2.5.4.1.4 Condition and Parasitism. Condition factors for alewife collected during 1980 were higher than those collected during 1974, 1977 and 1979, and slightly lower than those observed during 1975, 1976, and 1978 (Table 2-43). Yearly condition factors were similar to those reported by Liston and Tack (1973). No obvious external parasites were noted on alewife collected during 1980. Parasites that have been known to infest alewife have been previously discussed by Texas Instruments (1975).

Table 2-43

Condition Factors of Fish Collected in Bailly Station Vicinity, 1974-1980, Plus Values Obtained from Relevant Literature

Species	1980				1980	1979	1978	1977	1976	1975	1974	Literature Source
	Apr	Jun	Aug	Nov								
Alewife	0.808	0.766	0.726	—	0.767	0.751	0.783	0.690	0.834	0.800	0.708	0.700-0.861 (Liston and Tack 1973)
Gizzard shad	—	—	—	—	—	1.272	1.195	1.519	1.058	—	1.113	1.2193 (Jude et al 1973)
Chinook salmon	1.075	1.152	1.093	—	1.107	1.139	1.128	1.002	1.115	1.151	1.171	1.3462 (Jude et al 1973)
Coho salmon	0.819	1.043	1.072	0.992	0.982	—	1.293	0.884	1.010	0.926	1.085	1.0535 (Jude et al 1973)
Brown trout	1.082	1.609	1.557	—	1.416	1.408	1.408	1.354	1.267	1.336	1.327	1.26 (Carlander 1969) - 1.2621 (Jude et al 1973)
Lake trout	—	1.064	0.989	0.884	0.979	1.060	0.904	0.983	0.932	0.973	1.022	0.950-1.131 (Liston and Tack 1973)
Carp	—	—	—	—	—	—	—	1.503	1.489	1.349	1.564	1.23-1.80 (Carlander 1969)
Spottail shiner	—	—	0.814	—	0.814	0.738	0.845	0.762	0.795	0.870	0.809	0.826-0.941 (Liston and Tack 1973)
Black bullhead	1.395	—	—	—	1.395	1.523	1.255	1.062	1.384	1.213	1.248	1.11-1.96 (Carlander 1969)
Yellow perch	—	1.174	0.880	—	1.027	1.048	1.092	0.989	1.099	1.063	1.075	1.0485-1.359 (Jude et al 1973)
White sucker	—	—	—	—	—	—	1.234	—	0.997	—	—	—
Shorthead redhorse	—	—	—	—	—	—	—	1.419	—	—	—	—
Steelhead	—	—	—	—	—	1.236	1.162	1.457	—	0.942	1.115	—



2.5.4.2. Yellow Perch

2.5.4.2.1 Introduction. The yellow perch, a percid, is commonly found in all of the Great Lakes (Hubbs and Lagler 1958). In Lake Michigan, it inhabits the shallow and intermediate depths, and is near bottom during most of the year and at mid-levels in summer (Wells 1968).

2.5.4.2.2 Spatial and Temporal Distribution. Yellow perch were collected in greatest abundance (7) in August at Station 7. These 7 together with the 1 fish collected in June at Station 4 were all that were collected in 1980. Year-to-date (1974-1980) catch rates (C/f) were higher at Station 4; 1976 and 1980 were the only years (not including 1979 because of the missed sample) with higher catches at Station 7 than at Station 4, indicating that yellow perch may prefer the area of Station 4 over Station 7. Catches were low in 1980 as compared to prior years (Table 2-44). The yellow perch at Station 4 was slightly larger than the average of the 7 collected at Station 7. Because of the low numbers, little inference should be drawn from this. Large numbers of yellow perch were collected by beach seine during 1980 (Table 2-45), as was the case during August 1978 at stations 24 and 25. None were caught in 1979. Additionally, no perch were collected during 1976, but were collected in similar numbers at these same two stations in August 1974, 1975, and 1977. This was the first year that yellow perch have been collected at Station 23 by beach seine during the 7-year monitoring study.

2.5.4.2.3 Food Habits. Adult yellow perch examined during 1979 fed only on fish (Table 2-46). The primary food during other years was fish, although other food categories have been encountered (Texas Instruments 1975, 1976, 1977, 1978, 1979). During 1979, yellow perch fed exclusively on fish. The only identifiable ones were alewife. Twenty-five juvenile yellow perch stomachs were examined for food habit evaluation. Thirteen of those stomachs were empty. The most important food organisms were Daphnia and calanoid copepods (Table 2-47). This is typical for most juvenile fish as the primary food is zooplankton.



Table 2-44

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Yellow Perch
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4			Station 7			Total Catch	Total Samples	C/f
	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE			
1974									
May 26	0	—	—	1	191.0 \pm 0.0	68.0 \pm 0.0	1	2	0.3
Jun	7	190.7 \pm 45.4	112.6 \pm 79.5	1	185.0 \pm 0.0	64.0 \pm 0.0	8	2	4.0
Jul	69	200.3 \pm 18.9	93.6 \pm 40.5	28	205.5 \pm 23.9	99.6 \pm 60.2	97	2	48.5
Aug	0	—	—	0	—	—	0	2	0.0
Oct 4	0	—	—	0	—	—	0	2	0.0
Oct 24	0	—	—	0	—	—	0	2	0.0
Nov 8	2	205.8 \pm 6.3	97.0 \pm 14.8	0	—	—	2	2	1.0
Total fish	78			30			108		
Total samples	7			7				14	
C/f**	11.1			4.3					7.7
1975									
Mar	***	—	—	***	—	—	***	***	***
Apr 17	0	—	—	0	—	—	0	2	0.0
May 22	0	—	—	1	195.0 \pm 0.0	80.0 \pm 0.0	1	2	0.5
Jun 18	21	186.4 \pm 10.7	75.4 \pm 15.1	12	193.5 \pm 5.3	75.6 \pm 5.3	33	2	16.5
Aug 8	16	211.0 \pm 22.6	98.1 \pm 55.4	23	206.8 \pm 12.1	92.8 \pm 21.1	39	2	19.5
Nov 3	23	201.9 \pm 15.6	92.8 \pm 21.0	16	209.4 \pm 11.7	95.3 \pm 17.7	39	2	19.5
Total fish	60			52			112		
Total samples	5			5				10	
C/f	12.0			10.4					11.2
1976									
Apr 7	0	—	—	0	—	—	0	2	0.0
Jun 6	2	215.0 \pm 10.0	92.0 \pm 18.0	1	201.0 \pm 0.0	85.0 \pm 0.0	3	2	1.5
Aug 12	8	208.4 \pm 4.4	105.4 \pm 9.1	27	200.4 \pm 1.7	90.5 \pm 3.6	35	2	17.5
Nov 19	3	217.3 \pm 20.0	116.7 \pm 35.5	0	—	—	3	2	1.5
Total fish	13			28			41		
Total samples	4			4				8	
C/f	3.3			7.0					5.1
1977									
Apr 14	2	188.5 \pm 2.12	67.0 \pm 11.31	0	—	—	2	2	1.0
Jun 11	6	206.0 \pm 5.50	96.0 \pm 7.00	2	211.5 \pm 0.50	58.5 \pm 5.50	8	2	4.0
Aug 26	18	212.4 \pm 3.71	101.2 \pm 6.80	9	211.7 \pm 4.65	105.8 \pm 6.00	27	2	13.5
Nov 23	0	—	—	0	—	—	0	2	0
Total fish	26			11			37		
Total samples	4			4				8	
C/f	6.5			2.8					4.6
1978									
Apr 23	0	—	—	0	—	—	0	2	0.0
Jun 17	1	197.0 \pm 0.0	91.0 \pm 0.0	0	—	—	1	2	0.5
Aug 19, 21	35	204.0 \pm 5.66	98.2 \pm 9.70	0	—	—	35	2	17.5
Nov 19	0	—	—	0	—	—	0	2	0.0
Total fish	36			0			36		
Total samples	4			4				8	
C/f									4.5
1979									
May 5	0	—	—	0	—	—	0	2	0.0
Jul 15	***	—	—	28	164.3 \pm 9.96	65.8 \pm 12.25	28	1	28.0
Aug 18	2	193.0 \pm 3.00	76.0 \pm 8.00	1	192.0 \pm 0.0	77.0 \pm 0.0	3	2	1.5
Dec 9	0	—	—	0	—	—	0	2	0.0
Total fish	2			29			31		
Total samples	3			4				7	
C/f	0.7			7.3					
1980									
Apr 18	0	—	—	0	—	—	0	2	0.0
Jun 12	1	217.0 \pm 0.0	120.0 \pm 0.0	0	—	—	1	2	0.5
Aug 20	0	—	—	7	169.6 \pm 41.44	77.1 \pm 5.60	7	2	3.5
Nov 20	0	—	—	0	—	—	0	2	0.0
Total fish	1			7			8		
Total samples	4			4				8	
C/f	0.3			1.8					1.8
1974-1980									
Total fish	216			157			373		
Total samples	31			32				63	
C/f	7.0			4.9					5.9

*Total length in millimeters; weight is in grams.

**Catch per overnight set.

***No sample collected.

Table 2-45
Catch per Unit Effort (C/F) and Mean Lengths and Weights of Yellow Perch
Collected by Beach Seine, Bally Study Area, 1974-1980

SECTION 23										SECTION 24										SECTION 25									
CATCH ± LENGTH ± SE										CATCH ± LENGTH ± SE										CATCH ± LENGTH ± SE									
C/F										C/F										C/F									
Total										Total										Total									
1974										1975										1976									
May 24	0	0	0	0	0	0	0	0	0	Mar 27	0	0	0	0	0	0	0	0	0	Apr 10	0	0	0	0	0	0	0	0	0
Jun 28	0	0	0	0	0	0	0	0	0	Apr 17	0	0	0	0	0	0	0	0	0	Jun 8	0	0	0	0	0	0	0	0	0
Jul 18	0	0	0	0	0	0	0	0	0	May 19	0	0	0	0	0	0	0	0	0	Aug 11	0	0	0	0	0	0	0	0	0
Aug 26	0	0	0	0	0	0	0	0	0	Nov 16	0	0	0	0	0	0	0	0	0	Nov 16	0	0	0	0	0	0	0	0	0
Sep 21	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0
Nov 7	0	0	0	0	0	0	0	0	0	Nov 25	0	0	0	0	0	0	0	0	0	Nov 25	0	0	0	0	0	0	0	0	0
Nov 7	0	0	0	0	0	0	0	0	0	Nov 26	0	0	0	0	0	0	0	0	0	Nov 26	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0
C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977										1978										1979									
Apr 10	0	0	0	0	0	0	0	0	0	Apr 18	0	0	0	0	0	0	0	0	0	May 3	0	0	0	0	0	0	0	0	0
Apr 17	0	0	0	0	0	0	0	0	0	Jun 16	0	0	0	0	0	0	0	0	0	Jul 13 and 23	0	0	0	0	0	0	0	0	0
May 19	0	0	0	0	0	0	0	0	0	Aug 18	0	0	0	0	0	0	0	0	0	Aug 18	0	0	0	0	0	0	0	0	0
Nov 16	0	0	0	0	0	0	0	0	0	Nov 18	0	0	0	0	0	0	0	0	0	Dec 2	0	0	0	0	0	0	0	0	0
Nov 20	0	0	0	0	0	0	0	0	0	Nov 19	0	0	0	0	0	0	0	0	0	Nov 19	0	0	0	0	0	0	0	0	0
Nov 25	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0
Nov 26	0	0	0	0	0	0	0	0	0	Nov 21	0	0	0	0	0	0	0	0	0	Nov 21	0	0	0	0	0	0	0	0	0
Nov 27	0	0	0	0	0	0	0	0	0	Nov 22	0	0	0	0	0	0	0	0	0	Nov 22	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0
C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980										1981										1982									
Apr 18	0	0	0	0	0	0	0	0	0	Apr 18	0	0	0	0	0	0	0	0	0	Apr 18	0	0	0	0	0	0	0	0	0
Jun 12	0	0	0	0	0	0	0	0	0	Jun 12	0	0	0	0	0	0	0	0	0	Jun 12	0	0	0	0	0	0	0	0	0
Aug 21	0	0	0	0	0	0	0	0	0	Aug 21	0	0	0	0	0	0	0	0	0	Aug 21	0	0	0	0	0	0	0	0	0
Nov 20	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0	Nov 20	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0	Total	0	0	0	0	0	0	0	0	0
C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* Total length in millimeters; weight in grams.
** Catch per seine haul.
*** Samples missed.



Table 2-46

Food Habits of Adult Yellow Perch, Bailly Study Area, 1980

Length Range - 179-217 millimeters
Stomachs Examined - 8
Stomachs Empty - 5

Food Item	Occurrences		Abundance		Volume		Importance Index
	No.	%	No.	%	ml	%	
Unid. fish (juvenile)	3	100.0	3	50.00	1.90	48.71	97.62
Alewife (juvenile)	1	33.3	1	50.00	2.00	51.28	2.38

Table 2-47

Food Habits of Juvenile Yellow Perch, Bailly Study Area, 1980

Length Range - 46-67 millimeters
Stomachs Examined - 25
Stomachs Empty - 13

Food Item	Occurrences		Abundance		Importance Index
	No.	%	No.	%	
Zooplankton					
Bosminidae	4	33.33	14	1.14	0.18
Chydoridae	7	58.33	33	2.68	1.12
Daphnia sp.	10	83.33	407	33.06	55.34
Cladocera	7	58.33	59	4.79	1.43
Caldocera (immature)	1	8.33	0	0.0	0.61
Calanoida	10	83.33	319	25.91	26.99
Cyclopoid	6	50.00	29	2.36	1.09
Copepoda	10	83.33	369	29.98	8.52
Amphipoda	1	8.33	1	0.08	1.23
Other					
Digestive matter	5	41.67	0	0.0	2.64
Sand grains	5	41.67	0	0.0	0.86

2.5.4.2.4 Condition and Parasitism. The condition factor for yellow perch collected during 1980 was slightly lower than those of fish collected during all previous years except 1976 (Table 2-43). Slight differences in yearly condition factors were probably due to the different lengths, weights, and life stages of perch collected (Tables 2-44 and 2-45), rather than effects caused by operation of Bailly Generating Station or construction activities for the Bailly Nuclear-1 facility.



No obvious external parasites were noted on yellow perch during 1980. Parasitic infestations of yellow perch have been discussed previously (Texas Instruments 1975).

2.5.4.3 Spottail Shiner

2.5.4.3.1 Introduction. The spottail shiner is a small cyprinid that belongs to the group of fish collectively referred to as minnows. Spottail shiners inhabit all of the Great Lakes, where they can be found close to the bottom in nearshore water (Hubbs and Lagler 1958; Wells and House 1974). In Lake Michigan, they are most abundant in the southeastern portion of the lake and in Green Bay (unpublished data cited by Wells and House 1974).

2.5.4.3.2 Spatial and Temporal Distribution. Spottail shiner was collected only by beach seine and was found in greatest abundance at Station 25 (Table 2-48). Spottail shiner was collected with beach seine during August. Total catch (C/f) for spottail shiner during 1980 was intermediate with the prior years of monitoring (1974-1979). Catches of spottail shiner during most of the previous years (1974, 1975, 1976, 1978, and 1979) and overall catch rates (1974-1979) were higher at the warm-water station (Station 24), indicating that these fish may prefer the warm-water area. Spottails collected during August 1980 were primarily subadult or adult fish (Table 2-48). During previous years, subadult and adult fish were collected during spring or early summer, and smaller (young-of-the-year or subadult) fish were collected during late summer. Wells (1968) reported that spottail shiner in southeastern Lake Michigan were confined to depths of 12.8 meters (42 feet) in early spring and fall, and to depths of 31.1 to 45.7 meters (102 to 150 feet) in winter. This behavior in the Bailly area would preclude the capture of spottail shiner during these times of year. Wells (1968) also reported that during summer, spottails were usually restricted to depths less than 12.8 meters (42 feet).

2.5.4.3.3 Food Habits. All 11 of the adult spottail shiner stomachs examined during 1979 contained food. The most important food items in stomachs based on frequency of occurrence, percent by number, and the importance index, were aquatic insects (as a whole) (Table 2-49). During previous years, spottail shiners fed on cladocerans, copepods, fish eggs, insects, and plant material



(Texas Instruments 1976, 1977, 1978, 1979, and 1980). Scott and Crossman (1973) reported that juvenile spottail shiners feed primarily on zooplankton (cladocerans, copepods, rotifers) and algae, while adult fish feed on zooplankton, insect nymphs and larvae, molluscs, and fish eggs and larvae.

Table 2-48

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Spottail Shiners Collected by Beach Seine, Bailly Study Area, 1974-1980

Date	Station 23			Station 24			Station 25			Total Catch	Total Samples	C/f
	Catch	Length* ± SE	Weight* ± SE	Catch	Length ± SE	Weight ± SE	Catch	Length ± SE	Weight ± SE			
1974												
May 24	0	---	---	78	54.3 ± 13.8	1.33 ± 1.32	0	---	---	78	3	26.0
Jun 28	0	---	---	1	125 ± 7.0	22.70 ± 0.00	0	---	---	1	3	0.3
Jul	2	18.0 ± 2.8	0.10 ± 0.00	69	20.0 ± 1.8	0.1 ± 0.00	0	---	---	71	3	23.7
Aug 26	0	---	---	62	44.9 ± 13.3	0.89 ± 0.11	38	54.9 ± 23.7	2.26 ± 2.36	120	3	40.0
Sep 21	0	---	---	0	---	---	10	30.1 ± 1.1	0.29 ± 0.07	10	3	3.3
Nov 7	0	---	---	2	31.5 ± 2.1	0.29 ± 0.03	0	---	---	2	3	0.7
Nov 7	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	2			212			68			282		
Total samples	7			7			7				21	
C/f**	0.3			30.3			9.7					13.4
1975												
Mar 27	0	---	---	0	---	---	0	---	---	0	3	0.0
Apr 17	0	---	---	0	---	---	0	---	---	0	3	0.0
May 19	101	42.9 ± 11.8	0.89 ± 1.38	0	---	---	30	46.3 ± 9.4	0.99 ± 0.62	131	3	50.3
Jun 13	210	55.1 ± 5.6	1.57 ± 0.60	594	51.4 ± 6.5	1.23 ± 0.40	10	60.8 ± 24.3	2.70 ± 3.20	814	3	271.3
Aug 8	0	---	---	384	32.4 ± 8.7	0.40 ± 0.30	1014	28.0 ± 9.0	0.21 ± 0.30	1598	3	532.7
Nov 2	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	311			1178			1074			2563		
Total samples	6			6			6				18	
C/f	51.8			196.3			179.0					142.4
1976												
Apr 10	1	40.0 ± 0.0	0.50 ± 0.00	0	---	---	0	---	---	1	3	0.3
Jun 8	7	35.8 ± 3.3	1.60 ± 0.1	1308	56.0 ± 3.7	1.40 ± 0.10	31	54.7 ± 1.3	1.50 ± 0.10	1346	3	315.3
Aug 11	0	---	---	379	29.8 ± 0.9	0.45 ± 0.03	1	21.0 ± 0.0	0.16 ± 0.00	380	3	126.7
Nov 16	0	---	---	1	24.0 ± 0	0.08 ± 0	0	---	---	1	3	0.3
Total fish	8			1887			32			1928		
Total samples	4			4			4				12	
C/f	2.0			471.8			8.0					160.7
1977												
Apr	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 10	0	---	---	18	51.5 ± 1.53	1.08 ± 0.12	1	86.0 ± 0.0	9.0 ± 0.0	19	3	6.3
Aug 26	8	33.3 ± 2.8	0.3 ± 0.6	30	40.9 ± 1.75	0.81 ± 0.16	161	27.1 ± 0.56	0.18 ± 0.01	199	3	66.3
Nov 20	0	---	---	0	---	---	2	90.0 ± 21.20	2.29 ± 2.14	2	3	0.7
Total fish	8			48			164			220		
Total samples	4			4			4				12	
C/f	2.0			12.0			41.0					18.3
1978												
Apr 18	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 16	12	53.3 ± 1.39	1.4 ± 0.11	1260	58.8 ± 3.71	1.7 ± 0.07	16	82.1 ± 4.15	5.8 ± 0.79	2306	3	769.3
Aug 18	0	---	---	46	61.3 ± 1.0	2.1 ± 0.09	7	82.0 ± 5.17	1.7 ± 0.12	53	3	17.7
Nov 18	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	12			2306			23			2361		
Total samples	4			4			4				12	
C/f	8.0			576.5			4.0					196.3
1979												
May 3	0	---	---	0	---	---	0	---	---	0	3	0.0
Jul 15 and 13	0	---	---	717	72.3 ± 1.57	3.1 ± 0.21	66	94.8 ± 1.19	7.65 ± 0.37	783	3	261.0
Aug 16	0	---	---	0	---	---	0	---	---	0	3	0.0
Dec 4	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	0			717			66			783		
Total samples	4			4			4				12	
C/f	0.0			179.3			16.5					65.3
1980												
Apr 18	0	---	---	0	---	---	0	---	---	0	3	0.0
Jun 12	0	---	---	0	---	---	0	---	---	0	3	0.0
Aug 21	92	30.8 ± 0.87	0.29 ± 0.02	132	33.8 ± 0.38	0.32 ± 0.01	600	35.5 ± 8.23	0.43 ± 0.04	824	3	274.7
Nov 20	0	---	---	0	---	---	0	---	---	0	3	0.0
Total fish	92			132			600			824		
Total samples	4			4			4				12	
C/f	23.0			33.0			150.0					68.7
1974-1980												
Total fish	434			6480			2027			7961		
Total samples	33			33			33				99	
C/f	13.8			196.4			61.4					80.3

* Total length in millimeters; weight in grams.
 ** Catch per seine haul.
 *** No standard error calculated.
 **** Sample missed.



Table 2-49

Food Habits of Adult Spottail Shiners, Bailly Study Area, 1980

Length Range - 62-80 millimeters

Stomachs Examined - 11

Stomachs Empty - 0

Food Item	Occurrences		Abundance		Importance Index
	No.	%	No.	%	
Insects					
Corixidae nymph	3	27.27	10	41.67	19.53
Coleoptera	1	9.09	1	4.17	1.36
Hydroptilidae (pupae)	1	9.09	1	4.17	1.82
Chironomus sp. (larvae)	1	9.09	1	4.17	4.54
Chironomidae (pupae)	2	18.18	11	45.83	10.90
Aquatic insect remnants (nymph)	4	36.40	0	0.0	32.70
Aquatic insect remnants (adult)	1	9.09	0	0.0	9.08
Terrestrial insect remnants	2	18.20	0	0.0	9.53
Other					
Digestive matter	4	36.36	0	0.0	10.54

Zooplankton and insects comprised the most important food organism in the stomachs of juvenile spottail shiners (Table 2-50). Of the 25 examined, only 5 were empty, with 45 percent of the stomachs containing chydorid cladocerans and 40 percent containing other cladocerans. The unidentified cladocerans were the most important organisms in the stomachs and although only 20 percent of the stomachs contained corixid insects, these represented the second most important food material.

Table 2-50

Food Habits of Juvenile Spottail Shiner, Bailly Study Area, 1980

Length Range - 29-49 millimeters

Stomachs Examined - 25

Stomachs Empty - 5

Food Item	Occurrences		Abundance		Importance Index
	No.	%	No.	%	
Zooplankton					
Bosminidae	1	5.00	1	0.09	0.05
Bosminidae (immature)	5	25.00	115	10.67	5.65
Chydoridae (immature)	9	45.00	245	22.75	13.62
Daphnia sp.	2	10.00	2	0.19	0.11
Cladocera (immature)	11	55.00	681	65.17	36.14
Copepoda	3	15.00	23	2.13	1.65
Insects					
Corixidae	4	20.00	11	1.02	22.81
Aquatic insect remnants	3	15.00	0	0.0	9.03
Terrestrial insect remnants	2	10.00	0	0.0	6.55
Other					
Digestive matter	4	20.00	0	0.0	4.29
Sand grains	2	10.00	0	0.0	0.11



2.5.4.3.4 Condition and Parasitism. The condition of spottail shiner collected during August 1980 was intermediate within the condition of fish collected during previous years (Table 2-43).

No obvious external parasites were noted on spottails collected during 1980; external parasites found during other years (1974-1976) and possible parasites have been previously discussed by Texas Instruments (1975, 1976, 1977).

2.5.4.4 Salmon and Trout (Salmonidae)

2.5.4.4.1 Introduction. The salmonid species collected during this investigation included the lake trout, steelhead trout, brown trout, and chinook salmon. Generally, these fish occur throughout the Great Lakes (Scott and Crossman 1973), where they are highly prized and avidly sought by sport fishermen. All of the salmonids collected during this study, except lake trout, are exotic species which have been introduced into the waters of the Great Lakes.

All salmonid populations, including the indigenous lake trout, are maintained through stocking programs initiated by various governmental agencies of the lake states and provinces. Within the Indiana waters of Lake Michigan, these fish are stocked solely by the Indiana Department of Natural Resources (DNR). The Indiana DNR began its stocking program in 1967 when the Bureau of Sport Fisheries and Wildlife provided 87,000 lake trout for stocking off the Bethlehem Steel pier within the entrance channel of the Port of Indiana [personal communication, Bob Koch, Indiana DNR (1976)]; since that initial planting, the DNR has increased the number of lake trout planted and has broadened its program by stocking trout at several other locations. Lake trout were stocked in response to their rapid decline and near extinction in the 1950s because of predation by sea lamprey followed by complete failure of natural reproduction (Smith 1968). Koch (personal communication) states that even now, natural reproduction of lake trout is not confirmed anywhere in Lake Michigan. Stocking of lake trout was followed by plantings of steelhead trout in 1968, coho and chinook salmon in 1970, and brown trout in 1971. All these salmonids have been planted as fingerlings in the east branch of the Little Calumet River where they remain for varying periods of time, depending of the species, before migrating to the lake. This was probably the source of many of the salmonids



collected during the Bailly study. Once in the lake, however, they are largely unavailable to capture in nearshore nets since they inhabit various depths of the open lake. When mature, these fish return to congregate in large schools at the mouth of their natal streams before "running" upstream to spawn. At this time, they are vulnerable to capture by net in the near-shore water.

Spawning runs generally occur from early fall to late winter, depending on the strain or race of the stocked fish. Natural reproduction does occur, but only in streams, and for some species only on a limited basis (Koch, personal communication). Koch (personal communication) has stated that there has been no evidence that any of these species spawn in the Indiana waters of Lake Michigan, but there has been evidence of limited natural reproduction by coho and chinook salmon and steelhead trout in the east branch of the Little Calumet River and in Trail Creek; additionally, he has stated that there is evidence of successful natural reproduction by brown trout spawning in the east branch.

Since there is only limited natural reproduction of these fish, their abundance in the study area is governed largely by the number of each species stocked by the DNR and their survival and return rates. The return rates range from 1 to 6 percent, depending on the species stocked and the year of stocking (Koch, personal communication). However, strict computation of abundance in the study area based on these percentages is often misleading, since faster-maturing male salmonids return before slower-maturing females stocked during the same year; therefore, any fluctuation in yearly relative abundances presented for these species in the following discussions should be reviewed in the light of these factors. Specific spawning activities for all of the salmonids except lake trout have been deleted, since these species spawn in streams and would not likely be affected by the construction or operation of the Bailly Nuclear-1 plant.

2.5.4.4.2 Spatial and Temporal Distribution. Salmonids were collected in greatest abundance by gill net during August 1980. Salmonids were collected in overall equal abundance at both of the stations (combining Tables 2-51 through 2-55).



Table 2-51

Catch per Unit Effort (C/E) and Mean Lengths and Weights of Chinook Salmon
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4				Station 7				Total Catch	Total Samples	C/E
	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE		Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE				
1974											
May 26	0	-	-		0	-	-		0	2	0.0
Jun	0	-	-		0	-	-		0	2	0.0
Jul	0	-	-		2	955.0 \pm 11.3	10457.0 \pm 1560.5		2	2	1.0
Aug	3	880.0 \pm 50.0	8791 \pm 1052.0		6	916.2 \pm 51.1	10074.0 \pm 3207.0		9	2	4.5
Oct 4	1	900.0 \pm 0.0	9194.0 \pm 0.0		2	717.0 \pm 68.6	4483.0 \pm 883.2		3	2	1.5
Oct 24	0	-	-		0	-	-		0	2	0.5
Nov 8	0	-	-		0	-	-		0	2	0.5
Total fish	4				10				14		
Total samples	7				7					14	
C/E**	0.6				1.4						1.0
1975											
Mar	***	-	-		***	-	-		***	***	***
Apr 17	0	-	-		0	-	-		0	2	0.0
May 22	0	-	-		0	-	-		0	2	0.0
Jun 18	0	-	-		0	-	-		0	2	0.0
Aug 8	0	-	-		2	869.0 \pm 1.4	8207.0 \pm 1040.8		2	2	1.0
Nov 3	0	-	-		0	-	-		0	2	0.0
Total fish	0				2				2		
Total samples	5				5					10	
C/E	0.0				0.4						0.2
1976											
Apr 7	2	776.0 \pm 121.0	5603.0 \pm 1547.0		0	-	-		2	2	1.0
Jun 6	0	-	-		0	-	-		0	2	0.0
Aug 12	0	-	-		0	-	-		0	2	0.0
Nov 19	0	-	-		0	-	-		0	2	0.0
Total fish	2				0				2		
Total samples	4				4					8	
C/E	0.5				0.0						0.3
1977											
Apr 14	18	556.6 \pm 163.63	2204.2 \pm 1792.78		9	627.8 \pm 129.73	2842.6 \pm 1980.55		27	2	13.5
Jun 11	0	-	-		0	-	-		0	2	0.0
Aug 26	1	745 \pm 0.0	4717.4 \pm 0.0		1	715 \pm 0.0	4536 \pm 0.0		2	2	1.0
Nov 23	0	-	-		0	-	-		0	2	0.0
Total fish	19				10				29		
Total samples	4				4					8	
C/E	4.8				2.5						3.6
1978											
Apr 23	7	602.7 \pm 91.40	3411.3 \pm 1012.15		0	-	-		7	2	3.5
Jun 17	0	-	-		0	-	-		0	2	0.0
Aug 19, 21	5	861.6 \pm 26.10	6537.6 \pm 488.97		2	758.0 \pm 24.0	4721.5 \pm 272.5		7	2	3.5
Nov 19	0	-	-		0	-	-		0	2	0.0
Total fish	12				2				14		
Total samples	4				4					8	
C/E	3.0				0.5						1.8
1979											
May 5	7	506.1 \pm 86.75	2043.0 \pm 921.68		5	514.8 \pm 95.96	3323.0 \pm 396.67		12	2	6.0
Jul 15	***	-	-		0	-	-		0	1	0.0
Aug 18	0	-	-		1	869.0 \pm 0.0	6990.0 \pm 0.0		1	2	0.5
Dec 6	0	-	-		0	-	-		0	2	0.0
Total fish	7				6				13		
Total samples	3				4					7	
C/E	2.3				1.5						1.9
1980											
Apr 18	0	-	-		3	556.7 \pm 117.9	2409.7 \pm 1046.0		3	2	1.5
Jun 12	1	694.0 \pm 0.0	3849.0 \pm 0.0		0	-	-		1	2	0.5
Aug 20	0	-	-		1	845.0 \pm 0.0	6594.0 \pm 0.0		1	2	0.5
Nov 20	0	-	-		0	-	-		0	2	0.0
Total fish	1				4				5		
Total samples	4				4					8	
C/E											0.6
1974-1980											
Total fish	45				34				79		
Total samples	31				32					63	
C/E	1.5				1.1						1.3

*Total length in millimeters; weight is in grams.

**Catch per overnight set.

***No sample collected.



Table 2-52

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Lake Trout
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4				Station 7				Total Catch	Total Samples	C/f
	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE		Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE				
1974											
May 26	1	741.0 \pm 0.0	4500 \pm 0.0	0	-	-	-	1	2	0.5	
Jun	0	-	-	0	-	-	-	0	2	0.0	
Jul	0	-	-	2	688.5 \pm 77.1	3693.0 \pm 1180.8	-	2	2	1.0	
Aug	0	-	-	0	-	-	-	0	2	0.0	
Oct 4	21	678.0 \pm 43.7	3185.0 \pm 679.0	40	679.0 \pm 59.2	3385.0 \pm 1156.0	-	61	2	0.0	
Oct 24	35	694.0 \pm 56.6	3430.0 \pm 56.6	13	659.0 \pm 37.0	3071.0 \pm 461.0	-	48	2	24.0	
Nov 8	18	659.0 \pm 61.9	2761.0 \pm 696.1	4	675.0 \pm 31.6	3028.0 \pm 412.8	-	22	2	11.0	
Total fish	75			59				134			
Total samples	7			7					14		
C/f**	10.7			8.4						9.6	
1975											
Mar	***	-	-	***	-	-	-	***	***	***	
Apr 17	0	-	-	1	691.0 \pm 0.0	4047.0 \pm 0.0	-	1	2	0.5	
May 22	2	674.0 \pm 14.1	3353.5 \pm 20.5	0	-	-	-	2	2	1.0	
Jun 18	2	736.5 \pm 37.5	4287.5 \pm 340.1	0	-	-	-	2	2	1.0	
Aug 8	0	-	-	0	-	-	-	0	2	0.0	
Nov 3	28	674.3 \pm 65.1	3012.8 \pm 1032.4	20	689.1 \pm 55.3	3256.5 \pm 289.3	-	48	2	24.0	
Total fish	32			21				53			
Total samples	5			5					10		
C/f	6.4			4.2						5.3	
1976											
Apr 7	0	-	-	0	-	-	-	0	2	0.0	
Jun 6	0	-	-	0	-	-	-	0	2	0.0	
Aug 12	0	-	-	0	-	-	-	0	2	0.0	
Nov 19	3	589.7 \pm 95.6	2018.7 \pm 848.0	2	751.0 \pm 127.3	4160.0 \pm 2440.9	-	5	2	2.5	
Total fish	3			2				5			
Total samples	4			4					8		
C/f	0.8			0.5						0.6	
1977											
Apr 14	4	638.0 \pm 34.92	2837.3 \pm 417.13	11	669.5 \pm 66.11	3236.5 \pm 957.22	-	15	2	7.5	
Jun 11	0	-	-	0.0	-	-	-	0	2	0.0	
Aug 26	0	-	-	0.0	-	-	-	0	2	0.0	
Nov 23	1	728.0 \pm 0.0	3541.0 \pm 0.0	0.0	-	-	-	1	2	0.5	
Total fish	5			11				16			
Total samples	4			4					8		
C/f	1.3			2.8						2.0	
1978											
Apr 23	2	592.0 \pm 5.00	2531.0 \pm 34.0	0	-	-	-	2	2	1.0	
Jun 17	6	643.7 \pm 31.83	3447.3 \pm 562.87	0	-	-	-	6	2	3.0	
Aug 19, 21	11	681.8 \pm 14.84	2868.4 \pm 221.30	8	638.3 \pm 17.93	3326.8 \pm 256.50	-	19	2	9.5	
Nov 19	41	679.9 \pm 8.87	3100.0 \pm 120.67	42	686.6 \pm 9.12	3129.3 \pm 144.57	-	83	2	41.5	
Total fish	60			50				110			
Total sample	4			4					8		
C/f	15.4			12.5						13.8	
1979											
May 3	2	684.3 \pm 1.0	3405.0 \pm 45.00	5	677.0 \pm 25.45	3323.0 \pm 396.67	-	7	2	3.5	
Jul 15	***	-	-	0	-	-	-	0	2	0.0	
Aug 18	0	-	-	0	-	-	-	0	2	0.0	
Dec 6	0	-	-	1	642.0 \pm 0.0	2850.0 \pm 0.0	-	1	2	0.5	
Total fish	2			6				8			
Total samples	3			3					7		
C/f	0.7			1.5						1.1	
1980											
Apr 18	0	-	-	0	-	-	-	0	2	0.0	
Jun 12	1	525 \pm 0.0	1540 \pm 0.0	0	-	-	-	1	2	0.5	
Aug 20	27	654 \pm 9.59	2868.9 \pm 138.3	30	828.6 \pm 163.11	2892.3 \pm 134.53	-	37	2	28.5	
Nov 20	10	690 \pm 17.49	2931.1 \pm 262.6	13	676.7 \pm 24.67	2925.8 \pm 318.70	-	23	2	11.5	
Total fish	38			43				81			
Total samples	4			4					8		
C/f	9.5			10.8						10.2	
1974-1980											
Total fish	215			192				407			
Total samples	31			32					63		
C/f	6.9			6.0						6.5	

*Total length in millimeters; weight is in grams.

**Catch per overnight set.

***No sample collected.



Table 2-53

Catch per Unit Effort (C/E) and Mean Lengths and Weights of Brown Trout
Collected by Gill Net. Bailly Study Area, 1974-1980

Date	Catch	Station 4		Catch	Station 7		Total Catcl.	Total Samples	C/E
		\bar{x} Length \pm SE	\bar{x} Weight \pm SE		\bar{x} Length \pm SE	\bar{x} Weight \pm SE			
1974									
May 26	2	498.0 \pm 9.9	1910.5 \pm 99.7	0			2	2	1.0
Jun	1	595.0 \pm 0.0	3545.0 \pm 0.0	2	504.5 \pm 7.8	2042.5 \pm 160.5	3	2	1.5
Jul	1	508.0 \pm 0.0	1896.0 \pm 0.0	0			1	2	0.5
Aug	0			0			0	2	0.0
Oct 4	0			0			0	2	0.0
Oct 24	3	603.0 \pm 160.7	3431.0 \pm 2188.0	0			3	2	1.5
Nov 18	0			2	474.0 \pm 157.7	2023.0 \pm 1260.0	2	2	1.0
Total fish	7			4			11		
Total samples	7			7				14	
C/E**	1.0			0.6					0.8
1975									
Mar	***			***			***	0	***
Apr 17	2	325.8 \pm 7.1	436.5 \pm 62.9	2	382.5 \pm 219.9	1139.5 \pm 1430.4	4	2	2.0
May 22	0			0			0	2	0.0
Jun 18	0			0			0	2	0.0
Aug 18	0			2	600.0 \pm 127.3	3290.0 \pm 2194.1	2	2	1.0
Nov 13	1	420.0 \pm 0.0	772.5 \pm 0.0	2	395.0 \pm 127.3	847.0 \pm 664.5	3	2	1.5
Total fish	3			6			9		
Total samples	5			5				10	
C/E	0.6			1.2					0.9
1976									
Apr 7	4	491.5 \pm 39.8	1593.3 \pm 395.5	2	479.0 \pm 52.0	1471.5 \pm 537.5	6	2	3.0
Jun 6	0			0			0	2	0.0
Aug 12	1	704.0 \pm 0.0	4981.0 \pm 0.0	0			1	2	0.5
Nov 19	0			0			0	2	0.0
Total fish	5			2			7		
Total samples	4			4				8	
C/E	1.3			0.5					0.9
1977									
Apr 14	1	755.0 \pm 0.0	4217.0 \pm 0.0	0			1	2	0.5
Jun 11	0			0			0	2	0.0
Aug 26	0			1	592.0 \pm 0.0	3521.0 \pm 0.0	1	2	0.5
Nov 23	0			0			0	2	0.0
Total fish	1			1			2		
Total samples	4			4				8	
C/E	0.3			0.3					0.3
1978									
Apr 23	6	536.5 \pm 23.36	2223.2 \pm 254.0	3	429.0 \pm 25.51	1210.7 \pm 170.49	9	2	4.5
Jun 17	1	432.0 \pm 0.0	1678.0 \pm 0.0	1	555.0 \pm 0.0	3402.0 \pm 0.0	2	2	1.0
Aug 19, 21	8	463.8 \pm 43.81	1489.5 \pm 415.98	2	476.0 \pm 89.0	1248.3 \pm 567.50	10	2	5.0
Nov 19	2	437.5 \pm 30.50	1154.5 \pm 158.50	0			2	2	1.0
Total fish	17			6			23		
Total samples	4			4				8	
C/E	4.3			1.5					2.9
1979									
May 5	3	469.7 \pm 34.81	1543.7 \pm 476.85	1	535.0 \pm 0.0	2088.0 \pm 0.0	4	2	2.0
Jul 15	***			0			0	1	0.0
Aug 18	1	570.0 \pm 0.0	3080.0 \pm 0.0	1	527.0 \pm 0.0	2245.0 \pm 0.0	2	2	1.0
Dec 6	1	482.0 \pm 0.0	1575.0 \pm 0.0	1	464.0 \pm 0.0	1600.0 \pm 0.0	2	2	1.0
Total fish	5			3			8		
Total samples	3			4				7	
C/E	1.7			0.8					1.1
1980									
Apr 18	1	374 \pm 0.0	566.0 \pm 0.0	0			1	2	0.5
Jun 12	2	545 \pm 36.0	2603.5 \pm 339.5	0			2	2	1.0
Aug 20	3	580 \pm 5.0	3248.3 \pm 197.9	1	554 \pm 0.0	2745 \pm 0.0	4	2	1.0
Nov 20	0			0			0	2	0.0
Total fish	6			1			7		
Total samples	4			4				8	
C/E	1.5			.25					0.9
1974-1980									
Total fish	44			23			67		
Total samples	31			32				63	
C/E	1.4			0.7					1.1

*Total length in millimeters; weight is in grams.

**Catch per overnight set.

***No sample collected.



Table 2-54

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Steelhead Trout
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4			Station 7			Total Catch	Total Samples	C/f
	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE			
1974									
May 26	2	536.5 \pm 41.7	1556.5 \pm 440.5	1	191.0 \pm 0.0	68.0 \pm 0.0	3	2	1.5
Jun	0	-	-	0	-	-	0	2	0.0
Aug	3	773.0 \pm 14.7	5065.7 \pm 614.0	0	-	-	3	2	1.5
Oct 4	0	-	-	0	-	-	0	2	0.0
Oct 24	2	398.0 \pm 16.9	679.0 \pm 120.2	6	385.0 \pm 15.3	-	8	2	4.0
Nov 18	17	406.0 \pm 27.6	702.0 \pm 118.3	6	385.0 \pm 15.7	-	23	2	11.5
Total fish	24			13			37		
Total samples	7			7				14	
C/f **	3.4			1.9					2.6
1975									
Mar	***	-	-	***	-	-	***	***	***
Apr 17	0	-	-	0	-	-	0	2	0.0
May 22	0	-	-	0	-	-	0	2	0.0
Jun 18	0	-	-	0	-	-	0	2	0.0
Aug 18	0	-	-	0	-	-	0	2	0.0
Nov 13	3	350.3 \pm 62.2	381.4 \pm 112.5	0	-	-	3	2	1.5
Total fish	3			0			3		
Total samples	5			5				10	
C/f	0.6			0.0					0.3
1976									
Apr 9	0	-	-	0	-	-	0	2	0.0
Jun 6	0	-	-	0	-	-	0	2	0.0
Aug 12	0	-	-	0	-	-	0	2	0.0
Nov 19	0	-	-	0	-	-	0	2	0.0
Total fish	0			0			0		
Total samples	4			4				8	
C/f	0.0			0.0					0.0
1977									
Apr 14	0.0	-	-	0.0	-	-	0	2	0.0
Jun 11	0.0	-	-	0.0	-	-	0	2	0.0
Aug 26	0.0	-	-	0.0	-	-	0	2	0.0
Nov 23	0.0	-	-	1	491.0 \pm 0.0	1725.0 \pm 0.0	1	2	0.5
Total fish	0.0			1			1		
Total samples	4			4				8	
C/f	0.0			0.3					0.1
1978									
Apr 23	1	469.0 \pm 0.0	1249.0 \pm 0.0	0	-	-	1	2	0.5
Jun 17	3	610.3 \pm 79.32	3386.7 \pm 813.78	0	-	-	3	2	1.5
Aug 19, 21	4	703.0 \pm 25.08	3121.35 \pm 567.50	0	-	-	4	2	2.0
Nov 19	0	-	-	0	-	-	0	2	0.0
Total fish	8			0			8		
Total samples	4			4				8	
C/f	2.0			0					1.0
1979									
May 5	0	-	-	0	-	-	0	2	0.0
Jul 15	***	-	-	1	738.0 \pm 0.0	4250.0 \pm 0.0	1	1	1.0
Aug 18	0	-	-	0	-	-	0	2	0.0
Dec 6	2	627.0 \pm 11.00	3200.0 \pm 150.00	0	-	-	2	2	1.0
Total fish	2			1			3		
Total samples	3			4				7	
C/f	0.7			0.3					0.4
1980									
Apr 18	0	-	-	0	-	-	0	2	0.0
Jun 12	0	-	-	0	-	-	0	2	0.0
Aug 20	0	-	-	0	-	-	0	2	0.0
Nov 20	0	-	-	0	-	-	0	2	0.0
Total fish	0			0			0		
Total samples	4			4				8	
C/f	0.0			0.0					0.0
1974-1980									
Total fish	38			22			60		
Total samples	31			32				63	
C/f	1.2			0.7					0.9

*Total length in millimeters; weight in grams.

**Catch per overnight set.

***No sample collected.



Table 2-55

Catch per Unit Effort (C/f) and Mean Lengths and Weights of Coho Salmon
Collected by Gill Net, Bailly Study Area, 1974-1980

Date	Station 4				Station 7				Total Catch	Total Samples	C/f
	Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE		Catch	\bar{x} Length \pm SE	\bar{x} Weight \pm SE				
1974											
May 26	0	-	-		0	-	-		0	2	0.0
Jun	0	-	-		0	-	-		0	2	0.0
Jul	0	-	-		0	-	-		0	2	0.0
Aug	0	-	-		0	-	-		0	2	0.0
Oct 4	0	-	-		1	640.0 \pm 0.0	2838.0 \pm 0.0		1	2	0.5
Oct 24	1	745.0 \pm 0.0	5037.0 \pm 0.0		0	-	-		1	2	0.5
Nov 8	0	-	-		0	-	-		0	2	0.0
Total fish	1				1				2		
Total samples	7				7					14	
C/f**	0.1				0.1						0.1
1975											
Mar	***	-	-		***	-	-		***	***	***
Apr 17	31	450.1 \pm 135.8	1154.1 \pm 828.2		14	462.9 \pm 20.4	883.3 \pm 112.8		45	2	22.5
May 22	1	379.0 \pm 0.0	496.0 \pm 0.0		0	-	-		1	2	0.5
Jun 18	0	-	-		0	-	-		0	2	0.0
Aug 8	0	-	-		0	-	-		0	2	0.0
Nov 3	1	698.0 \pm 0.0	3098.0 \pm 0.0		0	-	-		1	2	0.5
Total fish	33				14				47		
Total samples	5				5					10	
C/f	6.6				2.8						4.7
1976											
Apr 7	0	-	-		1	428.0 \pm 0.0	792.0 \pm 0.0		1	2	0.5
Jun 6	0	-	-		0	-	-		0	2	0.0
Aug 17	0	-	-		0	-	-		0	2	0.0
Nov 19	0	-	-		0	-	-		0	2	0.0
Total fish	0				1				1		
Total samples	4				4					8	
C/f	0.0				0.3						0.1
1977											
Apr 14	1	411 \pm 0.0	538 \pm 0.0		7	499.1 \pm 42.08	1023.0 \pm 105.04		8	2	4.0
Jun 11	0	-	-		0	-	-		0	2	0.0
Aug 26	0	-	-		0	-	-		0	2	0.0
Nov 23	0	-	-		0	-	-		0	2	0.0
Total fish	1				7				8		
Total samples	4				4					8	
C/f	0.3				1.8						1.0
1978											
Apr 23	8	488.5 \pm 9.70	1390.4 \pm 66.30		3	470.7 \pm 22.92	1112.3 \pm 112.00		11	2	5.5
Jun 17	2	520.5 \pm 37.50	1746.5 \pm 385.50		9	576.8 \pm 9.17	2424.2 \pm 130.04		11	2	5.5
Aug 19, 21	0	-	-		0	-	-		0	2	0.0
Nov 19	1	305.0 \pm 0.0	298.0 \pm 0.0		0	-	-		1	2	0.5
Total fish	11				12				23		
Total samples	4				4					8	
C/f	2.8				3.0						2.9
1979											
May 5	0	-	-		0	-	-		0	2	0.0
Jul 15	***	-	-		0	-	-		0	1	0.0
Aug 18	0	-	-		0	-	-		0	2	0.0
Dec 5	0	-	-		0	-	-		0	2	0.0
Total fish	0				0				0		
Total samples	3				4					7	
C/f	0.0				0.0						0.0
1980											
Apr 18	0	-	-		6	504.0 \pm 7.9	1056.7 \pm 77.5		6	2	3.0
Jun 12	0	-	-		1	567.0 \pm 0.0	1902.0 \pm 0.0		1	2	0.5
Aug 20	2	710 \pm 35.0	3778 \pm 184.0		1	716.0 \pm 0.0	3962.0 \pm 0.0		3	2	
Nov 20	2	217 \pm 1.0	89 \pm 4.24		1	422.0 \pm 0.0	928.0 \pm 0.0		3	2	
Total fish	4				9				13		
Total samples	4				4					8	
C/f	1.0				2.3						1.6
1974-1980											
Total fish	50				44				94		
Total samples	31				32					63	
C/f	1.6				1.4						1.5

*Total length in millimeters; weight in grams.

**Catch per overnight set.

***No sample collected.



Overall (1974-1980) salmonid catches were higher at Station 4 (warm water station) than at Station 7. High catches of lake trout, the most numerous salmonid in the study area, usually occurred during the cooler fall months; however, highest 1980 catches were in August. Highest catches of other salmonids usually occurred during spring and summer but in 1980 catches were also highest for the other salmonids in summer and fall.

No salmonids were collected by beach seine during 1980. Brown trout have been collected by beach seine in 1974 and 1979; chinook salmon in 1974, 1975, 1977, and 1978; and steelhead trout in 1974.

Mean total lengths of salmonids collected during 1980 were similar to those in previous years.

2.5.4.4.3 Food Habits. Most of the salmonid stomachs examined during 1980 were lake trout. These evaluations were to determine the food habits of adult salmonids collected during 1980. Adult salmonids fed almost exclusively on fish, some of which were identified as alewife, rainbow smelt, and sculpin (Table 2-56). The most important food was rainbow smelt. Seven juvenile chinook salmon examined from 1978 indicated insects were the primary food item in the diet (Texas Instruments 1979a). Data presented for fish collected during 1979 were consistent with those of previous years (Texas Instruments 1976a, 1977, 1978, 1979a).

Table 2-56
Food Habits of Adult Salmonids, Bailly Study Area, 1980

Length Range - 509-845 millimeters
Stomachs Examined - 15
Stomachs Empty - 1

Food Item	Occurrence		Abundance		Volume		Importance Index
	No.	%	No.	%	ml	%	
Fish							
Unid. Fish	4	28.57	1	2.04	9.9	3.91	14.25
Alewife	1	7.14	3	6.12	28.0	11.06	1.12
Alewife	5	35.71	6	12.24	131.7	52.01	4.75
Rainbow smelt	7	50.00	8	16.33	72.0	28.44	43.58
Cottus sp. (juvenile)	1	7.14	1	2.04	1.6	0.63	0.56
Insects							
Coleoptera	2	14.29	5	10.20	1.2	0.47	6.15
Lepidoptera	1	7.14	25	51.02	3.8	.50	0.56
Lepidoptera	1	7.14	0	0.0	0.0	0.0	0.56
Other							
Digestive matter	2	14.29	0	0.0	5.0	1.97	28.49



2.5.4.4.4 Condition and Parasitism. The mean condition factor for brown trout collected during 1980 was similar to that of 1979 and highest of all years. The mean condition factor observed for lake trout was lower than 1979 but similar to all prior years (Table 2-39). Chinook salmon condition factors were similar to condition factors of fish collected during previous years. No steelhead were collected during 1980. No external parasites were observed on salmonids collected during 1980.

2.5.4.5 Other Species. No other fish species were collected by gill net during 1980 in the vicinity of the Bailly study area.

2.5.5 COMMERCIAL AND SPORT FISHING. Commercial and sport fishermen have been active in the Bailly Generating Station vicinity. Texas Instruments (1975), 1976) reported that three commercial fishermen used the Bailly area in 1974 and 1975, fishing primarily for yellow perch. There was only one commercial operation in the Bailly area in 1976 and 1977, and apparently no commercial fishermen have operated in the area since 1977. Past commercial fishing records for the Indiana water of Lake Michigan indicated that yellow perch was the dominant species taken (Table 2-57). This single commercial fishing operation during 1976 and 1977 was conducted from Burns Ditch by a single gill net tug, the STELLA POLARIS, owned by the Westerman Brothers. They set their nets at varying depths and locations, depending on the time of year, but did not set nets within the 15.2-meter (50-foot) depth contour. Thus, their fishing operation was excluded from the Bailly study area.

Table 2-57

Lake Michigan Commercial Fishery* Reported Catch in Pounds (1970-1980)

Species	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Lake trout	8,079	25,790	13,903	8,400	8,003	12,929	5,651	1,541	405	306	199
Brown trout	-	-	-	9	72	53	29	87	69	154	-
Steelhead	-	-	-	-	13	-	-	-	-	-	-
Coho	3,227	5,083	1,157	218	12	1,050	116	1,036	1,679	341	844
Chinook	-	-	-	9	4	29	-	64	59	-	-
Chubs	74,390	28,489	38,262	35,668	4,401	910	1,641	1,244	8,619	596	2,515
Whitefish	3,816	22,636	999	868	111	172	155	600	890	302	1,059
Suckers	31,698	208,984	17,659	12,255	8,013	8,269	4,041	2,183	3,511	2,692	6,425
Yellow perch	205,764	333,850	340,607	257,883	176,338	153,799	176,286	155,810	91,988	120,388	174,403
Smelt	239	43,642	9,466	**	16,418	7,852	5,463	1,365	3,770	1,195	2,259
Burbot	-	-	-	-	-	-	-	-	-	1.5	-
Catfish	-	-	-	-	-	-	-	-	-	3	10
Total production	334,600	784,855	428,473	352,000	213,385	185,063	193,382	156,439	111,341	126,578	187,714

* Indiana Dept. Nat. Resources (1979).

** Error on printout.



Fishing is a highly popular sport in the Bailly vicinity and in all nearshore Indiana waters of Lake Michigan. Texas Instruments' field crews have observed many boats trolling in the Bailly study area and in the vicinity of the Bailly Generating Station discharge. Other fishermen have been observed along the flume structure, where bow hunting for carp and hook-and-line fishing for carp, salmonids, and catfish are popular. The Indiana water of Lake Michigan has seven access sites with boat-launching ramps; three are located along Burns Ditch, two are in Michigan City, one is in Gary, and one is in East Chicago. Additionally, the Port of Indiana was recently opened to shoreline fishing on a limited basis. Sport fishermen from these areas primarily fish for salmonids (coho and chinook salmon, and lake, steelhead, and brown trout), yellow perch, and smallmouth bass. The total sport catch from Indiana waters of Lake Michigan in 1975 was 83.8 percent coho salmon, 5.0 percent chinook salmon, 4.0 percent yellow perch, 3.9 percent lake trout, 2.1 percent steelhead trout, 1.0 percent brown trout, and 0.2 percent smallmouth bass (Koch 1975).

2.5.6 POTENTIAL DISRUPTION OF RARE AND ENDANGERED SPECIES. Fish considered to be endangered or threatened in Indiana are listed in Table 2-58. Specimens denoted with an asterisk were listed by J.L. Janisch, fisheries staff specialist, Indiana Department of Natural Resources. Those specimens bearing two asterisks also were listed by Janisch and are recognized by Miller (1972) as well. Those specimens having three asterisks were not noted by Janisch but are considered rare or endangered in Lake Michigan by Miller (1972).

None of the fish species collected in the Bailly study area were identified by Janisch as endemic to Indiana or considered indigenous to Indiana waters of Lake Michigan. Of the species known to be endangered in Lake Michigan but not on the Indiana list, only lake sturgeon has been collected in impingement studies at Lake Michigan power plants; none were found to be either impinged or entrained at the Bailly Generating Station during the Texas Instruments 316(b) study (1976) or collected in gill nets or beach seines. The five coregonid species listed are deep-water forms and are not expected in the shallow waters of the Bailly Generating Station vicinity.



Table 2-58

Rare, Endangered, or Threatened Fish Species in Indiana

Eastern sand darter*	<u>Ammocrypta pellucida</u>
Spring cavefish*	<u>Chologaster agassizi</u>
Northern cavefish**	<u>Amblyopsis spelaea</u>
Southern cavefish**	<u>Typhlichthys subterreaneus</u>
Silverband shiner*	<u>Notropis shumardi</u>
Ribbon shiner*	<u>Notropis fumeus</u>
Popeye shiner*	<u>Notropis ariommus</u>
Crystal darter*	<u>Ammocrypta asprella</u>
Stargazing darter*	<u>Percina uranidea</u>
Gilt darter*	<u>Percina evides</u>
Spotted darter*	<u>Etheostoma maculatum</u>
Harlequin darter*	<u>Etheostoma histrio</u>
Tippecanoe darter*	<u>Etheostoma tippecanoe</u>
Spottail darter*	<u>Etheostoma squamiceps</u>
Redside dace*	<u>Clinostomus elongatus</u>
Rosefin shiner*	<u>Notropis ardens</u>
Swamp darter*	<u>Etheostoma swaini</u>
Blue sucker**	<u>Cycleptus elongatus</u>
Ohio River muskellunge**	<u>Esox masquinongy ohioensis</u>
Bluebreast darter*	<u>Etheostoma camurum</u>
Variegated darter*	<u>Etheostoma variatum</u>
Lake sturgeon**	<u>Acipenser fulvescens</u>
Longjaw cisco**	<u>Coregonus alpenae</u>
Kiyi***	<u>Coregonus kiyi</u>
Shortjaw cisco***	<u>Coregonus zenithicus</u>
Blackfin cisco***	<u>Coregonus nigripinnis</u>
Shortnose cisco***	<u>Coregonus reighardi</u>

*According to Janisch 1976 (see text).
**According to Janisch (1976) and Miller (1972).
***Rare and endangered in Lake Michigan (Miller 1972).

2.6 WATER QUALITY

2.6.1 INTRODUCTION. As discussed in previous annual reports, the Great Lakes have been a focal point of scientific interest since the 1800s because, as stated by Beeton (1970), they represent "the most important single factor for the settlement, growth and development of the mid-continent of North America." Multiple-purpose use of the lake waters has created a number of problems since the 1800s including collapse of fisheries, changes in species composition of primary and secondary trophic level organisms, and changes in water quality.



With the realization that change was occurring came the establishment of water quality standards for Lake Michigan and other lakes. These standards will be used as the reference base herein. Criteria for Lake Michigan and other water bodies in Indiana are listed in Table 2-59.

In the present study, Lake Michigan water quality was characterized through the analyses of five major groups of parameters, as listed in Table 2-60.

Samples were collected during 5 months over the period of April 1980 through January 1981. Data derived from these samples will be compared with data collected during the previous survey years and with the Lake Michigan water quality standards (as outlined in Table 2-59).

2.6.2 METHODOLOGY. All water quality samples in the Bailly study area were taken in duplicate using a 6-liter Van Dorn sampler (for water samples), a J-Z sterile water sampler (for bacteria samples), and an Ekman dredge (for sediment samples). Samples from the ash-settling basins (stations 13 through 16), the natural ponds (stations 17 through 20), and Cowles Bog (Station 21) were collected at mid-depth (sediment samples were from the substrate). Lake Michigan samples from locations along the 15-foot contour (stations 1, 4, 7, and 10) were collected from 1 meter below the surface. Lake samples along the 30-foot contour (stations 2, 5, and 8) were collected 1 meter below the surface and 1 meter above the bottom, and lake samples along the 50-foot contour were collected 1 meter below the surface, at mid-depth, and 1 meter above the bottom. Samples at stations 11, 12, and 22 were taken from 1 meter below the surface.

During the summer and fall of 1980 the ash-settling basins were being drained and lined by NIPSCO. As a result, sampling of the four stations in these ponds and the two stations in Pond B varied between sampling periods. During April, all stations were sampled; however, in June, August, and November, no samples could be collected at ash-settling pond stations 14 and 15. In August and November, Pond B was dry (stations 17 and 18) with no samples collected.

All samples were preserved and processed following Standard Methods (APHA 1975 and EPA 1973) techniques. Table 2-60 lists the sample locations, method, and accuracy of individual analyses performed during the study.



Table 2-59

Water Quality Values Defined by the Indiana Stream Pollution Control Board, or USEPA and Applicable to Lake Michigan in the NIPSCO Bailly Study Area

General Water Quality	Units	Indiana, USEPA or EPA Levels
Alkalinity	mg/l	30-500 range, whatever is of natural origin**
Calcium	mg/l	No limits defined
Chlorides	mg/l	20 single values, 15 monthly average*
Chlorine	mg/l	.002 mg/l**
Conductivity	umhos	<800-1200 micromhos/cm (at 25°C)*
Color	APHA units	15 single value maximum, 5 monthly average*
Dissolved oxygen	mg/l	Not ≤7 mg/l*
Fluorides	mg/l	Not to exceed 1.0 at any time*
Hardness	mg/l	0-5000 range, natural origin**
Magnesium	mg/l	No limits defined
Odor	odor units pos-neg	Single value 8 - daily avg 4*
pH	pH units	7.5-8.5*
Potassium	mg/l	No limits defined**
Sodium	mg/l	No limits defined**
Total dissolved solids	mg/l	172 (Lake Michigan monthly avg) 200 daily max*
Total suspended solids	mg/l	Should not reduce the depth of the compensation for photosynthesis by more than 10%.
Sulfate	mg/l	50-single value; 26-monthly average*
Water temperature	°C	3°F above existing 1000 ft from discharge or 45° (Jan-Mar) 55° (Apr) 60° (May) 70° (Jun) 80° (Jul-Sep) 65° (Oct) 60° (Nov) 50° (Dec), whichever is lower*
Turbidity	FTU	None other than natural origin*
<u>Aquatic Nutrient</u>		
Ammonia	mg/l	0.05 single value, 0.02 monthly average*
Nitrates	mg/l	10 mg/l***
Nitrites	mg/l	No limits defined**
Organic nitrogen	mg/l	No limits defined**
Orthophosphate	mg/l	No limits defined - presumably less than total P.
Total phosphorus	mg/l	0.04 single value, 0.03 monthly average*
Silicates	mg/l	No limits defined
<u>Trace Elements</u>		
Arsenic, total	mg/l	Not to exceed 0.05 at any time*
Cadmium, total	mg/l	Not to exceed 0.01 at any time*
Chromium, hexavalent	mg/l	Not to exceed 0.05 at any time*
Chromium, total	mg/l	Not to exceed 0.05 at any time*
Copper, total	mg/l	1.0**
Iron, soluble	mg/l	.30 single value; .15 monthly average*
Iron, total	mg/l	0.3 domestic supply; 1.0 freshwater aquatic life**
Lead, total	mg/l	Not to exceed 0.05 at any time*
Manganese, total	mg/l	0.05**
Mercury, total	mg/l	Not to exceed 0.0005 at any time*
Nickel, total	mg/l	1/50 96 hr TL ₅₀ - ~.5-2 mg/l***
Selenium, total	mg/l	Not to exceed 0.01 at any time*
Vanadium, total	mg/l	No limits defined**
Zinc, total	mg/l	5**
<u>Indicators of Industrial and Organic Contamination</u>		
Bacteria, fecal coliform	#/100 ml	20/100 (Lake Michigan open water 200/100 ml at beaches based on geometric mean of 5 samples*)
Bacteria, total coliform	#/100 ml	No limits defined**
Biochemical oxygen demand	mg/l	No prescribed limits
Chemical oxygen demand	mg/l	No prescribed limits
Cyanide	mg/l	Not to exceed .01 at any time*
Hexane, soluble material	mg/l	No limits defined
Phenols	mg/l	.003 single value; .001 monthly average*
Methylene blue active substances	mg/l	No limits defined
Total organic carbon	mg/l	No prescribed limits**

*Indiana Regulation SPC 4R-2 (1978)

**EPA Water Quality Criteria Data Book (1976)

***EPA National Interim Primary Drinking Water Regulations Implementation (1978)



Table 2-60

Water Quality Parameters Measured in Bailly Study Area

Parameter	Station	Method	Accuracy
AQUATIC			
<u>Water Chemistry and Bacteriology</u>			
<u>General Water Quality</u>			
Alkalinity, total	1-21	Titration	1% at 100 mg/l
Calcium, soluble	1-21 exc 12	Atomic absorption	±0.05 mg/l
Chloride, total		Auto analysis	2/3% at 5 mg/l
Conductance, specific		Conductivity bridge	5% at 50 umhos
Oxygen, dissolved	1-21	Winkler and polarographic	±0.1 mg/l
Oxygen, saturation	1-21	Calculation	N/A
Odor, threshold	1-21 exc 12	Threshold	N/A
Magnesium, soluble	1-21 exc 12	Atomic absorption	±0.004 mg/l
Hardness	1-21 exc 12	Titration	2.9% at 232 mg/l
pH	1-21	Electrode	±0.1 pH
Potassium, soluble	1-21 exc 12	Atomic absorption	±0.005 mg/l
Sodium, soluble	1-21 exc 12	Atomic absorption	±0.005 mg/l
Dissolved solids, total	1-21 exc 12	Gravimetric	4% at 100 mg/l
Suspended solids, total	1-21 exc 12	Gravimetric	4% at 100 mg/l
Sulfate	1-21 exc 12	Colorimetric	3% at 100 mg/l
Temperature	1-21	Thermometer	±0.1°C
Turbidity	1-21	Nephelometric	N/A
Color, true	1-21 exc 12	Standard filters	N/A
Fluoride, soluble	1-21 exc 12	Distillation	8% at 800 µg/l
<u>Aquatic Nutrients</u>			
Ammonia, soluble	1-21	Auto analysis	0.31% at 8 µgat/lN
Nitrate, soluble	1-21	Auto analysis	0.59% at 2.5 µgat/lN
Nitrite, soluble	1-21	Auto analysis	0.59% at 2.5 µgat/lN
Organic nitrogen, total	1-21	Auto analysis	1.25% at 50 mg/lN
Orthophosphate, soluble	1-21	Auto analysis	1.98% at 2 µgat/lP
Phosphorus, total	1-21	Auto analysis	0.89% at 30 mg/lP
Silica, soluble	1-21	Auto analysis	0.36% at 5 mg/lSiO ₂
<u>Trace Elements</u>			
Cadmium, total	13-21	Atomic absorption	±0.005 mg/l
Chromium, soluble hexavalent	13-21	Auto analysis	±0.14% at 0.10 mg/l
Chromium, total	13-21	Atomic absorption	±0.002 mg/l
Copper, total	13-21	Atomic absorption	±0.03 mg/l
Iron, soluble	13-21	Atomic absorption	±0.05 mg/l
Manganese, total	13-21	Atomic absorption	±0.01 mg/l
Mercury, total	13-21	Atomic absorption	±0.0002 mg/l
Nickel, total	13-21	Atomic absorption	±0.05 mg/l
Zinc, total	13-21	Atomic absorption	±0.01 mg/l
Lead	13-21	Atomic absorption	±0.01 mg/l
<u>Indicators of Industrial and Organic Contamination</u>			
Bacteria, fecal coliform	13-21	Membrane filter	N/A
Bacteria, total coliform	13-21	Membrane filter	N/A
Biochemical Oxygen Demand	13-21	Winkler and polarographic	±0.1 mg/l
Hexane-soluble materials	13-21	Hexane extraction	N/A
Organic Carbon, total	13-21	Combustion - IR	N/A
Phenols	13-21	Chloroform extraction	±0.0001 mg/l
Methylene Blue-Active Substance	13-21	Spectrophotometric	±0.02 mg/l
Cyanide	13-21	Cyanide distillation	±0.005 mg/l
Chemical Oxygen Demand	13-21	Titration	±0.1 mg/l
<u>Sediment</u>			
Cadmium, total	13-20	Atomic absorption	±0.005 mg/l
Chromium, total	13-20	Atomic absorption	±0.07 mg/l
Copper, total	13-20	Atomic absorption	±0.03 mg/l
Iron, total	13-20	Atomic absorption	±0.05 mg/l
Lead, total	13-20	Atomic absorption	±0.06 mg/l
Manganese, total	13-20	Atomic absorption	±0.01 mg/l
Mercury, total	13-20	Atomic absorption (flameless)	±0.0002 mg/l
Nickel, total	13-20	Atomic absorption	±0.05 mg/l
Selenium, total	13-20	Atomic absorption	±0.0003 mg/l
Vanadium, total	13-20	Atomic absorption	±0.002 mg/l
Zinc, total	13-20	Atomic absorption	±0.01 mg/l
Phosphorus, total	13-20	Auto analysis	±1.00% at 2 µgat/l



2.6.3 RESULTS. Results of monthly analyses for the 1979-1980 survey in the Bailly study area have been presented in previous quarterly reports (Texas Instruments 1980b, 1980c, 1981a, 1981b). These parameters are presented by month in the following five classes:

- General water quality parameters
- Aquatic nutrients
- Trace elements
- Indicators of industrial and organic pollution
- Sediments

2.6.4 DISCUSSION

2.6.4.1 General Water Quality Parameters. Water temperature, one of the easiest and most commonly measured parameters in natural waters, has significant effects on aquatic organisms. Mean monthly temperatures for Lake Michigan, the Bailly Station discharge, and the nearshore ponds are presented in Figure 2-32. Lake Michigan temperature normally peak in July or August, with the highest temperature recorded over the 6-year study period being 23°C in August 1979. Discharge temperatures during 1980 ranged from 1° to 8°C above ambient Lake Michigan temperatures at the surface. A 316(a)(b) study conducted in 1976 (Texas Instruments 1976b, 1976c) indicated a mean discharge ΔT of 7.9°C. Thermal stratification was observed in August 1980, when an approximately 6°C ΔT was recorded between the surface and bottom at the 50-foot depth contour. No thermal stratification was observed during the remainder of the 1980 sampling period.

During 1980, the interdunal ponds and Cowles Bog reached maximum temperatures in August with a range from 24.0° to 26.7°C. Minimum temperatures were recorded in November 1980, ranging from 4.0° to 8.0°C. Temperatures are measured only quarterly (monthly in 1974 and early 1975), although pond temperatures fluctuate daily because of their ability to gain or lose heat more rapidly than larger water bodies such as Lake Michigan. Year 7 (1980) results were similar to those of years 1 through 6; i.e., the temperatures of the smaller water bodies were generally higher than the lake (excluding discharge temperatures).

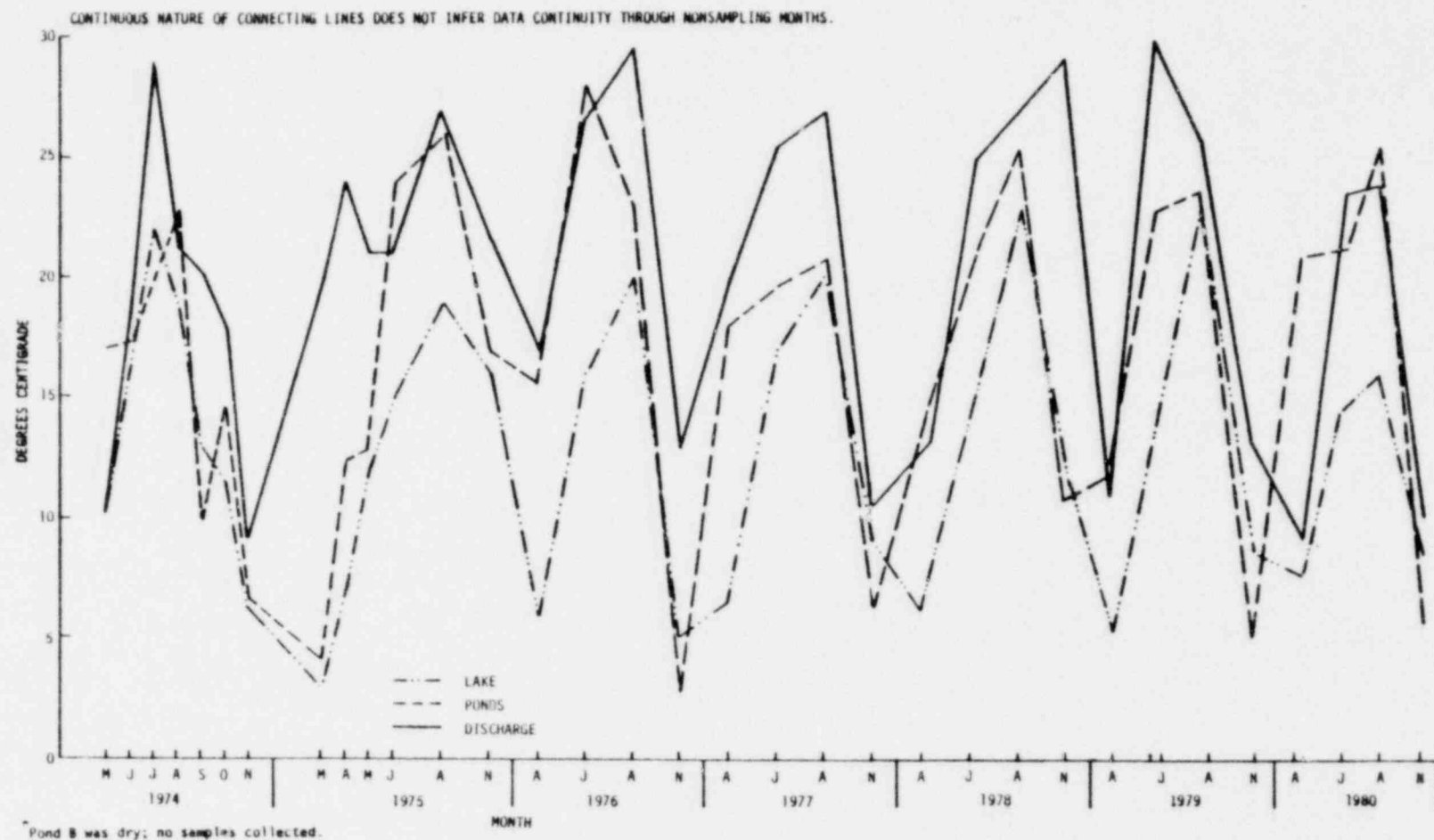


Figure 2-32. Temperatures Measured at Lake Michigan Control Station 9S, Discharge Station 10S, and Mean Pond Temperature for Stations 17S-21S, Bailly Study Area, 1974-1980





Ponds warmed sooner in the spring and cooled sooner in the fall. Based on the higher surface-to-volume ratios of the ponds, these changes were not unexpected.

Oxygen content is as important to the aquatic community structure as temperature; water which is low in dissolved oxygen can harm fish and other aquatic life. An absence of dissolved oxygen brought on by the accumulation of oxidizable material can result in anaerobic conditions, especially near the bottom of the water column. Oxygen content may be modified by such factors as temperature, phytoplankton composition, sunlight, nutrients, and decomposable organic matter (Reid 1961). Solubility of oxygen increases with decreasing temperature and vice-versa. Indiana standards call for not less than 7 milligrams per liter of oxygen for Lake Michigan (Indiana Reg. SPC 4R-2).

Oxygen content in Lake Michigan in the vicinity of Bailly Station during 1980 ranged from 8.0 to 12.8 milligrams per liter and 75 to more than 100 percent saturation. Average monthly percentage saturation levels were in excess of 91 percent (April, 99; June, 96; August, 91; November, 96 percent). Oxygen levels in the interdunal ponds during 1980 were highly variable, ranging from a low of 1.2 milligrams per liter in Cowles Bog (Station 21) in August to 10.9 milligrams per liter in November in Pond C (Station 19). Percent saturation values over the same period ranged from 14 to 108 percent. Observed levels in the interdunal ponds (stations 17-21), with the exception of the extremely low values at Station 21 in August, are ample for the protection of indigenous aquatic populations. Low oxygen levels in Cowles Bog are a natural occurrence for this type of water body.

Acidity or alkalinity of the water, as reflected by pH, is also important. Maximum productivity generally occurs between pH 6.0 to 8.0, and Indiana standards set a range of 7.5 to 8.5. The parameter pH, which is expressed mathematically as $\log_{10} \frac{1}{H^+}$, is regulated by the buffering capacity of the water, a capacity generally controlled by carbonate and bicarbonate ions, although iron compounds and silica are also important (Garrels 1965). The pH is altered by such factors as primary production and influx of external acidic or alkaline ions, and fluctuates through the day as CO_2 is utilized or produced. In 1980, pH in Lake Michigan ranged from 7.2 to 8.8, a range slightly exceeding the standard.



In 1976 and 1978, the pH in Lake Michigan varied from 7.3 to 8.3 and 7.1 to 8.7, respectively (ranges also exceeding the ISPCB standards), and during 1975, pH ranged from 6.4 to 8.2; the 1974 pH range was 6.4 to 8.4. As discussed by the EPA (1976), normal surface water pH ranges from 6.0 to 9.0. Tolerance limits for most organisms fall between 5.0 and 9.0 (when pH is the only factor considered [EPA 1976]), and McKee and Wolf (1963) state that 90 percent of the waters supporting good fish populations have ranges of 6.7 to 8.3. On these bases, the pH range described in the Bailly study area is normal and should not cause any problems for indigenous species.

The pH in the discharge was similar to the open-lake values, indicating that plant operation apparently does not affect pH. Pond values were lower (i.e., more acid) than lake values, as in previous years except 1975, when values were similar. Values in the settling ponds were much higher (low of 6.6) in 1980 than in most previous years but were similar to those found in 1979 (Texas Instruments 1980a). The lowest pH values recorded in the settling ponds were 3.9 in 1978, 3.0 in 1977, 3.6 in 1976, 2.8 in 1975, and 3.5 in 1974. The pH at Station 21 (Cowles Bog) was generally higher than expected for a bog area, with values ranging from 6.8 to 7.4 (similar values were recorded in previous years); this is probably due to the location of the station at the edge rather than center of the bog. Bog waters are generally characterized as being brown in color, nutrient rich and high in organic material, low in pH, and with little or no oxygen in deeper areas (Reid 1961). These conditions generally exist at Cowles Bog, although the bog is also quite shallow and apparently does not become anoxic except perhaps under the ice in winter. The conditions observed during 1980 were similar to previous years' data for the interdunal ponds in the Bailly Station vicinity.

Alkalinity is the measure of the ability of a solution to neutralize hydrogen ions and is generally expressed as an equivalent amount of calcium carbonate (CaCO_3). This measure is the effect of a combination of substances comprising primarily carbonates, bicarbonates, and hydroxides (McKee and Wolf 1963). Quarterly alkalinity values in the lake ranged from 50 to 149 milligrams per liter, well within acceptable standards and comparable to past data. Alkalinity values for control Station 9S in Lake Michigan, plus values for the

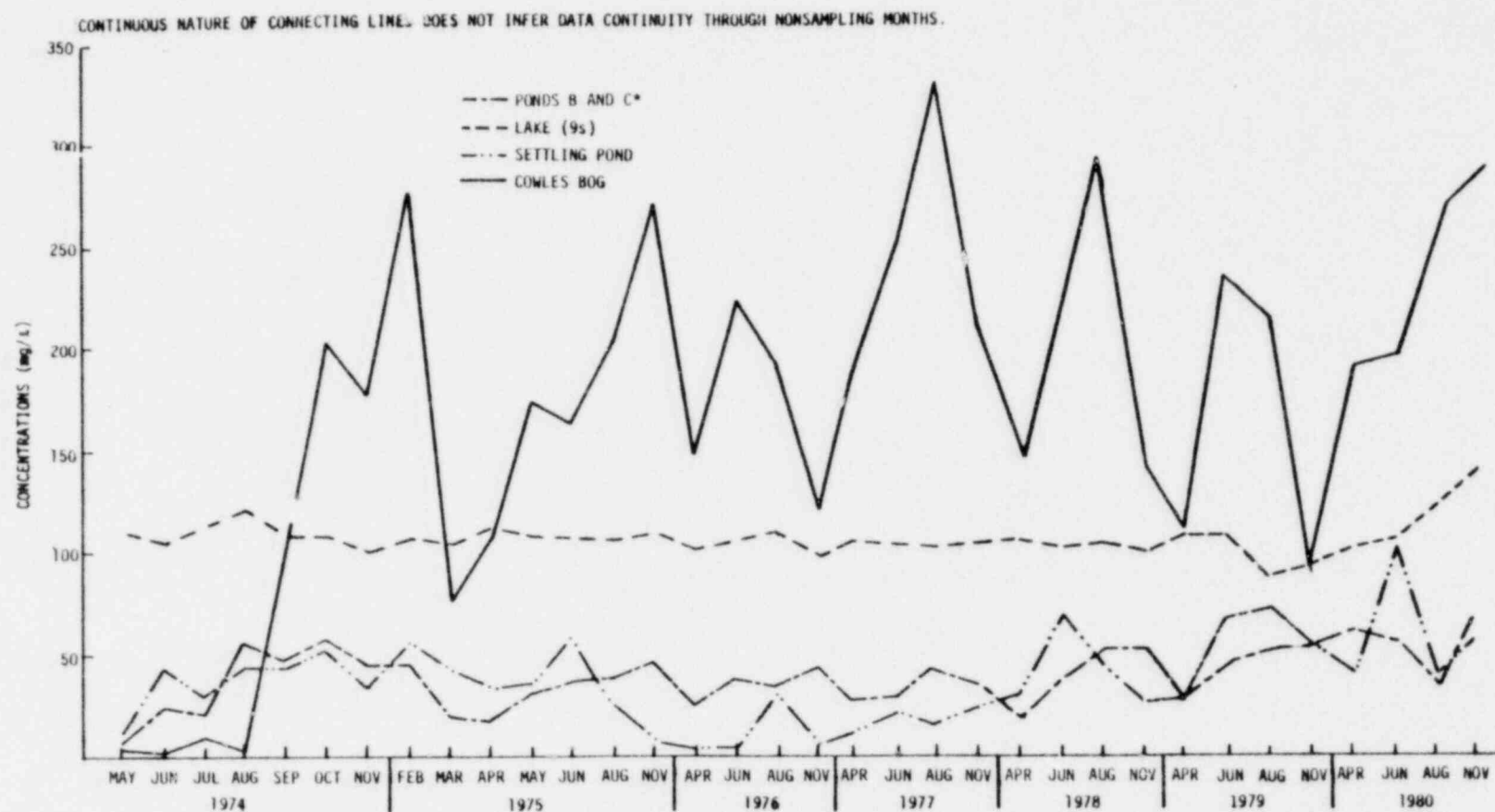


nearshore ponds, are shown in Figure 2-33. Alkalinity values at the discharge station were similar to lake values. These concentrations are similar to previous years of this study, and the observed alkalinity levels are adequate for the maintenance of moderate buffering capacity and should maintain pH within acceptable ranges.

Alkalinity in the nearshore ponds exhibited much wider variability, and all ponds except Cowles Bog exhibited generally low alkalinity (values less than 80 milligrams per liter) — an indication of low buffering capacity. Cowles Bog levels fluctuated widely from a low of 180 milligrams per liter in April to a high of 285 milligrams per liter in November. Similar ranges were observed in past years and appear to be an annual occurrence, although the August 1977 peak was the highest observed to date. Observation of this and other water quality parameters indicates that the Cowles Bog area may be influenced or maintained by runoff. Because of this, the Cowles Bog area is potentially sensitive and will continue to be closely monitored in the future.

The remaining parameters used as indicators of general water quality are often considered interrelated in their contribution to the chemical environment of water. Turbidity and color, suspended and dissolved solids, hardness, calcium, magnesium, potassium, sodium, sulfates, conductivity, chlorides and fluorides, and odor will be discussed in groups.

Turbidity is the property of water that causes light to be scattered and absorbed rather than transmitted in straight lines. The presence of suspended solids such as silt, finely divided organic material, bacteria, and plankton determines turbidity levels. Color is derived partly from dissolved solids and partly from suspended particulate material. Turbidity in Lake Michigan ranged from less than 1 to 15, while color levels ranged from less than 1 to 16 Platinum-Cobalt units. Values for turbidity were relatively constant throughout 1980 in both the open lake and discharge waters, continuing a trend established in the period of 1974 through 1979, and within ISPCB standards. As expected, turbidity and color in the nearshore ponds were generally higher than in the lake; possible sources of both turbidity and color include organic growth and decomposition and/or contributions of organic and inorganic material from



* Pond C only after June, as Pond B was dry.

Figure 2-33. Alkalinity at Lake Michigan Station 9S, Settling Ponds 13-16, Ponds B and C, and Cowles Bog, Bailly Study Area, 1974-1980

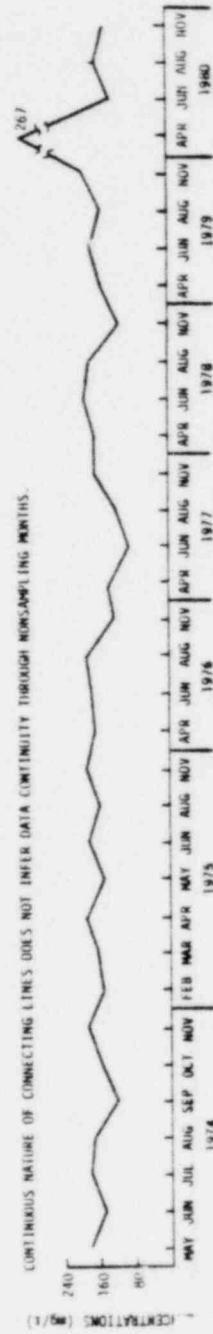


Figure 2-34. Total Dissolved Solids Concentrations, Lake Michigan, Bailly Study Area, 1974-1980



outside sources. Dramatically high color levels observed in Cowles Bog (e.g., 290 Pt-Co units in August) probably were the result of high levels of dissolved organic material. Color observed in the lake generally indicates "clear" water; the EPA (1971) has described waters below 45 APHA units as desirable for photosynthetic activity and lakes with levels of 0 to 5 units as highly transparent.

In natural waters, suspended solids normally consist of silt and clay from erosion, particulate organic detritus, bacteria, and plankton, while dissolved solids consist of carbonates, sulfates, chlorides, phosphates, and nitrates in combination with metallic cations such as calcium, sodium, potassium, and magnesium. Suspended and dissolved solids are important in the ecosystem where the suspended solids, which include bacteria and phytoplankton, may be used by secondary consumers, and where the bacteria and phytoplankton can assimilate the dissolved solids in the form of nutrients and/or osmotic balancers.

Suspended solids levels recorded in the Bailly study area of Lake Michigan ranged from 1.0 to 55 milligrams per liter with lowest overall values in April and highest values in June. The suspended solids levels (generally between 5 and 40 milligrams per liter) in June and August 1980 were slightly higher than the levels observed in years prior to 1979 (generally less than 5 milligrams per liter). The suspended solids concentrations have been slightly elevated during 1979 and 1980. Contributions by runoff or wind action may have been the cause of the high suspended solids levels. The nearshore ponds exhibited low levels of suspended solids throughout 1980. Suspended solids levels in the natural ponds (stations 17-21) were lower during 1980 than during 1979, similar to years prior to 1979.

Lake Michigan dissolved solids ranged from 86 to 1384 milligrams per liter. Values were generally similar to those observed during previous years with the exception of the all-time high value observed in April (Figure 2-34). Variations in concentrations of dissolved solids probably resulted from runoff and changes in water circulation patterns near the shore as these high April values were noted from a surface sample and may represent water movement out of the Port-of-Indiana. Nearshore ponds exhibited a variable pattern in dissolved solids (Figure 2-35), probably due to such natural processes as dilution and runoff, evaporative concentrations, and assimilation of elements in biological metabolism. The variability and range noted was similar to that noted in years past.

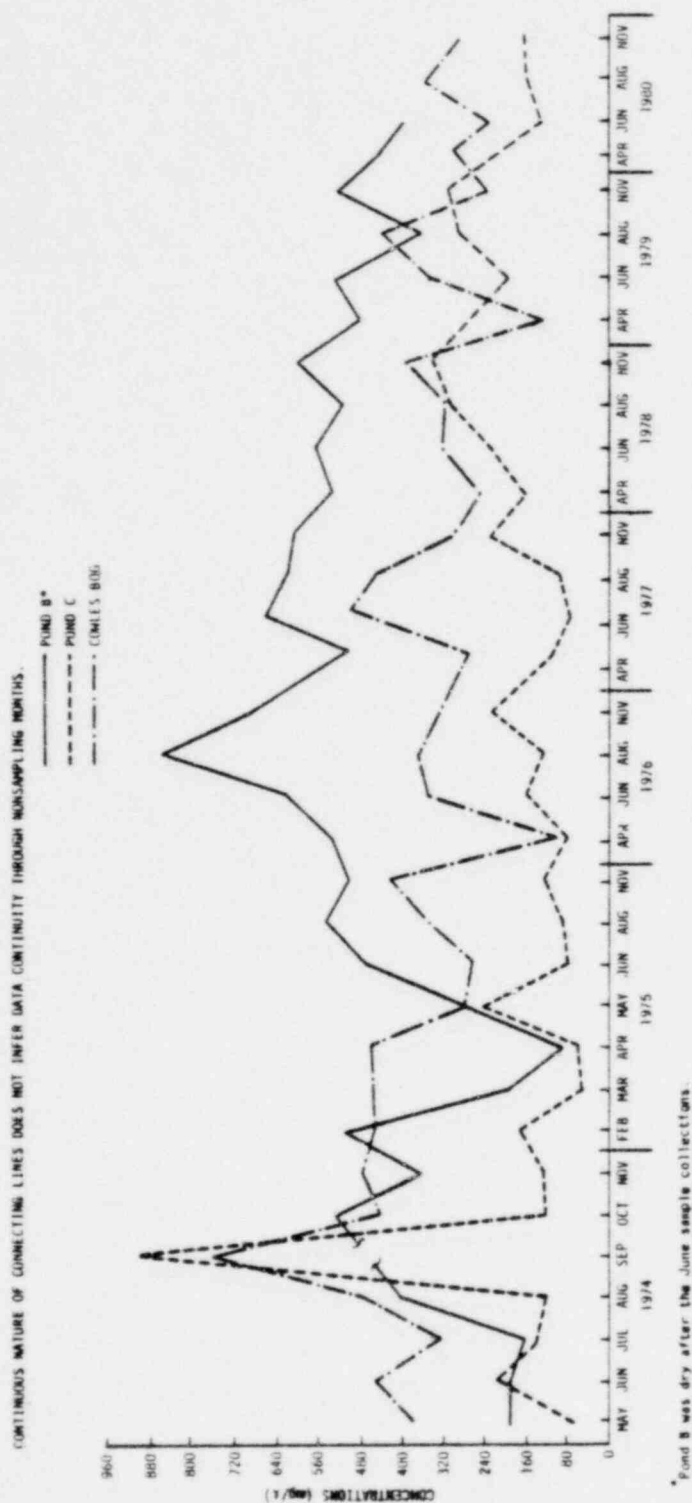


Figure 2-35. Total Dissolved Solids Concentration for Interdunal Pond Samples, Baily Study Area, 1974-1980



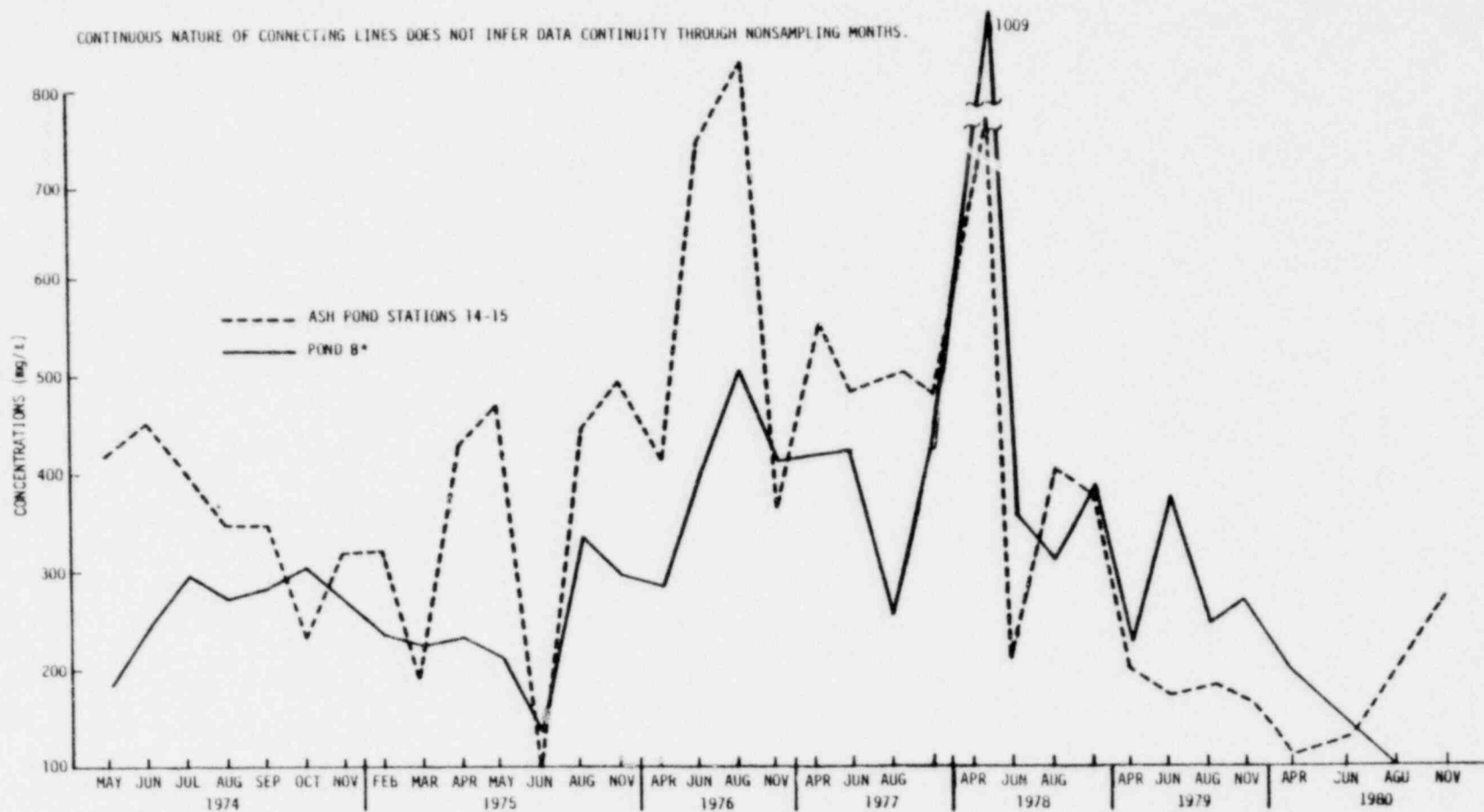
Many factors affect conductance. Concentrations of dissolved solids are most important, and there is usually a high correlation between conductance and calcium and magnesium ion levels, because the two elements are usually the most abundant ions in fresh water. Lake Michigan conductance values during 1980 ranged from 189 to 490 micromhos. Ranges of lake conductance values in previous years were 220 to 580 micromhos in 1979, 242 to 310 micromhos in 1978, 240 to 325 micromhos in 1977, 225 to 411 micromhos in 1976, 182 to 340 micromhos in 1975, and 160 to 340 micromhos in 1974. Values for all years fell well within ISPCB standards of less than or equal to 800-1200 micromhos. Conductance values in the ash-settling ponds, Pond B, and Cowles Bog were generally higher than in the lake; Pond C yielded conductance lower than the other ponds, similar to the lake. The conductance value fluctuations observed in the ponds are not unusual for shallow bodies of water, which reflect environmental changes quicker than larger bodies of water. Values in the ash-settling ponds appear to be related to coal-ash addition; seepage of water into Pond B from the ash pond was probably occurring because with draining and lining of the ash-settling ponds, Pond B dried and no samples were obtained after June 1980.

Calcium, magnesium, potassium, sodium, and sulfate comprise a group which is important to the chemical nature of the water, and which plays a role in determining hardness of waters. They are considered together because of their solubility and because they do not generally form complexes readily (except calcium, which may precipitate under alkaline conditions, and sulfates, which, because they are oxidation products, react somewhat differently). Concentrations of calcium, magnesium, potassium, and sodium fluctuated little during 1980 and constituted a trend of values similar to 1974 through 1979. High sulfate values (higher than ISPCB standards) were found during November 1980 at stations 10 and 22. Sulfate concentrations did not exceed the ISPCB standard (50-milligrams-per-liter) in any 1980 samples from Lake Michigan.

Levels of sulfate continued to be considerably higher in the ash-settling ponds than in the lake. The levels of sulfate were reduced to near Lake Michigan levels during June in Cowles Bog and Pond C during 1980. The previous year's (1979) high sulfate concentrations in ponds B, C, and Cowles Bog may have resulted from seepage from the ash-settling pond. With lining of the ash ponds,



2-180



* Pond B was dry after the June samples; ash ponds 14 and 15 after April; Pond C substituted for Pond B and, stations 13 and 16 substituted for 14 and 15 after the respective sampling occasions when dry.

Figure 2-36. Sulfate Concentrations, Pond B and Ash-Settling Pond Stations 14 and 15, Bailly Study Area, 1974-1980



these high sulfate concentrations were no longer observed in Pond C or Cowles Bog (Pond B is now dry). There are no defined ISPCB standards for any of the above parameters except sulfate. All of the above are found in what are considered to be acceptable concentrations in lake and discharge samples. Their concentrations in Lake Michigan appear to be indicative of water of good environmental quality. Results for all nearshore ponds revealed similar or lower concentrations of calcium, magnesium, potassium, and sulfates than in Lake Michigan.

Since the beginning of the study in May 1974 through mid-1978, a trend of increasing sulfate concentrations has been observed in Pond B; however, the sulfate levels were lower in 1979 than in 1976-1978. An attempt has been made to relate concentrations in Pond B to concentrations in the ash-settling ponds, particularly ash ponds 2 and 3 (stations 14 and 15), which are located directly across the Bailly Station access road from Pond B. Although a trend of increasing sulfate concentrations was observed in the ash ponds as well as in Pond B, the relationship between the ash ponds and Pond B was not totally clear, as shown in Figure 2-36. With the sealing of ash ponds 2 and 3, water level in Pond B has been lowered. This leads to the possibility that seepage was occurring but with lining is no longer occurring.

Hardness is affected by a variety of ions, primarily calcium and magnesium, mainly because of the ability of these ions to remain in solution at high concentrations. Since relatively small fluctuations (10 to 20 percent) in calcium and magnesium concentrations were observed in the lake, the result was relatively constant hardness for 1980, as in previous years. Hardness fluctuated more in the nearshore ponds than in Lake Michigan, as expected, based on wide variability in ionic concentrations. Variability was greatest in Cowles Bog, ranging from 128 to 222 (Appendix G).

Chlorides and fluorides were found at low concentrations similar to past years in both Lake Michigan and the interdunal ponds. Fluoride levels have remained below 2 milligrams per liter from 1974 through 1980. Levels were less than 0.5 milligram per liter in all samples except in the ash-settling ponds during November.



Odor, the last general water quality parameter to be considered, is restricted by Indiana standards to being less than 8 units for a single value or a daily average of 4 units. The method for obtaining these values is to dilute the original sample with odor-free water and smell it. A value of 4 indicates a sample having a detectable odor after dilution to one fourth of its original concentration. This was done for November samples only from the Bailly vicinity, with values being reported as positive (mean value 4 or greater or single value(s) of 8 or greater) or negative (no detectable odor). Results for November 1980 were similar to previous years' results. Lake samples had virtually no odor and were reported as negative in all but one case. Some settling pond samples had odor, and one sample from natural pond C had detectable odor, exceeding ISPCB standards. Undoubtedly these odors are due to decomposition of organic material. The natural pond waters and those from Cowles Bog usually have had odors in the past. The odors present in the ash pond waters most probably originated from the ash material which was added.

2.6.4.2 Aquatic Nutrients. Nineteen elements have been reported as being essential nutrients for aquatic plants: boron, carbon, calcium, chlorine, cobalt, copper, iron, hydrogen, potassium, magnesium, manganese, molybdenum, nitrogen, sodium, oxygen, phosphorus, sulfur, vanadium, and zinc (AWWA 1970). In this group the less common elements are as essential for plant growth as are the more common ones - carbon, hydrogen, oxygen, nitrogen, and phosphorus. The major nutrients considered in the Bailly Nuclear study were phosphorus (orthophosphate and total phosphorus), nitrogen (ammonia nitrogen, nitrate, nitrite, and organic nitrogen), and silica. Studies by FWPCA (1968) have shown that ammonia, total phosphorus, and silica are not heavily concentrated in the nearshore areas of southern Lake Michigan. The potential effect of additions of these elements, particularly phosphorus and nitrogen, is as follows (from Schelske 1971):

- Increase in plankton biomass
- Decreasing water transparency
- Changing water color (apparent)
- Oxygen depletion in the hypolimnion
- Changes in species composition



These effects are generally considered undesirable, as they change the ecosystem, reduce recreational opportunities, increase costs for water treatment, and reduce or destroy aesthetic values. Conclusions from studies of Lake Michigan (Schelske 1971) are that 1) silica depletion will become an increasingly serious problem (values of less than 0.1 milligram per liter were reported as early as 1969 in southern Lake Michigan by Schelske (1971); 2) phosphorus additions have caused an increased demand by diatoms for available soluble silica supplies; and 3) because of conditions 1 and 2, Schelske predicted a possible shift from diatom-dominant populations to increasing green- and blue-green-dominant populations. An examination of the 1979 and 1980 phytoplankton data from the vicinity of Bailly Station shows that such a shift may indeed be occurring. While diatoms remain the biovolume dominant, green and blue-green algae dominated the density during all seasons in 1979 and 1980.

Silica (SiO_2) is a common component of natural waters. Silica is important, since diatoms must incorporate silica into their frustules during reproduction. Unlike many other minerals, silica does not appear important in the composition of animal or plant protoplasm.

As mentioned, silica concentration has decreased in Lake Michigan since the early 1900s, and silica now is found primarily offshore, away from the productive nearshore zone. The downward trend in silicates in Lake Michigan is shown in Figure 2-37. In the vicinity of Bailly Station, silica concentrations during 1980 ranged from 0.10 to 1.33 milligrams per liter; 1974 through 1978 data yielded similar ranges, although mean values did fluctuate by month, as shown in Figure 2-38. Average silica concentrations were similar to those of 1979 and slightly higher than in 1977 and 1978 (Figure 2-38).

Silica was found at similar levels in the interdunal ponds as in Lake Michigan (Figure 2-39). Values in ponds B and C tended to be low throughout the year (Pond B was dry after June sampling). Values in Cowles Bog were erratic, ranging from 5.4 to 27.6 milligrams per liter.

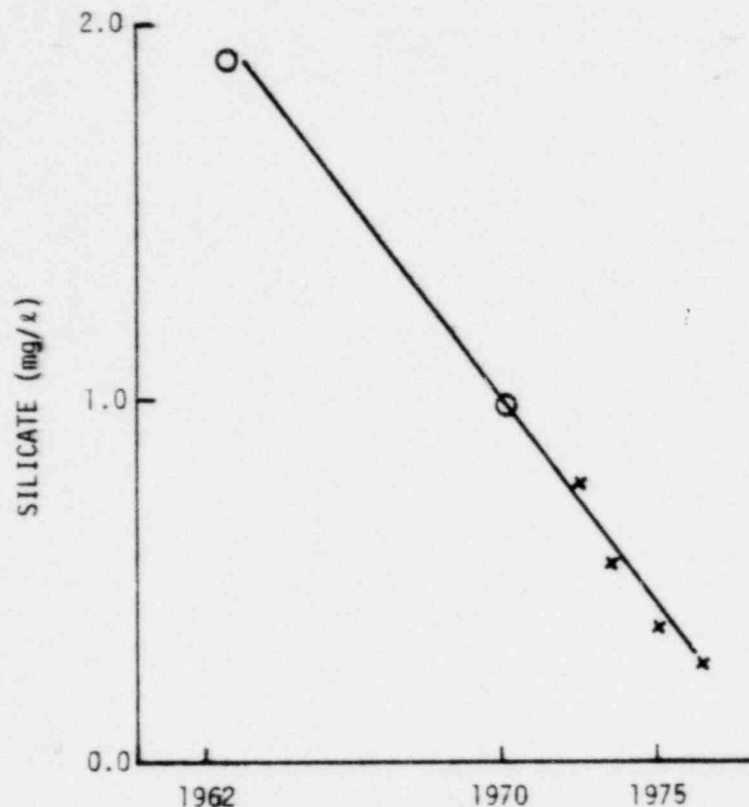


Figure 2-37. The Downward Trend in Silicate Concentrations in Lake Michigan during the Period 1962-1975 (From Verdium, 1977 - data compiled from 1962 data of Risley and Fuller [1965], 1970 data of Schelske and Roth [1973], and 1971-1975 data collected by NALCO Environmental Sciences for Commonwealth Edison Company)

Phosphorus occurs in many forms in aquatic ecosystems. The fully oxidized state, phosphate, is the principal form of naturally occurring phosphorus compounds. Orthophosphate (PO_4^{-3}) is generally the least abundant nutrient in natural waters, although it is the active component involved in growth of green aquatic plants. Considering the principal forms of phosphorus, dissolved orthophosphate makes up only 0.21 percent of the total, while particulate phosphorus represents 98.5 percent of the total. Concentrations of orthophosphate and total phosphorus in Lake Michigan during 1980 ranged from <0.001 to 0.725 milligram per liter and <0.002 to 1.09 milligram per liter, respectively. These total phosphorus values were observed in April and may have been caused by sample bottle contamination (see Appendix Table G-7). Other values (those not believed contaminated) were comparable to 1975 through 1979 Lake Michigan levels.

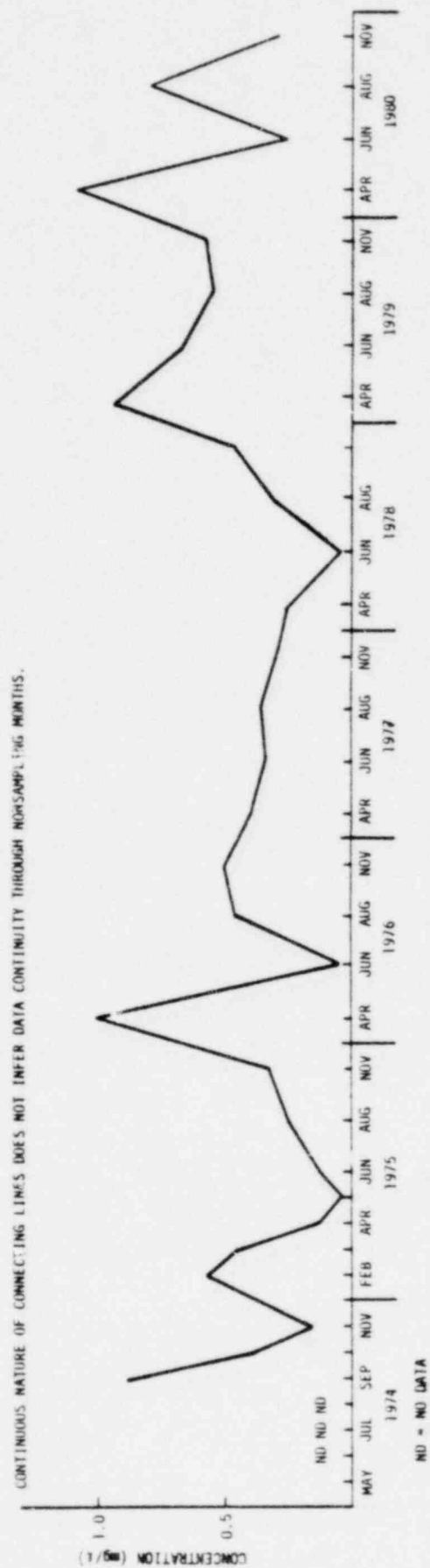


Figure 2-38. Mean Silica Concentrations, Lake Michigan Stations, Bailly Study Area, 1974-1980

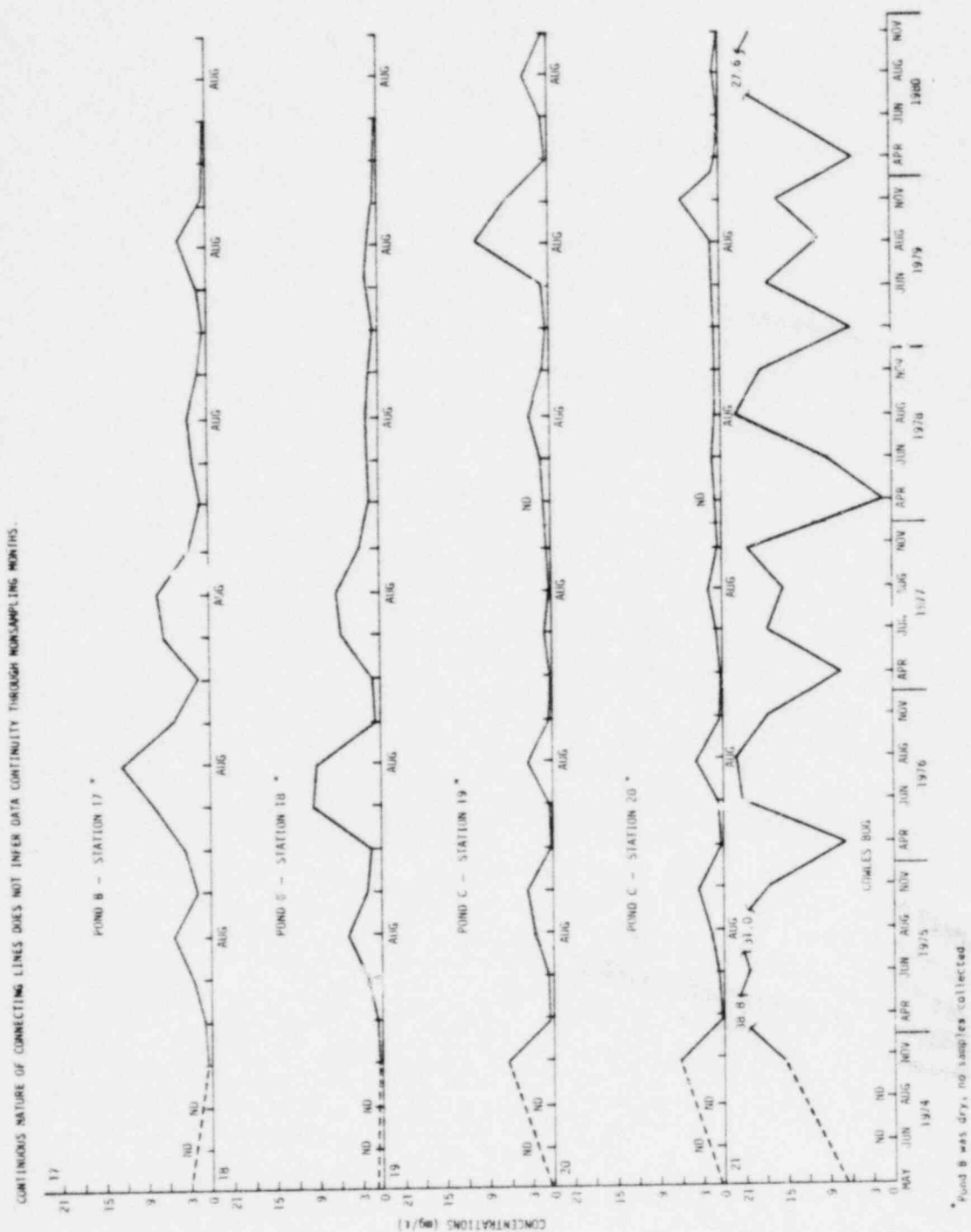


Figure 2-39. Silica Concentrations, Nearshore Ponds, Bailly Study Area, 1974-1980



Phosphorus (orthophosphate and total) loadings in the nearshore ponds were generally similar to those in the lake. Concentration varied from <0.002 to 0.127 milligram per liter for orthophosphate and <0.002 to 0.155 milligram per liter for total phosphorus. Ranges of orthophosphate for previous years were similar or slightly lower as shown in Figure 2-40. Values were high in ponds B and C in June, but decreased to lower and fairly constant levels in the other months. Levels in Cowles Bog increased from April through August then decreased in November with no extremely high levels as observed in some previous years (Figure 2-40).

The remaining major nutrient measured in the Bailly Station study was nitrogen, which exists in several forms in the aquatic ecosystem, including dissolved nitrogen gas (N_2), ammonia nitrogen (NH_4^+), nitrate salts (NO_3^-), nitrite (NO_2^-), ions, and organic nitrogen compounds (primarily attributable to the presence of aquatic life). The community structure of the aquatic ecosystem can be influenced by the concentration of the above forms, which commonly are made available to the aquatic ecosystem through biological processes (such as nitrogen release, denitrification, nitrification, and nitrogen fixation). Most of the nitrogen other than gaseous N_2 is in the form of organic nitrogen (Saucelli 1964, as recorded from AWWA 1970). Inorganic nitrogen forms seldom exceed concentrations of a few milligrams per liter in surface waters, although they may reach 100 parts per million in ground waters. The concentrations of nitrogen in the water varies widely in the U.S., ranging from 0.1 to 3 milligrams per liter. ISPCB or U.S. EPA standards permit the following maximum levels:

Ammonia — 0.05 milligram per liter

Nitrates plus nitrites — 10 milligrams per liter

Total organic nitrogen — no limits set

Of the nitrogen found in nature, organic nitrogen, as mentioned, is the predominant form followed closely by nitrate nitrogen (Hutchinson 1957). This is particularly true in the summer because of rapid incorporation of ammonia and nitrite nitrogen by green plants as organic nitrogen and because of the more complete nitrification occurring at that time.

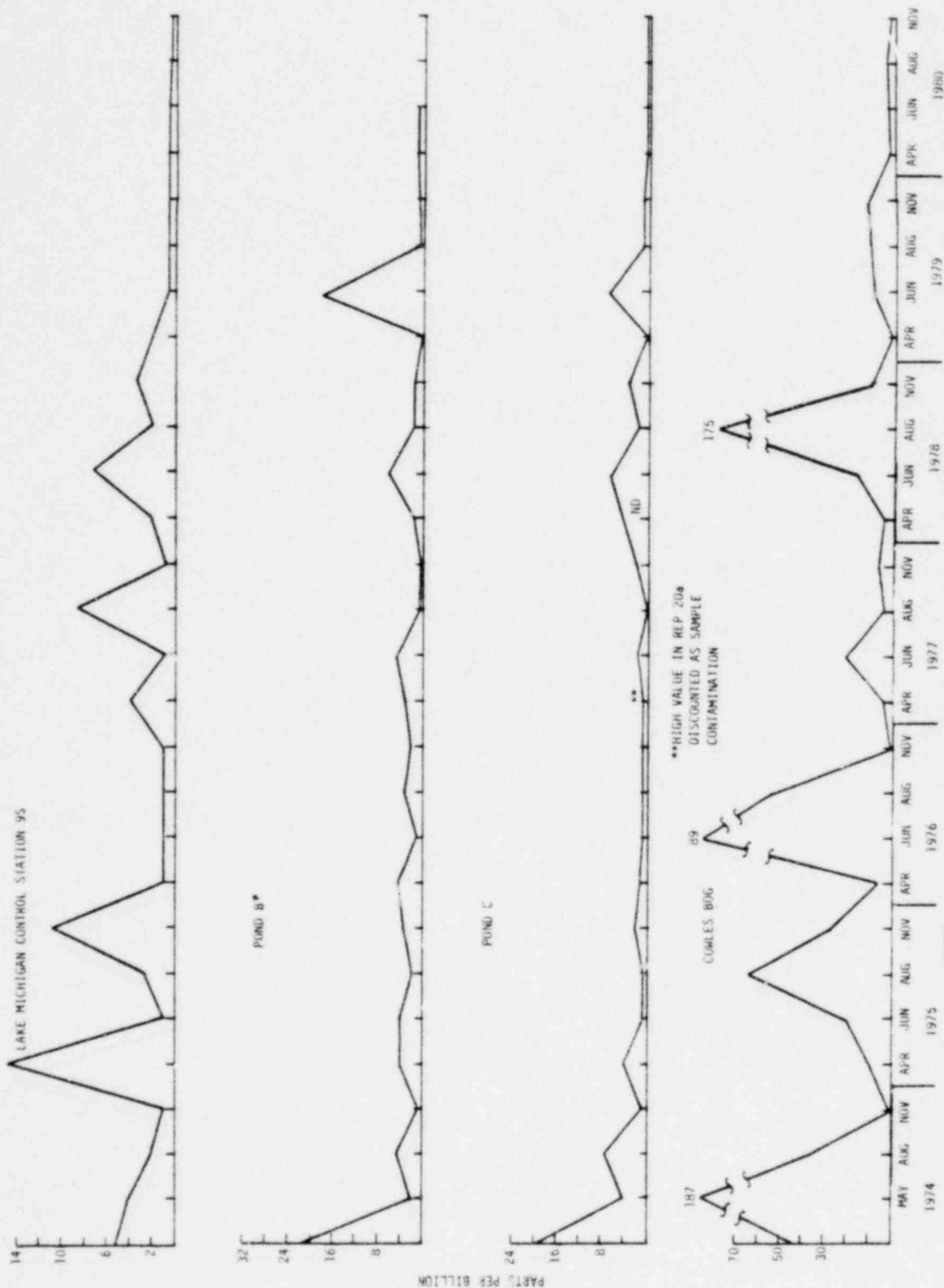


Figure 2-40. Orthophosphate Concentrations, Lake Michigan Control Station 9S and Nearshore Ponds, Bailly Study Area, 1974-1980



Ammonia nitrogen concentrations in Lake Michigan generally decreased from April through November (Table 2-61). Somewhat similar trends were observed in past years with lowest values usually during August. Values for ammonia exceeded ISPCB standards during April at many stations and during August at a few stations; ammonia values have exceeded ISPCB standards in portions of all previous years. Power plant operation has seemed to have little apparent relationship to these excessive values. The levels observed during April 1980 should not endanger any indigenous fauna (EPA 1971).

During the past 6 years, ammonia values were high at many pond stations, in some cases exceeding standards several fold. These levels were due primarily to microbial activity on detritus and possibly the introduction of ammonia from external sources. The excessive values in the ponds were probably of natural origin, as from decomposition products.

High levels of ammonia were noted during April, June, and August 1980. This was different than during 1979 when extremely high concentrations of ammonia were observed in the nearshore ponds. The values observed during 1980 are not in excess of the 0.29 to 0.41 milligram per liter levels noted by Ball (1967) as being lethal to lake trout and yellow perch (Neither of which are thought to be found in the ponds) in 2 to 7 days (LD_{50} or 50 percent death in 2-7 days). Other species (e.g., green sunfish or bluntnose minnow which could potentially be in the pond) are not as susceptible to these concentrations (Henderson et al. 1960, Hemens 1966, Summerfelt and Lewis 1967). Because of the wind-mixing potential of these shallow ponds, it is unlikely that toxic levels of ammonia were reached, and no dead fish have been noted during sample collection.

This same nitrogen load that controlled ammonia levels undoubtedly also affected nitrate and nitrite loadings, total levels of which must be below 10 milligrams per liter by U.S. EPA standards. Levels in the lakes and ponds never exceeded this value during the 7 years. Although nitrate values in Lake Michigan were higher than normal during November 1975, with concentrations at Station 5 of 2.80 milligrams per liter and at Station 6 of 2.80 and 3.40 milligrams per liter, levels during 1976 and 1977 never exceeded 0.3 milligram per liter; 1978 values were similarly low and usually below 0.2 milligram per liter.



Table 2-61

Concentrations of Ammonia, Nitrate, Nitrite, and Organic Nitrogen (mg/l),
Lake Michigan Control Station 9S and Nearshore Pond Stations 17-21,
Bailey Study Area, 1974-1980

Year	Month	Ammonia		Nitrate		Nitrite		Organic Nitrogen	
		9S	Pond	9S	Pond	9S	Pond	9S	Pond
1974	May	0.06	0.15	0.03	1.90	0.006	0.008	0.10	0.31
	Jun	0.02	0.06	0.18	0.02	0.006	0.006	0.31	1.22
	Jul	0.004	0.53	0.16	0.02	0.005	0.004	0.16	1.82
	Aug	0.004	0.11	1.45	0.04	0.007	0.004	0.34	1.24
	Sep	0.04	0.49	0.17	0.01	0.005	0.004	0.23	0.98
	Oct	0.03	1.22	0.10	0.01	0.004	0.006	0.11	1.45
	Nov	0.05	0.81	0.26	0.05	0.005	0.004	0.18	1.16
1975	Feb	0.10	0.66	0.27	0.006	0.004	0.007	0.15	0.77
	Mar	0.05	0.12	0.29	0.006	0.003	0.004	0.05	0.48
	Apr	0.03	0.058	0.27	0.03	0.004	0.002	0.09	0.41
	May	0.07	0.060	0.31	<0.04	0.008	0.004	0.20	0.46
	Jun	0.04	0.049	0.23	<0.04	0.006	0.002	0.13	0.60
	Aug	0.02	0.054	0.18	0.04	0.005	0.002	0.17	0.56
	Nov	0.008	0.089	0.13	0.05*	0.004	0.005	0.12	0.67
1976	Apr	0.03	0.112	0.26	0.37	0.004	0.003	0.17	0.28
	Jun	0.02	0.430	0.18	<0.04	0.004	0.002	0.05	0.36
	Aug	0.01	0.213	0.18	<0.04	0.007	0.002	0.13	0.30
	Nov	0.05	0.572	0.14	0.35	0.005	0.005	0.07	<0.04
1977	Apr	0.02	0.206	0.26	0.06	0.002	0.003	0.18	0.32
	Jun	0.04	0.293	0.24	0.11	0.002	0.007	0.14	0.54
	Aug	0.01	0.061	0.14	0.01	<0.002	0.002	0.11	0.27
	Nov	0.07	0.078	0.21	0.04	0.003	0.002	0.19	0.37
1978	Apr	0.04	0.042	0.25	0.166**	0.003	0.002**	0.71	0.90
	Jun	0.02	0.100	0.95	0.103**	0.003	0.009	0.44	0.76
	Aug	0.01	0.013	0.15	<0.040	<0.002	0.005	0.23	0.59
	Nov	0.04	0.177	0.16	0.060	0.003	0.004	0.31	0.91
1979	Apr	0.08	0.710	0.26	0.04	0.006	0.004	0.45	0.34
	Jun	0.04	0.315	0.190	0.262	0.009	0.001	0.180	1.32
	Aug	0.01	0.113	0.16	<0.01	0.001	<0.001	0.169	2.20
	Nov	<0.002	1.748	0.14	0.008	0.019	0.041	0.182	2.64
1980***	Apr	0.018	0.083	0.25	0.242	0.005	0.010	0.04	0.46
	Jun	0.021	0.082	0.20	0.008	0.004	0.006	0.46	1.42
	Aug	0.17	0.133	0.27	0.085	0.007	0.005	0.15	0.66
	Nov	<0.008	0.030**	0.22	<0.002	0.006	<0.002	0.15	0.73

* Sample contamination in three samples; these values were deleted in calculation.

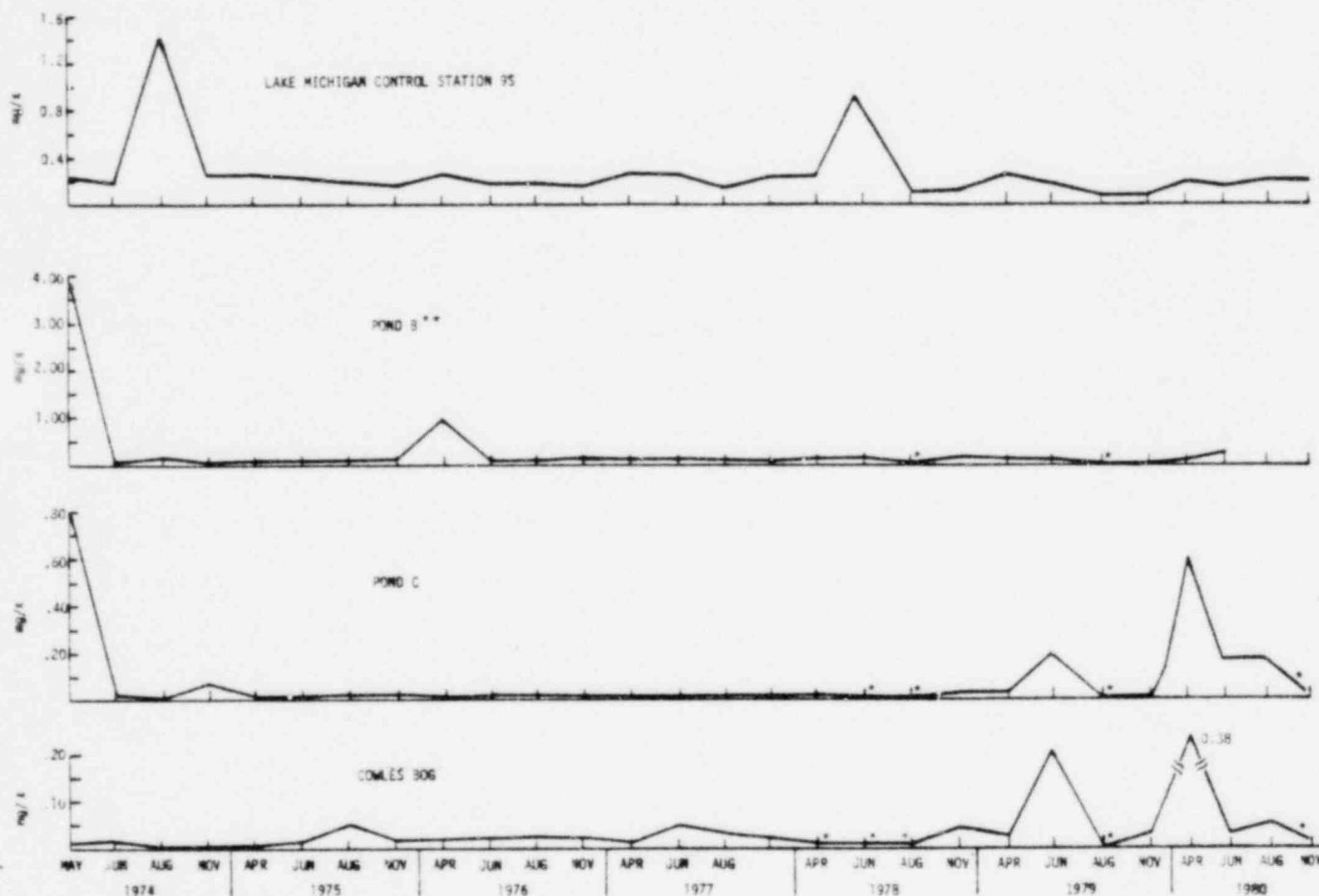
** Sample values below detection not used in calculation.

*** Pond B was dry during August and November with no samples taken at stations 17 and 18 during these months.



Higher levels occurred in 1979, however, with April nitrate levels between 0.3 and 0.4 milligram per liter. This also was the case in 1980 with concentrations decreasing throughout the year. Concentrations in the interdunal ponds were low, with only April values at or near the concentrations in the lake. Concentrations from comparable months (insofar as data were available) of 1974-1979 are shown in Figure 2-41.

Nitrates occur in very minute quantities in unpolluted waters (Reid 1961); appreciable quantities of nitrite and characteristic of organic contamination and decomposition. Highest nitrite concentrations were observed in June 1980. Concentrations of nitrite in the ponds were generally lower than in Lake Michigan, with the exception of the ash-settling ponds during November. These ponds may receive some nitrite addition via sanitary wastes.



CONTINUOUS NATURE OF CONNECTING LINES DOES NOT INFER DATA CONTINUITY THROUGH NONSAMPLING MONTHS.

* Values below limit of detection.

** Pond B was dry after June sample collection.

Figure 2-41. Nitrate Nitrogen Concentrations at Lake Michigan Control Station 9S and Nearshore Ponds, Bailly Study Area, 1974-1980



Organic nitrogen is formed and degraded primarily by biological action. The commonly recognized forms of organic nitrogen are proteins and their derivatives — purines, pyrimidines, and urea (AWWA 1970). The concentration of organic nitrogen can be expected to vary seasonally in natural waters such as Lake Michigan.

Total organic nitrogen is a valuable indicator of the productivity of a body of water. Lake Michigan organic nitrogen values in the vicinity of Bailly Station ranged from 0.06 to 0.87 milligram per liter during 1980. Values for previous years were in the same range. Values in the ponds exhibited individual ranges from 0.15 to 2.23 milligram per liter; values from the ponds in previous years, except 1979, were lower. The nearshore ponds, especially Cowles Bog, exhibited generally higher concentrations and greater fluctuations than Lake Michigan. The previous years' studies revealed similar trends.

Observations of the concentrations of the described aquatic nutrients revealed that the waters of southern Lake Michigan in the study area are environmentally of excellent quality and can support diverse aquatic communities; the nearshore ponds somewhat more enriched, should, and do, support a diverse community.

2.6.4.3 Trace Elements in Water. Trace elements are as essential to plant growth as are the more common compounds such as nitrates, phosphates, and silicates. However, just as with the nutrients, an overabundance of a trace element can cause problems to the indigenous flora and fauna. For example, copper is important for algal growth at low concentrations but at higher concentrations causes inhibition. Mercury can become concentrated in fish and other animal tissues and is linked to poisoning and reduced reproduction. Cadmium, lead, and zinc are known toxic metals to which some plants (such as Typha latifolia, broad-leafed cattail) can develop a tolerance (McNaughton et al. 1974), thus preventing devoid areas in the vicinity of known concentrations of these elements. Copper, nickel, and zinc have been shown to be toxic to some fish species by investigators including Renwoldt et al (1971) and Doudoroff and Katz (1953).



With this background and other literature in mind, water quality standards for the great majority of these elements have been proposed. For the State of Indiana, these have been presented in Table 2-57. Data collected in the Bailly Station vicinity will be compared with these standards.

Samples for trace element analysis were not scheduled for collection in Lake Michigan during the period April 1976 through March 1981. During 1974, cadmium concentrations were reported in excess of limits in 7 of the 42 samples collected in Lake Michigan during October. This is the only known excessive occurrence. During 1975 and 1976, many of the trace element concentrations were at or below analytical detection limits, an indication of water of good quality for existing biota.

The trace element survey in the nearshore ponds revealed no trends, but constant fluctuations of all values. Iron and mercury were found in concentrations greater than ISPCB limits during 1980. Mercury was found at greater than U.S. EPA recommended levels in 1974 and 1975, but did not exceed these standard levels in 1976, 1977, or 1978 samples. Table 2-62 shows those elements in excess by month for the 1980 collections. Tables 2-63, 2-64, 2-65, 2-66, 2-67, and 2-68 show excessive values for 1979, 1978, 1977, 1976, 1975, and 1974, respectively. The other element showing values above limits during past years was iron. During 1978, iron levels were below maximum standards but were above standards in previous years. The source of this element is thought to be airborne input from nearby steel-producing facilities. Coal-ash deposition is thought to be the cause for the levels in the ash ponds; subsequent seepage to Pond B is speculated but unproved as the source of manganese in Pond B.

Iron has received particular attention. Although lethal levels are estimated by Shaw and Gruskin (1967) as 100 milligrams per liter (for Daphnia magna) and the observed concentrations did not approach this level, concentrations approaching 20 milligrams per liter were observed in November 1977 in both Pond B and Cowles Bog, as well as within the ash ponds. Although ash-pond water may be leaching into Pond B and carrying iron with it, the source of the iron is unclear since concentrations of iron were variable in 1979 and not always highest in the ash ponds nor consistently high in any of the natural ponds. During 1980, the April and June samples from Pond B did not contain excessive iron.



Table 2-62

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, April 1980-March 1981

<u>Element</u>	<u>Ash Ponds*</u>	<u>Pond B**</u>	<u>Pond C</u>	<u>Cowles Bog</u>
Cadmium	Apr			
Chromium				
Copper				
Iron			Apr	Aug
Lead				
Manganese	Apr, Aug			
Mercury	Apr, Jun, Aug	Apr, Jun	Apr, Jun, Aug	Apr, Jun, Aug
Nickel				
Zinc				
No. values in excess	22	8	12	8

Note: No samples required for stations 1-10.

* Sampling locations and numbers of samples collected were variable as a result of pond lining activities.

** Pond B was dry during August and November, with no samples collected during those months.

Table 2-63

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, April 1979-March 1980

<u>Element</u>	<u>Ash Ponds</u>	<u>Pond B</u>	<u>Pond C</u>	<u>Cowles Bog</u>
Cadmium	Apr, Jun			
Chromium				
Copper				
Iron	Apr, Jun, Aug, Nov	Apr, Jun	Apr, Nov	Apr, Jun, Aug
Lead				
Manganese	Apr, Aug, Nov	Apr, Aug, Nov	Nov	Nov
Mercury	Jun			
Nickel				
Zinc				
No. values in excess	10	5	3	4

Note: No samples required for stations 1-10.



Table 2-64

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, April 1978-March 1979

Element	Ash Ponds	Pond B	Pond C	Cowles Bog
Cadmium	Apr, Nov, Aug	Jun		
Chromium				
Copper				
Iron				
Lead				
Manganese	Apr, Nov			
Mercury				
Nickel	Nov			
Zinc				
No. values in excess	6	1	0	0

Note: No samples required for stations 1-10.

Table 2-65

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, April 1977-March 1978

Element	Ash Ponds	Pond B	Pond C	Cowles Bog
Cadmium	Apr, Jun Aug, Nov			
Chromium	Jun, Nov			Jun
Copper				
Iron	Apr, Jun Aug, Nov	Aug, Nov	Nov	Apr, Jun Aug, Nov
Lead	Aug			
Manganese	Apr, Jun Nov	Nov		
Mercury				
Nickel				
Zinc				
No. values in excess	14	3	1	5

* Note: No samples required for stations 1-10.



Table 2-66

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, January 1976-March 1977

Element	Ash Ponds	Pond B	Pond C	Cowles Bog
Cadmium	Apr, Jun Aug, Nov	Apr		
Iron	Apr, Jun	Apr, Aug	Jun, Aug	Jun, Aug
Manganese	Apr, Jun Aug, Nov	Apr Nov		
Chromium, Hexavalent	Aug			
Chromium, Total	Aug			
Nickel				
No. values in excess	14	6	2	2

* Note: No samples required for stations 1-10.

Table 2-67

Trace Element Concentrations Exceeding Indiana Standards,
Bailly Study Area, April 1975-March 1976

Element	Stations* 1-10	Ash Ponds	Pond B	Pond C	Cowles Bog
Mercury		Mar, Jun	Jun	Nov	May
Cadmium		Mar, Apr May, Aug Nov			
Iron		Mar, May Aug, Nov	Mar, Jun	May, Apr Jun	Mar, Jun Nov
Manganese		Mar, Apr May, Jun Aug, Nov	Mar, Apr May, Aug Nov	Apr, May Nov	Apr, May Nov
Chromium		Nov			
No. values in excess		18	8	7	7

* None



Table 2-68

Trace Element Concentrations Exceeding Indiana Standards,
Bailey Study Area, May 1974-February 1975

Element	Stations 1-10	Ash Ponds	Pond B	Pond C	Cowles Bog
Mercury		May, Jun Jul, Aug Nov, Feb	May, Jun Nov, Feb	May, Jun Nov, Feb	Jun, Feb
Cadmium	Oct	May, Jun Jul, Aug Sep, Oct Nov	Aug		
Iron		May, Jun Jul, Oct Feb	Jul, Aug Sep, Oct Feb	Jun, Jul Aug, Sep Oct, Feb	Jun, Jul Aug, Feb
Manganese		May, Jun Jul, Aug Sep, Oct Feb	May, Jun Jul, Aug Sep, Oct Feb	Jun, Jul Aug, Sep Oct, Feb	May, Jun Jul, Aug Sep, Oct Feb
Chromium		May, Nov	Nov	Nov	May, Jun Jul
No. values in excess	1	27	18	17	16

During August and November Pond B was dry. Probable sources for the element may be airborne input from nearby steel-producing facilities. Iron concentrations above the standards did not occur in 1978, but occurred in all ponds during 1979. Only Pond C and Cowles Bog showed iron concentrations in excess of the ISPCB standards during 1980.

Because of the scattered nature of excess values, the observed high and low values may be a normal pond cycle. The increases are possibly due to changes in solubility or to additions from external sources (possibly airborne pollutants from nearby manufacturing facilities). Decreases may occur through dilution by rainfall or through uptake by the aquatic flora or sediment. The dramatically lower iron levels found during 1978 and 1980 are not understood at this time in relation to data from 1974 through 1977.



Whatever the source of excess trace elements in the ponds (notably fewer in 1980), the indigenous pond populations have suffered no apparent ill effects. As mentioned in other sections, productivity in the ponds is higher than in Lake Michigan, and species composition is varied.

2.6.4.4 Indicators of Industrial and Organic Contamination. As with the other parameters studied in the Bailly Station vicinity, indicators of industrial and organic contamination are represented by several parameters: fecal and total coliform bacteria, chemical and biochemical oxygen demand (COD and BOD), total organic carbon (TOC), cyanides, phenols, hexane-soluble materials (oils and greases), and methylene-blue active substance. All have limits prescribed in Indiana or U.S. EPA standards, as listed in Table 2-57. These standards are used for comparison to all data presented.

Fecal and total coliform bacteria are a measure of a system's contamination by coliform bacteria and provide an index of contamination by warm-blooded animals. The coliform bacteria are a group of 17 bacterial forms, only four of which are fecal in origin. The remainder are natural soil or water organisms. Levels prescribed for Lake Michigan are 20 fecal coliform bacteria per 100 milliliters of water from open water areas and 200 per 100 milliliters at beaches, based on a geometric mean of five samples. No specific limits for total coliform levels are available.

Considerable variability existed in fecal and total coliform levels during 1980. Lowest numbers were noted during April when all settling ponds, interdunal pond C, and Cowles Bog had fecal coliforms less than 5 per 100 milliliters. Highest fecal coliform counts were observed at all ponds during August, with values from Cowles Bog the highest (averaging 700 per 100 milliliters). These values do not specifically exceed allowable limits as there are none specific to these waters. The source of the coliform bacteria is not known but is not attributed to operation of the power plant. Relative high total coliform bacteria counts have been present in the natural ponds and Cowles Bog during most sampling periods except April 1979. As in previous years of study,



highest bacterial levels were associated with highest water temperatures in August. The relatively high total coliforms found during August have been noted in years past and are probably the result of natural soil microbial activity degrading dead plant and animal matter.

Biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total organic carbon (TOC) are all methods used for determination of total organic contaminants. Measuring TOC is a direct determination of contaminating pollutants in the water (APHA 1971). BOD and COD are both "methods for measuring organic contaminants based on determinations of the equivalence of oxidizing agents which can react with organic substances" (APHA 1971). While not direct measures of organic contamination, these methods are widely used, and a rationale for data interpretation has been developed. Allowable limits for these three parameters have not been established.

The natural ponds yielded slightly higher BOD, TOC, and COD concentrations than did the settling ponds. Overall, BODs were generally low, with the highest value reported, 17 milligrams per liter, in Pond C during April. COD and TOC measurements were highest in Cowles Bog during November and June, respectively. Cowles Bog generally behaved differently from the other ponds because of differences in nutrient input, productivity, and amounts of decomposable organic matter present. During 1974, 1975, 1976, 1977, 1978, and 1979, the interdunal ponds (especially the Cowles Bog area) also revealed higher BOD, TOC, and COD levels than the settling ponds. In general, these three measurements indicate that the nearshore ponds have reasonably low levels of organic loading, with the variations during the study apparently seasonally related to macrophyte growth and runoff patterns.

These remaining parameters, hexane-soluble materials (oil and grease), phenols, and methylene-blue active substances (surfactants), were also analyzed as indicators of contamination. Phenols and methylene-blue active substances (MBAS) are both low-level parameters (Indiana standards are 0.001 milligram per liter for phenols). MBAS levels were never above detection limit (0.02 milligrams per liter) during 1980, and phenols were detected at concentrations above detectability limits only in April. These phenol concentrations were above the



ISPCB standards for Lake Michigan; however, the standards do not necessarily apply to the nearshore ponds. Hexane-soluble materials (oils and greases) have no assigned standard in Indiana regulation SPC-4R-2. The ponds were generally low in hexane-soluble materials. The highest value (16.2 milligrams per liter) was observed in Cowles Bog during August. This quantity of material was probably of natural origin, apparently had no adverse effect on the system, and probably was the result of dead and decaying plant and animal material.

2.6.4.5 Trace Elements in Sediments. Trace elements often collect in sediments at much higher concentrations than in the water column. Much of the material becomes tied to clay-micelles, to Sphagnum in bogs, and to detritus, effectively removing it from the system except under specific conditions of low oxygen tension. When such conditions occur and the oxidation/reduction potential changes, iron, manganese, and silica concentrations often rise in the interstitial waters (Sullivan 1967), and mineral recycling begins at the sediment-water interface. When lake or pond waters turn over, this hypolimnetic concentration is mixed throughout the water column, providing a basis for the primary productivity and for all levels that depend on that primary production.

During sampling year 7, sediment samples in the NIPSCO Bailly Station vicinity were collected during April, August, and November 1980, and January 1981. Samples were collected and processed according to an EPA procedure in which a weighed portion of settled, wet, dredge material was added to a fixed volume of water and shaken under controlled conditions. After shaking, the samples were settled and the supernatant decanted and analyzed. Results were expressed in milligrams of constituent per kilogram of sediment (equivalent to parts per million).

Sediment elements analyzed were cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, zinc, and total phosphorus. These elements were chosen for their importance as nutrients to the phytoplankton and, in the case of metals like mercury, because of their potential danger in human consumption of fish.



Values for all ranged from low to moderate. Concentrations of mercury were at or below analytic detection limits during August, November, and January; concentrations of vanadium were below detection in November and January in the ash-settling ponds and in November in Pond C. Barely detectable levels of mercury were observed during April at all locations.

Cadmium was noted during all months in both the natural and ash-settling ponds. Concentrations over the year's samples in the ash-settling ponds ranged from less than 0.002 to 0.059 milligrams per kilogram while in the natural ponds (Pond B was not sampled after April as it was dry) ranged from 0.002 to 0.040 milligrams per kilogram.

Nickel was found in moderate concentrations, the highest occurring in Pond C during November. Average concentrations of copper at each station revealed values well below maximum levels for water samples during all months sampled. High copper levels had been found during the 1979 survey, but did not persist in 1980. Lead values were low, less than the permissible levels in water, except in one ash-settling pond and one natural pond sample in August and two samples from Pond C in November.

Vanadium and manganese, both important trace elements for phytoplankton, were present during 1980. Vanadium was detectable during all months except November. The high levels observed in 1979 were not found during 1980. Manganese was present in all four months at levels up to 34.0 milligrams per kilogram (Station 19). Relatively high levels of manganese were also observed during previous years. In general, the values in the nearshore ponds are thought to be due to allochthonous airborne additions, but the high manganese levels are difficult to explain. In past years it did not appear that wastes from the Bailly Station had any effect on manganese levels, based on the low observed levels in the ash ponds. However, the 1980 samples revealed relatively high manganese in the ash-settling ponds but even higher values from Pond C.

Zinc concentrations were similar to those found in 1979. No standards for zinc have been promulgated for sediment samples, but allowable water concentrations are 5 milligrams per liter and this level was not exceeded nor even approached as the highest concentration was 1.31 milligram per kilogram in sediment from Pond C.



Phosphorus and iron are commonly reported together in sediment analyses. Phosphorus values were moderate at most stations, with a range of less than 0.02 to 62.2 milligrams per kilogram reported. (Again, no standards for sediments have been promulgated.) These concentrations were similar to those observed in previous years. Iron was found in concentrations ranging from 0.002 to 150 milligrams per kilogram. The maximum concentration noted during 1980 were more than 13 times the 1979 concentration. Iron was also found to be in excess in water samples from the ponds, as discussed previously. Airborne particulates may be the source of some of this material.

- Cadmium, mercury, manganese, iron, and phosphorus appear tied to ash deposition or atmospheric particulate fallout.
- There is a tendency for a general decrease in most trace elements with the onset of winter.
- Most trace element concentrations fluctuate erratically from station to station and from season to season.
- Sediment selenium values probably reflect background levels and are influenced little or not at all by the existing Bailly station plant or other facilities in the area.

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APPENDIX A

ANNOTATED LIST OF MAMMAL SPECIES REPORTED FROM
BAILLY STUDY AREA, MAY, JULY, AND OCTOBER 1980



APPENDIX A

ANNOTATED LIST OF MAMMAL SPECIES REPORTED FROM
BAILLY STUDY AREA, MAY, JULY, AND OCTOBER 1980

Opossum, Didelphis marsupialis

Tracks were reported from all communities during 1980; one was sighted in the maple forest in May.

Short-tailed shrew, Blarina brevicauda

The short-tailed shrew was captured only in the Transmission Corridor and Immature Oak Forest sampling locations.

Masked shrew, Sorex cinereus

The masked shrew was captured in the Beachgrass Community.

Eastern mole, Scalopus aquaticus

Mole tunneling was observed in Cowles Bog (open and wooded), Maple Forest, and Transmission Corridor communities.

Eastern cottontail rabbit, Sylvilagus floridanus

Cottontails were reported from all sampling locations except the Cowles Bog (open), Emergent Macrophyte, and Immature Oak Forest communities.

Raccoon, Procyon lotor

Tracks of the raccoon were found in all sampling locations; sightings took place in the wooded and open bog.

Red fox, Vulpes fulva

One fox scat was found on Cowles Bog Trail in October.

Thirteen-lined ground squirrel, Spermophilus tridecem lineatus

One individual was seen in the Beachgrass Community and one was caught on the Transmission Corridor during May 1980.

Eastern chipmunk, Tamias striatus

Chipmunks were captured or seen in all three wooded sampling locales. The chipmunk was more abundant in the wooded bog than in other locations.

Woodchuck, Marmota monax

Woodchuck dens were reported in the Immature Oak Forest, Cowles Bog (wooded) and the Maple Forest communities. Sightings took place in the wooded bog.

Fox squirrel, Sciurus niger

Fox squirrel sightings were made in all three wooded sampling locales. They were most numerous in the wooded bog.



APPENDIX A (CONTD)

Red squirrel, Tamiasciurus hudsonicus

This small, arboreal squirrel was sighted in all three wooded sampling locales.

Muskrat, Ondatra zibethica

Three muskrats were seen in May and one in July in the Emergent Macrophyte Community. Numbers of this species appear to be increasing over the last few years.

Deer mouse, Peromyscus maniculatus

This species was trapped in the Immature Oak Forest and the Maple Forest communities. It was previously unrecorded.

White-footed mouse, Peromyscus leucopus

The white-footed mouse was trapped along all five assessment lines. It was the most abundant species captured in forested habitats.

Meadow vole, Microtus pennsylvanicus

Meadow voles were captured only in the Beachgrass and Transmission Corridor communities. Numbers of the meadow vole were high in 1980.

Meadow jumping mouse, Zapus hudsonicus

Jumping mice were captured in the Transmission Corridor Community.

White-tailed deer, Odocoileus virginianus

Deer tracks and/or other signs (e.g., scrapes) were noticed in all sampling locations. The maximum number of sightings in any 1980 survey period was two.



APPENDIX B

1974-1980 CHECKLIST AND ANNOTATED LIST OF BIRD SPECIES
OBSERVED IN THE BAILLY STUDY AREA, MAY, JULY AND OCTOBER 1980



Table B-1

Checklist of Birds Reported from the Bailly Study Area, 1974-1980

*Common Loon	Ruddy Turnstone
*Horned Grebe	*American Woodcock
*Pied-billed Grebe	Common Snipe
Double-crested Cormorant	*Spotted Sandpiper
*Great Blue Heron	Solitary Sandpiper
*Green Heron	Greater Yellowlegs
*Great Egret	*Lesser Yellowlegs
Black-crowned Night Heron	Pectoral Sandpiper
Least Bittern	*Least Sandpiper
American Bittern	Dunlin
*Mute Swan	Long-billed Dowitcher
*Canada Goose	Semipalmated Sandpiper
Snow Goose	Sanderling
*Mallard	Great Black-backed Gull
Black Duck	*Herring Gull
*Gadwall	*Ring-billed Gull
Pintail	Bonaparte's Gull
*Green-winged Teal	Common Tern
*Blue-winged Teal	Caspian Tern
American Wigeon	*Rock Dove
Northern Shoveler	*Mourning Dove
*Wood Duck	*Yellow-billed Cuckoo
Redhead	*Black-billed Cuckoo
*Ring-necked Duck	*Screech Owl
Greater Scaup	Great Horned Owl
Lesser Scaup	Barred Owl
*Common Goldeneye	Whip-poor-will
Bufflehead	*Common Nighthawk
White-winged Scoter	*Chimney Swift
Ruddy Duck	Ruby-throated Hummingbird
Hooded Merganser	*Belted Kingfisher
*Common Merganser	*Common Flicker
Red-breasted Merganser	*Red-bellied Woodpecker
Turkey Vulture	*Red-headed Woodpecker
Sharp-shinned Hawk	*Yellow-bellied Sapsucker
Red-tailed Hawk	*Hairy Woodpecker
Red-shouldered Hawk	*Downy Woodpecker
Rough-legged Hawk	*Eastern Kingbird
*Broadwinged Hawk	*Great Crested Flycatcher
Marsh Hawk	*Eastern Phoebe
*American Kestrel	Yellow-bellied Flycatcher
Bobwhite	Acadian Flycatcher
*Ring-necked Pheasant	Willow Flycatcher
*Virginia Rail	Alder Flycatcher
*Sora	*Least Flycatcher
Yellow Rail	Olive-sided Flycatcher
Common Gallinule	*Eastern Wood Pewee
*American Coot	Horned Lark
Semipalmated Plover	*Tree Swallow
*Killdeer	*Bank Swallow
Black-bellied Plover	Rough winged Swallow
*Observed in 1980	



Table B-1 (Contd)

*Barn Swallow	*Cerulean Warbler
Cliff Swallow	Blackburnian Warbler
*Purple Martin	*Chestnut-sided Warbler
*Blue Jay	Bay-breasted Warbler
*Common Crow	Blackpoll Warbler
*Black-capped Chickadee	*Pine Warbler
*Tufted Titmouse	*Palm Warbler
*White-breasted Nuthatch	*Ovenbird
*Red-breasted Nuthatch	*Northern Waterthrush
*Brown Creeper	*Louisiana Waterthrush
*House Wren	*Kentucky Warbler
Winter Wren	Connecticut Warbler
Carolina Wren	Mourning Warbler
*Long-billed Marsh Wren	*Common Yellowthroat
*Short-billed Marsh Wren	*Yellow-breasted Chat
Mockingbird	Hooded Warbler
*Gray Catbird	*Wilson's Warbler
*Brown Thrasher	*Canada Warbler
*American Robin	*American Redstart
*Wood Thrush	*House Sparrow
*Hermit Thrush	Bobolink
*Swainson's Thrush	*Eastern Meadowlark
*Gray-cheeked Thrush	*Red-winged Blackbird
*Veery	Northern Oriole
*Eastern Bluebird	Rusty Blackbird
*Blue-gray Gnatcatcher	*Brewer's Blackbird
*Golden-crowned Kinglet	*Common Grackle
*Ruby-crowned Kinglet	*Brown-headed Cowbird
Cedar Waxwing	*Scarlet Tanager
Northern Shrike	*Northern Cardinal
*European Starling	*Rose-breasted Grosbeak
*White-eyed Vireo	*Indigo Bunting
*Yellow-throated Vireo	Purple Finch
Solitary Vireo	*American Goldfinch
*Red-eyed Vireo	*Rufous-sided Towhee
Philadelphia Vireo	*Savannah Sparrow
*Warbling Vireo	Leconte's Sparrow
*Black-and-white Warbler	*Northern Junco
Golden-winged Warbler	*Tree Sparrow
Blue-winged Warbler	*Chipping Sparrow
*Tennessee Warbler	*Field Sparrow
*Orange-crowned Warbler	*Grasshopper Sparrow
*Nashville Warbler	*White-crowned Sparrow
*Northern Parula	*White-throated Sparrow
*Yellow Warbler	*Fox Sparrow
*Magnolia Warbler	Lincoln's Sparrow
Black-throated Blue Warbler	*Swamp Sparrow
*Yellow-rumped Warbler	*Song Sparrow
Black-throated Green Warbler	Snow Bunting



Table B-2

Annotated List of Bird Species Observed in the
Bailey Study Site Vicinity, May, July, and October 1980

Horned Grebe, P. diceps auritus (migrant)

Two individuals were observed on Pond B during May.

Pied-billed Grebe, Podilymbus podiceps (summer resident)

Pied-billed Grebes were observed on Pond B during May and on ponds E and F during October.

Great Blue Heron, Ardea herodias (summer resident)

Several individuals were sighted in ponds A, B, G, and the discharge area (J).

Green Heron, Butorides virescens (summer resident)

This species was sighted on Pond C and during the road route.

Great Egret, Casmerodius albus (summer resident)

Two individuals were observed in ponds B and C during October and May, respectively.

Mute Swan, Cygnus olor (permanent resident)

One Mute Swan was seen on Pond B in May and October. This species was previously unrecorded.

Canada Goose, Branta canadensis (summer resident)

Ten Canada Geese were seen on the site in May and 23 were seen in October.

Mallard, Anas platyrhynchos (summer resident)

The Mallard was one of the more common and widely distributed ducks inhabiting aquatic areas on the study site. They are less abundant than during past years.

Gadwall, Anas strepera (migrant)

Four Gadwalls were sighted on Pond B during October. The Gadwall is an infrequent visitor of water bodies on the study area.

Green-winged Teal, Anas crecca (migrant)

The Green-winged Teal was less abundant in 1980 than in 1979. It was seen on four ponds.

Blue-winged Teal, Anas discolor (summer resident)

The Blue-winged Teal was less abundant in the study area than was the Green-winged Teal. They were seen in both May and October.



Table B-2 (Contd)

Wood Duck, Aix sponsa (summer resident)

Large numbers of Wood Duck roosted on Pond G during October 1980.

Ring-necked Duck, Aythya collaris (migrant)

Four Ring-necked Ducks were observed feeding on Pond G during May.

Common Merganser, Mergus merganser (migrant)

Two Common Mergansers were observed in the discharge area during May.

Common Goldeneye, Bucephala clangula (winter resident)

Ten individuals were seen in May.

Broad-winged Hawk, Buteo platypterus (permanent resident)

One individual was observed on the road route during July.

American Kestrel, Falco sparverius (permanent resident)

An individual was observed on the road route during July.

Ring-necked Pheasant, Phasianus colchicus (permanent resident)

One bird was heard during May in the open bog; none were sighted on the road route. Ring-necked Pheasant populations are down over most of the north-central states.

Virginia Rail, Rallus limicola (summer resident)

One individual was seen in May.

Sora, Porzana carolina (summer resident)

A Sora was sighted along the open bog during May.

American Coot, Fulica americana (summer resident)

American Coot was among the most abundant and widely distributed aquatic species on the site. The greatest numbers occurred in ponds B and G. The highest count was 23 in Pond G during October.

Killdeer, Charadrius vociferus (summer resident)

One Killdeer was seen around Pond F in May.

American Woodcock, Philohela minor (summer resident)

One individual was noted in the Immature Oak Woods during October.

Spotted Sandpiper, Actitis macularia (summer resident)

Two individuals were sighted along the beach area during May.



Table B-2 (Contd)

Least Sandpiper, Calidris minutilla (summer resident)

A flock of six Least Sandpipers was reported along the beach adjacent to the outfall in October.

Herring Gull, Larus argentatus (migrant/winter resident)

Spring and fall maximum counts for the Lake Michigan beach area were 15 in May but only one in October. Gulls generally occur only along the Lake Michigan shoreline.

Ring-billed Gull, Larus delawarensis (permanent resident)

A maximum of 29 birds was counted along the beach of Lake Michigan during May, and 89 birds were tallied during October.

Rock Dove, Columba livia (permanent resident)

Rock Doves were most commonly observed during the July road survey.

Mourning Dove, Zenaida macroura (permanent resident)

Mourning Doves sighted during the roadside surveys were more numerous than at any time since the study began.

Yellow-billed Cuckoo, Coccyzus americanus (summer resident)

An individual was sighted along the road route in July.

Black-billed Cuckoo, Coccyzus erythrophthalmus (summer resident)

One individual was seen in the open bog in October.

Screech Owl, Otus asio (permanent resident)

An individual of this small owl species was heard calling in May. The Screech Owl is one of the most nocturnal of North American owls.

Common Highthawk, Chordeiles minor (summer resident)

This aerial predator of insects was observed flying over the study area in May.

Chimney Swift, Chaetura pelagica (summer resident)

Various numbers were observed hawking for insects on the road route during July.

Belted Kingfisher, Megasceryle alcyon (permanent resident)

An individual was sighted in both May and October near the discharge area.

Common Flicker, Colaptes auratus (permanent resident)

This species was seen in the open bog, Cowles Bog, and on the road route.



Table B-2 (Contd)

Red-bellied Woodpecker, Centurus carolinus (permanent resident)

Observations were made along the road route during May and July.

Red-headed Woodpecker, Melanerpes erythrocephalus (permanent resident)

Red-headed Woodpeckers were most common in dead timber in the open bog.

Yellow-bellied Sapsucker, Sphyrapicus varius (permanent resident)

One was observed during October in the wooded bog.

Hairy Woodpecker, Dendrocopos villosus (permanent resident)

The Hairy Woodpecker was observed in the study area only in July on the road route.

Downy Woodpecker, Dendrocopos pubescens (permanent resident)

This fairly common woodpecker species was recorded from woodlands over the study area. Woodpeckers are generally not destructive to healthy trees, but instead make cavities in trees that have been previously damaged by insects, disease, fires, or storms.

Eastern Kingbird, Tyrannus tyrannus (summer resident)

This species was sighted on the road route in May.

Great Crested Flycatcher, Myiarchus crinitus (summer resident)

Several individuals were observed along Cowles Bog Trail in July.

Eastern Phoebe, Sayornis phoebe (summer resident)

This early-arriving and late-departing summer resident was seen on the road route in May and in the Maple Forest in October.

Least Flycatcher, Empidonax minimum (summer resident)

One individual was observed on the road route in July.

Eastern Wood Pewee, Contopus virens (summer resident)

Two observations of this woodland flycatcher were recorded in the wooded bog in May.

Tree Swallow, Iridoprocne bicolor (summer resident)

This species was commonly sighted hunting for insects over the open bog in May. It also was seen on the road route during May and July.

Bank Swallow, Riparia riparia (summer resident)

Bank Swallows were seen in and around the areas where Tree Swallows were observed during May.



Table B-2 (Contd)

Barn Swallow, Hirundo rustica (summer resident)

The greatest numbers of this species occurred during May.

Blue Jay, Cyanocitta cristata (permanent resident)

This common permanent resident was observed in all woodlands on the study area.

Common Crow, Corvus brachyrhynchos (permanent resident)

Small flocks of this species were seen on practically all parts of the study area.

Black-capped Chickadee, Parus atricapillus (permanent resident)

Black-capped Chickadees were seen in small numbers on the road route (May and July) and on the Cowles Bog (wooded) transect during May.

Tufted Titmouse, Parus bicolor (permanent resident)

A few individuals were observed in woodlands on the study area during May and October.

White-breasted Nuthatch, Sitta carolinensis (permanent resident)

This nuthatch species was observed infrequently in maple and oak woodlands.

Red-breasted Nuthatch, Sitta canadensis (winter resident)

This northern species is an infrequent visitor to northern Indiana. In October, one was seen in the Immature Oak Forest.

Brown Creeper, Certhia familiaris (migrant/winter resident)

Brown Creeper was seen in Cowles Bog (wooded) during October.

House Wren, Troglodytes aedon (summer resident)

House Wrens were observed along the road route in May and July.

Short-billed Marsh Wren, Cistothorus platensis (summer resident)

This smallest marsh wren was common in the open bog during May.

Long-billed Marsh Wren, Telmatodytes palustris (summer resident)

This species was also seen in the open marsh in May.

Gray Catbird, Dumetella carolinensis (summer resident)

Gray Catbirds were most abundant in moist woodlands in the study area during May.



Table B-2 (Contd)

Brown Thrasher, Toxostoma rufum (summer resident)

This species was observed most commonly along the road route in May and July.

American Robin, Turdus migratorius (summer resident)

Numerous observations were made of this common woodland thrush, especially in the Maple Forest.

Wood Thrush, Hylocichla mustelina (summer resident)

The Wood Thrush was common during May and October in Cowles Bog (wooded).

Hermit Thrush, Catharus guttata (migrant)

Incidental Hermit Thrush observations occurred during May, but in October this species was common in the wooded bog.

Swainson's Thrush, Catharus ustulata (migrant)

A few individuals were sighted in the Maple Woods in October.

Gray-cheeked Thrush, Catharus minima (migrant)

An occasional Gray-cheeked Thrush was observed along Cowles Bog Trail during May.

Veery, Catharus fuscescens (summer resident)

As in previous years, the Veery nested in the woods along Cowles Bog Trail.

Blue-gray Gnatcatcher, Polioptila caerulea (summer resident)

One individual was observed in May.

Golden-crowned Kinglet, Regulus satrapa (migrant/winter resident)

This species was common in the wooded and open bog in October.

Ruby-crowned Kinglet, Regulus calendula (migrant)

This species was observed in Cowles Bog in both May and October.

European Starling, Sturnus vulgaris (permanent resident)

Starlings could usually be observed in the industrial areas. Large numbers again roosted in cattails in Cowles Bog (open).

White-eyed Vireo, Vireo griseus (summer resident)

White-eyed Vireos were observed on the road route in July.



Table B-2 (Contd)

Yellow-throated Vireo, Vireo flavifrons (summer resident)

One individual was recorded from Cowles Bog (wooded) in May.

Red-eyed Vireo, Vireo olivaceus (summer resident)

Red-eyed Vireos were seen in all wooded communities except the Immature Oak Forest.

Warbling Vireo, Vireo gilvus (summer resident)

Several Warbling Vireos were observed in the Maple Forest and Cowles Bog (wooded) during May.

Black-and-white Warbler, Minotilta varia (summer resident)

A few sightings of this species were reported in Cowles Bog (wooded) during October.

Tennessee Warbler, Vermivora peregrina (migrant)

One individual was seen on Cowles Bog Trail in October.

Orange-crowned Warbler, Vermivora celata (migrant)

One individual was seen in May.

Nashville Warbler, Vermivora ruficapilla (migrant)

This species was seen in October on Cowles Bog Trail.

Northern Parula, Parula americana (migrant)

One individual was seen on the road route in May.

Yellow Warbler, Dendroica petechia (summer resident)

Yellow Warblers were observed in the wooded and open bog during May and October.

Magnolia Warbler, Dendroica magnolia (migrant)

One Magnolia Warbler was observed on the road route during May.

Yellow-rumped Warbler, Dendroica coronata (migrant)

Although generally the most common warbler migrating through the region, only two were seen in 1980 (October) in the open bog.

Cerulean Warbler, Dendroica cerulean (summer resident)

One individual was seen in Cowles Bog (wooded) in October.

Chestnut-sided Warbler, Dendroica pensylvanica (summer resident)

Several individuals were observed along Cowles Bog Trail during May.



Table B-2 (Contd)

Pine Warbler, Dendroica pinus (migrant)

This species, previously unrecorded, was seen in the Immature Oak Forest.

Palm Warbler, Dendrocia palmarum (migrant)

This species was observed in the Immature Oak Forest during May and October and on the road route in May.

Ovenbird, Seiurus aurocapillus (summer resident)

Ovenbirds were sighted along Cowles Bog Trail and the road route in May.

Northern Waterthrush, Seiurus noveboracensis (summer resident)

The Northern Waterthrush was seen in May.

Kentucky Warbler, Oporornis formosus (summer resident)

Kentucky Warblers were common on Cowles Bog Trail in May.

Common Yellowthroat, Geothlypis trichas (summer resident)

The Common Yellowthroat was commonly observed along Cowles Bog Trail and the road route in May.

Wilson's Warbler, Wilsonia pusilla (migrant)

This species was observed in May.

American Redstart, Setophaga ruticilla (summer resident)

American Redstarts were common in the wooded bog during May.

House Sparrow, Passer domesticus (permanent resident)

This introduced species was most frequent in residential areas along the road route.

Eastern Meadowlark, Stunella magna (permanent resident)

This species was common on the road route during May and July.

Red-winged Blackbird, Agelaius phoeniceus (summer resident)

Red-winged Blackbirds were abundant in the study area during all sampling periods. Redwings again roosted by the thousands in Cowles Bog (open) in October.

Brewer's Blackbird, Euphagus cyanocephalus (migrant)

A few hundred were observed roosting in and around Cowles Bog (open) in October. This species was previously unrecorded.



Table B-2 (Contd)

Common Grackle, Quiscalus quiscula (summer resident)

Common Grackles were common to abundant in the study area during all sampling seasons. They were among the large number of birds roosting in the open bog during October.

Brown-headed Cowbird, Molothrus ater (summer resident)

This species was commonly observed during May and October, although its numbers were lower than other blackbird and related species.

Northern Cardinal, Cardinalis cardinalis (permanent resident)

Although generally common in forested locales, this conspicuous permanent resident was observed only on Cowles Bog Trail and the road route.

Rose-breasted Grosbeak, Pheucticus ludovicianus (summer resident)

This species was common only during May.

Indigo Bunting, Passerina cyanea (summer resident)

This species was common on the road route in July.

American Goldfinch, Spinus tristis (permanent resident)

Several small flocks of this small finch were observed in open habitat during May and October.

Rufous-sided Towhee, Pipilo erythrophthalmus (summer resident)

This species was observed commonly in May and October in the wooded bog.

Savannah Sparrow, Passerculus sandwichensis (summer resident)

Two individuals were sighted in the Beachgrass sampling location in October.

Northern Junco, Junco hyemalis (winter resident)

Small flocks were common in all open habitats during October.

American Tree Sparrow, Spizella arborea (winter resident)

Tree Sparrows were observed most frequently along the road route.

Chipping Sparrow, Spizella passerina (summer resident)

The Chipping Sparrow was common along the road route in May and July.

Field Sparrow, Spizella pusilla (summer resident)

Field Sparrows were recorded from the road route during May and July.

White-throated Sparrow, Zonotrichia albicollis (summer resident)

This species was common in damp areas in the wooded bog during October.



Table B-2 (Contd)

White-crowned Sparrow, Zonotrichia leucophrys (migrant)

An individual was observed in the open bog during May.

Fox Sparrow, Passerella iliaca (migrant)

Two Fox Sparrows were sighted along edge habitat in Cowles Bog (wooded).

Swamp Sparrow, Melospiza georgiana (permanent resident)

This wetland-inhabiting sparrow was observed in the bog during May and October.

Song Sparrow, Melospiza melodia (permanent resident)

This generally common sparrow was observed in thicket and brushy habitats over the study area.



APPENDIX C

ANNOTATED LIST OF AMPHIBIAN AND REPTILE SPECIES OBSERVED
AT THE BAILLY STUDY AREA, 1980



APPENDIX C

ANNOTATED LIST OF AMPHIBIAN AND REPTILE SPECIES OBSERVED AT THE BAILLY STUDY AREA, 1980

American toad, Bufo americanus

One individual was seen in the Beachgrass and a chorus was heard in the Emergent Macrophyte Community in May.

Cricket frog, Acris crepitans

During May, chorus activity was reported from the open bog, Emergent Macrophyte Community, and standing water in the Transmission Corridor.

Spring peeper, Hyla crucifer

Large choruses of spring peepers were reported from the wooded and open bog and Emergent Macrophyte Community during May.

Gray treefrog, Hyla versicolor

Gray treefrogs were heard calling from Cowles Bog (wooded) and Emergent Macrophyte sampling locations during May, and from the wooded bog location during July.

Bullfrog, Rana catesbeiana

The bullfrog was observed in Cowles Bog (open) during May and July.

Green frog, Rana clamitans

The green frog was common during May and July in the wooded and open bog and Emergent Macrophyte Community. One was found in the maple forest in July.

Wood frog, Rana sylvatica

Several individuals of this almost exclusively woodland frog were heard calling from Cowles Bog (wooded) during May. It was uncommon in the wooded bog during July.

Painted turtle, Chrysemys picta

Painted turtles were observed commonly during May and July from the Emergent Macrophyte Community.

Six-lined racerunner, Cnemidophorus sexlineatus

One individual was observed along the greenbelt in July.

Northern water snake, Natrix sipedon

The northern water snake was reported from the Emergent Macrophyte sampling location during May and July.



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Eastern hognose snake, Heterodon platyrhinos

One individual was observed in the Immature Oak Forest in July.

Eastern garter snake, Thamnophis sirtalis

Individuals were observed during May and July in the Transmission Corridor.

Northern brown snake, Storeria dekayi

One individual of this small secretive species was found sunning itself on Cowles Bog Trail in October.



APPENDIX D

CHECKLIST OF ARTHROPOD FAUNA COLLECTED
IN THE BAILLY STUDY AREA, 1974-1980



Table D-1

Checklist of Arthropod Fauna Collected in the Bailly Study Area, 1974-1980

Order Protura (proturans)	Order Hemiptera (bugs) (Continued)
Order Diplura (diploans)	Gelastocoridae (toad bugs)
Order Collembola (springtails)	Belostomatidae (giant water bugs)
Poduridae	Belostoma sp.
Onychiuridae	Gerridae (water striders)
Isotomidae	Gerris sp.
Entomobryidae	Trepobates sp.
Sminthuridae	Veliidae (broadshouldered water striders)
Order Ephemeroptera (mayflies)	Microvelia sp.
Caenidae	Mesoveliidae (water treaders)
Caenis spp.	Mesovelia sp.
Baetidae	Hebridae (velvet water bugs)
Baetis sp.	Hebrus sp.
Callibaetis sp.	Saldidae (shore bugs)
Stenonema sp.	Mirisidae (plant bugs)
Heptageniidae	Adelphocoris lineolatus
Stenonema sp.	Ceratocapsus luteus
Ephemeridae	Collaria meillyrui
Hexagenia sp.	Ceraecoris sp.
Orderodonata (dragonflies, damselflies)	Eustictus sp.
Aeshnidae (dragonflies)	Halticus bracteatus (garden firehopper)
Aeschna verticalis	Nyalodes sp.
Anax junius	Lopidea sp.
Libellulidae (dragonflies)	Lygus lineolaris (tarnished plant bug)
Erythemis sp.	Neolygus sp.
Leucorrhinia intacta	Neurocolpus sp.
Libellula sp.	Orthotylus sp.
Pachydiplax longipennis	Plagiognathus obscurus
Stethemys lydi	Plectrocapus lineatus
Sympetrum sp.	Sixeonotus sp.
S. vittatum	Stenodema trispinosum
Lestidae (damselflies)	Strongylocoris atritibialis
Lestes rectangularis	Trigonotylus ruficornis
Coenagrionidae (damselflies)	T. tarsalis
Amphiagrion saucium	Nabidae (damselfly bugs)
Challagma sp.	Nabis sp.
Schnura sp.	Reduviidae (assassin bugs)
Nehalennia sp.	Reduvius sp.
Order Orthoptera (grasshoppers, katydids, roaches, etc.)	Sinea sp.
Tetrigidae (pygmy grasshoppers)	Telus sp.
Acrilidae (grasshoppers)	Phymatidae (ambush bugs)
Dissosteira carolina (Carolina grasshopper)	Phymata sp.
Malanoplus sp.	Tingidae (lace bugs)
Tettigoniidae (katydids)	Corythucha arcuata
Gonocephalus sp.	C. contracta
Microcentrum sp.	C. marmorata
Neocenocephalus sp.	Leptopharsa sp.
Opcheilum sp.	Piesmatidae (ashgray leaf bugs)
Scudderella fuscata	Piesma cinerea
Gryllidae (crickets)	Lygaeidae (seed bugs)
Gryllus sp.	Blissus leucopterus (chinch bug)
Decanthus sp.	Lygus sp.
Phasmatidae (walkingsticks)	Fremocoris sp.
Diapheromera femorata	Geocoris sp.
Mantidae (mantids)	Schnodenus fallax
Blattidae (cockroaches)	Schnorrhynchus resedae
Parcoblatta virginica	Lygaeus kalmii
Order Dermaptera (earwigs)	Nysius sp.
Forficulidae	Medanella sp.
Order Isoptera (termites)	Incopeltus fasciatus
Rhinotermitidae	Orthaea sp.
Order Plecoptera (stoneflies)	Phlegyas abbreviatus
Soperiidae	Selysidae (stilt bugs)
Soperia sp.	Salysus sp.
Perlidae	Coreidae (coreid bugs)
Perlesta placida	Euthochina sp.
Order Psocoptera (psocids)	Pentatomidae (stink bugs)
Liposcelidae (booklice)	Acrosternum sp.
Pseudocaeciliidae (psocids)	Chlorochroa persimilis
Polypsocidae (psocids)	Cosmopepla bimaculata
Psocidae (psocids)	Coenus delius
Order Thysanoptera (thrips)	Euchistus sp.
Aelothripidae	Mimodes lugens
Thripidae	Paribatus sp.
Phloeothripidae	Podops sp.
Order Hemiptera (bugs)	Colubra sp.
Corixidae (waterboatmen)	Cyrtidae (burrower bugs)
Sigara spp.	Allochoris sp.
Trichocorixa sp.	Galgus sp.
Notonectidae (backswimmers)	Order Homoptera (hoppers, aphids)
Notonecta spp.	Cicadidae (cicadas)
Pleidae (pleid water bugs)	Membracidae (treehoppers)
Neopiea strigosa	Cyrtolobus sp.
Nepidae (waterscorpions)	Enchenopa binotata
Nepa apiculata	Entylla sp.
Ranatra sp.	Ophiderma sp.
	Gallia camelus



Table D-1 (Contd)

Order Homoptera (hoppers, aphids) (Continued)

Membracidae (treehoppers) (Continued)
Stictoccephala bubalus
Stictoccephala sp.
elamon sp.
Vanduzee sp.
Cicadellidae (leafhoppers)
Agallia constricta
Agalliopsis sp.
Chlorostethus sp.
Cicadula sp.
Cloanthus sp.
Comellus sp.
Deltocephalus sp.
Dixaneura spp.
Draculacephala sp.
Empoasca sp.
Erythroneura sp.
Flexamia sp.
Gnaphocephala sp.
Gypsona sp.
Hecalus lineatus
Idiocerus sp.
Jassus sp.
Limothettix sp.
Macrostelus spp.
Mesamia sp.
Palus sp.
Paraphlepsius sp.
Polyamia sp.
Scapholideus sp.
Tyloglyptus bifidus
Cercopidae (spittlebugs)
Delonacidae (delonacid planthoppers)
Cixiidae (cixiid planthoppers)
Dictyopharidae (dictyopharid planthoppers)
Achilidae (achilid planthoppers)
Flatidae (flatid planthoppers)
Acanaloniidae (acanaloniid planthoppers)
Issidae (issid planthoppers)
Psyllidae (jumping plantlice)
Aphididae (aphids)

Order Coleoptera (beetles)

Cupedidae (recticulated beetles)
Cupes concolor
Cicindelidae (tiger beetles)
Cicindela dorsalis
C. hirticollis
C. repanda
C. scutellaris
Carabidae (ground beetles)
Agonoderus sp.
Anisodactylus sp.
Anomolossus sp.
Ammodon sp.
Chlaenius sp.
Alvinia sp.
Salentia sp.
Margalus sp.
Lebia ornata
L. pumila
L. viridis
Amphron tabiatum
Platynus sp.
Pterostichus sp.
Stenocellus sp.
Stenolophus sp.
Achycellus sp.
Schys sp.
Halpidae (crawling water beetles)
Halipus sp.
Pelodytes duodecimpunctatus
P. muticus
Dytiscidae (predaceous diving beetles)
Agabus sp.
Amphotonus sp.
Cyrtister fimbriolatus
Desmopachria sp.
Hydrophorus sp.
H. consimilis
H. niger
Hydrobius sp.
Hydrobius sp.
Laccophilus sp.
Laccophilus spp.
Planus sp.
Gyrinidae (whirling beetles)
Gyrinus sp.
G. borealis

Order Coleoptera (beetles) (Continued)

Hydrophilidae (water scavenger beetles)
Anacaena sp.
Berosus sp.
Cymbiodyta fimbriata
Enochrus sp.
E. cincta
E. ochraceus
Helophorus sp.
Hydrobius sp.
Hydrochara sp.
Hydrochus sp.
H. scabratus
H. subcupreus
Paracymus sp.
Tropisternus sp.
T. lateralis
Ptiliidae (featherwinged beetles)
Ptinella sp.
Ptinellodes sp.
Staphylinidae (rove beetles)
Cynophana sp.
Paederus sp.
Stenus sp.
Schizus sp.
Pselaphidae (shortwinged mold beetles)
Silphidae (carrion beetles)
Nicrophorus sayi
Orthoperidae (minute fungus beetles)
Artholips sp.
Cantharidae (soldier beetles)
Cantharis rectus
Cantharis sp.
Podabrus spp.
Polemus sp.
Lythopyx sp.
Lampyridae (fireflies)
Ellychnia cornusca
Lycidota sp.
L. punctata
Photinus sp.
Photuris sp.
P. pennsylvanica
Pyralonema sp.
Dermestidae (dermestid beetles)
Malachiidae (softwinged flower beetles)
Attalus terminalis
Cleridae (checkered beetles)
Enoclerus sp.
Ischnocera tabida
Phyllotaenus pallipennis
Elateridae (click beetles)
Agrilus oblongicollis
Agrilus sp.
Conoderus vespertinus
Clamiera sp.
Hemicrepidius sp.
Heteroderes sp.
Limonius basilaris
L. interstitialis
Malanotus spp.
Euchemidae (false click beetles)
Throscidae (throscid beetles)
Aulonothroscus sp.
Bucrestidae (metallic woodborers)
Acmaeodera pulchella
Agrilus sp.
A. arvensis
Brachys ovatus
Sphrocerus sp.
Ptilodactylidae (ptilodactylid beetles)
Ptilodactyla sp.
Helodidae (marsh beetles)
Cyphon sp.
Elodes sp.
Prionocyphon sp.
Sorites sp.
Elmidae (riffle beetles)
Cryptophagidae (cryptophagid beetles)
Paraxontha sp.
Lanuridae (lanurid beetles)
Acropterus sp.
Cucujidae (flat bark beetles)
Laemochileus sp.
Phalacridae (shining fungus beetles)
Olibrus sp.
Phalacrus sp.
Stilbus sp.



Table D-1 (Contd)

Order Coleoptera (beetles) (Continued)

Nitidulidae (sap beetles)
Brachypterus sp.
Cryptarcha sp.
Lathridiidae (minute brown scavenger beetles)
Corticaria sp.
Erotylidae (pleasing fungus beetles)
Ischyrops quadrupunctatus
Megalodacne fuscata
Coccinellidae (lady beetles)
Adalia bipunctata (twospotted lady beetle)
Anatis quindecimpunctata
Chilocoris stigma (twicestabbed lady beetle)
Coccinella novemnotata
Coleomegilla fuscilabris
Cycloneda sanguinea
Hippodamia convergens (convergent lady beetle)
H. glacialis
H. parvula
H. tridecimpunctata (13-spotted lady beetle)
Hyperaspis signata
H. undulata
Microwisea sp.
Psyllora virginimaculata
Scymnus sp.
S. puncticollis
Colydiidae (cylindrical bark beetles)
Anthicidae (antlike flower beetles)
Anthicus sp.
Notoxus sp.
Notoxus muripennis
Euglenidae (antlike leaf beetles)
Elonus sp.
Emelinus sp.
Pediliidae (false antlike flower beetles)
Sternoporus sp.
Mycetophagidae (hair fungus beetles)
Mycetophagus sp.
Pyrochroidae (firecolored beetles)
Dendroides sp.
Mordellidae (tumbling flower beetles)
Mordella spp.
Mordellistena spp.
Alteculidae (combed clawed beetles)
Hymanus sp.
Isomira sericea
Tenebrionidae (darkling beetles)
Mercanthe contracta
Ugma imberbis
Sytophinus saperdoides
Melandryidae (false darkling beetles)
Canifa sp.
Lymnoria sp.
Ptilidae (spider beetles)
Ptilinus sp.
Anobiidae (anobiid beetles)
Cryptorhina sp.
Lucanidae (stag beetles)
Pseudolucanus sp.
Bostrichidae (false powderpost beetles)
Lichenophanes sp.
Scarabaeidae (scarabs)
Anomala sp.
A. taenius sp.
Geotrupes sp.
Macrodactylus subspinosus (rose center)
Melolontha castanea (Asiatic garden beetle)
Onthophagus janus
Phyllophaga spp.
Popillia japonica
Scarab sp.
Tritolitus sp.
Cerambycidae (longhorned beetles)
Anoplophora rubra
Belyta suturalis
Enicospilus mucronatus
Oberea tripunctata
Orthosia brunnea
Parandra brunnea
Pseudoceros supernotatus
Syrassa unicolor
Saperda vestita
Synaldis sp.
Chrysomelidae (leaf beetles)
Acalymma vittata
Altica sp.
Enisostena sp.
Anoplitis inaequalis
Sabia sp.

Order Coleoptera (beetles) (Continued)

Chrysomelidae (leaf beetles) (Continued)
Calligrapha spp.
Leptoma trifurcata
Chaetocnema minuta
Chalepus scapularis
Chalepus sp.
Chalcidius sp.
Chrysoschus auratus
Chrysodina sp.
Colaspis sp.
Crepidodera sp.
Crioceris duodecimpunctata (spotted asparagus beetle)
Cryptoccephalus sp.
Deloyala guttata
Diabrotica undecimpunctata (spotted cucumber beetle)
D. virgifera (western corn rootworm)
Diachus sp.
Dibolia sp.
Disonycha pennsylvanica
D. latifrons
Exema sp.
Glyptocelis sp.
Lema collaris
Longitarsus sp.
Modonota sp.
Medionychus sp.
Pachybrachis sp.
Phaedon viridis
Phyllotreta sp.
Plagioderma versicolor (imported willow leaf beetle)
Plagiometron clavata
Psyllodes sp.
Stenisa sp.
Systema frontalis
S. marginalis
S. rufipennis
Ymnus sp.
Anthribidae (fungus weevils)
Ishnocerus sp.
Curculionidae (weevils)
Apion sp.
Calendra sp.
Hypena postica (alfalfa weevil)
Rhynchaenus sp.
Scaphophorus sp.
Scolytidae (bark beetles)
Order Neuroptera (antlions, lacewings, dobsonflies, etc.)
Corydalidae (dobsonflies, fishflies)
Sialidae (aldersflies)
Chrysopidae (green lacewings)
Hemeroptera (brown lacewings)
Coniopterygidae (dustwings)
Mymecoptera (antlions)
Order Mecoptera (scorpionflies)
Panorpidae (scorpionflies)
Panorpa sp.
Bittacidae (hangingflies)
Bittacus sp.
Order Trichoptera (caddisflies)
Psychomyiidae
Hydropsychidae
Hydropsyche sp.
Hydroptilidae
Leptoceridae
Athripsodes sp.
Decetis sp.
Tricentrus sp.
Phryganeidae
Agrypnia sp.
Banksiola selina
Uligostomus sp.
Limnephilidae
Order Lepidoptera (butterflies, moths)
Papilionidae (swallowtail butterflies)
Papilio glaucus (tiger swallowtail)
P. polyxenes (black swallowtail)
Pieridae (whites, sulfurs)
Colias philodice (common sulfur)
Pieris protodice (southern cabbageworm)
P. rapae (imported cabbageworm)
Danaiidae (milkweed butterflies)
Danaus plexippus (monarch butterfly)
Nymphalidae (brushfooted butterflies)
Cynthia cardui (painted lady)
Euphydryas phaeton (Baltimore)
Junonia coenia (buckeye)



Table D-1 (Contd)

Order Lepidoptera (butterflies, moths) (Continued)

Nymphalidae (brushfooted butterflies) (Continued):
Limnitis archippus (viceroy)
Nymphalis antiopa (mourningcloak butterfly)
Phycodes tharos (pearl crescent)
Polygona interrogationis (question mark)
Speyeria cybele (great spangled fritillary)
S. diana (diana)
Vanessa atalanta (red admiral)
Satyridae (satyr butterflies)
Euptychia cymela (little wood satyr)
E. mitchellii (Mitchell's satyr)
Lethe eurydice (eyed brown)
L. portlandia (pearly eye)
Lycaenidae (blues, coppers, hairstreaks)
Euxoa comyntas (eastern tailed blue)
Lycaenopsis arctolus (spring azure)
Satyrus caryaeformis (hickory hairstreak)
Hesperiidae (skippers)
Ephedrus clarus (silverspotted skipper)
Saturniidae (giant silkworm moths)
Antheraea polyphemus (polyphemus moth)
Automeris io (io moth)
Sphingidae (sphinx moths)
Ponias myops (smalleyed sphinx)
Smerinthus jamaicensis (twinspot sphinx)
Ctenuchidae (ctenuchid moths)
Scepsis fulvicollis (yellowcollared scape moth)
Arctiidae (tiger moths)
Estigmia congrua
Haliidota tessellaris (pale tussock moth)
Rapla confusa
Hypopimpla fucosa
H. miniata
Isia isabella (banded woollybear)
Noctuidae (owllet moths, underwings)
Aosteia sp.
Calpe canadensis
Catocala sp.
Epizeuxis sp.
Euthysanota unio
Leucania multilinea
Leucoxyta diptheroides
Mamestra vicina
Metopis sp.
Phosphila miseloides
Pachoplistia ni (cabbage looper)
Urolonche cullea
Zale sp.
Notodontidae (notodontid moths)
Cerura borealis
Datana ministra (yellownecked caterpillar)
Heterocampa guttivitta (saddled prominent)
Lasiocampidae (tent caterpillar moths)
Malacosoma americana (eastern tent caterpillar)
Geometridae (geometrid moths)
Abbotana clementaria
Apicia confusaria
Bapta vestaliata
Chlorochlamys chloroleucaria (blackberry looper)
Ectropis crepuscularia
Epimectis sp.
Lygris diversilineata (grapevine looper)
Phyllobia enotata
Physostegania pustularia
Sabulodes thisoaria
S. transversata
Scopula imboundata
Tetractis crocalata
Xanthotype ceciliaria
Limacodidae (slug caterpillar moth)
Euclea pumilata
Polimacodes scapha
Pyromorphidae (smoky moths)
Pyralidae (pyralid moths)
Desmia funeralis (grape leafroller)
Hercyia himonialis
Nymphula sp.
Xanthographa limata (basswood leafroller)
Paraponyx sp.
Tortricidae (tortricid moths)
Archips parallela
Micro-moths
Order Diptera (flies)

Order Diptera (flies) (Continued)

Ptychoptera sp.
Psychodidae (moth flies)
Chaoboridae (phantom midges)
Chironomidae (midges)
Bibionidae (March flies)
Bibio sp.
Dixidae (dixid midges)
Simuliidae (black flies)
Culicidae (mosquitoes)
Hymenoptera (fungus gnats)
Scatopsidae (black scavenger flies)
Sciariidae (darkwinged fungus gnats)
Cecidomyiidae (gall midges)
Geratopogonidae (biting midges)
Xylophagidae (xylophagid flies)
Stratiomyidae (soldier flies)
Cyphomyia sp.
Nemotelus sp.
Odontomyia sp.
Pedicia sp.
Ptereticus sp.
Tabanidae
Chrysops cincticornis
C. cucullatus
C. vittatus
Tabanus spp.
T. trimaculatus
Therevidae (stiletto flies)
Rhaconidae (snipe flies)
Scenopinidae (window flies)
Metatrichia sp.
Mydidae (mydas flies)
Mydas clavatus
Asilidae (robber flies)
Efferia albipennis
Leptogaster sp.
Bombyliidae (bee flies)
Empididae (dance flies)
Chelipoda sp.
Hybox sp.
Schrypeza sp.
Dolichopodidae (longlegged flies)
Argyra sp.
Asynetus sp.
Chrysotus spp.
Condylostylus sp.
Dolichopus sp.
Gymnoterus sp.
Mesorhaga sp.
Pelastoneurus sp.
Plagioneurus sp.
Sciapus sp.
Thimophius sp.
Lonchoceridae (spearwinged flies)
Lonchocera sp.
Phoridae (humpbacked flies)
Pompilidae (bigheaded flies)
Alloneura sp.
Pompilus sp.
Syrphidae (flower flies)
Conopidae (thickheaded flies)
Micropezidae (stiltlegged flies)
Otitidae (littid flies)
Chaetopsis sp.
Eumetopia sp.
Platystomatidae (platystomatid flies)
Rivellia sp.
Tephritidae (fruit flies)
Sepsidae (black scavenger flies)
Sepsis sp.
Sciomyzidae
Hoplocictya sp.
Tetanocera sp.
Lauxaniidae (lauxaniid flies)
Camptoprosopella sp.
Homonera sp.
Winettia sp.
Sapromyza sp.
Chamaemyiidae (chamaemyiid flies)
Pipophilidae (skipper flies)
Lixaeidae (loncheid flies)
Sphaeroceridae (dung flies)
Lipocera sp.
Scatophora sp.



Table D-1 (Contd)

Order Diptera (flies) (Continued)

Ephydriidae (shore flies)
Dichaeta sp.
Phyda sp.
Ptilomyia sp.
Scatella sp.
Scatophila sp.
Drosophilidae (vinegar flies)
Chymomya sp.
Drosophila sp.
Chloropidae (chloropid flies)
Cetema sp.
Chlorops sp.
Crassiseia sp.
Dipterops sp.
Scaphophila sp.
Epichlorops sp.
Hippelates sp.
Meromyza sp.
Oscinella sp.
Parectococephala sp.
Thaumatomyia sp.
Agromyzidae (leafminer flies)
Clusiidae (clusiid flies)
Clusiodus sp.
Heteromynia sp.
Heliomyzidae (heliomyzid flies)
Anthomyzidae (anthomyzid flies)
Cuterebridae (rodent bots)
Anthomyiidae (anthomyiid flies)
Calliphoridae (blow flies)
Lucilia sp.
Phaenicia sp.
Muscidae (muscid flies)
Musca domestica (house fly)
Tachinidae (tachinid flies)
Order Hymenoptera (sawflies, wasps, ants, bees)
Pamphiliidae (web-spinning sawflies)
Pergidae (pergid sawflies)
Acordulecera sp.
Argidae (argid sawflies)
Tenthredinidae (sawflies)
Braconidae (braconids)

Order Hymenoptera (sawflies, wasps, ants, bees) (Continued)

Ichneumonidae (ichneumonids)
Eulophidae (eulophids)
Chrysididae (chrysidids)
Cenaphronidae (cenaphronids)
Eupelmidae (eupelmids)
Perilampidae (perilampids)
Torymidae (torymids)
Pteromalidae (pteromalids)
Eurytomidae (eurytomids)
Chalcididae (chalcids)
Cynipidae (gall wasps)
Perilampidae (perilampids)
Dryinidae (dryinids)
Evanidae (ensign wasps)
Prototrupidae (prototrupids)
Cenaphronidae (cenaphronids)
Diapriidae (diapriids)
Scelionidae (scelionids)
Tiphidae (tiphids)
Formicidae (ants)
Diapriidae (diapriids)
Figitidae (figitids)
Pompilidae (spider wasps)
Sphecidae (mud daubers)
Andrenidae (andrenid bees)
Colletidae (yellow-faced bees)
Halictidae (sweat bees)
Apidae (bees)
Apis mellifera (honey bee)
Ceratina sp.
Xylocopa virginica (large carpenter bee)
Order Decapoda (crayfish)
Order Amphipoda (scuds)
Order Chelonethida (pseudoscorpions)
Order Phalangida (harvestmen)
Order Acari (mites)
Dermacentor variabilis (American dog tick)
Order Araneida (spiders)
Order Isopoda (isopods)
Class Chilopoda (centipedes)
Class Diplopoda (millipedes)



APPENDIX E
WATER QUALITY



Table E-1

General Water Quality Parameters at Lake Michigan and Pond Stations,
Bailly Study Area, April 1980 (Page 1 of 2)

Parameter	Unit	Rep	Station															
			TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS	TS
Alkalinity	mg/L	a	115	121	119	132	119	111	118	118	117	110	116	116	115	116	116	116
		b	117	118	119	123	120	113	118	118	117	121	119	116	117	116	116	116
Calcium, soluble	mg/L	a	40.1	42.3	41.0	41.7	40.5	37.1	38.7	38.3	37.5	38.1	36.7	37.2	37.5	35.9	35.3	35.3
		b	39.9	41.9	41.1	41.1	39.0	37.8	38.1	37.3	37.6	38.1	36.8	36.7	37.1	37.5	35.8	35.8
Chloride, total	mg/L	a	11.5	12.9	11.7	12.3	11.3	9.7	11.0	11.0	11.0	9.9	10.3	10.6	10.3	9.9	9.9	9.9
		b	11.3	12.7	11.7	12.3	11.1	9.9	11.1	11.1	10.8	11.1	10.4	10.5	10.6	10.3	9.7	9.7
Color, true	Pt-Co	a	<7	<7	<7	<7	<7	<7	<7	<7	<7	9	<7	<7	<7	<7	<7	<7
		b	8	<7	<7	<7	<7	<7	<7	<7	<7	11	<7	<7	<7	<7	<7	<7
Conductance	umhos	a	330	355	350	350	330	300	310	325	325	315	300	300	320	290	285	285
		b	330	355	350	350	330	300	310	325	325	315	300	300	320	290	285	285
Fluoride, soluble	mg/L	a	0.10	0.10	0.08	0.04	0.10	0.07	0.10	0.10	0.11	0.11	0.10	0.08	0.08	0.04	0.06	0.06
		b	0.07	0.10	0.09	0.10	0.10	0.05	0.11	0.10	0.11	0.19	0.10	0.07	0.10	0.07	0.06	0.06
Hardness	mg/L	a	145	153	139	149	158	128	145	141	135	145	128	139	145	141	128	128
		b	145	153	162	149	143	124	141	109	132	145	124	128	145	141	128	128
Magnesium, soluble	mg/L	a	11.0	12.4	12.4	12.4	12.3	11.3	11.9	11.9	11.6	11.7	11.3	11.4	11.5	11.1	11.1	11.1
		b	11.2	12.2	12.3	12.5	12.1	11.4	12.0	11.9	11.6	11.5	11.5	11.4	11.3	11.5	11.4	11.4
Odor, threshold*	Pos/Neg	a																
		b																
Oxygen, dissolved	mg/L	a	11.5	11.7	11.6	11.7	11.7	11.8	11.7	13.1	12.2	12.2	11.4	10.5	12.0	12.1	11.8	11.8
		b	11.5	11.7	11.6	11.7	11.7	11.8	11.7	13.1	12.2	12.2	11.4	10.5	12.0	12.1	11.8	11.8
Oxygen saturation	%	a	99	101	97	101	96	96	103	113	103	104	95	96	104	102	98	98
		b	99	101	97	101	96	96	103	113	103	104	95	96	104	102	98	98
pH	pH	a	7.6	7.6	7.6	7.4	7.5	7.5	7.4	7.4	7.4	*	7.2	7.2	*	7.4	7.2	7.2
		b	7.6	7.6	7.6	7.4	7.5	7.5	7.4	7.4	7.4	*	7.2	7.2	*	7.4	7.2	7.2
Potassium, soluble	mg/L	a	1.43	1.50	1.42	1.52	1.42	1.26	1.35	1.33	1.30	1.33	1.34	1.33	1.36	1.31	1.35	1.35
		b	1.42	1.47	1.56	1.63	1.51	1.30	1.35	1.32	1.30	1.34	1.32	1.34	1.35	1.31	1.38	1.38
Sodium, soluble	mg/L	a	7.00	8.10	7.40	7.88	7.26	6.67	6.50	6.48	6.36	6.41	5.84	6.49	6.97	6.47	5.29	5.29
		b	6.90	8.11	7.37	7.94	7.21	6.83	6.48	6.50	6.35	6.46	6.14	6.46	6.78	6.48	6.25	6.25
Solids, total dissolved (TDS)	mg/L	a	243	249	221	894	507	179	186	186	185	187	178	184	185	188	190	190
		b	242	239	215	1384	683	183	190	186	183	184	187	188	190	194	188	188
Solids, total suspended (TSS)	mg/L	a	12.0	4.0	6.4	5.0	3.6	7.4	6.0	3.6	7.4	2.8	5.6	4.4	6.6	6.8	5.2	5.2
		b	7.6	4.6	6.6	4.6	3.6	4.4	5.6	4.2	4.4	4.0	4.0	12.8	5.8	2.0	9.2	9.2
Sulfate	mg/L	a	18	22	29	22	34	23	18	18	27	18	26	26	16	16	25	25
		b	18	22	28	22	28	24	18	18	27	18	26	26	16	16	25	25
Temperature	°C	a	9.0	9.0	8.0	9.2	7.0	6.8	9.8	9.0	8.0	8.5	7.5	7.1	7.1	8.0	7.5	7.5
		b	9.0	9.0	8.0	9.2	7.0	6.8	9.8	9.0	8.0	8.5	7.5	7.0	7.1	8.0	7.5	7.5
Turbidity	NTU	a	4	2	3	2	2	3	3	2	3	2	3	5	3	3	3	3
		b	3	2	3	2	2	2	3	2	3	2	2	3	3	2	3	3

* Measurements not taken.



Table E-1 (Contd)

Parameter	Unit	Rep	Station																
			95	96	98	105	115	125	225**	135	145	155	165	175	185	195	205	215	
Alkalinity	mg/L	a	112	115	115	87	118	118		53.9	80.7	66.9	57.1	38.6	47.6	35.3	37.6	180	
		b	115	115	126	89	117	118		53.1	71.4	65.6	57.9	39.6	55.6	36.8	32.9	180	
Calcium, soluble	mg/L	a	33.9	36.7	37.1	65.0	38.1	39.5		40.8	51.3	47.1	51.9	81.0	67.0	25.0	25.4	43.0	
		b	32.1	37.0	37.4	63.4	37.1	39.2		51.0	55.1	48.0	53.5	84.2	68.1	25.3	24.3	43.7	
Chloride, total	mg/L	a	9.0	9.2	9.4	11.6	11.0	12.0		11.1	10.3	10.3	11.0	9.2	10.0	6.6	6.6	8.5	
		b	17.0	9.2	9.7	11.3	11.0	12.0		11.3	10.0	10.0	11.0	9.4	10.0	8.9	6.6	8.3	
Color, true	Pt-Co	a	<7	<7	<7	<7	<7	<7		<7	<7	<7	<7	<7	<7	<7	<7	14	
		b	<7	<7	<7	<7	<7	<7		<7	<7	<7	<7	<7	<7	<7	<7	14	
Conductance	umhos	a	330	260	295	490	325	330		460	400	380	425	500	560	230	230	370	
		b	330	260	295	490	325	330		460	400	380	425	500	560	230	230	370	
Fluoride, soluble	mg/L	a	0.03	0.04	0.06	0.11	0.05	0.06		0.11	0.39	0.29	0.17	0.21	0.29	0.14	0.07	0.21	
		b	0.07	0.03	0.05	0.11	0.05	0.06		0.12	0.39	0.29	0.14	0.29	0.27	0.16	0.08	0.22	
Hardness	mg/L	a	141	132	128	230	149	101		194	220	101	177	242	177	167	149	173	
		b	141	128	109	218	145	93		194	222	101	173	246	181	161	153	173	
Magnesium, soluble	mg/L	a	10.8	11.0	10.8	16.0	11.5	12.1		13.6	11.1	11.0	12.3	11.6	13.3	8.4	8.1	21.2	
		b	10.8	10.8	11.1	15.6	11.4	12.1		12.4	10.9	11.1	12.1	11.0	13.6	8.6	8.1	21.7	
Odor, threshold**	Pos/Neg	a																	
		b																	
Oxygen, dissolved	m/L	a	12.9	11.9	11.9	8.8	11.7	12.0		8.9	8.9	10.0	9.4	10.4	10.3	8.9	8.4	9.7	
		b	11.9	11.9	11.9	8.8	11.7	12.0		8.9	8.9	10.0	9.4	10.4	10.3	8.9	8.4	9.7	
Oxygen saturation	%	a	106	98	96	76	103	103		97	95	105	95	113	112	99	95	108	
		b	106	98	96	76	103	103		97	95	105	95	112	112	99	95	108	
pH	pH	a	7.2	7.2	7.5	7.4	*	7.4		8.2	8.5	7.5	7.2	*	7.3	7.0	7.1	6.8	
		b	7.2	7.2	7.5	7.4	*	7.4		8.2	8.5	7.5	7.2	*	7.3	7.0	7.1	6.8	
Potassium, soluble	mg/L	a	1.22	1.22	1.28	3.70	1.34	1.39		4.2	4.8	3.2	3.8	9.7	8.7	1.5	1.5	1.6	
		b	1.21	1.23	1.21	3.64	1.33	1.39		4.2	4.9	3.1	3.8	9.8	8.6	1.5	1.4	1.4	
Sodium, soluble	mg/L	a	5.48	5.59	5.75	16.04	6.61	7.76		21.6	13.8	14.8	19.6	17.4	18.9	5.3	5.2	8.4	
		b	5.49	5.55	5.60	15.99	6.87	7.83		21.5	14.8	14.6	19.6	17.7	18.7	5.2	5.1	8.0	
Solids, total dissolved (TDS)	mg/L	a	195	159	169	367	197	193		331	305	268	275	455	430	180	152	278	
		b	213	171	172	373	187	208		326	302	278	332	443	411	189	178	288	
Solids, total suspended (TSS)	mg/L	a	6.0	20.2	13.8	6.0	8.8	6.0		11.8	33.4	6.4	3.0	7.8	6.6	5.8	7.8	3.6	
		b	7.0	7.2	8.2	4.6	9.2	6.4		12.6	50.8	4.6	4.6	7.0	7.2	6.8	7.8	4.6	
Sulfate	mg/L	a	14	22	23	156	18	22		159	114	108	142	260	220	52	46	10	
		b	14	22	23	158	18	22		162	108	108	146	260	220	48	46	10	
Temperature	°C	a	7.2	7.0	6.5	8.9	9.9	9.0		20.0	19.0	18.0	16.5	20.0	20.0	21.0	22.0	21.0	
		b	7.2	7.0	6.5	8.9	9.9	9.0		20.0	19.0	18.0	16.5	20.0	20.0	21.0	22.0	21.0	
Turbidity	NTU	a	3	8	5	3	3	2		6	5	2	3	3	2	3	1	1	
		b	3	4	4	3	3	2		6	5	2	3	3	2	3	1	1	

* Measurements not taken.

** Samples not collected because power plant was offline.



Table E-2

General Water Quality Parameters at Lake Michigan and Pond Stations,
Bailly Study Area, June 1980 (Page 1 of 2)

Parameter	Unit	Rep	Station													
			15	25	28	35	3M	3B	45	55	5B	65	6M	6B	75	85
Alkalinity	mg/l	a	115	112	115	111	107	116	115	117	115	115	120	123	117	117
		b	116	111	114	108	104	116	117	115	115	113	122	121	119	115
Calcium, soluble	mg/l	a	39.9	40.0	42.4	50.4	48.2	49.4	40.7	41.7	41.1	43.3	41.1	41.9	39.1	40.7
		b	39.5	38.8	43.0	49.2	48.2	49.3	41.8	42.2	42.0	43.4	41.5	42.2	40.2	42.1
Chloride, total	mg/l	a	12.6	10.4	10.8	9.87	9.97	13.0	13.3	13.4	13.3	13.3	12.4	12.9	12.4	12.7
		b	12.0	10.1	10.7	9.63	9.63	13.3	13.3	13.3	13.3	13.3	12.9	12.5	12.4	12.7
Color, true	Pt-Co	a	2	<1	*	<1	<1	<1	<1	<1	<1	<1	<1	<1	*	<1
		b	1	<1	*	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Conductance	umhos	a	290	270	275	270	270	270	285	295	290	290	280	290	280	290
		b	290	270	275	270	270	270	285	295	290	290	280	290	280	290
Fluoride, soluble	mg/l	a	0.20	0.22	0.21	0.22	0.22	0.21	0.19	0.23	0.24	0.24	0.35	0.25	0.27	0.28
		b	0.20	0.22	0.22	0.22	0.22	0.23	0.34	0.23	0.24	0.24	0.27	0.26	0.24	0.29
Hardness	mg/l	a	120	143	120	120	120	150	128	135	143	111	113	105	128	113
		b	120	120	135	128	112	105	113	135	135	135	128	128	120	150
Magnesium, soluble	mg/l	a	12.4	12.6	12.8	12.9	12.8	12.9	13.4	13.3	13.3	13.3	13.2	13.3	12.6	12.6
		b	12.2	12.9	12.9	12.9	12.9	13.0	13.1	13.4	14.3	13.5	13.5	13.3	12.5	12.7
Odor, threshold*	Pos/Neg	a														
		b														
Oxygen, dissolved	mg/l	a	9.2	9.0	9.4	9.6	9.6	9.9	9.1	9.3	9.7	9.5	10.0	10.5	9.7	9.8
		b	9.2	9.0	9.4	9.6	9.6	9.9	9.1	9.3	9.7	9.5	10.0	10.5	9.7	9.8
Oxygen saturation	%	a	92	90	92	94	94	97	89	93	97	95	100	103	97	96
		b	92	90	92	94	94	97	89	93	97	95	100	103	97	96
pH	pH	a	8.0	7.8	7.8	7.3	7.7	7.7	8.0	8.1	8.1	8.1	8.1	8.1	8.2	8.2
		b	8.0	7.8	7.8	7.3	7.7	7.7	8.0	8.1	8.1	8.1	8.1	8.1	8.2	8.2
Potassium, soluble	mg/l	a	1.62	1.42	1.49	1.49	1.42	1.44	1.48	1.51	1.49	1.49	1.41	1.48	1.44	1.46
		b	1.51	1.46	1.49	1.47	1.44	1.51	1.41	1.46	1.47	1.45	1.50	1.44	1.44	1.45
Sodium, soluble	mg/l	a	5.9	5.6	5.8	5.8	5.6	5.6	5.7	5.8	5.9	5.9	5.5	5.8	5.6	5.9
		b	5.9	5.7	5.9	5.8	5.6	5.9	5.6	5.8	5.8	5.9	5.5	5.6	5.6	5.8
Solids, total dissolved (TDS)	mg/l	a	182	151	133	115	124	112	134	142	179	175	167	166	122	123
		b	148	151	137	112	113	109	143	139	163	162	150	121	102	107
Solids, total suspended (TSS)	mg/l	a	37.6	37.2	38.0	28.0	28.0	36.4	40.4	32.0	42.0	35.8	42.0	32.8	1.6	32.2
		b	30.4	36.4	29.2	1.6	36.4	40.4	37.2	40.0	40.4	32.4	36.4	35.6	31.0	39.6
Sulfate	mg/l	a	17.7	17.7	17.3	17.7	17.7	17.3	18.0	19.8	19.4	18.4	18.0	18.7	20.1	20.1
		b	17.7	18.0	17.3	17.7	17.7	19.1	18.7	19.4	19.8	20.1	20.1	19.8	20.1	20.1
Temperature	°C	a	16.0	16.0	15.0	15.0	15.0	14.9	15.0	16.0	16.0	16.0	16.0	15.0	16.0	15.1
		b	16.0	16.0	15.0	15.0	15.0	14.9	15.0	16.0	16.0	16.0	16.0	15.0	16.0	15.1
Turbidity	NTU	a	5	4	5	5	3	4	6	5	3	3	5	6	3	4
		b	5	4	5	4	3	4	4	3	4	3	5	3	5	3

* Measurements not taken.



Table E-2 (Contd)

Parameter	Unit	Rep	Station																
			95	96	98	105	115	125	126	135	145**	155**	165	175	185	195	205	215	
Alkalinity	mg/l	a	113	112	112	113	113	146	123	106			114	64	57	46	51	182	
		b	115	112	111	110	115	149	129	111			108	58	42	47	54	197	
Calcium, soluble	mg/l	a	39.8	40.0	40.7	39.6	40.1	39.9	25.6	54.6			62.3	81.8	84.0	22.3	21.9	58.9	
		b	41.2	40.5	41.6	40.0	40.4	40.2	33.4	54.4			63.0	85.2	79.9	17.6	22.0	60.2	
Chloride, total	mg/l	a	12.4	12.3	12.3	12.4	12.4	12.4	12.0	12.8			13.0	12.3	12.0	6.7	5.7	3.7	
		b	12.4	12.3	11.8	12.4	12.4	12.4	12.0	12.9			28.9	12.1	25.9	7.4	7.1	3.7	
Color, true	Pt-Co	a	<1	<1	<1	<1	16	*	13	19			35	90	*	250	*	130	
		b	*	<1	<1	10	16	10	10	*			35	*	95	250	*	*	
Conductance	umhos	a	290	285	280	275	300	265	300	430			470	525	525	185	185	385	
		b	290	285	280	275	300	265	300	430			470	525	525	185	185	385	
Fluoride, soluble	mg/l	a	0.24	0.26	0.26	0.27	0.27	0.29	0.09	0.13			0.14	0.18	0.18	0.12	0.12	0.18	
		b	0.29	0.26	0.32	0.26	0.28	0.28	0.10	0.14			0.13	0.20	0.18	0.13	0.12	*	
Hardness	mg/l	a	124	124	132	135	136	128	113	165			180	211	207	75	71	211	
		b	128	128	128	128	128	128	113	165			180	218	207	64	71	222	
Magnesium	mg/l	a	12.8	12.8	12.8	12.9	13.2	12.7	12.5	14.2			13.9	13.9	13.9	8.0	8.3	25.7	
		b	13.2	12.5	12.7	12.3	12.6	12.8	12.3	14.6			14.2	13.8	13.7	7.1	8.0	26.2	
Odor, threshold*	Pos/Neg	a																	
		b																	
Oxygen, dissolved	mg/l	a	10.5	11.1	11.6	6.8	9.2	9.5	8.6	6.8			6.4	7.5	8.6	6.4	6.0	2.5	
		b	10.5	11.1	11.6	6.8	9.2	9.5	8.6	6.8			6.4	7.5	8.6	6.4	6.0	2.5	
Oxygen saturation	%	a	103	109	112	78	92	93	91	73			69	84	99	73	67	28	
		b	103	109	112	78	92	93	91	73			69	84	99	73	67	28	
pH	pH	a	8.2	8.2	8.2	8.2	8.2	8.2	8.2	7.8			7.9	8.3	8.8	7.9	7.8	7.4	
		b	8.2	8.2	8.2	8.2	8.2	8.2	8.2	7.8			7.9	8.3	8.8	7.9	7.8	7.4	
Potassium, soluble	mg/l	a	1.43	1.44	1.44	1.56	1.46	1.44	1.53	3.65			4.77	8.68	8.38	0.76	0.80	0.40	
		b	1.44	1.41	1.37	1.52	1.47	1.46	1.45	3.73			4.86	8.62	10.24	0.63	0.80	0.35	
Sodium, soluble	mg/l	a	5.8	5.8	5.7	6.1	5.9	5.8	5.8	19.1			19.8	20.1	20.1	6.1	5.7	7.0	
		b	5.8	5.7	5.5	6.0	5.8	5.8	5.6	19.4			20.6	20.3	20.4	6.1	6.0	7.1	
Solids, total dissolved (TDS)	mg/l	a	123	116	112	101	116	119	163	239			287	406	410	139	135	326	
		b	130	119	86	116	96	131	175	267			321	408	390	132	141	146	
Solids, total suspended (TSS)	mg/l	a	15.2	31.0	28.4	18.4	12.8	32.8	24.8	6.2			8.4	3.8	4.0	5.2	4.4	8.6	
		b	39.4	32.8	27.2	32.8	33.6	38.0	34.8	5.6			6.6	4.0	3.2	8.8	3.4	65.4	
Sulfate	mg/l	a	19.8	18.4	18.0	21.5	20.8	18.0	8.9	107			136	210	202	16.9	18.8	5.4	
		b	20.1	18.4	18.0	21.5	20.5	20.5	9.7	110			*	207	158	10.7	18.8	3.5	
Temperature	°C	a	15.0	15.3	14.0	23.0	16.0	15.0	18.0	19.5			19.5	21.5	21.5	22.2	21.0	21.0	
		b	15.0	15.0	14.0	23.0	16.0	15.0	18.0	19.5			19.5	21.5	21.5	22.2	21.0	21.0	
Turbidity	NTU	a	4	3	3	4	5	5	14	7			9	5	6	7	5	5	
		b	3	2	5	5	4	4	17	7			7	5	5	6	5	5	

* Measurements not taken.

** No samples were collected because ponds were dry.



Table E-2

General Water Quality Parameters at Lake Michigan and Pond Stations,
Bailly Study Area, August 1980 (Page 1 of 2)

Parameter	Unit	Rep	Station															
			15	25	28	35	38	45	55	58	65	68	75	85	88			
Alkalinity*	mg/l	a	73	79	118	89	58	57	120	77	72	67	86	116	116	50	123	
		b	106	77	58	101	106	121	42	107	99	106	70	116	118	112	114	
Calcium, soluble	mg/l	a	24.1	24.0	35.8	21.4	22.7	21.3	35.8	23.0	24.9	24.1	30.0	34.8	34.0	***	34.9	
		b	33.9	23.9	19.7	37.1	31.8	36.2	13.1	32.7	29.3	29.4	25.4	35.5	35.2	***	33.8	
Chloride, total	mg/l	a	18.0	9.3	9.1	9.3	8.8	5.1	9.4	8.0	8.8	9.3	9.1	8.7	9.1	8.9	9.0	
		b	8.9	8.5	6.6	9.3	9.8	8.8	9.5	9.4	8.9	9.5	8.9	8.8	8.9	8.8	8.9	
Color, true	Pt-Co	a	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	
		b	<1	1	<1	<1	1	<1	2	<1	<1	<1	<1	<1	<1	<1	1	
Conductance	umhos	a	270	225	252	249	250	232	252	230	240	240	215	200	250	254	260	
		b	270	225	252	249	250	232	252	230	240	240	215	200	250	254	260	
Fluoride, soluble	mg/l	a	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		b	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hardness	mg/l	a	111	98	126	90	75	65	128	90	86	98	113	130	124	128	124	
		b	120	188	85	128	109	132	61	117	105	105	92	128	128	132	128	
Magnesium, soluble	mg/l	a	9.9	9.8	10.5	10.2	10.2	6.9	10.6	9.1	9.8	10.3	10.4	10.6	10.5	***	10.5	
		b	10.1	9.6	8.5	10.6	10.5	10.5	9.2	10.5	10.5	10.4	10.3	10.5	10.5	***	10.5	
Odor, threshold***	Pos/Neg	a																
		b																
Oxygen, dissolved	mg/l	a	8.6	8.3	8.1	8.4	9.3	9.0	9.2	9.5	9.4	9.6	10.0	9.8	10.0	9.4	9.2	
		b	8.6	8.3	8.1	8.4	9.3	9.0	9.2	9.5	9.4	9.6	10.0	9.8	10.0	9.4	9.2	
Oxygen saturation	%	a	89	88	75	85	88	80	97	96	90	97	97	89	102	97	88	
		b	89	88	75	85	88	80	97	96	90	97	97	89	102	97	88	
pH	pH	a	7.8	7.5	7.9	7.9	7.9	7.6	8.0	8.0	7.8	7.9	7.9	7.8	8.0	8.0	7.8	
		b	7.8	7.5	7.9	7.9	7.9	7.6	8.0	8.0	7.8	7.9	7.9	7.8	8.0	8.0	7.8	
Potassium, soluble	mg/l	a	1.24	1.27	1.34	1.31	1.28	0.73	1.27	1.09	1.20	1.25	1.24	1.20	1.24	***	1.19	
		b	1.22	1.21	0.96	1.31	1.29	1.15	1.29	1.29	1.20	1.29	1.20	1.20	1.25	***	1.26	
Sodium, soluble	mg/l	a	4.97	5.15	5.18	5.19	5.06	3.11	5.06	4.42	4.92	5.08	4.95	4.91	5.03	***	4.81	
		b	4.94	4.90	3.91	5.26	5.23	4.56	5.35	5.11	4.83	5.32	4.82	4.82	5.98	***	4.96	
Solids, total dissolved (TDS)	mg/l	a	203	102	166	168	77	78	117	113	125	156	158	420	170	111	173	
		b	191	105	162	173	77	105	100	165	161	163	161	161	171	176	163	
Solids, total suspended (TSS)	mg/l	a	2.0	21.0	0.0	0.5	26.0	47.0	25.0	30.5	29.0	1.5	2.5	4.0	1.3	43.5	5.5	
		b	0.5	28.0	1.3	3.3	1.5	28.5	26.0	3.5	2.5	2.5	2.0	3.0	0.5	3.5	2.0	
Sulfate	mg/l	a	22.3	21.5	21.5	21.5	21.0	15.1	22.4	28.6	12.9	13.9	13.9	12.9	16.1	15.3	16.3	
		b	21.7	20.5	17.5	28.2	22.7	21.1	18.3	12.0	13.3	14.2	13.9	14.5	16.0	16.3	23.6	
Temperature	°C	a	17.0	18.2	12.2	16.5	13.0	10.5	18.0	16.5	13.5	16.5	14.5	11.5	16.5	17.0	14.0	
		b	17.0	18.2	12.2	16.5	13.0	10.5	18.0	16.5	13.5	16.5	14.5	11.5	16.5	17.0	14.0	
Turbidity	NTU	a	2	2	2	1	1	2	2	2	4	2	2	2	2	2	2	
		b	2	2	2	1	1	1	1	2	2	1	2	2	1	2	1	

* Several unusually low values from lake stations were possibly due to contamination during sampling.

** No samples collected because ponds were dry.

*** Measurements not taken.



Table E-3 (Contd)

Parameter	Unit	Rep	Station															
			95	96	98	105	115	125	225	135	145**	155**	165	175**	185**	195	205	215
Alkalinity*	mg/L	a	113	126	133	125	120	109	52	13.8			60.2			30.6	31.4	269
		b	126	127	127	120	114	110	73	9.8			50.4			24.4	20.3	249
Calcium, soluble	mg/L	a	34.8	34.2	35.3	35.8	35.1	35.1	19.7	51.5			53.9			26.8	20.8	48.9
		b	****	34.7	****	35.4	35.8	35.4	24.2	51.9			50.8			26.4	18.8	42.9
Chloride, total	mg/L	a	8.9	9.1	8.5	9.3	9.3	9.3	8.8	9.8			9.9			5.2	4.0	6.3
		b	8.9	9.6	8.4	9.3	9.3	9.7	8.9	10.1			11.0			4.0	4.0	6.8
Color, true	Pt-Co	a	<1	<1	<1	<1	<1	<1	<1	80			8			29	23	270
		b	<1	<1	<1	<1	<1	<1	<1	75			9			26	24	290
Conductance	umhos	a	235	245	245	234	219	240	250	430			400			217	95	365
		b	235	245	245	234	219	240	250	430			400			217	195	365
Fluoride, soluble	mg/L	a	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1			0.2			0.2	0.2	0.2
		b	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1			0.2			0.2	0.2	0.2
Hardness	mg/L	a	124	126	130	115	128	128	128	167			173			102	87	233
		b	128	128	150	135	139	132	132	175			173			105	90	128
Magnesium, soluble	mg/L	a	10.5	10.4	10.5	10.5	10.5	10.6	9.6	12.8			12.7			8.3	8.1	21.4
		b	****	10.5	****	10.5	10.5	10.5	10.1	12.7			10.9			7.7	7.3	22.6
Odor, threshold***	Pos/Neg	a																
		b																
Oxygen, dissolved	mg/L	a	9.3	10.2	7.6	8.0	9.0	8.5	8.2	5.2			5.8			5.0	6.5	1.2
		b	9.3	10.2	9.6	8.0	9.0	8.5	8.2	5.2			5.6			5.0	6.3	1.2
Oxygen saturation	%	a	96	96	87	93	95	89	87	64			67			73	80	14
		b	96	96	87	93	95	89	87	64			67			73	80	14
pH	pH	a	8.1	8.0	7.7	8.0	7.8	7.8	8.0	5.9			6.7			6.6	7.1	7.0
		b	8.1	8.0	7.7	8.0	7.8	7.8	8.0	5.9			6.7			6.6	7.1	7.0
Potassium, soluble	mg/L	a	1.24	1.22	1.14	1.30	1.29	1.44	1.76	4.72			4.16			0.98	0.73	1.07
		b	****	1.23	****	1.35	1.30	1.46	1.26	4.71			3.29			0.77	1.00	1.09
Sodium, soluble	mg/L	a	5.00	4.83	4.57	5.02	5.04	5.42	4.31	18.34			20.65			5.28	3.77	6.63
		b	****	4.90	****	5.17	5.08	5.51	4.36	18.51			15.65			4.44	4.62	6.54
Solids, total dissolved (TDS)	mg/L	a	158	160	162	167	167	167	165	332			313			176	140	344
		b	159	158	159	171	165	170	124	348			312			190	146	398
Solids, total suspended (TSS)	mg/L	a	1.5	3.5	8.0	4.0	7.0	7.0	3.5	56.0			9.0			4.5	5.5	66.5
		b	2.0	2.0	3.0	2.5	2.5	0.5	34.0	68.0			8.5			2.7	6.0	12.5
Sulfate	mg/L	a	20.9	19.0	18.8	21.2	19.6	21.4	18.7	266			156			60	32	21
		b	20.1	19.0	18.9	22.6	25.6	27.6	19.7	237			136			70	33	18
Temperature	°C	a	17.0	13.0	11.2	23.5	18.2	18.0	18.5	27.0			25.5			26.7	26.7	24.0
		b	17.0	13.0	11.2	23.5	18.2	18.0	18.5	29.0			25.5			26.7	26.7	24.0
Turbidity	NTU	a	2	2	3	2	2	2	2	68			16			3	3	4
		b	1	1	2	2	2	2	2	71			17			3	2	4

**** Samples lost during analysis.



Table E-4

General Water Quality Parameters at Lake Michigan and Pond Stations,*
Bailey Study Area, November 1980

Parameter	Unit	Rep	1S	2S	2B	3S	3M	3B	4S	5S	5B	6S	6M	6B	7S
Alkalinity	mg/L	a	140	138	126	136	140	138	138	135	142	136	138	136	142
		b	140	135	140	138	140	138	152	124	140	138	140	138	138
Calcium, soluble	mg/L	a	32.9	33.0*	37.0	30.6	29.7	32.6	30.4	31.1	32.8	33.4	30.0	30.9	37.0
		b	35.5	31.8	32.5	31.3	31.5	31.8	36.3	36.3	28.7	31.8	32.1	37.0	30.6
Chloride, total	mg/L	a	10	10.5	9.3	9.7	9.5	9.7	9.4	9.5	9.4	9.7	9.0	8.8	10.0
		b	9.8	10.4	9.7	9.8	10.2	9.7	9.4	9.4	9.4	9.5	8.8	8.8	9.0
Color, true	Pt-Co	a	<1.0	1.7	5.5	6.0	<1.0	6.0	<1.0	<1.0	<1.0	1.4	3.1	2.2	7.4
		b	1.7	1.7	6.0	5.7	<1.0	6.0	<1.0	<1.0	<1.0	1.7	3.1	2.3	3.4
Conductance	umhos	a	215	233	228	251	245	198	212	240	255	250	225	208	213
		b	215	233	228	251	245	198	212	240	255	250	225	208	213
Fluoride, soluble	mg/L	a	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		b	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Hardness	mg/L	a	135.2	133.0	146.1	117.7	117.7	126.4	117.7	126.4	133.0	126.4	113.4	95.9	113.4
		b	124.3	126.4	128.6	126.4	117.7	135.2	148.2	154.8	109.0	122.1	126.4	157.0	113.4
Magnesium, soluble	mg/L	a	10.8	10.9	10.6	10.3	10.4	10.6	10.5	10.3	10.7	10.4	10.4	10.4	8.9
		b	10.7	10.4	10.6	10.4	10.2	10.3	10.5	10.3	10.4	10.4	10.5	10.3	10.3
Odor, threshold	Pos/Neg	a	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg
		b	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Oxygen, dissolved	mg/L	a	12.2	11.0	10.9	10.0	10.3	10.4	12.4	12.2	12.4	11.8	12.0	12.1	12.8
		b	12.2	11.0	10.9	10.0	10.3	10.4	12.4	12.2	12.4	11.8	12.0	12.1	12.8
Oxygen saturation	%	a	100	92	92	84	87	85	100	101	99	98	100	98	102
		b	100	97	92	84	87	85	100	101	99	98	100	98	102
pH	pH	a	8.1	8.2	8.3	8.5	8.5	8.5	8.5	8.5	8.5	8.2	8.6	8.8	8.1
		b	8.1	8.2	8.3	8.5	8.5	8.5	8.5	8.5	8.5	8.2	8.6	8.8	8.1
Potassium, soluble	mg/L	a	1.70	1.47	1.37	1.36	1.40	1.41	1.32	1.41	1.51	1.36	1.33	1.32	1.97
		b	1.36	1.8	1.43	1.33	1.38	1.39	1.39	1.36	1.34	1.35	1.30	1.31	1.30
Sodium, soluble	mg/L	a	6.31	6.01	5.58	5.66	5.70	5.68	5.37	5.44	5.39	5.49	5.44	5.41	7.13
		b	5.53	5.77	5.69	5.59	5.55	5.62	5.44	5.44	5.37	5.48	5.39	5.37	5.34
Solids, total dissolved (TDS)	mg/L	a	177	149	186	132	145	148	144	157	149	146	141	152	241
		b	172	160	192	156	143	148	152	176	145	144	150	151	148
Solids, total suspended (TSS)	mg/L	a	13	14	4	14	31	47	24	14	18	16	14	24	21
		b	27	13	17	12	24	41	6	6	23	11	12	12	21
Sulfate	mg/L	a	20.7	26.1	23.5	23.5	22.6	23.5	23.5	22.6	22.6	22.6	23.5	22.6	25.2
		b	23.5	26.1	23.5	24.3	23.5	24.3	25.2	22.6	23.5	22.6	21.7	24.3	23.5
Temperature	°C	a	7.0	8.0	8.0	8.0	8.0	7.0	6.5	7.5	6.0	7.5	7.5	6.5	6.0
		b	7.0	8.0	8.0	8.0	8.0	7.0	6.5	7.5	6.0	7.5	7.5	6.5	6.0
Turbidity	NTU	a	3	3	3	3	3	12	5	4	3	3	2	2	3
		b	3	3	2	2	2	6	5	3	3	2	2	3	2



Table E-4 (Contd)

Parameter	Unit	Rep	85	88	95	9M	9B	105	115	125	135	165	195	205	215
Alkalinity	mg/L	a	136	140	140	135	144	140	140	138	54	65	80	75	285
		b	140	135	140	135	136	140	136	147	52	70	77	75	271
Calcium, soluble	mg/L	a	30.8	26.9	30.0	30.9	32.6	30.3	30.3	27.3	108.4	102.8	26.4	25.7	52.2
		b	30.1	31.1	30.6	32.9	31.9	37.1	27.1	31.8	149.9	141.6	26.1	26.2	49.7
Chloride, total	mg/L	a	9.0	8.8	8.8	8.8	8.8	9.5	9.0	11.0	13.0	14.0	7.5	8.0	17.0
		b	9.0	9.0	8.8	8.8	8.5	9.5	9.0	11.0	13.0	13.7	8.5	8.0	16.0
Color, true	Pt-Co	a	3.9	4.5	<1.0	<1.0	<1.0	1.5	1.4	1.5	3.0	4.9	19.2	17.1	62.8
		b	3.9	4.5	<1.0	<1.0	<1.0	1.5	1.5	<1.0	2.2	4.7	19.2	17.3	67.5
Conductance	umhos	a	182	219	189	298	288	221	225	251	760	740	214	220	400
		b	182	219	189	298	288	221	225	251	760	740	214	220	400
Fluoride, soluble	mg/L	a	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7	0.6	0.2	0.2	0.4
		b	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.5	0.2	0.2	0.3
Hardness	mg/L	a	122.1	89.4	130.8	126.4	124.3	122.1	122.1	102.5	311.7	300.8	191.8	95.9	242.0
		b	137.3	126.4	119.9	126.4	117.7	143.9	104.6	122.1	320.5	309.6	139.5	106.8	255.1
Magnesium, soluble	mg/L	a	10.5	8.8	10.6	9.9	10.0	11.6	11.3	11.6	12.8	14.8	10.2	9.6	24.6
		b	9.9	10.3	9.9	10.0	9.8	11.6	11.5	11.6	19.2	17.8	9.9	9.5	25.6
Odor,	Pos/Neg	a	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Pos	Neg	Pos	Neg	Neg
		b	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Pos	Pos	Neg	Neg	Neg	Neg
Oxygen, dissolved	mg/L	a	12.3	12.2	11.8	11.7	11.6	10.0	12.3	11.6	6.7	6.8	10.9	10.2	5.2
		b	12.3	12.2	11.8	11.7	11.6	10.0	12.3	11.6	6.7	6.8	10.9	10.2	5.2
Oxygen saturation	%	a	100	101	99	98	97	89	101	99	56	57	83	73	44
		b	100	101	99	98	97	89	101	99	56	57	83	73	44
pH	pH	a	8.3	8.5	8.7	8.8	8.5	8.2	8.3	8.3	7.2	7.1	7.6	7.8	7.3
		b	8.3	8.5	8.7	8.8	8.5	8.2	8.3	8.3	7.2	7.1	7.6	7.8	7.3
Potassium, soluble	mg/L	a	1.37	1.47	1.35	1.28	1.29	1.49	1.37	1.62	12.4	9.5	1.46	1.41	2.03
		b	1.34	1.33	1.36	1.26	1.28	1.46	1.35	1.59	18.4	12.5	1.46	1.40	1.83
Sodium, soluble	mg/L	a	5.53	5.51	5.45	5.16	5.30	5.74	5.63	6.60	22.6	23.9	6.40	6.24	13.1
		b	5.39	5.40	5.38	5.24	5.06	5.83	5.49	6.49	35.0	29.9	6.48	6.28	12.6
Solids, total dissolved (TDS)		a	148	122	152	150	159	165	172	147	514	498	169	168	319
		b	135	140	138	154	149	175	147	163	519	498	169	168	319
Solids, total suspended (TSS)	mg/L	a	13	25	12	27	55	31	22	33	9	9	8	13	17
		b	28	15	24	23	33	7	31	21	10	8	8	8	14
Sulfate	mg/L	a	23.5	27.6	22.6	22.6	23.5	26.1	23.5	24.3	301	275	38.7	38.7	6.49
		b	23.5	22.6	22.6	23.5	22.6	25.2	23.5	25.2	306	279	38.7	34.3	4.70
Temperature	°C	a	7.0	7.5	8.0	8.0	8.0	10.5	7.0	8.5	8.0	8.0	4	4	9.0
		b	7.0	7.5	8.0	8.0	8.0	10.5	7.0	8.5	8.0	8.0	4	4	8.0
Turbidity	NTU	a	2	3	2	1	4	2	2	3	9	7	1	1	3
		b	2	2	1	2	3	2	3	2	10	6	1	1	4

* No samples collected at pond stations 14, 15, 17, or 18 (ponds were dry).



Table E-5

**Aquatic Nutrients at Lake Michigan and Pond Stations,
Bailey Study Area, April 1980**

Parameter	Unit	Rep	Station									
			1S	2S	2B	3S	3M	3B	4S	5S	5B	6S
Ammonia, soluble	mg/l	a	0.042	0.055	0.046	0.069	0.040	0.032	0.016	0.032	0.034	0.036
		b	0.051	0.045	0.039	0.068	0.045	0.035	0.040	0.027	0.052	0.033
Nitrate, soluble	mg/l	a	0.372	0.452	0.403	0.362	0.375	0.272	0.353	0.350	0.343	0.350
		b	0.367	0.452	0.394	0.412	0.367	0.269	0.353	0.351	0.342	0.351
Nitrite, soluble	mg/l	a	0.005	0.009	0.009	0.009	0.008	0.006	0.008	0.007	0.008	0.007
		b	0.005	0.010	0.008	0.010	0.009	0.005	0.008	0.008	0.007	0.008
Organic nitrogen, total	mg/l	a	0.557	0.553	0.565	0.519	0.601	0.573	0.590	0.543	0.590	0.592
		b	0.555	0.561	0.569	0.537	0.595	0.575	0.578	0.563	0.559	0.595
Orthophosphate, total	mg/l	a	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
		b	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005
Phosphorus, total	mg/l	a	0.019	0.059	0.066	0.038	0.057	0.031	0.035	0.025	0.017	0.014
		b	0.031	0.066	0.075	0.031	0.054	0.037	0.020	0.015	0.024	0.053
Silica, soluble	mg/l	a	1.07	1.33	1.15	1.28	1.08	0.85	1.00	1.08	1.03	1.04
		b	1.02	1.30	1.14	1.24	1.02	0.85	1.05	1.03	1.08	1.00

Parameter	Unit	Rep	6M	6B	7S	8S	8B	9S	9M	9B	10S	11S
Ammonia, soluble	mg/l	a	0.038	0.033	0.025	0.025	0.023	0.015	0.017	0.021	0.092	0.041
		b	0.036	0.032	0.023	0.023	0.024	0.021	0.015	0.023	0.108	0.038
Nitrate, soluble	mg/l	a	0.305	0.368	0.331	0.322	0.300	0.253	0.251	0.264	0.388	0.344
		b	0.322	0.368	0.331	0.322	0.299	0.251	0.250	0.264	0.383	0.341
Nitrite, soluble	mg/l	a	0.007	0.007	0.007	0.006	0.005	0.005	0.004	0.005	0.011	0.007
		b	0.007	0.007	0.006	0.006	0.005	0.005	0.004	0.005	0.011	0.007
Organic nitrogen, total	mg/l	a	0.572	0.554	0.429	0.419	0.419	0.439	0.437	0.397	0.351	0.387
		b	0.557	0.568	0.421	0.419	0.428	0.443	0.402	0.397	0.337	0.392
Orthophosphate, total	mg/l	a	<0.002	<0.002	<0.002	<0.002	0.500	<0.002	<0.002	<0.002	<0.002	<0.002
		b	<0.002	<0.002	0.445	<0.002	<0.002	0.725	<0.002	<0.002	<0.002	<0.002
Phosphorus, total	mg/l	a	0.030	0.015	<0.002	0.009	0.565	0.006	0.031	<0.002	<0.002	<0.002
		b	0.026	0.011	0.573	<0.002	0.004	1.09	<0.002	<0.002	<0.002	<0.002
Silica, soluble	mg/l	a	0.74	0.61	0.80	0.80	0.75	0.83	0.81	0.90	3.96	1.09
		b	0.98	0.80	0.79	0.79	0.77	0.88	0.81	0.88	3.63	1.05

Parameter	Unit	Rep	12S	22S*	13S	14S	15S	16S	17S	18S	19S	20S	21S
Ammonia, soluble	mg/l	a	0.059		0.053	0.191	0.051	0.096	0.154	0.123	0.061	0.105	0.006
		b	0.058		0.040	0.184	0.067	0.084	0.070	0.098	0.131	0.077	0.005
Nitrate, soluble	mg/l	a	0.005		0.005	0.060	0.005	0.400	0.070	0.037	0.239	0.481	0.392
		b	0.005		0.005	0.060	0.005	0.405	0.060	0.040	0.243	0.483	0.381
Nitrite, soluble	mg/l	a	0.004		0.004	0.006	0.004	0.008	0.006	0.006	0.010	0.011	0.015
		b	0.004		0.004	0.007	0.004	0.008	0.005	0.009	0.010	0.011	0.015
Organic nitrogen, total	mg/l	a	0.379		0.386	0.273	0.403	0.362	0.344	0.371	0.490	0.454	0.569
		b	0.378		0.400	0.292	0.389	0.376	0.428	0.377	0.414	0.496	0.576
Orthophosphate, total	mg/l	a	<0.002		<0.002	0.052	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
		b	<0.002		<0.002	0.055	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Phosphorus, total	mg/l	a	<0.002		0.003	0.048	<0.002	<0.002	<0.002	<0.002	<0.002	0.017	<0.002
		b	<0.002		<0.002	0.050	<0.002	<0.002	<0.002	<0.002	<0.002	0.018	<0.002
Silica, soluble	mg/l	a	1.22		1.96	6.63	1.69	2.46	0.38	0.43	0.51	0.43	5.59
		b	1.21		2.02	6.84	1.67	0.48	0.41	0.45	0.49	0.46	5.44

* No sample collected because power plant was offline.



Table E-6

Aquatic Nutrients at Lake Michigan and Pond Stations,
Bailly Study Area, June 1980

Parameter	Unit	Rep	Station									
			15	25	28	35	3M	38	45	55	58	65
Ammonia, soluble	mg/l	a	0.022	0.017	0.020	0.016	0.017	0.016	0.014	0.014	0.021	0.018
		b	0.023	0.014	0.017	0.017	0.017	0.017	0.014	0.014	0.026	0.022
Nitrate, soluble	mg/l	a	0.223	0.218	0.212	0.215	0.197	0.201	0.196	0.212	0.210	0.218
		b	0.219	0.215	0.214	0.216	0.196	0.216	0.201	0.213	0.214	0.219
Nitrite, soluble	mg/l	a	0.004	0.004	0.007	0.004	0.014	0.005	0.004	0.004	0.004	0.005
		b	0.003	0.004	0.004	0.004	0.003	0.005	0.005	0.005	0.005	0.005
Organic nitrogen, total	mg/l	a	0.852	0.843	0.600	0.404	0.323	0.219	0.319	0.319	0.469	0.355
		b	0.677	0.866	0.443	0.443	0.323	0.356	0.378	0.319	0.444	0.723
Orthophosphate, total	mg/l	a	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
		b	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Phosphorus, total	mg/l	a	0.012	0.012	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
		b	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Silica, soluble	mg/l	a	0.226	0.259	0.284	0.259	0.226	0.247	0.121	0.225	0.226	0.242
		b	0.224	0.253	0.267	0.261	0.229	0.257	0.217	0.223	0.242	0.232

Parameter	Unit	Rep	6M	6B	75	85	8B	95	9M	9B	105	115
Ammonia, soluble	mg/l	a	0.025	0.026	0.018	0.020	0.016	0.010	0.028	0.016	0.031	0.061
		b	0.024	0.019	0.023	0.016	0.018	0.031	0.027	0.020	0.036	0.055
Nitrate, soluble	mg/l	a	0.202	0.213	0.196	0.211	0.213	0.203	0.202	0.203	0.198	0.198
		b	0.211	0.203	0.202	0.211	0.210	0.202	0.198	0.191	0.197	0.195
Nitrite, soluble	mg/l	a	0.005	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.004
		b	0.003	0.004	0.004	0.003	0.003	0.005	0.003	0.003	0.003	0.003
Organic nitrogen, total	mg/l	a	0.308	0.484	0.257	0.353	0.384	0.490	0.305	0.434	0.452	0.566
		b	0.505	0.412	0.408	0.298	0.399	0.419	0.473	0.313	0.547	0
Orthophosphate, total	mg/l	a	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
		b	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Phosphorus, total	mg/l	a	<0.006	<0.006	0.081	<0.006	<0.006	0.042	0.018	<0.006	<0.006	<0.006
		b	<0.006	<0.006	0.100	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.012
Silica, soluble	mg/l	a	0.257	0.263	0.130	0.246	0.263	0.246	0.241	0.232	0.189	0.204
		b	0.269	0.230	0.152	0.256	0.259	0.246	0.236	0.261	0.196	0.180

Parameter	Unit	Rep	125	125	135	145*	155*	165	175	185	195	205	215
Ammonia, soluble	mg/l	a	0.024	0.015	0.047			0.102	0.077	0.042	0.172	0.122	0.011
		b	0.018	0.016	0.041			0.103	0.072	0.044	0.147	0.115	0.021
Nitrate, soluble	mg/l	a	0.193	0.190	0.24*			0.226	0.010	0.009	0.006	0.006	0.005
		b	0.190	0.198	0.243			0.223	0.010	0.006	0.013	0.010	0.006
Nitrite, soluble	mg/l	a	0.002	0.008	0.041			0.031	0.005	0.006	0.006	0.005	0.006
		b	0.003	0.008	0.041			0.005	0.005	0.005	0.008	0.008	0.006
Organic nitrogen, total	mg/l	a	0.599	0.484	0.609			0.472	0.874	0.988	1.24	2.09	1.96
		b	0.408	0.623	0.648			0.504	1.16	0.986	1.33	2.23	1.36
Orthophosphate, total	mg/l	a	<0.006	<0.006	<0.006			<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
		b	<0.006	<0.006	<0.006			<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Phosphorus, total	mg/l	a	<0.006	0.032	0.024			0.024	0.012	0.024	0.019	0.032	0.038
		b	<0.006	0.019	0.024			0.012	0.012	0.018	0.019	0.032	0.045
Silica, soluble	mg/l	a	0.175	0.200	0.69			3.60	0.245	0.234	0.215	0.231	15.6
		b	0.206	0.260	2.73			2.40	0.228	0.172	0.336	0.273	15.6

* No samples were collected because ponds were dry.



Table E-7

Aquatic Nutrients at Lake Michigan and Pond Stations,
Bailly Study Area, August 1980

Parameter	Unit	Rep	Station									
			15	25	28	35	38	45	55	58	65	
Ammonia, soluble	mg/L	A	0.008	0.014	0.022	0.019	0.019	0.008	0.023	0.020	0.020	
	B		0.045	0.085	0.023	0.017	0.025	0.015	0.032	0.022	0.033	
Nitrate, soluble	mg/L	A	0.310	0.290	0.276	0.290	0.358	0.324	0.338	0.218	0.206	
	B		0.275	0.303	0.283	0.324	0.255	0.359	0.331	0.212	0.277	
Nitrite, soluble	mg/L	A	0.010	0.012	0.012	0.013	0.012	0.012	0.009	0.012	0.013	
	B		0.012	0.013	0.012	0.013	0.007	0.016	0.010	0.012	0.011	
Organic nitrogen, total	mg/L	A	0.288	0.198	0.210	0.166	0.101	0.153	0.052	0.089	0.151	
	B		0.112	0.204	0.142	0.128	0.135	0.193	0.087	0.147	0.118	
Orthophosphate, total	mg/L	A	0.071	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	
	B		0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Phosphorus, total	mg/L	A	0.123	0.114	0.123	0.101	0.107	0.102	0.115	0.074	0.093	
	B		0.132	0.140	0.121	0.107	0.083	0.097	0.102	0.074	0.093	
Silica, soluble	mg/L	A	0.446	0.639	0.431	0.531	0.498	0.491	0.455	0.774	0.545	
	B		0.462	0.626	0.649	0.531	0.488	0.548	0.527	0.753	0.548	
Station												
Ammonia, soluble	mg/L	A	0.017	0.016	0.014	0.009	0.016	0.009	0.001	0.028	0.023	
	B		0.015	0.015	0.014	0.010	0.014	0.008	0.030	0.023	0.015	
Nitrate, soluble	mg/L	A	0.200	0.294	0.290	0.271	0.273	0.273	0.290	0.276	0.225	
	B		0.284	0.290	0.194	0.273	0.273	0.200	0.254	0.216	0.225	
Nitrite, soluble	mg/L	A	0.011	0.011	0.012	0.010	0.008	0.007	0.008	0.001	0.001	
	B		0.010	0.011	0.012	0.009	0.008	0.002	0.002	0.001	0.001	
Organic nitrogen, total	mg/L	A	0.158	0.171	0.114	0.176	0.176	0.121	0.168	0.082	0.171	
	B		0.171	0.174	0.033	0.141	0.175	0.059	0.157	0.085	0.125	
Orthophosphate, total	mg/L	A	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
	B		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Phosphorus, total	mg/L	A	0.097	0.097	0.079	0.097	0.098	0.087	0.08	0.006	0.022	
	B		0.079	0.097	0.055	0.085	0.097	0.009	0.012	0.025	0.006	
Silica, soluble	mg/L	A	0.509	0.618	0.440	0.498	0.739	0.544	2.79	0.537	0.491	
	B		0.535	0.571	0.86	0.503	0.520	0.54	2.57	0.535	0.533	
Station												
Ammonia, soluble	mg/L	A	0.006	0.018	1.38	0.92	0.92	0.22	0.22	0.16	0.071	
	B		0.004	0.016	1.92	0.93	0.93	0.27	0.27	0.007	0.068	
Nitrate, soluble	mg/L	A	0.225	0.275	0.254	0.458	0.458	0.356	0.356	0.012	0.048	
	B		0.275	0.227	0.451	0.364	0.364	0.076	0.076	0.004	0.072	
Nitrite, soluble	mg/L	A	0.001	0.003	0.002	0.020	0.020	0.021	0.021	0.001	0.002	
	B		0.002	0.002	0.021	0.019	0.019	0.001	0.001	0.001	0.002	
Organic nitrogen, total	mg/L	A	0.104	0.273	0.140	0.017	0.017	0.168	0.151	0.0726	1.39	
	B		0.065	0.089	0.011	0.155	0.155	0.197	0.197	0.001	1.40	
Orthophosphate, total	mg/L	A	0.001	0.009	0.007	0.006	0.006	0.001	0.001	0.001	0.017	
	B		0.001	0.009	0.007	0.004	0.004	0.001	0.001	0.014	0.127	
Phosphorus, total	mg/L	A	0.006	0.019	0.007	0.007	0.007	0.012	0.012	0.010	0.148	
	B		0.006	0.014	0.008	0.007	0.007	0.012	0.012	0.010	0.155	
Silica, soluble	mg/L	A	0.560	0.493	2.01	4.90	4.90	3.92	3.92	0.64	27.6	
	B		0.706	0.489	4.62	4.94	4.94	3.54	3.54	0.62	27.6	

*No samples were collected because ponds were dry.



Table E-8

Aquatic Nutrients (mg/l) at Lake Michigan and Pond Stations,* Bailly Study Area, November 1980

Parameter	Rep	1S	2S	2B	3S	3M	3B	4S	5S	5B	6S	6M	6B	7S
Ammonia, soluble	a	<0.008	0.008	0.010	<0.008	<0.008	0.011	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
	b	<0.008	<0.008	0.012	<0.008	0.008	0.010	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Nitrate, soluble	a	0.211	0.226	0.214	0.217	0.209	0.217	0.218	0.222	0.215	0.207	0.215	0.222	0.217
	b	0.221	0.221	0.221	0.215	0.215	0.217	0.220	0.219	0.215	0.210	0.215	0.224	0.220
Nitrite, soluble	a	0.006	0.007	0.007	0.007	0.005	0.007	0.006	0.007	0.007	0.007	0.005	0.006	0.006
	b	0.006	0.007	0.007	0.007	0.006	0.007	0.006	0.007	0.007	0.005	0.006	0.005	0.008
Organic nitrogen, total	a	0.240	0.201	0.123	0.128	0.115	0.383	0.132	0.080	0.150	0.153	0.080	0.080	0.948
	b	0.259	0.178	0.197	0.083	0.115	0.549	0.132	0.098	0.115	0.150	0.157	0.101	0.178
Orthophosphate, total	a	0.498	0.005	<0.004	0.014	<0.004	0.012	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
	b	<0.004	0.005	<0.004	<0.004	<0.004	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Phosphorus, total	a	0.479	0.015	0.030	0.031	0.015	0.093	0.015	0.003	0.003	0.023	0.003	0.017	0.196
	b	0.054	0.031	0.048	0.022	0.015	0.093	0.006	0.003	0.031	0.025	0.003	0.016	0.023
Silica, soluble	a	0.438	0.197	0.156	0.103	0.125	0.984	0.102	0.122	0.109	0.114	0.185	0.303	0.935
	b	0.213	0.156	0.188	0.128	0.133	0.734	0.141	0.128	0.214	0.136	0.318	0.212	0.189
Parameter	Rep	8S	8B	9S	9M	9B	10S	11S	12S	13S	16S	19S	20S	21S
Ammonia, soluble	a	<0.008	0.012	<0.008	0.008	<0.008	0.009	<0.008	0.013	0.155	0.146	0.038	<0.008	0.019
	b	<0.008	<0.008	<0.008	<0.008	<0.008	0.008	<0.008	0.013	0.149	0.139	0.037	<0.008	0.030
Nitrate, soluble	a	0.225	0.228	0.215	0.215	0.216	0.228	0.224	0.203	0.363	0.388	<0.002	<0.002	<0.002
	b	0.224	0.215	0.219	0.215	0.219	0.228	0.189	0.203	0.387	0.373	<0.002	<0.002	<0.002
Nitrite, soluble	a	0.006	0.010	0.006	0.007	0.006	0.006	0.006	0.006	0.112	0.073	<0.002	<0.002	<0.002
	b	0.007	0.006	0.006	0.006	0.007	0.006	0.004	0.006	0.133	0.073	<0.002	<0.002	<0.002
Organic nitrogen, total	a	0.136	0.079	0.178	0.199	0.401	0.218	0.327	0.055	0.193	0.288	0.664	0.525	0.876
	b	0.157	0.083	0.116	0.219	0.288	0.178	0.221	0.094	0.351	0.315	0.649	0.620	1.03
Orthophosphate, total	a	<0.004	<0.004	<0.004	<0.004	0.014	<0.004	<0.004	<0.004	0.010	<0.004	<0.004	<0.004	0.010
	b	<0.004	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	<0.004	0.013
Phosphorus, total	a	0.010	0.011	0.005	0.015	0.255	0.023	0.016	0.018	0.038	0.023	0.11	0.015	0.039
	b	0.013	0.005	0.006	0.023	0.102	0.023	0.031	0.015	0.028	0.023	0.023	0.011	0.039
Silica, soluble	a	0.136	0.527	0.118	0.221	0.544	0.279	0.132	0.294	5.53	5.43	0.318	0.104	18.1
	b	0.152	0.228	0.206	0.162	0.544	0.174	0.147	0.191	5.40	5.43	0.318	0.100	18.4

* No samples collected at pond stations 14, 15, 17, or 18 (these ponds were dry).



Table E-9

Indicators of Industrial and Organic Contamination,
Nearshore Pond Stations, Bailly Study Area, April 1980

Parameter	Unit	Rep	Station								
			135	145	155	165	175	185	195	205	215
Bacteria, fecal coliform	No./100 ml	a	<5	<5	<5	<5	50	50	<5	<5	<5
		b	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bacteria, total coliform	No./100 ml	a	<5	<5	200	100	350	625	2850	2475	1000
		b	<5	<5	225	<5	675	450	1725	2725	1725
Biochemical oxygen demand	mg/l	a	12	3	4	7	3	3	7	9	6
		b	11	3	3	8	4	3	8	17	8
Chemical oxygen demand	mg/l	a	15	11	9	9	17	18	25	28	42
		b	14	10	10	11	17	16	27	26	43
Hexane-soluble materials	mg/l	a	1.8	1.8	<0.1	<0.1	1.4	<0.1	1.2	<0.1	1.2
		b	<0.1	0.8	<0.1	1.2	0.8	3.4	0.4	0.4	<0.1
Methylene-blue active substances	mg/l	a	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		b	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Organic carbon, total (TOC)	mg/l	a	3.8	2.8	5.0	2.0	13.3	8.3	17.5	16.0	18.2
		b	46.5	45.0	2.2	1.8	10.8	6.0	13.0	18.8	16.5
Phenols	mg/l	a	0.007	0.007	0.008	0.008	0.005	0.005	0.008	0.010	0.009
		b	0.007	0.008	0.008	0.008	0.005	0.006	0.010	0.010	0.011

Table E-10

Indicators of Industrial and Organic Contamination,
Nearshore Pond Stations, Bailly Study Area, June 1980

Parameter	Unit	Rep	Station								
			135	145*	155*	165	175	185	195	205	215
Bacteria, fecal coliform	No./100 ml	a	<100			100	100	<100	50	325	200
		b	<100			<100	<100	<100	75	125	100
Bacteria, total coliform	No./100 ml	a	250			150	2,000	<100	5,700	1,050	20,300
		b	500			225	1,250	250	4,750	1,850	13,150
Biochemical oxygen demand	mg/l	a	1			1	1	1	5	7	5
		b	2			1	1	1	4	9	7
Chemical oxygen demand	mg/l	a	10			10	21	23	40	35	66
		b	10			10	21	23	44	36	69
Hexane-soluble materials	mg/l	a	4.6			3.4	0.2	<0.1	<0.1	<0.1	<0.1
		c	2.4			1.8	2.8	1.4	<0.1	<0.1	<0.1
Methylene-blue active substances	mg/l	a	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		b	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organic carbon, total (TOC)	mg/l	a	9.8			21.6	14.2	16.1	20.1	21.1	65.8
		b	18.0			11.8	13.5	20.3	25.6	21.8	66.9
Phenols	mg/l	a	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		b	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

* No samples collected because ponds were dry.



Table E-11

Indicators of Industrial and Organic Contamination,
Nearshore Pond Stations, Bailly Study Area, August 1980

Parameter	Unit	Rep	Station								
			135	145*	155*	165	175*	185*	195	205	215
Bacteria, fecal coliform	No./100 ml	a	150			<100			225	300	250
		b	225			100			175	200	1,150
Bacteria, total coliform	No./100 ml	a	2,000			525			3,150	3,100	42,000
			2,150			675			2,175	3,375	75,000
Biochemical oxygen demand	mg/l	a	13			4			2	4	8
		b	3			2			4	4	5
Chemical oxygen demand	mg/l	a	4			9			32	31	57
		b	4			8			30	32	57
Hexane-soluble materials	mg/l	a	3.6			4.8			15.6	8.6	11.4
		b	4.0			4.8			8.2	3.4	16.2
Methylene-blue active substances	mg/l	a	<0.02			<0.02			<0.02	<0.02	<0.02
		b	<0.02			<0.02			<0.02	<0.02	<0.02
Organic carbon, total (TOC)	mg/l	a	0.4			0.8			10.7	10.6	34.0
		b	0.8			0.7			10.3	11.0	26.5
Phenols	mg/l	a	<0.005			<0.005			<0.005	<0.005	<0.005
		b	<0.005			<0.005			<0.005	<0.005	<0.005

* No samples were collected because ponds were dry.

Table E-12

Indicators of Industrial and Organic Contamination,
Nearshore Pond Stations,* Bailly Study Area, November 1980

Parameter	Unit	Rep	135	165	195	205	215
Bacteria, fecal coliform	No./100 ml	a	<20	<20	<20	<20	<20
		b	<20	<20	<20	<20	<20
Bacteria, total coliform	No./100 ml	a	100	50	12,500	450	1,650
		b	250	50	600	750	1,900
Biochemical oxygen demand	mg/l	a	5	3	6	1	5
		b	5	2	1	1	5
Chemical oxygen demand	mg/l	a	6.3	9.9	56.6	53.4	92.0
		b	9.9	9.9	54.4	54.4	92.8
Hexane-soluble materials	mg/l	a	0.012	0.014	0.012	0.014	0.014
		b	0.016	0.026	0.016	0.012	0.020
Methylene-blue active substances	mg/l	a	<0.02	<0.02	<0.02	<0.02	<0.02
		b	<0.02	<0.02	<0.02	<0.02	<0.02
Organic carbon, total (TOC)	mg/l	a	3.8	3.7	11.9	11.8	23.9
		b	3.5	3.7	12.4	12.7	26.6
Phenols	mg/l	a	<0.005	<0.005	<0.005	<0.005	<0.005
		b	<0.005	<0.005	<0.005	<0.005	<0.005

* No samples collected at pond stations 14, 15, 17, or 18 (these ponds were dry).



Table E-13

Trace-Element Concentrations (mg/l) in Water,
Nearshore Pond Stations, Bailly Study Area, April 1980

Parameter	Rep	Station								
		13S	14S	15S	16S	17S	18S	19S	20S	21S
Cadmium, total	a	0.012	0.001	0.001	0.004	0.001	<0.001	<0.001	<0.001	<0.001
	b	0.008	0.002	0.001	0.005	0.002	<0.001	<0.001	<0.001	0.003
Chromium, hexavalent	a	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.006
	b	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.006
Chromium, total	a	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	b	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper, total	a	0.019	0.029	0.020	0.013	0.015	0.013	0.022	0.018	0.033
	b	0.018	0.017	0.028	0.013	0.022	0.023	0.021	0.018	0.039
Iron, soluble	a	0.032	0.064	0.086	0.113	0.152	0.168	0.430	0.510	0.270
	b	0.026	0.112	0.070	0.113	0.146	0.140	0.490	0.445	0.230
Lead, total	a	0.002	0.001	0.001	0.001	0.002	0.002	<0.001	<0.001	<0.001
	b	0.001	0.001	0.001	<0.001	0.003	0.002	<0.001	<0.001	<0.001
Manganese, total	a	0.007	0.033	0.003	0.087	0.008	0.009	0.006	0.025	0.006
	b	0.065	0.028	0.002	0.095	0.009	0.027	0.005	0.007	0.007
Mercury, total	a	0.0021	0.0022	0.0013	0.0013	0.0022	0.0030	0.0017	0.0023	0.0022
	b	0.0015	0.0022	0.0015	0.0015	0.0026	0.0026	0.0022	0.0022	0.0024
Nickel, total	a	0.019	0.001	0.008	0.017	0.017	0.010	<0.001	<0.001	<0.001
	b	0.020	0.002	0.012	0.020	0.012	0.012	<0.001	<0.001	<0.001
Zinc, total	a	0.023	0.005	0.005	0.022	0.012	0.005	0.006	0.004	0.005
	b	0.028	0.004	0.005	0.022	0.013	0.005	0.003	0.005	0.034



Table E-14

Trace-Element Concentrations (mg/l) in Water,
Nearshore Pond Stations, Bailly Study Area, June 1980

Parameter	Rep	Station								
		135	145*	155*	165	175	185	195	205	215
Cadmium, total	a	0.003			0.001	0.001	0.002	0.001	0.001	0.001
	b	0.001			0.001	0.008	0.001	0.001	0.001	0.001
Chromium, hexavalent	a	<0.002			<0.002	0.004	0.003	0.013	0.005	0.006
	b	<0.002			<0.002	0.002	<0.002	0.006	0.006	0.007
Chromium, total	a	<0.001			<0.001	<0.001	0.001	0.001	<0.001	0.001
	b	<0.001			<0.001	<0.001	<0.001	0.001	<0.001	0.001
Copper, total	a	0.012			0.010	0.024	0.021	0.027	0.019	0.019
	b	0.011			0.012	0.037	0.018	0.027	0.022	0.018
Iron, soluble	a	0.001			0.005	0.007	0.010	0.146	0.039	0.130
	b	0.002			0.002	0.055	0.005	0.397	0.021	0.191
Lead, total	a	0.015			0.015	0.011	0.011	0.007	0.006	0.024
	b	0.015			0.015	0.011	0.010	0.006	0.007	0.025
Manganese, total	a	0.007			0.014	0.005	0.006	0.025	0.010	0.032
	b	0.005			0.048	0.009	0.008	0.011	0.006	0.021
Mercury, total	a	0.0031			0.0011	0.0006	0.0007	0.0009	0.0016	0.0011
	b	0.0029			0.0022	0.0007	0.0014	0.0008	0.0010	0.0010
Nickel, total	a	0.008			0.008	0.015	0.017	0.006	0.006	0.004
	b	0.006			0.010	0.016	0.016	0.006	0.006	0.004
Zinc, total	a	0.002			0.001	0.004	0.003	0.006	0.001	0.004
	b	0.001			0.003	0.003	0.002	0.001	0.006	0.008

* Samples not collected because ponds were dry.



Table E-15

Trace-Element Concentrations (mg/l) in Water, Nearshore Pond Stations,
Bailey Study Area, August 1980

Parameter	Rep	Station								
		13S	14S*	15S*	16S	17S*	18S*	19S	20S	21S
Cadmium, total	a	<0.001			<0.001			<0.001	<0.001	<0.001
	b	<0.001			<0.001			<0.001	<0.001	<0.001
Chromium, hexavalent	a	0.006			<0.002			<0.003	<0.002	<0.026
	b	0.005			<0.001			<0.003	<0.003	<0.027
Chromium, total	a	0.016			<0.001			<0.001	<0.001	0.001
	b	0.013			<0.001			<0.001	<0.001	0.001
Copper, total	a	0.208			0.017			0.079	0.072	0.153
	b	0.095			0.024			0.067	0.071	0.125
Iron, soluble	a	0.157			0.009			0.013	0.025	0.376
	b	0.094			0.008			0.047	0.032	0.345
Lead, total	a	<0.001			<0.001			<0.001	<0.001	0.031
	b	<0.001			<0.001			<0.001	<0.001	0.022
Manganese, total	a	0.298			0.160			0.008	0.017	0.018
	b	0.309			0.145			0.024	0.039	0.025
Mercury, total	a	<0.0005			0.001			0.001	0.003	0.009
	b	<0.0005			<0.0005			0.001	<0.0005	0.001
Nickel, total	a	0.225			0.088			0.042	0.037	0.094
	b	0.230			0.107			0.036	0.032	0.097
Zinc, total	a	0.049			0.028			0.033	0.024	0.034
	b	0.050			0.025			0.033	0.016	0.038

* No samples were collected because ponds were dry.



Table E-16

Trace-Element Concentrations (mg/l) in Water from Nearshore Pond Stations,*
Bailey Study Area, November 1980

<u>Parameter</u>	<u>Rep</u>	13S	16S	19S	20S	21S
Cadmium, total	a	<0.001	<0.001	<0.001	<0.001	<0.001
	b	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium, hexavalent	a	<0.001	<0.002	<0.001	<0.001	<0.005**
	b	<0.001	<0.001	<0.001	<0.001	<0.005**
Chromium, total	a	<0.001	<0.001	<0.001	<0.001	<0.001
	b	<0.001	<0.001	<0.001	<0.001	<0.001
Copper, total	a	0.004	0.004	0.009	0.009	0.009
	b	0.004	0.003	0.010	0.008	0.004
Iron, soluble	a	0.027	0.010	0.033	0.018	0.089
	b	0.018	0.011	0.029	0.091	0.074
Lead, total	a	0.009	0.008	0.001	0.001	0.012
	b	0.012	0.010	0.001	<0.001	0.009
Manganese, total	a	0.015	0.043	0.003	0.002	0.003
	b	0.039	0.037	0.002	0.002	0.006
Mercury, total	a	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	b	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel, total	a	0.011	0.011	0.006	0.001	0.003
	b	0.017	0.011	0.003	0.001	0.003
Zinc, total	a	0.008	0.017	<0.001	<0.001	<0.001
	b	0.020	0.014	<0.001	<0.001	<0.001

* No samples collected at pond stations 14, 15, 17, or 18 (these ponds were dry).



Table E-17

Trace-Element Concentrations (mg/kg Dry Weight)* in Sediment Samples,
Nearshore Pond Stations, Bailey Study Area, April 1980

Parameter	Replicate	Station								
		13	14	15	16	17	18	19	20	
Cadmium	a	0.013	0.002	0.002	0.003	0.005	0.003	0.003	0.010	0.003
	b	0.005	0.003	0.005	0.003	0.020	0.002	0.007	0.007	0.007
Chromium	a	<0.003	<0.002	<0.002	0.003	0.003	0.003	0.003	0.003	<0.003
	b	0.003	<0.003	<0.003	0.003	0.005	0.002	0.002	0.002	<0.002
Copper	a	0.050	0.032	0.030	0.020	0.090	0.060	0.061	0.040	0.040
	b	0.033	0.040	0.031	0.023	0.020	0.065	0.045	0.037	0.037
Iron	a	0.003	0.002	0.072	0.150	0.930	0.170	1.300	0.717	0.717
	b	0.010	<0.003	0.123	0.010	0.150	0.620	1.110	0.850	0.850
Lead	a	0.020	0.030	0.015	0.010	0.020	0.026	0.010	0.010	0.010
	b	0.013	0.030	0.010	0.007	0.040	0.027	0.002	0.002	0.012
Manganese	a	0.98	0.17	0.56	0.37	0.26	0.78	0.24	0.19	0.19
	b	1.55	0.15	0.02	0.20	0.44	0.48	0.09	0.19	0.19
Mercury	a	0.0080	0.0022	0.0022	0.0035	0.0020	0.0040	0.0020	0.0020	0.0020
	b	0.0040	0.0022	0.0022	0.0610	0.0017	0.0040	0.0010	0.0010	**
Nickel	a	0.035	0.027	0.025	0.020	0.043	0.018	0.036	0.015	0.015
	b	0.023	0.020	0.028	0.020	0.152	0.022	0.027	0.015	0.015
Selenium	a	0.048	0.045	0.020	0.018	0.030	0.044	0.001	0.015	0.015
	b	0.022	0.045	0.020	0.010	0.050	0.010	0.015	0.012	0.012
Vanadium	a	<0.003	0.040	0.002	0.003	0.060	0.026	0.018	0.015	0.015
	b	<0.003	0.040	0.003	0.005	0.001	0.060	0.017	0.017	0.017
Zinc	a	0.208	0.064	0.040	0.063	0.060	0.023	0.051	0.015	0.015
	b	0.440	0.040	0.114	0.050	0.080	0.025	0.030	0.020	0.020
Phosphorus	a	0.030	0.460	0.054	0.018	<0.02	0.810	0.151	0.130	0.130
	b	0.562	0.393	0.040	0.018	0.055	0.330	0.030	0.090	0.090
Percent solids	a	44.8	49.4	47.6	24.2	19.3	33.1	14.2	4.2	4.2
	b	47.2	47.1	46.6	0.28	35.8	28.8	15.1	3.2	3.2

* Variable minimum detection limits based on concentration necessary for analysis.

** Insufficient sediment for analysis.



Table E-18

Trace-Element Concentrations (mg/kg Dry Weight)* in Sediment Samples
from Pond Stations,** Bailly Study Area, August 1980

<u>Parameter</u>	<u>Replicate</u>	<u>13</u>	<u>16</u>	<u>19</u>	<u>20</u>
Cadmium	a	<0.003	0.009	0.005	<0.005
	b	0.003	0.059	<0.005	0.015
Chromium	a	0.024	0.018	0.005	<0.005
	b	0.018	0.035	0.005	0.005
Copper	a	0.047	0.059	0.035	0.050
	b	0.024	0.438	0.086	0.555
Iron	a	8.63	10.3	0.845	0.446
	b	5.85	17.6	0.907	26.2
Lead	a	0.036	0.026	0.020	0.020
	b	0.035	0.112	0.020	0.107
Manganese	a	0.030	0.293	0.249	1.44
	b	1.51	4.31	0.100	3.79
Mercury	a	<0.001	<0.001	<0.002	<0.002
	b	<0.001	<0.001	<0.003	<0.002
Nickel	a	0.050	0.023	0.020	0.020
	b	0.027	0.092	0.025	0.180
Selenium	a	0.018	0.023	0.030	0.050
	b	0.018	0.038	0.035	0.058
Vanadium	a	0.009	0.041	0.025	0.020
	b	0.012	0.109	0.020	0.088
Zinc	a	0.119	0.147	0.199	0.146
	b	0.148	0.562	0.202	1.01
Phosphorus	a	0.38	0.50	0.36	0.04
	b	0.28	0.28	0.33	0.16
Percent Solids	a	52.0	50.5	15.1	50.0
	b	50.9	50.9	15.2	46.9

* Variable minimum detection limits based on concentration necessary for analysis.

** No samples collected at pond stations 14, 15, 17, or 18 (these ponds were dry).



Table E-19

Trace-Element Concentrations (mg/kg Dry Weight)* in Sediment Samples
from Pond Stations,** Bailly Study Area, November 1980

Parameter	Replicate	13	16	19	20
Cadmium	a	0.003	0.013	0.019	<0.004
	b	0.004	<0.003	0.035	<0.004
Chromium	a	0.054	0.042	<0.02	<0.004
	b	0.033	0.012	0.035	0.004
Copper	a	0.009	0.007	0.46	0.072
	b	0.029	0.025	0.23	0.047
Iron	a	0.20	0.31	1.0	0.28
	b	0.26	0.17	1.7	0.22
Lead	a	0.006	0.003	0.76	0.016
	b	0.007	0.049	0.10	0.008
Manganese	a	0.92	0.99	0.76	1.80
	b	1.48	0.09	3.30	1.95
Mercury	a	<0.002	<0.002	<0.010	<0.002
	b	<0.002	<0.002	<0.009	<0.002
Nickel	a	0.032	0.016	0.096	0.200
	b	0.029	0.003	0.017	0.113
Selenium	a	0.063	0.051	0.25	0.064
	b	0.080	0.056	0.28	0.070
Vanadium	a	<0.03	<0.03	<0.2	<0.04
	b	<0.04	<0.03	<0.2	<0.04
Zinc	a	0.079	11.0	0.63	0.052
	b	0.246	0.160	0.63	0.063
Phosphorus	a	0.10	0.48	3.7	0.68
	b	0.14	0.12	2.7	0.74
Percent Solids	a	76.9	77.7	12.4	59.1
	b	66.4	77.7	14.4	62.9

* Variable minimum detection limits based on concentration necessary for analysis.

** No samples collected at pond stations 14, 15, 17, or 18 (these ponds were dry).



APPENDIX F

DATA CORRECTIONS FOR 1980 QUARTERLY REPORTS:
APRIL PHYTOPLANKTON, JUNE AND NOVEMBER ZOOPLANKTON,
AND APRIL AND JUNE BENTHIC MACROINVERTEBRATES



Corrections to:

APPENDIX A

PHYTOPLANKTON DENSITY REPLICATE REPORTS,
BAILLY STUDY AREA, APRIL 1980

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 0 0 00

SID	DATE	TIME	D/N	DUPATION			SD	WD	TOW			SP	D	SAMP VOL			SC	DI	WIND			CL	SP	DI	CURENT		TEMP		BT	TURBD	COND	DO	PH	SALN	P	
				UNITS	C				UNITS	C	SECH			W	T	5			0	0	AIR				WAT											
11	4/16/80	1334	0	0.0	0	1.0	4.6	0.0	0	2.0	4	0.5	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
12	4/16/80	1334	0	0.0	0	1.0	4.6	0.0	0	2.0	4	0.5	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0	
LS	TAXA																																			
0	CYANOPHYTA																																			
0	CHROCOCCACEAE																																			
0	CHROCOCCUS (LPIL)																																			
0	GOMPHOSPHERIA LACUSTRIS																																			
0	CHLOROPHYTA																																			
0	VOLVOCALES																																			
0	CHLAMYDOMONAS (LPIL)																																			
0	TETRASPORALES																																			
0	ELAKATOTHRIS (LPIL)																																			
0	CHLOROCOCCALES																																			
0	ANKISTRODESMUS FALCATUS																																			
0	CHRYSOPHYTA																																			
0	MONOSTIGALES																																			
0	STELIXOMONAS DICHOTOMA																																			
0	BACILLARIOPHYTA-CENTRIC																																			
0	EUPODISCALES																																			
0	NELOSIRA (LPIL)																																			
0	STEPHANODISCUS BINDERANA																																			
0	STEPHANODISCUS NIAGARAE																																			
0	EUPODISCALES (LPIL)																																			
0	RHIZOSOLENIALES																																			
0	RHIZOSOLENTIA EPIENSIS																																			
0	BACILLARIOPHYTA-PENNATE																																			
0	FRAGILARIALES																																			
0	ASTERIONELLA FORMOSA																																			
0	FRAGILARIA CROTONENSIS																																			
0	FRAGILARIALES (LPIL)																																			
0	NAVICULALES																																			
0	NAVICULA (LPIL)																																			
0	BACILLARIALES																																			
0	NIITZCHIA (LPIL)																																			
0	BACILLARIOPHYTA-PENNATE (LPIL)																																			
0	CRYPTOPHYTA																																			
0	CRYPTOMONADALES																																			
0	CRYPTOMONAS REFLEXA																																			
0	CRYPTOMONAS (LPIL)																																			

DATE 03/09/81
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL ABZ
0	RHOZOMYXAS HIRUTA	82215.19	621547.06	351831.12	269665.94	3.7
0	CHROMOMYXAS (LPII)	82215.19	88792.44	85503.81	3288.62	0.9
TOTAL		3370818.00	15423234.0	9397026.00	6026208.00	100.0
DIVERSITY (H PRIME)		3.09	2.37	2.73	0.36	
DIVERSITY (J PRIME)		0.66	0.61	0.73	0.13	
NUMBER OF TAXA		12	15	21		

ABOVE COMPUTED USING SAMPLE IDS

11

12

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3

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS TAXA

2

	REL
S.E.	AGZ

ABOVE COMPUTED USING SAMPLE IDS

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DAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 0 0 00

STD	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TON	SAMP VOL	C SECH	W T	MIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN	P					
														SC	DI	CL	SP	DI	ATN								WAT				
31	4/16/80	1351	0	0.0	0	1.0	15.2	0.0	0	2006050.00	399894.69	2.0	4	1.0	6.0	7	2	5	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0					
32	4/16/80	1351	0	0.0	0	1.0	15.2	0.0	0	2006050.00	399894.69	2.0	4	1.0	6.0	7	2	5	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0					
IS TAXA																															
0	CYANOPHYTA											1	2																		
0	CHROCOCCACEAE											2006050.00	399894.69																		
0	CHROCOCCIDUS (LPIL)											0.0	399894.69																		
0	OSCIATORACEAE											2006050.00	0.0																		
0	OSCIATORIA (LPIL)											240726.00	99973.62																		
0	CHLOROPHYTA																														
0	VOLVOCAL																														
0	CHLAMYDOMONAS (LPIL)											80242.00	49986.84																		
0	TETRASTRALES																														
0	ELAKATONIA (LPIL)											160484.00	0.0																		
0	CHLOROCOCCAL																														
0	AKYSTRONETUS FALCATUS											0.0	49986.84																		
0	CHRYSOPHYTA											461391.50	299820.94																		
0	CHRYSONOMADAL																														
0	MALLONIAS (LPIL)											80242.00	0.0																		
0	DINERTON SOCIALE											300907.50	49986.84																		
0	MOROSIGAL																														
0	STELONOMAS DICHOTOMA											80242.00	249934.12																		
0	BACILLARIOPHYTA-CENTRIC											802420.00	799769.19																		
0	EUPODISCALES																														
0	HELOSIPA (LPIL)											361089.00	0.0																		
0	STEPHANODISCUS BINDERANA											0.0	199947.31																		
0	STEPHANODISCUS (LPIL)											0.0	99973.62																		
0	EUPODISCALES (LPIL)											160484.00	149960.44																		
0	RHIZOSOLENTALES																														
0	RHIZOSOLENTA TRIENSIS											280847.00	349907.81																		
0	BACILLARIOPHYTA-PEIRATE											565706.12	1574584.00																		
0	FRAGILARIALES																														
0	ASTEDIONELLA FORMOSA											401210.06	1224677.00																		
0	FRAGILARIA CROTCHENSIS											0.0	349907.87																		
0	NAVICULALES																														
0	PIRULARIA (LPIL)											40121.01	0.0																		
0	BACILLARIOPHYTA-PEIRATE (LPIL)											124375.06	0.0																		
0	CRYPTOPHYTA											561694.00	1049723.00																		
0	CRYPTOPHYTODAL																														
0	CRYPTONOMAS (LPIL)											0.0	49986.84																		

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-		REL
		1	2	X	S.E.	ABZ
0	PHODONONAS MINUTA	521573.00	949749.87	735661.44	214008.44	16.6
0	CHROONONAS (LPIL)	40121.01	49986.84	45053.93	4932.91	1.0
TOTAL		4637986.00	4223079.00	4430932.00	207053.50	100.0
DIVERSITY (H PRIME)		2.67	3.05	2.96	0.09	
DIVERSITY (J PRIME)		0.75	0.80	0.78	0.02	
NUMBER OF TAXA		14	14	20		

ABOVE COMPUTED USING SAMPLE IOS
31 32

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	1	2	3	- X	S.E.	REL ABZ
0	CYANOPHYTA	4972376.00	651144.00	1202972.00	2275497.00	1357816.00	34.3
0	CHIROCOCCACEAE						
0	CHIROCOCCUS (LPIL)	532754.50	0.0	199947.31	244233.94	155378.87	3.7
0	GONPHOSPHERIA LACUSTRIS	4439621.00	0.0	0.0	1479873.00	1479873.00	22.3
0	OSCILLATORIACEAE						
0	OSCILLATORIA (LPIL)	0.0	651144.00	1003025.00	551389.62	293812.81	8.3
0	CHLOROPHYTA	253222.81	214417.25	170349.81	212663.25	23939.44	3.2
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	88792.44	107208.62	69114.42	87038.44	12183.15	1.3
0	TETRASPORALES						
0	ELAKATOTHRIX (LPIL)	123322.75	0.0	80242.00	67854.87	36134.95	1.0
0	CHLOROCCOCALES						
0	ANKISTRODESNIUS FALCATUS	41107.59	107208.62	24993.42	57769.88	25153.25	0.9
0	CHRYSOPHYTA	177584.87	177584.81	380656.19	245275.25	67690.44	3.7
0	CHRYSOMONADALES						
0	MALLAMONAS (LPIL)	0.0	0.0	40121.00	13373.66	13373.66	0.2
0	DINOERYON SOCIALE	0.0	0.0	175447.12	58482.37	58482.37	0.9
0	MONOSIGALES						
0	STELIXOMONAS DICHOTOMA	177584.87	177584.81	165088.06	173419.25	4165.59	2.6
0	BACILLARIOPHYTA-CENTRIC	1851321.00	2979279.00	801104.56	1877234.00	628918.25	28.3
0	EUPODISCALES						
0	HELOSIRA (LPIL)	581919.19	773151.25	180544.50	511871.62	174619.25	7.7
0	STEPHANODISCUS BINDERANA	164430.37	1302288.00	99973.62	522230.62	390472.25	7.9
0	STEPHANODISCUS NIAGARAE	41107.59	71033.94	0.0	37380.51	20590.23	0.6
0	STEPHANODISCUS (LPIL)	0.0	71033.94	49986.81	40340.25	21065.35	0.6
0	EUPODISCALES (LPIL)	674164.62	392659.81	155222.19	407348.87	149985.69	6.1
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	389700.06	369113.31	315377.37	358063.56	22155.04	5.4
0	BACILLARIOPHYTA-PENNATE	1616350.00	1093132.00	1070145.00	1259875.00	178360.62	19.0
0	FRAGILARIALES						
0	ASTERIONELLA FORMOSA	662654.56	732701.81	812943.50	736099.94	43417.93	11.1
0	FRAGILARIA CROTONENSIS	577150.50	0.0	174953.94	250701.44	170859.50	3.8
0	FRAGILARIALES (LPIL)	205537.94	0.0	0.0	68512.62	68512.62	1.0
0	NAVICULALES						
0	NAVICULA (LPIL)	44396.22	0.0	0.0	14798.74	14798.74	0.2
0	PINNULARIA (LPIL)	0.0	0.0	20060.50	6686.83	6686.83	0.1
0	CYMBELLA (LPIL)	0.0	36174.69	0.0	12058.23	12058.23	0.2
0	BACILLARIALES						
0	NITZCHIA (LPIL)	44396.22	216390.37	0.0	86928.81	65987.25	1.3
0	BACILLARIOPHYTA-PENNATE (LPIL)	82215.19	107866.31	62187.53	84089.62	13219.59	1.3
0	CRYPTOPHYTA	526177.37	967508.50	805708.50	766464.75	128903.50	11.5
0	CRYPTOMONADALES						

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA				-		REL
		1	2	3	X	S.E.	AB%
0	CRYPTOMONAS REFLEXA	44396.22	71033.94	0.0	38476.72	20718.23	0.6
0	CRYPTOMONAS (LPIL)	44396.22	0.0	24993.42	23129.88	12849.91	0.3
0	RHODOMONAS MINUTA	351881.12	896474.56	735661.44	661339.00	161542.94	10.0
0	CHRODOMONAS (LPIL)	85503.81	0.0	45053.93	43519.25	24694.75	0.7
TOTAL		9397026.00	6083059.00	4430932.00	6637005.00	1460098.00	100.0
DIVERSITY (H PRIME)		2.73	3.09	2.96	2.93	0.11	
DIVERSITY (J PRIME)		0.73	0.85	0.78	0.79	0.03	
NUMBER OF TAXA		21	16	20	27		

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
31	32		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER CELLS PER LITER

DATE REPORT

C TC CC LOC

5 56 56 0 0 10

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	W	T	WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN	P	
															SC	DI	CL	SP	DI	AIR								WAT
41	4/16/80	1324	0	0.0	0	1.0	4.6	0.0	0	2.0	4	0.5	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0.0	0.0	0
42	4/16/80	1324	0	0.0	0	1.0	4.6	0.0	0	2.0	4	0.5	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0.0	0.0	0

LS	TAXA	1	2	X	S.E.	ABZ
----	------	---	---	---	------	-----

0	CYANOPHYTA	0.0	9281770.00		4640885.00	4640885.00	56.2
0	OSCILLATORIACEAE						
0	LYNGBYA CONTORTA	0.0	9281770.00		4640885.00	4640885.00	56.2
0	CHLOROPHYTA	263088.50	451197.06		357142.75	94054.25	4.3
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	197316.37	128913.44		163114.47	34201.47	2.0
0	CHLOROCOCCALES						
0	ANKISTRODESMUS FALCATUS	65772.12	64456.74		65114	657.69	0.8
0	SCENEDESMUS QUADRICAUDA	0.0	257826.94		128913.44	128913.44	1.6
0	CHRYSOPHYTA	328860.62	773480.87		551170.75	222310.12	6.7
0	CHRYSOMONADALES						
0	SYNURA (LPIL)	65772.12	0.0		32886.06	32886.06	0.4
0	DINOBRYON SOCIALE	0.0	773480.87		386740.44	386740.44	4.7
0	MONOSICALES						
0	STEELEXONONAS DICHOTOMA	263088.50	0.0		131544.25	131544.25	1.6
0	BACILLARIOPHYTA-CENTRIC	1446986.00	580110.50		1013548.25	433437.75	12.3
0	EUPODISCALES						
0	HELOSIRA (LPIL)	526177.00	0.0		263088.50	263088.50	3.2
0	STEPHANODISCUS BINDERANA	526177.00	0.0		263088.50	263088.50	3.2
0	STEPHANODISCUS (LPIL)	65772.12	193370.12		129571.12	63799.00	1.6
0	EUPODISCALES (LPIL)	65772.12	0.0		32886.06	32886.06	0.4
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	263088.50	386740.37		324914.44	61825.94	3.9
0	BACILLARIOPHYTA-PENNATE	703761.69	663904.37		683833.00	19928.66	8.3
0	FRAGILARIALES						
0	ASTERIONELLA FORMOSA	526177.00	515653.94		520915.44	5261.53	6.3
0	BACILLARIOPHYTA-PENNATE (LPIL)	177584.69	148250.44		162917.56	14667.12	2.0
0	PHYRHOPHYTA-DINOPHYCEAE	65772.12	0.0		32886.06	32886.06	0.4
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	65772.12	0.0		32886.06	32886.06	0.4
0	CRYPTOPHYTA	855037.62	1095764.00		975400.81	120363.19	11.8
0	CRYPTOMONADALES						
0	RHODONOPAS HIPERT*	855037.62	1095764.00		975400.81	120363.19	11.8
TOTAL		3663505.00	12846221.0		8254863.00	4591358.00	100.0
-DIVERSITY (H PRIME)		3.20	1.61		2.40	0.80	
-DIVERSITY (J PRIME)		0.67	0.48		0.67	0.19	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS TAXA

NUMBER OF TAXA

ABOVE COMPUTED USING SAMPLE IDS
41 42

	1	2	
	13	10	16

-		
X	S.E.	REL ABZ

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-	X	S.E.	REL
		1	2				ABZ
0	CRYPTOMONAS MARSSONII	0.0	52617.74		26308.87	26308.87	0.4
0	CRYPTOMONAS REFLEXA	0.0	105235.44		52617.72	52617.72	0.8
0	CRYPTOMONAS (LPIL)	0.0	52617.74		26308.87	26308.87	0.4
0	RHODOMONAS MINUTA	1101683.00	473559.56		787621.25	314061.69	12.2
0	CHROMOMONAS (LPIL)	0.0	105235.44		52617.72	52617.72	0.8
0	CYANOMONAS (LPIL)	65772.12	0.0		32886.06	32886.06	0.5
TOTAL		6373316.00	6550893.00		6462104.00	86788.50	100.0
DIVERSITY (H PRIME)		2.77	2.88		2.82	0.06	
DIVERSITY (J PRIME)		0.69	0.72		0.71	0.01	
NUMBER OF TAXA		16	16		24		

ABOVE COMPUTED USING SAMPLE IDS

51 52

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BAILY GENERATING PLANT

PHYTOPLANKTON ANALYSIS

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	4	5	6	- X	S.E.	REL ABZ
0	UNIDENTIFIED ALGAE	0.0	0.0	64127.84	21375.95	21375.95	0.3
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.0	64127.84	21375.95	21375.95	0.3
0	CYANOPHYTA	4640885.00	1233228.00	1239205.00	2371306.00	1134791.00	36.0
0	CHROCOCCACEAE	0.0	1233228.00	0.0	411076.00	411076.00	6.2
0	COGNOSPHAERIA LACUSIRIS	0.0	1233228.00	0.0	411076.00	411076.00	6.2
0	OSCILLATORIACEAE	0.0	0.0	1239805.00	413268.31	413268.31	6.3
0	OSCILLATORIA (LPIL)	0.0	0.0	1239805.00	413268.31	413268.31	6.3
0	LYNGBYA CONIORTIA	4640885.00	0.0	0.0	1546961.00	1546961.00	23.5
0	CHLOROPHYTA	357142.75	134832.87	180215.62	224063.75	67816.94	3.4
0	VOLVOCALES	163114.87	101946.81	95698.44	120253.37	21506.52	1.8
0	CHLADONOMAS (LPIL)	0.0	0.0	0.0	0.0	0.0	0.0
0	CHLOPLOCALLES	65114.43	32886.06	84517.19	60039.23	15057.12	0.9
0	AKRISTRODESNIUS FALCATUS	128913.44	0.0	0.0	42971.14	42971.14	0.7
0	SCENEDESNIUS QUADRICAUDA	551170.75	203893.62	0.0	251688.12	160893.87	3.8
0	CHRYSOHYTA	0.0	0.0	0.0	0.0	0.0	0.0
0	CHRYSONOMADACEAE	0.0	0.0	0.0	0.0	0.0	0.0
0	CHLADONOMAS (LPIL)	0.0	0.0	0.0	0.0	0.0	0.0
0	CHRYSOCCOCCUS (LPIL)	0.0	0.0	0.0	0.0	0.0	0.0
0	SYNURA (LPIL)	32886.06	0.0	0.0	10962.02	10962.02	0.2
0	DINOBRYON (LPIL)	306740.44	0.0	0.0	128913.44	128913.44	2.0
0	MONOSIGALES	131594.25	171007.56	0.0	100950.56	51696.13	1.5
0	STELIONOMAS (LPIL)	1013540.25	915377.19	1263975.00	1064466.00	103662.12	16.2
0	BACILLARIOPHYTES (LPIL)	0.0	0.0	0.0	0.0	0.0	0.0
0	EUPODISCALES	263088.50	305840.50	682168.44	483699.12	199616.50	7.3
0	HELOSIRA (LPIL)	263088.50	0.0	0.0	87696.12	87696.12	1.3
0	STEFANODISCUS BIRDERARA	0.0	0.0	0.0	0.0	0.0	0.0
0	STEFANODISCUS NIAGARAE	0.0	16443.04	0.0	5481.01	5481.01	0.1
0	STEFANODISCUS (LPIL)	129571.12	130121.50	191396.94	153029.81	19341.68	2.3
0	EUPODISCALES (LPIL)	32886.06	52617.72	42751.91	42751.89	5696.04	0.6
0	PHIZOSOLENIALES	324914.44	402054.44	147658.44	291809.06	75505.44	4.4
0	PHIZOSOLENIA ERIENSIS	683933.00	2969612.00	1555181.00	1736208.30	666026.69	26.4
0	BACILLARIOPHYTES-PERINATE	0.0	0.0	0.0	0.0	0.0	0.0
0	FRAGILARIALES	520915.44	634701.37	872467.56	676028.12	103566.62	10.3
0	ASTERIONELLA FORMOSA	0.0	13154.43	0.0	4394.81	4394.81	0.1
0	DIATOMA TERRE	0.0	0.0	0.0	0.0	0.0	0.0
0	FRAGILARIA CROTONEIS	0.0	65326.69	568271.00	475532.56	252079.00	7.2
0	FRAGILARIA (LPIL)	0.0	1341752.00	0.0	447250.62	447250.62	6.8
0	BACILLARIALES	0.0	0.0	0.0	0.0	0.0	0.0
0	BITZCHIA (LPIL)	0.0	0.0	0.0	7125.32	7125.32	0.1
0	SURIPELLAE	0.0	16443.04	0.0	5481.01	5481.01	0.1
0	CHLADONOMAS SOLEA	162917.56	105235.44	93067.56	120406.81	21543.63	1.8
0	BACILLARIOPHYTES-PERINATE (LPIL)	0.0	0.0	0.0	0.0	0.0	0.0

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL AB%
0	PYRRHOPHYTA-DINOPHYCEAE	32886.06	26308.87	0.0	19731.64	10046.86	0.3
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	32886.06	26308.87	0.0	19731.64	10046.86	0.3
0	CRYPTOPHYTA	975400.81	978360.37	743225.37	898995.50	77889.75	13.4
0	CRYPTOMONODALES						
0	CRYPTOMONAS MARSSONII	0.0	26308.87	42751.91	23020.26	12450.47	0.3
0	CRYPTOMONAS REFLEXA	0.0	52617.72	0.0	17539.24	17539.24	0.3
0	CRYPTOMONAS (LPIL)	0.0	26308.87	31570.64	19293.17	9765.43	0.3
0	RHODOMONAS MINUTA	975400.81	787621.25	668902.87	810641.62	89223.87	12.3
0	CHROOMONAS (LPIL)	0.0	52617.72	0.0	17539.24	17539.24	0.3
0	CYANOMONAS (LPIL)	0.0	32886.06	0.0	10962.02	10962.02	0.2
	TOTAL	8254863.00	6462104.00	5046524.00	6587830.00	928298.62	100.0
	DIVERSITY (H PRIME)	2.40	2.82	2.55	2.59	0.12	
	DIVERSITY (J PRIME)	0.67	0.71	0.73	0.70	0.02	
	NUMBER OF TAXA	16	24	15	32		

ABOVE COMPUTED USING SAMPLE IDS

41	42	51	52
61	62		

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BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 0 0 20

SID	DATE	TIME	D/H	UNITS	C	SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN P					
								SP	D	UNITS	C	SECH	W	T	SC	DI	CL							SP	DI	AIR	WAT	
101	4/16/80	1105	0	0.0	0	1.0	1.5	0.0	0	2.0	4	0.2	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0.0	0.0			
102	4/16/80	1105	0	0.0	0	1.0	1.5	0.0	0	2.0	4	0.2	6	0	7	2	5	0.0	0	7.2	0.0	0	0.0	0.0	0.0			
IS																							-	REL				
	TAXA																							X	S.E.	ABZ		
																								1	2			
0	CHLOROPHYTA																							246645.56	2923571.00	1585108.00	1338462.00	34.5
0	VOLVOCALES																											
0	CHLAMYDOMONAS (LPIL)																							164430.37	584714.37	374572.37	210142.00	8.1
0	CHLOROCOCCALES																											
0	SPHAEROCYSTIS SCHROETERI																							0.0	2338857.60	1169423.00	1169428.00	25.4
0	ANKISTRODESNIUS FALCATUS																							82215.19	0.0	41107.59	41107.59	0.9
0	CHRYSOPHYTA																							0.0	334122.50	167061.25	167061.25	3.6
0	MONOSIGALES																											
0	STELIXOMONAS DICHOTOMA																							0.0	334122.50	167061.25	167061.25	3.6
0	BACILLARIOPHYTA-CENTRIC																							986582.25	668245.00	827413.62	159168.62	18.0
0	EUPODISCALES																											
0	HELOSIRA (LPIL)																							328060.75	501183.75	415022.25	86161.50	9.0
0	STEPHANODISCUS BINDERANA																							164430.37	0.0	82215.19	82215.19	1.8
0	STEPHANODISCUS (LPIL)																							411075.94	0.0	205537.94	205537.94	4.5
0	RHIZOSOLENIALES																											
0	RHIZOSOLENIA ERIENSIS																							82215.19	167061.25	124638.19	42423.03	2.7
0	BACILLARIOPHYTA-PENNIATE																							2055379.00	417653.12	1236516.00	818862.94	26.9
0	FRAGILARIALES																											
0	ASTERIONELLA FORMOSA																							0.0	334122.50	167061.25	167061.25	3.6
0	FRAGILARIA (LPIL)																							2055379.00	0.0	1027689.50	1027689.50	22.3
0	BACILLARIOPHYTA-PENNIATE (LPIL)																							0.0	83530.62	41765.31	41765.31	0.9
0	CRYPTOPHYTA																							1068797.00	501183.75	784990.37	283806.62	17.1
0	CRYPTOMONADALES																											
0	CRYPTOMONAS (LPIL)																							164430.37	0.0	82215.19	82215.19	1.8
0	RHODOMONAS MINUTA																							904367.06	417653.12	661016.56	243356.94	14.4
0	CHROOMONAS (LPIL)																							0.0	83530.62	41765.31	41765.31	0.9
TOTAL																							4357402.00	4844768.00	4601085.00	243683.00	100.0	
DIVERSITY (H PRIME)																							2.34	2.42	2.38	0.04		
DIVERSITY (J PRIME)																							0.74	0.76	0.75	0.01		
NUMBER OF TAXA																							9	9	14			

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PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	10	X	S.E.	REL AB%
0	CHLOROPHYTA	1585108.00	1585108.00	-1.00	34.5
0	VOLVOCALES				
0	CHLAMYDOMONAS (LPIL)	374572.37	374572.37	-1.00	8.1
0	CHLOROCOCCALES				
0	SPHAEROCYSTIS SCHROETERI	1169428.00	1169428.00	-1.00	25.4
0	ANKISTRODESMUS FALCATUS	41107.59	41107.59	-1.00	0.9
0	CHRYSOPHYTA	167061.25	167061.25	-1.00	3.6
0	MONOSIGALES				
0	STELERODONAS DICHOTOMA	167061.25	167061.25	-1.00	3.6
0	BACILLARIOPHYTA-CENTRIC	827413.62	827413.62	-1.00	18.0
0	EUPODISCALES				
0	HELOSIRA (LPIL)	415022.25	415022.25	-1.00	9.0
0	STEPHANODISCUS BINDERANA	82215.19	82215.19	-1.00	1.8
0	STEPHANODISCUS (LPIL)	205537.94	205537.94	-1.00	4.5
0	RHIZOSOLENIALES				
0	RHIZOSOLENIA ERIENSIS	124638.19	124638.19	-1.00	2.7
0	BACILLARIOPHYTA-PENNATE	1236516.00	1236516.00	-1.00	26.9
0	FRAGILARIALES				
0	ASTERIONELLA FORMOSA	167061.25	167061.25	-1.00	3.6
0	FRAGILARIA (LPIL)	1027689.50	1027689.50	-1.00	22.3
0	BACILLARIOPHYTA-PENNATE (LPIL)	41765.31	41765.31	-1.00	0.9
0	CRYPTOPHYTA	784990.37	784990.37	-1.00	17.1
0	CRYPTONONDALES				
0	CRYPTONONCHAS (LPIL)	82215.19	82215.19	-1.00	1.8
0	RHODONONCHAS MINUTA	661010.06	661010.06	-1.00	14.4
0	CHROONONCHAS (LPIL)	41765.31	41765.31	-1.00	0.9
	TOTAL	4601085.00	4601085.00	-1.00	100.0
	DIVERSITY (H PRIME)	2.38	2.38	-1.00	
	DIVERSITY (J PRIME)	0.75	0.75	-1.00	
	NUMBER OF TAXA	14	14		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL ABZ
0	UNIDENTIFIED ALGAE	0.0	21375.95	0.0	7125.31	7125.31	0.1
0	UNIDENTIFIED ALGAE (LPIL)	0.0	21375.95	0.0	7125.31	7125.31	0.1
0	CYANOPHYTA	2275497.00	2371306.00	0.0	1548934.00	774960.81	26.1
0	CHROOCOCCACEAE						
0	CHROOCOCCUS (LPIL)	244233.94	0.0	0.0	81411.31	81411.31	1.4
0	GOMPHOSPHERIA LACUSTRIS	1479873.00	411076.00	0.0	630316.31	441042.56	10.6
0	OSCILLATORIAEAE						
0	OSCILLATORIA (LPIL)	551389.62	413268.31	0.0	321552.62	165646.62	5.4
0	LYNGBYA CONTORTA	0.0	1546961.00	0.0	515653.62	515653.62	8.7
0	CHLOROPHYTA	212663.25	224063.75	1585108.00	673945.00	455593.37	11.3
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	87038.44	120253.37	374572.37	193954.69	90816.37	3.3
0	TETRASPORALES						
0	ELAKATOTHRIX (LPIL)	67854.87	0.0	0.0	22618.29	22618.29	0.4
0	CHLOROCCOCCALES						
0	SPHAEROCYSTIS SCHROETERI	0.0	0.0	1169428.00	389809.31	389809.31	6.6
0	ANKISTRODESNIUS FALCATUS	57769.88	60839.23	41107.59	53238.90	6130.02	0.9
0	SCENEDESNIUS QUADRICAUDA	0.0	42971.14	0.0	14323.71	14323.71	0.2
0	CHRYSTOPHYTA	245275.25	251688.12	147061.25	221341.50	27203.21	3.7
0	CHRYSONOMADALES						
0	CHALLAMONAS (LPIL)	13373.66	5481.01	0.0	6284.89	3881.51	0.1
0	CHRYSOCCOCCUS (LPIL)	0.0	5481.01	0.0	1827.00	1827.00	0.0
0	SYNURA (LPIL)	0.0	10962.02	0.0	3654.01	3654.01	0.1
0	DINOLRYON SOCIALE	58482.37	128913.44	0.0	62465.27	37267.35	1.1
0	MONOSIGALES						
0	STELIXOMONAS DICHOTOMA	173419.25	100850.56	167061.25	147110.31	23202.60	2.5
0	BACILLARIOPHYTA-CENTRIC	1677234.00	1064466.00	827413.62	1256371.00	317864.31	21.1
0	EUPODISCALES						
0	HELOSIRA (LPIL)	511871.62	483699.12	415022.25	470197.62	28761.47	7.9
0	STEPHANODISCUS BINDERANA	522230.62	87696.12	82215.19	230713.94	145766.87	3.9
0	STEPHANODISCUS NIAGARAE	37380.51	5481.01	0.0	14287.17	11654.57	0.2
0	STEPHANODISCUS (LPIL)	40340.25	153029.81	205537.94	132969.31	48731.87	2.2
0	EUPODISCALES (LPIL)	407348.87	42751.89	0.0	150033.56	129248.55	2.5
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	358063.56	291809.06	124638.19	250170.25	69451.44	4.3
0	BACILLARIOPHYTA-PENNATE	1259875.00	1736208.00	1236516.00	1410866.00	162810.50	23.7
0	FRAGILARIALES						
0	ASIERIONELLA FORMOSA	736099.94	676028.12	167061.25	526396.44	180502.50	8.9
0	DIATOMA TENUE	0.0	4334.81	0.0	1461.60	1461.60	0.0
0	FRAGILARIA COTONENSIS	250701.44	475532.56	0.0	242078.00	137342.06	4.1
0	FRAGILARIA (LPIL)	0.0	447250.62	1027689.50	491646.69	297497.69	8.3
0	FRAGILARIALES (LPIL)	68512.62	0.0	0.0	22837.54	22837.54	0.4

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BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL AB%
0	NAVICULALES						
0	NAVICULA (LPIL)	14798.74	0.0	0.0	4932.91	4932.91	0.1
0	PIRULARIA (LPIL)	6686.83	0.0	0.0	2228.94	2228.94	0.0
0	CYMBELLA (LPIL)	12058.23	0.0	0.0	4019.41	4019.41	0.1
0	BACILLARIALES						
0	HITZCHIA (LPIL)	86928.81	7125.32	0.0	31351.37	27664.74	0.5
0	SURIPELLALES						
0	CYMATOPLEURA SOLEA	0.0	5481.01	0.0	1827.00	1827.00	0.0
0	BACILLARIOPHYTA-PENNIATE (LPIL)	84089.62	120406.81	41765.31	82087.25	22723.91	1.4
0	PYRRHOPHYTA-DINOPHYCEAE	0.0	19731.64	0.0	6577.21	6577.21	0.1
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	0.0	19731.64	0.0	6577.21	6577.21	0.1
0	CRYPTOPHYTA	766464.75	898995.50	784990.37	816816.87	41435.87	13.7
0	CRYPTONONDALES						
0	CRYPTONONAS MARSSONII	0.0	23020.26	0.0	7673.42	7673.42	0.1
0	CRYPTONONAS REFLEXA	38476.72	17539.24	0.0	18671.98	11121.70	0.3
0	CRYPTONONAS (LPIL)	23129.68	19293.17	82215.19	41546.08	20364.69	0.7
0	RHODONONAS MINUTA	661339.00	810641.62	661010.06	710996.87	49822.45	12.0
0	CHROONONAS (LPIL)	43519.25	17539.24	41765.31	34274.60	8382.98	0.6
0	CYANONONAS (LPIL)	0.0	10962.02	0.0	3654.01	3654.01	0.1
TOTAL		6637005.00	6587830.00	4601085.00	5941973.00	670594.37	100.0
DIVERSITY (H PRIME)		2.93	2.59	2.38	2.63	0.16	
DIVERSITY (J PRIME)		0.79	0.70	0.75	0.75	0.02	
NUMBER OF TAXA		27	32	14	39		

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
31	32	41	42
51	52	61	62
101	102		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 0 1 00

SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	TOW		SECH	W	T	WIND		CURRENT		TEMP		BT	TURED	COND	DO	PH	SALN	P	
										UNITS	C				SC	DI	CL	SP	DI	AIR								WAT
81	4/16/80	1125	0	0.0	0	1.0	9.1	0.0	0	2.0	4	1.0	6	0	7	2	5	0.0	0	7.2	5.0	0	0.0	0	0.0	0.0	0.0	0
82	4/16/80	1125	0	0.0	0	1.0	9.1	0.0	0	2.0	4	1.0	6	0	7	2	5	0.0	0	7.2	5.0	0	0.0	0	0.0	0.0	0.0	0
LS	TAXA																											
										1		2																
0	CYANOPHYTA									570902.25		168376.75										369639.50		201262.75		9.9		
0	CHROOCOCCACEAE																											
0	MICROCYSTIS (LPIL)									570902.25		0.0										285451.12		285451.12		7.6		
0	OSCILLATORIACEAE																											
0	OSCILLATORIA LIMNETICA									0.0		168376.75										84188.37		84188.37		2.3		
0	CHLOPPOPHYTA									40778.73		126282.56										83530.62		42751.91		2.2		
0	VOLVOCALES																											
0	CHLAMYDOMONAS (LPIL)									0.0		126282.56										63141.28		63141.28		1.7		
0	CHLOROCOCCALES																											
0	ANKISTRODESMUS FALCATUS									40778.73		0.0										20389.37		20389.37		0.5		
0	CHRYSOPHYTA									285451.12		168376.75										226913.94		58537.19		6.1		
0	CHRYSONOMADALES																											
0	CHRYSOCCUS (LPIL)									0.0		42094.19										21047.09		21047.09		0.6		
0	DINODIOM SOCIALE									285451.12		84188.37										184819.75		100631.37		4.9		
0	CHRYSOPHYTA (LPIL)									0.0		42094.19										21047.09		21047.09		0.6		
0	BACILLARIOPHYTA-CENTRIC									897131.94		463036.06										680084.00		217047.94		18.2		
0	EUPODISCALES																											
0	HELOSIRA (LPIL)									448566.00		0.0										224283.00		224283.00		6.0		
0	STEPHANODISCUS NIAGARAE									40778.73		0.0										20389.37		20389.37		0.5		
0	STEPHANODISCUS (LPIL)									81557.44		84188.37										82872.87		1315.47		2.2		
0	EUPODISCALES (LPIL)									0.0		42094.19										21047.09		21047.09		0.6		
0	RHIZOLENIALES																											
0	RHIZOLENIA ERIENSIS									326229.81		336753.50										331491.62		5261.84		8.9		
0	BACILLARIOPHYTA-PENNATE									1631147.00		1262825.00										1446986.00		184161.00		38.7		
0	FRAGILARIALES																											
0	ASTERIONELLA FORMOSA									1060247.00		715401.19										887924.06		172322.87		23.7		
0	DIATOMA TENUE									203893.62		126282.56										165088.06		38805.53		4.4		
0	FRAGILARIA CROTONENSIS									0.0		168376.75										84188.37		84188.37		2.3		
0	FRAGILARIA (LPIL)									285451.12		0.0										142725.56		142725.56		3.8		
0	TABELLARIA FLOCCULOSA									0.0		252565.12										126282.56		126282.56		3.4		
0	NAVICULALES																											
0	PINNULARIA (LPIL)									40778.73		0.0										20389.37		20389.37		0.5		
0	BACILLARIOPHYTA-PENNATE (LPIL)									40778.73		0.0										20389.37		20389.37		0.5		
0	PYRRHOPHYTA-DINOPHYCEAE									0.0		42094.19										21047.09		21047.09		0.6		
0	PERIDINIALES																											
0	PERIDINIUM INCONSPICUUM									0.0		42094.19										21047.09		21047.09		0.6		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-	X	S.E.	REL ABZ
		1	2				
0	CRYPTOPHYTA	937910.87	803977.94		910944.37	26966.47	24.4
0	CRYPTOMONADALES						
0	RHODOMONAS MINUTA	937910.87	841883.75		889897.31	48013.56	23.8
0	CHROMONAS (LPIL)	0.0	42094.19		21047.09	21047.09	0.6
TOTAL		4363316.00	3114965.00		3739140.00	624175.50	100.0
DIVERSITY (H PRIME)		3.05	3.17		3.11	0.06	
DIVERSITY (J PRIME)		0.83	0.81		0.82	0.01	
NUMBER OF TAXA		13	15		22		

ABOVE COMPUTED USING SAMPLE IDS
81 82

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			X	S.E.	REL ABZ
		1	2			
TOTAL		2460535.00	14963873.0	8712204.00	6251669.00	100.0
DIVERSITY (H PRIME)		3.06	1.42	2.24	0.82	
DIVERSITY (J PRIME)		0.85	0.37	0.61	0.24	
NUMBER OF TAXA		12	14	18		

ABOVE COMPUTED USING SAMPLE IDS
91 92

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AB%
0	UNIDENTIFIED ALGAE	0.0	0.0	313404.25	104468.06	104468.06	2.0
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.0	313404.25	104468.06	104468.06	2.0
0	CYANOPHYTA	0.0	369639.50	5870164.00	2079934.00	1898116.00	40.1
0	CHROOCOCCACEAE						
0	MICROCYSTIS (LPIL)	0.0	285451.12	0.0	95150.37	95150.37	1.8
0	GOMPHOSPHERIA LACUSTRIS	0.0	0.0	5870164.00	1956721.00	1956721.00	37.7
0	OSCILLATORIA						
0	OSCILLATORIA LIMNETICA	0.0	84188.37	0.0	28062.79	28062.79	0.5
0	CHLOROPHYTA	69060.75	83530.62	271967.81	141519.69	65357.66	2.7
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	69060.75	63141.28	143054.37	91752.12	25707.97	1.8
0	TETRASPORALES						
0	ELAKATOTHRIX (LPIL)	0.0	0.0	95369.62	31789.87	31789.87	0.6
0	CHLOROCOCCALES						
0	ANKISTRODESMIUS FALCATUS	0.0	20389.37	33543.78	17977.71	9758.04	0.3
0	CHRYSOPHYTA	89778.94	226913.94	95369.62	137354.12	44808.96	2.6
0	CHRYSOOMONADALES						
0	CHRYSOCCOCUS (LPIL)	0.0	21047.09	0.0	7015.70	7015.70	0.1
0	DINOBRYON SOCIALE	0.0	184819.75	0.0	61606.58	61606.58	1.2
0	MONOSIGALES						
0	STELIXOMONAS DICHTOMIA	89778.94	0.0	95369.62	61716.19	30900.27	1.2
0	CHRYSOPHYTA (LPIL)	0.0	21047.09	0.0	7015.70	7015.70	0.1
0	BACILLARIOPHYTA-CENTRIC	1052025.00	680084.00	446099.56	726069.50	176420.31	14.0
0	EUPODISCALES						
0	NELOSIRA (LPIL)	207182.31	224283.00	134339.62	188601.62	27576.46	3.6
0	STEPHANODISCUS BINDERANA	128913.37	0.0	0.0	42971.12	42971.12	0.8
0	STEPHANODISCUS NIAGARAE	0.0	20389.37	0.0	6796.45	6796.45	0.1
0	STEPHANODISCUS (LPIL)	308471.37	82872.87	150947.06	180763.75	66809.25	3.5
0	EUPODISCALES (LPIL)	0.0	21047.09	0.0	7015.70	7015.70	0.1
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	407458.44	331491.62	160812.87	299920.94	72929.25	5.8
0	BACILLARIOPHYTA-PINNATE	1562844.00	1446986.00	935147.81	1314992.00	192844.75	25.4
0	FRAGILARIALES						
0	ASTERIONELLA FORMOSA	1037062.44	887924.06	358162.25	761049.56	205992.87	14.7
0	DIATOMA TENUE	0.0	165088.06	16771.90	60619.98	52457.95	1.2
0	FRAGILARIA CROTONENSIS	460405.19	84188.37	436069.31	326887.62	121552.75	6.3
0	FRAGILARIA (LPIL)	0.0	142725.56	0.0	47575.19	47575.19	0.9
0	TABELLARIA FLOCCULOSA	0.0	126282.56	56564.00	60948.87	36520.50	1.2
0	NAVICULALES						
0	NAVICULA (LPIL)	29926.33	0.0	0.0	9975.44	9975.44	0.2
0	PINNULARIA (LPIL)	0.0	20389.37	0.0	6796.45	6796.45	0.1
0	BACILLARIALES						

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AB%
0	NIITZCHIA (LPIL)	23941.06	0.0	0.0	7980.35	7980.35	0.2
0	BACILLARIOPHYTA-PENNATE (LPIL)	11510.13	20389.37	67580.87	160.12	17400.20	0.6
0	PYRRHOPHYTA-DINOPHYCEAE	0.0	21047.09	240397.25	148.06	76865.06	1.7
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	0.0	21047.09	240397.25	87148.06	76865.06	1.7
0	CRYPTOPHYTA	333793.62	910944.37	539660.44	594799.44	168874.69	11.5
0	CRYPTOMONADALES						
0	CRYPTOMONAS REFLEXA	0.0	0.0	33543.78	11181.26	11181.26	0.2
0	CRYPTOMONAS (LPIL)	23020.26	0.0	14141.02	12387.09	6702.99	0.2
0	RHODOMONAS MINUTA	310773.37	889897.31	491975.62	564215.44	171036.12	10.9
0	CHROONONAS (LPIL)	0.0	21047.09	0.0	7015.70	7015.70	0.1
	TOTAL	3107500.00	3739140.00	8712204.00	5186281.00	1772365.00	100.0
	DIVERSITY (H PRIME)	2.56	3.11	2.24	2.64	0.25	
	DIVERSITY (J PRIME)	0.81	0.82	0.61	0.75	0.07	
	NUMBER OF TAXA	13	22	18	31		

ABOVE COMPUTED USING SAMPLE IDS

71	72	81	82
91	92		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

RAFFLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA		X	S.E.	REL AB%
		9			
0	UNIDENTIFIED ALGAE	104468.06	104468.06	-1.00	2.0
0	UNIDENTIFIED ALGAE (LPIL)	104468.06	104468.06	-1.00	2.0
0	CYANOPHYTA	2079934.00	2079934.00	-1.00	40.1
0	CHROOCOCCACEAE				
0	MICROCYSTIS (LPIL)	95150.37	95150.37	-1.00	1.8
0	GOMPHOSPHERA LACUSTRIS	1956721.00	1956721.00	-1.00	37.7
0	OSCILLATORIACEAE				
0	OSCILLATORIA LIMNETICA	28062.79	28062.79	-1.00	0.5
0	CHLOROPHYTA	141519.69	141519.69	-1.00	2.7
0	VOLVOCALES				
0	CHLAMYDOMONAS (LPIL)	91752.12	91752.12	-1.00	1.8
0	TETRASPORALES				
0	ELAKATOTHRIX (LPIL)	31789.87	31789.87	-1.00	0.6
0	CHLOROCOCCALES				
0	ANKISTRODESMUS FALCATUS	17977.71	17977.71	-1.00	0.3
0	CHRYSOPHYTA	137354.12	137354.12	-1.00	2.6
0	CHRYSOOMADALES				
0	CHRYSOCCOCUS (LPIL)	7015.70	7015.70	-1.00	0.1
0	DINODRYON SOCIALE	61606.58	61606.58	-1.00	1.2
0	MONOSIGALES				
0	STELAXOMONAS DICHOTOMA	61716.19	61716.19	-1.00	1.2
0	CHRYSOPHYTA (LPIL)	7015.70	7015.70	-1.00	0.1
0	BACILLARIOPHYTA-CENTRIC	726069.50	726069.50	-1.00	14.0
0	EUPODISCALES				
0	NELOSIRA (LPIL)	188601.62	188601.62	-1.00	3.6
0	STEPHANODISCUS BINDERANA	42971.12	42971.12	-1.00	0.8
0	STEPHANODISCUS NIAGARAE	6796.45	6796.45	-1.00	0.1
0	STEPHANODISCUS (LPIL)	180763.75	180763.75	-1.00	3.5
0	EUPODISCALES (LPIL)	7015.70	7015.70	-1.00	0.1
0	RHIZOSOLENTALES				
0	RHIZOSOLENTA ERIENSIS	299920.94	299920.94	-1.00	5.8
0	BACILLARIOPHYTA-PENIATE	1314992.00	1314992.00	-1.00	25.4
0	FRAGILARIALES				
0	ASTERIONELLA FORMOSA	761049.56	761049.56	-1.00	14.7
0	DIATOMA TENUE	60619.98	60619.98	-1.00	1.2
0	FRAGILARIA CROTONENSIS	326887.62	326887.62	-1.00	6.3
0	FRAGILARIA (LPIL)	47575.19	47575.19	-1.00	0.9
0	TABELLARIA FLOCCULOSA	60948.87	60948.87	-1.00	1.2
0	NAVICULALES				
0	NAVICULA (LPIL)	9975.44	9975.44	-1.00	0.2
0	PINNULARIA (LPIL)	6796.45	6796.45	-1.00	0.1
0	BACILLARIALES				

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA		- X	S.E.	REL ABZ
		9			
0	NITZCHIA (LPIL)	7980.35	7980.35	-1.00	0.2
0	BACILLARIOPHYTA-PENNATE (LPIL)	33160.12	33160.12	-1.00	0.6
0	PYRPHOPHYTA-DINOPHYCEAE	87148.06	87148.06	-1.00	1.7
0	PERIDINTALES				
0	PERIDINIUM INCONSPICUUM	87148.06	87148.06	-1.00	1.7
0	CRYPTOPHYTA	594799.44	594799.44	-1.00	11.5
0	CRYPTONONDALES				
0	CRYPTONONHAS REFLEXA	11181.26	11181.26	-1.00	0.2
0	CRYPTONONHAS (LPIL)	12387.09	12387.09	-1.00	0.2
0	RHODONONHAS MINUTA	564215.44	564215.44	-1.00	10.9
0	CHRCNONHAS (LPIL)	7015.70	7015.70	-1.00	0.1
TOTAL		5186281.00	5186281.00	-1.00	100.0
DIVERSITY (H PRIME)		2.64	2.64	-1.00	
DIVERSITY (J PRIME)		0.75	0.75	-1.00	
NUMBER OF TAXA		31	31		

ABOVE COMPUTED USING SAMPLE IDS

71	72	81	82
91	92		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

SITE SUMMARY

LS	TAXA	Nearfield (1-6, 10)		Farfield (7-9)		REL ABZ
		0	0	X	S.E.	
0	UNIDENTIFIED ALGAE	7125.31	104468.06	55796.69	48671.37	1.0
0	UNIDENTIFIED ALGAE (LPIL)	7125.31	104468.06	55796.69	48671.37	1.0
0	CYANOPHYTA	1548934.00	2079934.00	1814434.00	265500.00	32.6
0	CHROOCOCCACEAE					
0	CHROOCOCCUS (LPIL)	81411.31	0.0	40705.66	40705.66	0.7
0	MICROCYSTIS (LPIL)	0.0	150.37	47575.19	47575.19	0.9
0	GOMPHOSPHERIA LACUSTRIS	630316.31	1956721.00	1293518.00	663202.31	23.2
0	OSCILLATORIACEAE					
0	OSCILLATORIA LIMNETICA	0.0	29062.79	14031.39	14031.39	0.3
0	OSCILLATORIA (LPIL)	321552.62	0.0	160776.31	160776.31	2.9
0	LYNGBYA CONTORTA	515653.62	0.0	257826.81	257826.81	4.6
0	CHLOROPHYTA	673945.00	141519.69	407732.31	266212.62	7.3
0	VOLVOCALES					
0	CHLAMYDOMONAS (LPIL)	193954.69	91752.12	142853.37	51101.28	2.6
0	TETRASPORALES					
0	ELAKATOTHRIS (LPIL)	22618.29	31789.87	27204.08	4585.79	0.5
0	CHLOROCOCCALES					
0	SPHAEROCYSTIS SCHROETERI	389809.31	0.0	194904.62	194904.62	3.5
0	ANKISTRODESNIUS FALCATUS	53238.90	17977.71	35608.30	17630.59	0.6
0	SCENEDESNIUS QUADRICAUDA	14323.71	0.0	7161.86	7161.86	0.1
0	CHRYSOPHYTA	221341.50	137354.12	179347.81	41993.69	3.2
0	CHRYSONOMADALES					
0	CHLAMYDOMONAS (LPIL)	6284.89	0.0	3142.45	3142.45	0.1
0	CHRYSOOCOCCUS (LPIL)	1827.00	7015.70	4421.35	2594.35	0.1
0	SYNURA (LPIL)	3654.01	0.0	1827.00	1827.00	0.0
0	DINODRYON SOCIALE	62465.27	61606.58	62035.93	429.34	1.1
0	MONOSIGALES					
0	STELIONOMAS DICHOTOMA	147110.31	61716.19	104413.25	42697.06	1.9
0	CHRYSOPHYTA (LPIL)	0.0	7015.70	3507.85	3507.85	0.1
0	BACILLARIOPHYTA-CENTRIC	1256371.00	726069.50	991220.25	265150.75	17.8
0	EUPODISCALES					
0	HELOSIRA (LPIL)	470197.62	188601.62	329399.62	140798.00	5.9
0	STEPHANODISCUS BINDERANA	230713.94	42971.12	136842.50	93871.37	2.5
0	STEPHANODISCUS NIACARAE	14287.17	6796.45	10541.81	3745.36	0.2
0	STEPHANODISCUS (LPIL)	132969.31	180763.75	156866.50	23897.22	2.8
0	EUPODISCALES (LPIL)	150033.56	7015.70	78524.62	71508.87	1.4
0	RHIZOSOLENIALES					
0	RHIZOSOLENIA ERIENSIS	258170.25	299920.94	279045.56	20875.34	5.0
0	BACILLARIOPHYTA-PENIATE	1410866.00	1314992.00	1362929.00	47937.00	24.5
0	FRAGILARIALES					
0	ASTERIONELLA FORMOSA	526396.44	761049.56	643723.00	117326.56	11.6
0	DIATOMA TENUE	1461.60	60619.98	31040.79	29579.19	0.6

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

SITE SUMMARY

		Nearfield	Farfield			REL
		(1-6, 10)	(7-9)			ABZ
LS	TAXA			-	S.E.	
		0	0	X		
0	FRAGILARIA CROTONENSIS	242078.00	326887.62	284482.81	42404.81	5.1
0	FRAGILARIA (LPIL)	491646.69	47575.19	269610.94	222035.75	4.8
0	TABELLARIA FLOCCULOSA	0.0	60948.87	30474.44	30474.44	0.5
0	FRAGILARIALES (LPIL)	22837.54	0.0	11418.77	11418.77	0.2
0	NAVICULALES					
0	NAVICULA (LPIL)	4932.91	9975.44	7454.18	2521.27	0.1
0	PINNULARIA (LPIL)	2228.94	6796.45	4512.70	2283.75	0.1
0	CYMBELLA (LPIL)	4019.41	0.0	2009.70	2009.70	0.0
0	BACILLARIALES					
0	NITZCHIA (LPIL)	31351.37	7980.35	19665.86	11685.51	0.4
0	SURIPELLALES					
0	CYMATOPLEURA SOLEA	1827.00	0.0	913.50	913.50	0.0
0	BACILLARIOPHYTA-PENNIATE (LPIL)	82087.25	33160.12	57623.68	24463.56	1.0
0	PYRENOPHYTA-DINOPHYCEAE	577.21	87148.06	46862.64	40285.43	0.8
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	6577.21	87148.06	46862.64	40285.43	0.8
0	CRYPTOPHYTA	816816.87	594799.44	705808.12	111008.69	12.7
0	CRYPTOMONADALES					
0	CRYPTOMONAS HANSSONII	7673.42	0.0	3836.71	3836.71	0.1
0	CRYPTOMONAS REFLEXA	18671.98	11181.26	14926.62	3745.36	0.3
0	CRYPTOMONAS (LPIL)	41546.08	12387.09	26966.58	14579.49	0.5
0	RHOZOMONAS MINUTA	710996.87	564215.44	637606.12	73390.69	11.5
0	CHROONONAS (LPIL)	34274.60	7015.70	20645.14	13629.45	0.4
0	CYANONONAS (LPIL)	3654.01	0.0	1827.00	1827.00	0.0
TOTAL		5941973.00	5186281.00	5564127.00	377846.00	100.0
DIVERSITY (H PRIME)		2.63	2.64	2.64	0.00	
DIVERSITY (J PRIME)		0.75	0.75	0.75	0.00	
NUMBER OF TAXA		39	31	43		

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
31	32	41	42
51	52	61	62
101	102	71	72
81	82	91	92

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 1 1 00

				DURATION			TOW				SAMP VOL				WIND			CURENT			TEMP										
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P				
171	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	4	1	5	0.0	0	17.8	16.0	0	0.0	0	8.9	0.0	0.0	0				
172	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	4	1	5	0.0	0	17.8	16.0	0	0.0	0	8.9	0.0	0.0	0				
																									REL						
																									S.E.		ABZ				
TAXA																									X						
										1		2																			
0	CYANOPHYTA									0.0		562351.87														281175.94		281175.94		6.2	
0	OSCILLATORIAEAE																														
0	OSCILLATORIA (LPIL)									0.0		562351.87														281175.94		281175.94		6.2	
0	CHLOROPHYTA									3207047.00		1274663.00														2240855.00		966192.00		49.2	
0	CHLOROCOCCALES																														
0	SCENEDESMUS QUADRICAUDA									2783476.00		1199683.00														1991579.00		791896.50		43.7	
0	SCENEDESMUS EORNIS									181531.12		0.0														90765.56		90765.56		2.0	
0	SCENEDESMUS SPINOSUS									60510.37		0.0														30255.19		30255.19		0.7	
0	TETRAEDRON CAUDATUM									30255.19		0.0														15127.59		15127.59		0.3	
0	OEDOGONIALES																														
0	OEDOGONIUM (LPIL)									121020.75		0.0														60510.37		60510.37		1.3	
0	ZYGNEATALES																														
0	MOUGEOTIA (LPIL)									0.0		37490.12														18745.06		18745.06		0.4	
0	CLOSTERIUM MONILIFERUM									30255.19		0.0														15127.59		15127.59		0.3	
0	STAUROSTRUM (LPIL)									0.0		37490.12														18745.06		18745.06		0.4	
0	EUGLENOPHYTA									90765.56		74980.25														82872.87		7892.66		1.8	
0	EUGLENALES																														
0	TRACHELONONAS (LPIL)									90765.56		74980.25														82872.87		7892.66		1.8	
0	CHRYSPHYTA									816890.06		2174426.00														1495658.00		678767.94		32.8	
0	CHRYSONOMADALES																														
0	CHRYSOCOCCUS (LPIL)									272296.69		1124703.00														698499.81		426203.12		15.3	
0	DINOSRYON SERTULARIA									453827.81		1012233.37														733030.56		279202.75		16.1	
0	EPIPHYTIS UTRICULUS									90765.56		0.0														45382.78		45382.78		1.0	
0	KEPHYRION (LPIL)									0.0		37490.12														18745.06		18745.06		0.4	
0	BACILLARIOPHYTA-PENNATE									429623.62		224940.75														327282.19		102341.44		7.2	
0	FRAGILARIALES																														
0	TABELLARIA FLOCCULOSA									157326.94		0.0														78663.44		78663.44		1.7	
0	ACHNANTHIALES																														
0	ACHNANTHES MINUTISSIMA									181531.12		149960.50														165745.81		15785.31		3.6	
0	ACHNANTHES (LPIL)									60510.37		0.0														30255.19		30255.19		0.7	
0	SURIPELLALES																														
0	SURIPELLA (LPIL)									30255.19		0.0														15127.59		15127.59		0.3	
0	BACILLARIOPHYTA-PENNATE (LPIL)									0.0		74980.25														37490.12		37490.12		0.8	
0	CRYPTOPHYTA									0.0		262430.87														131215.44		131215.44		2.9	
0	CRYPTONONODALES																														
0	CRYPTONONAS (LPIL)									0.0		112470.37														56235.19		56235.19		1.2	

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-		REL
		1	2	X	S.E.	ABZ
0	RHODOMONAS MINUTA	0.0	37490.12	18745.06	18745.06	0.4
0	CHROMOMONAS (LPIL)	0.0	112470.37	56235.19	56235.19	1.2
TOTAL		4544321.00	4573789.00	4559055.00	14734.00	100.0
DIVERSITY (H PRIME)		2.12	2.70	2.46	0.24	
DIVERSITY (J PRIME)		0.58	0.73	0.66	0.07	
NUMBER OF TAXA		14	13	22		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-	S.E.	REL
		1	2	X		AB%
DIVERSITY (J PRIME)		0.62	0.67			
NUMBER OF TAXA		11	14	0.65	0.02	
				19		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	17	18	X	S.E.	REL AB%
0	CYANOPHYTA	281175.94	580110.50	430643.19	149467.25	6.2
0	OSCILLATORIACEAE					
0	OSCILLATORIA (LPIL)	281175.94	0.0	140587.94	140587.94	2.0
0	NOSTOCACEAE					
0	ANABAENA (LPIL)	0.0	580110.50	290055.25	290055.25	4.2
0	CHLOROPHYTA	2240855.00	4729507.00	3485181.00	1244326.00	49.9
0	CHLOROCOCCALES					
0	OOCYSTIS (LPIL)	0.0	32886.06	16443.03	16443.03	0.2
0	SCENEDESMUS QUADRICAUDA	1991579.00	2174755.00	2083167.00	91588.00	29.8
0	SCENEDESMUS EORNIS	90765.56	131544.25	111154.87	20389.34	1.6
0	SCENEDESMUS SPINOSUS	30255.19	64456.72	47355.95	17100.77	0.7
0	PEDIASTRUM DUPLEX	0.0	2104708.00	1052354.00	1052354.00	15.1
0	TETRAEDRON CAUDATUM	15127.59	0.0	7563.80	7563.80	0.1
0	OEDOGONIALES					
0	OEDOGONIUM (LPIL)	60510.37	0.0	30255.19	30255.19	0.4
0	ZYGNEATALES					
0	MOUGEOTIA (LPIL)	18745.06	221158.75	119951.87	101206.81	1.7
0	CLOSTERIUM MONILIFERUM	15127.59	0.0	7563.80	7563.80	0.1
0	STAUROSTROM (LPIL)	18745.06	0.0	9372.53	9372.53	0.1
0	EUGLENOPHYTA	82872.87	16114.18	49493.53	33379.35	0.7
0	EUGLENALES					
0	TRACHELONONAS (LPIL)	82872.87	16114.18	49493.53	33379.35	0.7
0	CHRYSOPHYTA	1495658.00	3132429.00	2564043.00	1068385.00	36.7
0	CHRYSOMONADALES					
0	CHRYSOCOCCUS (LPIL)	698499.81	2144946.00	1821722.00	1123223.00	26.1
0	DINOBRYON SERTULARIA	733030.56	519483.00	661256.75	71773.75	9.5
0	EPIPYXIS UTRICULUS	45302.78	0.0	22691.39	22691.39	0.3
0	KEPHYRION (LPIL)	18745.06	90000.44	58372.75	39627.69	0.8
0	BACILLARIOPHYTA-PENNIATE	327282.19	359970.94	343626.56	16344.37	4.9
0	FRAGILARIALES					
0	FRAGILARIA (LPIL)	0.0	80570.87	40285.44	40285.44	0.6
0	TABELLARIA FLOCCULOSA	78663.44	16114.18	47388.81	31274.63	0.7
0	ACHNANTHIALES					
0	ACHNANTHES MINUTISSIMA	165745.81	0.0	82872.87	82872.87	1.2
0	ACHNANTHES (LPIL)	30255.19	0.0	15127.59	15127.59	0.2
0	NAVICULALES					
0	NEIDIUM (LPIL)	0.0	32886.06	16443.03	16443.03	0.2
0	BACILLARIALES					
0	NITZSCHIA (LPIL)	0.0	13154.42	6577.21	6577.21	0.1
0	SURIPELLALES					
0	SURIPELLA (LPIL)	15127.59	0.0	7563.80	7563.80	0.1
0	BACILLARIOPHYTA-PENNIATE (LPIL)	37490.12	217245.37	127367.75	89877.62	1.8

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

S	TAXA			-	S.E.	REL
		17	18	X		ABZ
0	CRYPTOPHYTA	13122.44	96685.00	113950.19	17265.22	1.6
0	CRYPTOMONADALES					
0	CRYPTOMONAS (LPIL)	56235.19	48342.53	52288.86	3946.33	0.7
0	RHODOMONAS MINUTA	18745.06	16114.18	17429.62	1315.44	0.2
0	CHROOMONAS (LPIL)	56235.19	32228.36	44231.77	12003.41	0.6
TOTAL		4559055.00	9414813.00	6986934.00	2427879.00	100.0
DIVERSITY (H PRIME)		2.46	2.35	2.41	0.06	
DIVERSITY (J PRIME)		0.66	0.65	0.65	0.01	
NUMBER OF TAXA		22	19	28		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	18	X	S.E.	REL ABZ
0	CYANOPHYTA	430643.19	430643.19	-1.00	6.2
0	OSCILLATORIA	140587.94	140587.94	-1.00	2.0
0	OSCILLATORIA (LPIL)	140587.94	140587.94	-1.00	2.0
0	NOSTOCACEAE	290055.25	290055.25	-1.00	4.2
0	ANABAENA (LPIL)	290055.25	290055.25	-1.00	4.2
0	CHLOROPHYTA	3485181.00	3485181.00	-1.00	49.9
0	CHLOROCOCCALES	16443.03	16443.03	-1.00	0.2
0	OOCYSTIS (LPIL)	2083167.00	2083167.00	-1.00	29.8
0	SCENEDESMUS QUADRICAUDA	111154.87	111154.87	-1.00	1.6
0	SCENEDESMUS ECOPHIS	47355.95	47355.95	-1.00	0.7
0	SCENEDESMUS SPINOSUS	1052354.00	1052354.00	-1.00	15.1
0	PEDIASTRUM DUPLEX	7563.80	7563.80	-1.00	0.1
0	TETRAEDRON CALIATUM	30255.19	30255.19	-1.00	0.4
0	OEDOCONIALES	119951.87	119951.87	-1.00	1.7
0	OEDOCONIUM (LPIL)	7563.80	7563.80	-1.00	0.1
0	ZYGNEATALES	9372.53	9372.53	-1.00	0.1
0	MOUSEOTIA (LPIL)	49493.53	49493.53	-1.00	0.7
0	CLOSTERIUM MONILIFERUM	49493.53	49493.53	-1.00	0.7
0	STAUROSTROM (LPIL)	2564043.00	2564043.00	-1.00	36.7
0	EUGLENOPHYTA	1821722.00	1821722.00	-1.00	26.1
0	EUGLENALES	661256.75	661256.75	-1.00	9.5
0	TRACHELOMONAS (LPIL)	22691.39	22691.39	-1.00	0.3
0	CHRYSOOPHYTA	58372.75	58372.75	-1.00	0.8
0	CHRYSOONADALES	343626.56	343626.56	-1.00	4.9
0	CHRYSOCCOCUS (LPIL)	40285.44	40285.44	-1.00	0.6
0	DINOBRYON SERTULARIA	47388.81	47388.81	-1.00	0.7
0	EPIPYXIS UTRICULUS	82872.87	82872.87	-1.00	1.2
0	KEPHYRION (LPIL)	15127.59	15127.59	-1.00	0.2
0	BACILLARIOPHYTA-PENNAE	16443.03	16443.03	-1.00	0.2
0	FRAGILARIALES	6577.21	6577.21	-1.00	0.1
0	FRAGILARIA (LPIL)	7563.80	7563.80	-1.00	0.1
0	TAEELLARIA FLOCCULOSA	127367.75	127367.75	-1.00	1.8
0	ACHNANTHALES				
0	ACHNANTHES MINUTISSIMA				
0	ACHNANTHES (LPIL)				
0	NAVICULALES				
0	NEIDIUM (LPIL)				
0	BACILLARIALES				
0	HITZCHIA (LPIL)				
0	SURIRELLALES				
0	SURIRELLA (LPIL)				
0	BACILLARIOPHYTA-PENNAE (LPIL)				

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA		- X	S.E.	REL AB%
		18			
0	CRYPTOPHYTA	113950.19	113950.19	-1.00	1.6
0	CRYPTOMONADALES				
0	CRYPTOMONAS (LPIL)	52288.86	52288.86	-1.00	0.7
0	PHODOMONAS MINUTA	17429.62	17429.62	-1.00	0.2
0	CHRODOMONAS (LPIL)	44231.77	44231.77	-1.00	0.6
TOTAL		6986934.00	6986934.00	-1.00	100.0
DIVERSITY (H PRIME)		2.41	2.41	-1.00	
DIVERSITY (J PRIME)		0.65	0.65	-1.00	
NUMBER OF TAXA		28	28		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 1 2 00

SID	DATE	TIME	D/H	DURATION			SD	WD	TOW			SAMP VOL	SC	DI	CURRENT			TEMP		BT	TURBD	COND	DO	PH	SALN	P		
				UNITS	C				D						CL	SP	DI	AIR	WAT									
191	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	178.1	9.5	0	0.0	0	8.5	0.0	0.0	0
192	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	17.8	19.5	0	0.0	0	8.5	0.0	0.0	0
LS																									-	REL		
	TAXA																								X	S.E.	AB%	
						1					2																	
0	CYANOPHYTA					399894.81					0.0										199947.37		199947.37		1.5			
0	CHROCOCCACEAE																											
0	AGNELLUM (LPIL)					399894.81					0.0										199947.37		199947.37		1.5			
0	CHLOROPHYTA					124967.06					242699.12										183833.06		58866.03		1.4			
0	VOLVOCALES																											
0	CHLAMYDOMONAS (LPIL)					24993.43					26966.58										25930.00		986.58		0.2			
0	CHLOROCOCCALES																											
0	ANKISTRODESMUS FALCATUS					0.0					53933.16										26966.58		26966.58		0.2			
0	S. NEDDESUS QUADRICAUDA					0.0					161799.44										80899.69		80899.69		0.6			
0	SCENEDESUS EORNIS					99973.69					0.0										49986.84		49986.84		0.4			
0	EUGLENOPHYTA					224940.69					134832.87										179886.75		45053.91		1.3			
0	EUGLENALES																											
0	TRACHELONONAS VOLVOGINA					24993.43					26966.58										25980.00		986.58		0.2			
0	TRACHELONONAS (LPIL)					199947.31					107866.31										153906.81		46040.50		1.1			
0	CHRYSTOPHYTA					15420937.0					9613582.00										12517259.0		2903677.00		92.9			
0	CHRYSONOMADALES																											
0	CHRYSOCOCCLUS (LPIL)					1049723.00					566298.12										808010.56		241712.44		6.0			
0	DINOBYRON SERTULARIA					3049195.00					2170809.00										2610002.00		439193.00		19.4			
0	DINOBYRON DIVERGENS					0.0					53933.16										26966.58		26966.58		0.2			
0	OCHROMONAS (LPIL)					11172059.0					6795576.00										8983817.00		2188241.00		66.7			
0	KEPHYRION (LPIL)					149960.50					26966.58										80463.50		61496.96		0.7			
0	BACILLARIOPHYTA-PENNATE					249934.19					80899.69										165416.94		84517.25		1.2			
0	FRAGILARIALES																											
0	FRAGILARIA (LPIL)					224940.81					0.0										112470.37		112470.37		0.8			
0	TABELLARIA FLOCCULOSA					0.0					80899.69										40449.84		40449.84		0.3			
0	BACILLARIOPHYTA-PENNATE (LPIL)					24993.43					0.0										12496.71		12496.71		0.1			
0	PYRRHOPHYTA-DINOPHYCEAE					99973.62					107866.25										103919.94		3946.31		0.8			
0	PERIDINIALES																											
0	PERIDINIUM INCONSPICUUM					74980.25					107866.25										91423.25		16443.00		0.7			
0	PERIDINIUM CINCTUM					24993.43					0.0										12496.71		12496.71		0.1			
0	CRYPTOPHYTA					99973.62					134832.87										117403.25		17429.62		0.9			
0	CRYPTONOMADALES																											
0	CRYPTONONAS (LPIL)					74980.25					107866.31										91423.25		16443.03		0.7			
0	CHROONONAS (LPIL)					24993.43					26966.58										25980.00		986.58		0.2			
-	TOTAL					16620614.0					10314706.0										13467660.0		3152954.00		100.0			
-	DIVERSITY (H PRIME)					1.62					1.62										1.62		0.00					

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	-	S.E.	REL
				X		ABZ
DIVERSITY (J PRIME)		0.42	0.43	0.42	0.01	
NUMBER OF TAXA		15	14	19		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 1 2 00

SID	DATE	TIME	D/N	UNITS	C	SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TUBED	COND	DO	PH	SALN	P					
								SP	D	UNITS	C	SECH	W	T	SC	DI	CL								SP	DI	AIR	WAT	
201	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	17.8	19.5	0	0.0	0	8.7	0.0	0.0	0	
202	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	17.8	19.5	0	0.0	0	8.7	0.0	0.0	0	
LS																							-			REL			
																							X			AB%			
																										S.E.			
																							1			2			
0	CYANOPHYTA																							0.0	2440147.00		1220073.00	1220073.00	4.6
0	NOSTOCACEAE																												
0	ANABAENA (LPIL)																							0.0	2440147.00		1220073.00	1220073.00	4.6
0	CHLOROPHYTA																							126282.56	209155.50		167719.00	41436.47	0.6
0	VOLVOCALES																												
0	CHLAMYDOMONAS (LPIL)																							42094.19	34859.25		38476.72	3617.47	0.1
0	CHLOROCOCCALES																												
0	ANKISTRODESMIUS FALCATUS																							0.0	34859.25		17429.62	17429.62	0.1
0	SCENEDESMUS ACUTUS																							0.0	139437.00		69718.50	69718.50	0.3
0	SCENEDESMUS QUADRICAUDA																							84188.37	0.0		42094.19	42094.19	0.2
0	EUGLENOPHYTA																							399894.75	313733.25		356814.00	43080.75	1.3
0	EUGLENALES																												
0	TRACHELOMONAS VOLVOICINA																							84188.37	0.0		42094.19	42094.19	0.2
0	TRACHELOMONAS (LPIL)																							315706.37	313733.25		314719.81	986.56	1.2
0	CHRYSOPHYTA																							24077824.0	24506032.0		24291920.0	214104.00	91.6
0	CHRYSOMONADALES																												
0	CHRYSOCOCCUS (LPIL)																							168376.75	871401.25		519929.00	351552.25	2.0
0	SYNCRYPTEA (LPIL)																							42094.19	0.0		21047.09	21047.09	0.1
0	DINOBRYON SERTULARIA																							883977.94	1777821.00		1330899.00	446921.50	5.0
0	DINOBRYON (LPIL)																							84188.37	0.0		42094.19	42094.19	0.2
0	OCHROMONAS (LPIL)																							22815040.0	21787024.0		22301024.0	514008.00	84.1
0	EPIPYXIS UTRICULUS																							42094.19	0.0		21047.09	21047.09	0.1
0	KLEPHYRION (LPIL)																							42094.19	69718.50		55906.34	13812.15	0.2
0	BACILLARIOPHYTA-PENNATE																							0.0	69718.50		34859.25	34859.25	0.1
0	BACILLARIALES																												
0	NIITZCHIA (LPIL)																							0.0	34859.25		17429.62	17429.62	0.1
0	BACILLARIOPHYTA-PENNATE (LPIL)																							0.0	34859.25		17429.62	17429.62	0.1
0	PYRRHOPHYTA-DINOPHYCEAE																							366219.37	209155.50		287687.44	78531.94	1.1
0	PERIDINIALES																												
0	PERIDINIUM INCONSPICUUM																							366219.37	139437.00		252828.19	113391.19	1.0
0	PERIDINIUM CINCTUM																							0.0	69718.50		34859.25	34859.25	0.1
0	CRYPTOPHYTA																							168376.75	139437.00		153906.87	14469.87	0.6
0	CRYPTOMONADALES																												
0	CRYPTOMONAS (LPIL)																							168376.75	104577.75		136477.25	31899.50	0.5
0	CHROONONAS (LPIL)																							0.0	34859.25		17429.62	17429.62	0.1
-	TOTAL																							25138480.0	27887280.0		26512880.0	1374400.00	100.0

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-	X	S.E.	REL
		1	2				AB%
DIVERSITY (H PRIME)		0.71	1.28		0.99	0.29	
DIVERSITY (J PRIME)		0.19	0.33		0.26	0.07	
NUMBER OF TAXA		13	15		20		

ABOVE COMPUTED USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	19	20	X	S.E.	REL ABZ
0	CYANOPHYTA	199947.37	1220073.00	710010.19	510062.81	3.6
0	CHROCOCCACEAE					
0	AGMENELLUM (LPIL)	199947.37	0.0	99973.69	99973.69	0.5
0	NOSTOCACEAE					
0	ANABAENA (LPIL)	0.0	1220073.00	610036.50	610036.50	3.1
0	CHLOROPHYTA	183833.06	167719.00	175776.00	8057.03	0.9
0	VOLVOCALES					
0	CHLAMYDOMONAS (LPIL)	25980.00	38476.72	32228.36	6248.36	0.2
0	CHLOROCOCCALES					
0	ANKISTRODESMUS FALCATUS	26966.58	17429.62	22193.10	4768.48	0.1
0	SCENEDESMUS ACUTUS	0.0	69718.50	34859.25	34859.25	0.2
0	SCENEDESMUS QUADRICAUDA	80699.69	42094.19	41496.94	19402.75	0.3
0	SCENEDESMUS ECORNIS	49986.84	0.0	14993.42	24993.42	0.1
0	EUGLENOPHYTA	179886.75	356814.00	268350.37	88463.62	1.3
0	EUGLENALES					
0	TRACHELONONAS VOLVOCHIA	25980.00	42094.19	34037.09	8057.09	0.2
0	TRACHELONONAS (LPIL)	153906.81	314719.81	234313.31	80406.50	1.2
0	CHRYCOPHYTA	12517259.0	24291920.0	18404576.0	5887330.00	92.1
0	CHRYSOMONADALES					
0	CHRYSOCOCCUS (LPIL)	808010.56	519929.00	663969.75	144041.75	3.3
0	SYNCRYPHA (LPIL)	0.0	21047.09	10523.55	10523.55	0.1
0	DINODRYON SERTULARIA	2610002.00	1330899.00	1970450.00	639551.50	9.9
0	DINODRYON DIVERGENS	26966.58	0.0	13483.29	13483.29	0.1
0	DINODRYON (LPIL)	0.0	42094.19	21047.09	21047.09	0.1
0	OCCHROMONAS (LPIL)	8983817.00	22301024.0	15642420.0	6658603.00	78.3
0	EPIPYXIS UTRICULUS	0.0	21047.09	10523.55	10523.55	0.1
0	KEPHYRION (LPIL)	88463.50	55906.34	72184.87	16278.58	0.4
0	BACILLARIOPHYTA-PERINATE	165416.94	34859.25	100138.06	65278.84	0.5
0	FRAGILARIALES					
0	FRAGILARIA (LPIL)	112470.37	0.0	56235.19	56235.19	0.3
0	TABELLARIA FLOCCULOSA	40449.84	0.0	20224.92	20224.92	0.1
0	BACILLARIALES					
0	NIETZSCHIA (LPIL)	0.0	17429.62	8714.81	8714.81	0.0
0	BACILLARIOPHYTA-PERINATE (LPIL)	12496.71	17429.62	14963.17	2466.46	0.1
0	PYRRHOPHYTA-DINOPHYCEAE	103919.94	287687.44	195803.69	91883.75	1.0
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	91423.25	252828.19	172125.69	80702.44	0.9
0	PERIDINIUM CINCTUM	12496.71	34859.25	23477.98	11181.27	0.1
0	CRYPTOPHYTA	117403.25	153906.87	135655.06	18251.81	0.7
0	CRYPTOMONADALES					
0	CRYPTOMONAS (LPIL)	91423.25	136477.25	113950.25	22527.00	0.6
0	CHROONONAS (LPIL)	25980.00	17429.62	21704.81	4275.19	0.1

NORTHERN INDIANA PUBLIC SERVICE COMPANY 1497201

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA			X			REL
		19	20		S.E.	ABX	
TOTAL		13467060.0	26512880.0	19990255.0	6522610.00	100.0	
DIVERSITY (H PRIME)		1.62	0.99	1.31	0.32		
DIVERSITY (J PRIME)		0.42	0.26	0.34	0.08		
NUMBER OF TAXA		19	20	25			

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	20	X	S.E.	REL ABZ
0	CYANOPHYTA	710010.19	710010.19	-1.00	3.6
0	CHROOCOCCACEAE				
0	ACNETHELLUM (LPIL)	99973.69	99973.69	-1.00	0.5
0	NOSTOCACEAE				
0	ANABAENA (LPIL)	610036.50	610036.50	-1.00	3.1
0	CHLOROPHYTA	175776.00	175776.00	-1.00	0.9
0	VOLVOCALES				
0	CHLAMYDOMONAS (LPIL)	32228.36	32228.36	-1.00	0.2
0	CHLOROCCOCCALES				
0	ANKISTRODESNIUS FALCATUS	22198.10	22198.10	-1.00	0.1
0	SCENEDESNIUS ACUTUS	34859.25	34859.25	-1.00	0.2
0	SCENEDESNIUS QUADRICAUDA	61496.94	61496.94	-1.00	0.3
0	SCENEDESNIUS EORNIS	24993.42	24993.42	-1.00	0.1
0	EUGLENOPHYTA	268350.37	268350.37	-1.00	1.3
0	EUGLENALES				
0	TRACHELONONAS VOLVOCINA	34037.09	34037.09	-1.00	0.2
0	TRACHELONONAS (LPIL)	234313.31	234313.31	-1.00	1.2
0	CHRYSOPHYTA	18404576.0	18404576.0	-1.00	92.1
0	CHRYSONOMADALES				
0	CHRYSOCCOCCUS (LPIL)	663969.75	663969.75	-1.00	3.3
0	SYNCRYPTA (LPIL)	10523.55	10523.55	-1.00	0.1
0	DINODRYON SEPTULARIA	1970450.00	1970450.00	-1.00	9.9
0	DINODRYON DIVERGENS	13483.29	13483.29	-1.00	0.1
0	DINODRYON (LPIL)	21047.09	21047.09	-1.00	0.1
0	OCHROMONAS (LPIL)	1564240.0	1564240.0	-1.00	78.3
0	EPIPYXIS UTRICULUS	10523.55	10523.55	-1.00	0.1
0	KEPHYTRION (LPIL)	72184.87	72184.87	-1.00	0.4
0	BACILLARIOPHYTA-PENNATE	100138.06	100138.06	-1.00	0.5
0	FRAGILARIALES				
0	FRAGILARIA (LPIL)	56235.19	56235.19	-1.00	0.3
0	TABELLARIA FLOCCULOSA	20224.92	20224.92	-1.00	0.1
0	BACILLARIALES				
0	NITZSCHIA (LPIL)	8714.81	8714.81	-1.00	0.0
0	BACILLARIOPHYTA-PENNATE (LPIL)	14963.17	14963.17	-1.00	0.1
0	PHYTOPHYTA-DINOPHYCEAE	195803.69	195803.69	-1.00	1.0
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	172125.69	172125.69	-1.00	0.9
0	PERIDINIUM CINCTUM	23677.98	23677.98	-1.00	0.1
0	CRYPTOPHYTA	135655.06	135655.06	-1.00	0.7
0	CRYPTONOMADALES				
0	CRYPTONONAS (LPIL)	113950.25	113950.25	-1.00	0.6
0	CHROMONAS (LPIL)	21704.81	21704.81	-1.00	0.1

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

PC TC GC LOC
5 56 56 1 3 00

		DURATION				TOW				SAMP VOL				WIND				CURRENT				TEMP							
SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P		
211	4/20/80	1327	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	17.8	19.0	0	0.0	0	12.0	0.0	0.0	0	
212	4/20/80	1327	0	0.0	0	1.0	1.0	0.0	0	2.0	4	1.0	8	0	4	1	5	0.0	0	178.1	90.1	0	0.0	0	12.0	0.0	0.0	0	
LS	TAXA														X				S.E.				REL ABZ						
								1					2																
0	CYANOPHYTA							1639042.00					1882399.00									1760720.00			121678.50		27.8		
0	OSCILLATORIACEAE																												
0	OSCILLATORIA (LPIL)							1580505.00					0.0										790252.50			790252.50		12.5	
0	NOSTOCACEAE																												
0	ANABAENA (LPIL)							0.0					1882399.00										941199.50			941199.50		14.8	
0	RIVULARIACEAE																												
0	RAPHIDIOPSIS CURVATA							58537.23					0.0										29268.62			29268.62		0.5	
0	CHLOROPHYTA							1041962.69					10457.77										526210.19			515752.44		8.3	
0	OEDOGONIALES																												
0	OEDOGONIUM (LPIL)							936595.69					0.0										466297.81			466297.81		7.4	
0	ZYGNEHATALES																												
0	SPIROGYRA (LPIL)							105367.00					0.0										52683.50			52683.50		0.8	
0	CLOSTERIUM (LPIL)							0.0					10457.77										5228.89			5228.89		0.1	
0	EUGLENOPHYTA							286832.37					34859.25										160845.81			125986.56		2.5	
0	EUGLENALES																												
0	TRACHELONCHAS (LPIL)							286832.37					34859.25										160845.81			125986.56		2.5	
0	CHRYSOPHYTA							117074.44					0.0										58537.22			58537.22		0.9	
0	CHRYSONOMADALES																												
0	CHRYSOCOCCLUS (LPIL)							117074.44					0.0										58537.22			58537.22		0.9	
0	BACILLARIOPHYTA-CENTRIC							234148.94					174296.25										204222.56			29926.34		3.2	
0	EUPODISCALES																												
0	MELOSIRA VARIANS							234148.94					0.0										117074.44			117074.44		1.8	
0	MELOSIRA (LPIL)							0.0					174296.25										87148.12			87148.12		1.4	
0	BACILLARIOPHYTA-PENNATE							6409822.00					787819.00										3500820.00			2811001.00		56.8	
0	FRAGILARIALES																												
0	FRAGILARIA CROTONENSIS							409760.62					0.0										204880.31			204880.31		3.2	
0	FRAGILARIA (LPIL)							3804919.00					662325.75										2233622.00			1571296.00		35.2	
0	SYNEDRA (LPIL)							321954.75					55774.79										188864.75			133089.94		3.0	
0	NAVICULALES																												
0	NAVICULA (LPIL)							702446.75					34859.25										368653.00			333793.75		5.8	
0	NEIDIUM (LPIL)							58537.23					0.0										29268.62			29268.62		0.5	
0	PINNULARIA (LPIL)							117074.44					0.0										58537.22			58537.22		0.9	
0	GONPHONEMA (LPIL)							526835.06					0.0										263417.50			263417.50		4.2	
0	AIPHORA (LPIL)							0.0					34859.25										17429.62			17429.62		0.3	
0	EPIITHENIALES																												
0	RHOPOLODIA GIBBA							117074.44					0.0										58537.22			58537.22		0.9	

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

REPLICATE REPORT

LS	TAXA			-		REL
		1	2	X	S.E.	AB%
0	BACILLARIOPHYTA-PENNATE (LPIL)	351223.37	0.0	175611.69	175611.69	2.8
0	PYRPHOPHYTA-DINOPHYCEAE	58537.23	0.0	29268.62	29268.62	0.5
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	58537.23	0.0	29268.62	29268.62	0.5
TOTAL		9787415.00	2889828.00	6338621.00	3448793.00	100.0
DIVERSITY (H PRIME)		3.01	1.50	2.26	0.76	
DIVERSITY (J PRIME)		0.74	0.50	0.62	0.12	
NUMBER OF TAXA		17	8	21		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA		- X	S.E.	REL ABZ
		21			
0	CYANOPHYTA	1760720.00	1760720.00	-1.00	27.8
0	OSCILLATORIACEAE				
0	OSCILLATORIA (LPIL)	790252.50	790252.50	-1.00	12.5
0	NOSTOCACEAE				
0	ANABAENA (LPIL)	941199.50	941199.50	-1.00	14.8
0	RIVULARIACEAE				
0	RAPHIDIOPSIS CURVATA	29268.62	29268.62	-1.00	0.5
0	CHLOROPHYTA	526210.19	526210.19	-1.00	8.3
0	OEDOGONIALES				
0	OEDOGONIUM (LPIL)	468297.81	468297.81	-1.00	7.4
0	ZYGNEHATALES				
0	SPIROGYRA (LPIL)	52683.50	52683.50	-1.00	0.8
0	CLOSTERIUM (LPIL)	5228.89	5228.89	-1.00	0.1
0	EUGLENOPHYTA	160845.81	160845.81	-1.00	2.5
0	EUGLENALES				
0	TRACHELONONAS (LPIL)	160845.81	160845.81	-1.00	2.5
0	CHRYSOPHYTA	58537.22	58537.22	-1.00	0.9
0	CHRYSOMONADALES				
0	CHRYSOCOCCUS (LPIL)	58537.22	58537.22	-1.00	0.9
0	BACILLARIOPHYTA-CENTRIC	204222.56	204222.56	-1.00	3.2
0	EUPODISCALES				
0	HELOSIRA VARIANS	117074.44	117074.44	-1.00	1.8
0	HELOSIRA (LPIL)	87148.12	87148.12	-1.00	1.4
0	BACILLARIOPHYTA-PENNATE	3598820.00	3598820.00	-1.00	50.8
0	FRAGILARIALES				
0	FRAGILARIA CROTONENSIS	204880.31	204880.31	-1.00	3.2
0	FRAGILARIA (LPIL)	2233622.00	2233622.00	-1.00	35.2
0	SYNEDRA (LPIL)	188864.75	188864.75	-1.00	3.0
0	NAVICULALES				
0	NAVICULA (LPIL)	368653.00	368653.00	-1.00	5.8
0	NEIDIUM (LPIL)	29268.62	29268.62	-1.00	0.5
0	PINNULARIA (LPIL)	58537.22	58537.22	-1.00	0.9
0	GOMPHONEMA (LPIL)	263417.50	263417.50	-1.00	4.2
0	AMPHORA (LPIL)	17429.62	17429.62	-1.00	0.3
0	EPITHEMIALES				
0	RHOPOLODIA GIBBA	58537.22	58537.22	-1.00	0.9
0	BACILLARIOPHYTA-PENNATE (LPIL)	175611.69	175611.69	-1.00	2.8
0	PYRRHOPHYTA-DINOPHYCEAE	29268.62	29268.62	-1.00	0.5
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	29268.62	29268.62	-1.00	0.5
-	TOTAL	6338621.00	6338621.00	-1.00	100.0
-	DIVERSITY (H PRIME)	2.26	2.26	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA		-	S.E.	REL
		21	X		ABZ
DIVERSITY (J PRIME)		0.62	0.62	-1.00	
NUMBER OF TAXA		21	21		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS	TAXA	21	X	S.E.	REL AB%
0	CYANOPHYTA	1760720.00	1760720.00	-1.00	27.8
0	OSCILLATORIACEAE				
0	OSCILLATORIA (LPIL)	790252.50	790252.50	-1.00	12.5
0	NOSTOCACEAE				
0	ANABAENA (LPIL)	941199.50	941199.50	-1.00	14.8
0	RIVULARIACEAE				
0	RAPHIIDIOPSIS CURVATA	29268.62	29268.62	-1.00	0.5
0	CHLOROPHYTA	526210.19	526210.19	-1.00	8.3
0	OEDOGONIALES				
0	OEDOGONIUM (LPIL)	468297.81	468297.81	-1.00	7.4
0	ZYGHEMATALES				
0	SPIROGYRA (LPIL)	52683.50	52683.50	-1.00	0.8
0	CLOSTERIUM (LPIL)	5228.89	5228.89	-1.00	0.1
0	EUGLENOPHYTA	160845.81	160845.81	-1.00	2.5
0	EUGLENALES				
0	TRACHELONONAS (LPIL)	160845.81	160845.81	-1.00	2.5
0	CHRYSOPIHYTA	58537.22	58537.22	-1.00	0.9
0	CHRYSONOMADALES				
0	CHRYSOCOCCLUS (LPIL)	58537.22	58537.22	-1.00	0.9
0	BACILLARIOPHYTA-CENTRIC	204222.56	204222.56	-1.00	3.2
0	EUPODISCALES				
0	MELOSIRA VARIANS	117074.44	117074.44	-1.00	1.8
0	MELOSIRA (LPIL)	87148.12	87148.12	-1.00	1.4
0	BACILLARIOPHYTA-PENNATE	3598820.00	3598820.00	-1.00	56.8
0	FRAGILARIALES				
0	FRAGILARIA CROTONENSIS	204880.31	204880.31	-1.00	3.2
0	FRAGILARIA (LPIL)	2233622.00	2233622.00	-1.00	35.2
0	SYNEDRA (LPIL)	188864.75	188864.75	-1.00	3.0
0	NAVICULALES				
0	NAVICULA (LPIL)	368653.00	368653.00	-1.00	5.8
0	NEIDIUM (LPIL)	29268.62	29268.62	-1.00	0.5
0	PINULARIA (LPIL)	58537.22	58537.22	-1.00	0.9
0	GOMPHONEMA (LPIL)	263417.50	263417.50	-1.00	4.2
0	AMPHORA (LPIL)	17429.62	17429.62	-1.00	0.3
0	EPITHEMIALES				
0	RHOPOLODIA GILDA	58537.22	58537.22	-1.00	0.9
0	BACILLARIOPHYTA-PENNATE (LPIL)	175611.69	175611.69	-1.00	2.8
0	PIRRHOPHYTA-DINOPHYCEAE	29268.62	29268.62	-1.00	0.5
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	29268.62	29268.62	-1.00	0.5
-	TOTAL	6330621.00	6330621.00	-1.00	100.0
-	DIVERSITY (H PRIME)	2.26	2.26	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

STATION REPORT

LS TAXA

21

DIVERSITY (J PRIME)

0.62

NUMBER OF TAXA

21

-
X

REL
S.E. AB%

0.62

-1.00

21

ABOVE COMPUTED USING SAMPLE IDS

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BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B 1	Pond C 1	Cowles Bog 1	- X	S.E.	REL ABX
0	CYANOPHYTA	430643.19	710010.19	1760720.00	967124.44	404910.19	8.7
0	CHROOCOCCACEAE						
0	AGENEIUM (LPIL)	0.0	99973.69	0.0	33324.56	33324.56	0.3
0	OSCILLATORIA (LPIL)	140587.94	0.0	790252.50	310290.12	243393.56	2.8
0	NOSTOCACEAE						
0	ANABAENA (LPIL)	290055.25	610036.50	941199.50	613763.75	187978.37	5.5
0	RIVULARIACEAE						
0	PAPHIIDIOPSIS CURVATA	0.0	0.0	29268.62	9756.20	9756.20	0.1
0	CHLOROPHYTA	3485181.00	175776.00	526210.19	1395722.00	1049615.00	12.4
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	0.0	32228.36	0.0	10742.79	10742.79	0.1
0	CHLOROCCOCCALES						
0	ANKISTRODESNIUS FALCATUS	0.0	22198.10	0.0	7399.37	7399.37	0.1
0	OOCYSTIS (LPIL)	16443.03	0.0	0.0	5481.01	5481.01	0.0
0	SCENEDESMUS ACUTUS	0.0	34859.25	0.0	11617.75	11619.75	0.1
0	SCENEDESMUS QUADRICAUDA	2083167.00	61496.94	0.0	714887.94	684369.75	6.4
0	SCENEDESMUS ECOMIS	111154.87	24993.42	0.0	45382.77	33668.21	0.4
0	SCENEDESMUS SPIROSUS	47355.95	0.0	0.0	15785.32	15785.32	0.1
0	PEDIASTRUM DUPLEX	1052354.00	0.0	0.0	350784.62	350784.62	3.2
0	TETRAEDRON CAUDATUM	7563.00	0.0	0.0	2521.27	2521.27	0.0
0	OEDOGONIALES						
0	OEDOGONIUM (LPIL)	30255.19	0.0	468297.81	166184.31	151309.00	1.5
0	ZYGNEMATALES						
0	NOUGETIA (LPIL)	119951.87	0.0	0.0	39983.96	39983.96	0.4
0	SPIROGYRA (LPIL)	0.0	0.0	52683.50	17561.16	17561.16	0.2
0	CLOSTERIUM NONLIFERUM	7563.80	0.0	0.0	2521.27	2521.27	0.0
0	CLOSTERIUM (LPIL)	0.0	0.0	5228.89	1742.96	1742.96	0.0
0	STAUSTRUM (LPIL)	9372.53	0.0	0.0	3124.18	3124.18	0.0
0	EUGLENOPHYTA	49493.53	268350.37	160845.81	159563.19	63181.78	1.4
0	EUGLENALES						
0	TRACHELONONAS VOLVOCA	0.0	34037.09	0.0	11345.70	11345.70	0.1
0	TRACHELONONAS (LPIL)	49493.53	234313.31	160845.81	148217.50	53725.20	1.3
0	CHRYSOPHYTA	2564043.00	18404576.0	50537.22	7009052.00	5743405.00	63.1
0	CHRYSONOMADALES						
0	CHRYSOCOCCLUS (LPIL)	1821722.00	663969.75	58537.22	648076.31	517244.75	7.6
0	SYNCRYPTEA (LPIL)	0.0	10523.55	0.0	3507.85	3507.85	0.0
0	DINODRYON SERTULARIA	661256.75	1970450.00	0.0	877235.56	578979.94	7.9
0	DINODRYON DIVERGENS	0.0	13483.29	0.0	4494.43	4494.43	0.0
0	DINODRYON (LPIL)	0.0	21047.09	0.0	7015.70	7015.70	0.1
0	OCHRONONAS (LPIL)	0.0	15642420.0	0.0	5214140.00	5214140.00	47.0
0	EPIPYXIS UTRICULUS	22691.39	10523.55	0.0	11071.64	6556.17	0.1

BAILLY GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

SITE SUMMARY

Nearshore Ponds

TS	TAXA	Pond B 1	Pond C 1	Cowles Bog 1	X	S.E.	REL ABZ
0	KELPHYTOM (LPIL)	58372.75	72184.87	0.0	43519.21	22121.89	0.4
0	BACILLARIOPHYTA-CENTRIC	0.0	0.0	204222.56	68074.19	68074.19	0.6
0	EUPHOSCALE						
0	HELOSIRA ARIANS	0.0	0.0	117074.44	39024.81	39024.81	0.4
0	HELOSIRA (LPIL)	0.0	0.0	87148.12	29049.37	29049.37	0.3
0	BACILLARIOPHYTA-PENNATE	343626.56	100133.06	3598820.00	1347528.00	1127838.00	12.1
0	FRAGILARIALES						
0	FRAGILARIA CROTONENSIS	0.0	0.0	204800.31	68293.44	68293.44	0.6
0	FRAGILARIA (LPIL)	40285.44	56235.19	2233622.00	776714.19	728468.44	7.0
0	SYNDRE (LPIL)	0.0	0.0	108864.75	62954.91	62954.91	0.6
0	TABELLARIA FLOCCULOSA	47389.81	20224.92	0.0	22537.91	13723.77	0.2
0	ACHNARIANES						
0	ACHNARIANES HIRITISSIMA	82872.87	0.0	0.0	27624.29	27624.29	0.2
0	ACHNARIANES (LPIL)	15127.59	0.0	0.0	5042.53	5042.53	0.0
0	NAVICULALES						
0	NAVICULA (LPIL)	0.0	0.0	368653.00	122884.31	122884.31	1.1
0	HEIDIM (LPIL)	16443.03	0.0	29268.62	15237.21	8470.61	0.1
0	PIRULARIA (LPIL)	0.0	0.0	58537.22	19512.41	19512.41	0.2
0	GOMPHOREA (LPIL)	0.0	0.0	26347.50	87805.81	87805.81	0.8
0	ALPHORA (LPIL)	0.0	0.0	17429.62	5809.87	5809.87	0.1
0	EPITHEMIALES						
0	RHOPILOGIA GIBBA	0.0	0.0	56537.22	19512.41	19512.41	0.2
0	BACILLARIALES						
0	NITZSCHIA (LPIL)	6577.21	8714.81	0.0	5097.34	2622.31	0.0
0	SURIRELLALES						
0	SURIRELLA (LPIL)	7563.80	0.0	0.0	2521.27	2521.27	0.0
0	BACILLARIOPHYTA-PENNATE (LPIL)	127367.75	14963.17	175611.69	105980.81	47592.14	1.0
0	PIRROPHYTA-DINOPHYCEAE	0.0	195803.69	29268.62	75024.06	60977.98	0.7
0	LEPIDINIALES						
0	PERIDINIUM INCONSPICUUM	0.0	172125.69	29268.62	67131.37	53172.70	0.6
0	PERIDINIUM CINCTUM	0.0	23677.98	0.0	7892.66	7892.66	0.1
0	CRYPTOPHYTA	113950.19	135655.06	0.0	83501.75	42070.07	0.7
0	CRYPTOPHYCEAE						
0	CRYPTOPHYTES (LPIL)	52269.86	113950.25	0.0	55413.04	32931.67	0.5
0	RHOPILOGIA MINUTA	17429.62	0.0	9.0	5099.87	5099.87	0.1
0	CHROOCOCYTES (LPIL)	44231.77	21704.81	0.0	21778.86	12769.35	0.2
TOTAL		6986934.00	19990256.0	6339621.00	11105270.0	4446433.00	100.0
DIVERSITY (H PRIME)		2.41	1.31	2.26	1.99	0.34	
DIVERSITY (J PRIME)		0.65	0.34	0.62	0.54	0.10	
NUMBER OF TAXA		28	25	21	51		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAYLLE GENERATING PLANT

PHYTOPLANKTON DENSITY

NUMBER OF CELLS PER LITER

SITE SUMMARY

ABOVE COMPLETED USING SAMPLE IDS			
171	172	181	182
191	192	201	202
211	212		

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Corrections to:

APPENDIX B

PHYTOPLANKTON BIOVOLUME REPOICATE REPORTS,
BAILLY STUDY AREA, APRIL 1980

REPLICATE REPORT

5	56	56	0	0	00
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA			-	X	S.E.	REL
		1	2				AB%
0	RHODOMONAS MINUTA	0.01	0.07		0.04	0.03	0.5
0	CHROMONAS (LPIL)	0.0	0.03		0.02	0.02	0.2
TOTAL		5.77	10.01		7.89	2.12	100.0
DIVERSITY (H PRIME)		2.13	3.11		2.62	0.49	
DIVERSITY (J PRIME)		0.61	0.80		0.71	0.09	
NUMBER OF TAXA		11	15		21		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	-	S.E.	REL
				X		ABZ

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PC TC GC LOC
5 56 56 0 0 00

SID	DATE	TIME	DURATION		SD	WD	TON		SAMP VOL	WIND		CURRENT		TEMP		BI	TUBED	COND	DO	PH	SALIN P
			TIME D/H	UNITS C			SP	D		SC	DI	CL	SP	DI	AIR						
31	4/16/60	1351	0	0.0	0	1.0	15.2	0.0	2.0	4	7	2	5	0.0	0	0.0	0	0.0	0.0	0.0	0.0
32	4/16/60	1351	0	0.0	0	1.0	15.2	0.0	2.0	4	7	2	5	0.0	0	0.0	0	0.0	0.0	0.0	0.0
15	TAXA																				
0	CYANOPHYTA							1	2												
0	CHROOCOCCACEAE							0.01	0.21							0.11				0.10	3.8
0	CHROOCOCCUS (LPIL)							0.0	0.21							0.10				0.10	3.7
0	OSCILLATORIACEAE							0.01	0.0							0.00				0.00	0.1
0	OSCILLATORIA (LPIL)							0.43	0.13							0.27				0.13	9.4
0	CHLOROPHYTA																				
0	VOLVOCALES																				
0	CHLAMYDOMONAS (LPIL)							0.35	0.13							0.24				0.11	8.5
0	TETRASPORALES																				
0	ELAKATOTRIX (LPIL)							0.05	0.0							0.02				0.02	0.9
0	CHLOROOCOCCALES																				
0	AKKISIRODESNIUS FALCATUS							0.0	0.00							0.00				0.00	0.1
0	CHRYSOPHYTA							0.53	0.08							0.30				0.22	10.8
0	CHRYSOMONADALES																				
0	HALLANCIAS (LPIL)							0.23	0.0							0.12				0.12	4.1
0	DINOBRYON SOCIALE							0.28	0.06							0.17				0.11	6.1
0	PHOSIGALES																				
0	STELXORONAS DICHOLOHA							0.01	0.02							0.02				0.00	0.6
0	BACILLARIOPHYTA-CENTRIC							0.85	0.72							0.78				0.07	27.8
0	EUPODISCALES																				
0	MELOSIRA (LPIL)							0.47	0.0							0.24				0.24	8.4
0	STEPHANODISCUS BINDERANA							0.0	0.21							0.11				0.11	3.8
0	STEPHANODISCUS (LPIL)							0.0	0.04							0.02				0.02	0.7
0	EUPODISCALES (LPIL)							0.28	0.09							0.19				0.10	6.6
0	RHIZOSOLENIALES																				
0	RHIZOSOLENIA ERGENSIS							0.10	0.38							0.24				0.14	8.4
0	BACILLARIOPHYTA-PERRIAE							0.89	0.96							0.93				0.03	32.8
0	FRAGILARIALES																				
0	ASTERIONELLA FORMOSA							0.33	0.68							0.51				0.17	17.9
0	FRAGILARIA CROTONENSIS							0.0	0.28							0.14				0.14	4.9
0	HAVICULALES																				
0	PIRRULARIA (LPIL)							0.29	0.0							0.14				0.14	5.1
0	BACILLARIOPHYTA-PERRIAE (LPIL)							0.27	0.0							0.14				0.14	4.8
0	CRYPTOPHYTA							0.23	0.63							0.43				0.20	15.2
0	CRYPTOPHYTONDALES																				
0	CRYPTONONAS (LPIL)							0.0	0.24							0.12				0.12	4.2

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA			X	S.E.	REL ABZ
		1	2			
0	RHODONONAS MINUTA	0.18	0.33	0.25	0.07	9.0
0	CHROONONAS (LPIL)	0.05	0.06	0.06	0.00	2.0
TOTAL		2.91	2.72	2.82	0.09	100.0
DIVERSITY (H PRIME)		3.42	3.25	3.33	0.08	
DIVERSITY (J PRIME)		0.90	0.85	0.87	0.02	
NUMBER OF TAXA		14	14	20		

ABOVE COMPUTED USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	1	2	3	X	S.E.	REL ABZ
0	CYANOPHYTA	0.34	0.06	0.11	0.17	0.09	2.8
0	CHROCOCCACEAE						
0	CHROCOCCUS (LPIL)	0.28	0.0	0.10	0.13	0.08	2.1
0	GOMPHOSPHERIA LACUSTRIS	0.06	0.0	0.0	0.02	0.02	0.3
0	OSCILLATORIA						
0	OSCILLATORIA (LPIL)	0.0	0.06	0.00	0.02	0.02	0.4
0	CHLOROPHYTA	0.39	0.56	0.27	0.41	0.08	6.7
0	CHLOROPHYTES						
0	CHLOROPHYTES (LPIL)	0.37	0.55	0.24	0.39	0.09	6.4
0	TETRASTOMATALES						
0	ELAKATOPHIX (LPIL)	0.02	0.0	0.02	0.01	0.01	0.2
0	CHLOROCOCCEAE						
0	ANKISTRODESNIUS FALCATUS	0.00	0.01	0.00	0.00	0.00	0.1
0	CHRYSOCHYTA	0.01	0.01	0.30	0.11	0.10	1.8
0	CHRYSOCHYTALES						
0	CHLAMYDOMONAS (LPIL)	0.0	0.0	0.12	0.04	0.04	0.6
0	DINOBRYON SOCIALE	0.0	0.0	0.17	0.06	0.06	0.9
0	MONOSIGALES						
0	STELIONOMAS DICHOTOMA	0.01	0.01	0.02	0.01	0.00	0.2
0	BACILLARIOPHYTA-CENTRIC	3.54	2.52	0.78	2.28	0.81	37.6
0	EUPHODISCALES						
0	HELOSIRA (LPIL)	1.03	0.74	0.24	0.67	0.23	11.1
0	STEPHANODISCUS BINDERANA	0.28	0.18	0.11	0.19	0.05	3.1
0	STEPHANODISCUS NIAGARAE	1.57	1.18	0.0	0.92	0.47	15.1
0	STEPHANODISCUS (LPIL)	0.0	0.13	0.02	0.05	0.04	0.8
0	EUPHODISCALES (LPIL)	0.54	0.15	0.19	0.29	0.12	4.6
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	0.12	0.14	0.24	0.17	0.04	2.7
0	BACILLARIOPHYTA-PENIATE	3.09	3.70	0.93	2.57	0.84	42.4
0	FRAGILARIALES						
0	ASTERIONELLA FORNOSA	0.57	0.65	0.51	0.58	0.04	9.5
0	FRAGILARIA CROTONENSIS	1.50	0.0	0.14	0.54	0.48	9.0
0	FRAGILARIALES (LPIL)	0.16	0.0	0.0	0.05	0.05	0.9
0	NAVICULALES						
0	NAVICULA (LPIL)	0.21	0.0	0.0	0.07	0.07	1.2
0	PINNULARIA (LPIL)	0.0	0.0	0.14	0.05	0.05	0.8
0	CYDRELLA (LPIL)	0.0	0.03	0.0	0.01	0.01	0.1
0	BACILLARIALES						
0	NITZSCHIA (LPIL)	0.47	2.85	0.0	1.11	0.88	18.3
0	BACILLARIOPHYTA-PENIATE (LPIL)	0.18	0.17	0.14	0.16	0.01	2.7
0	CRYPTOPHYTA	0.51	0.64	0.43	0.52	0.06	8.7
0	CRYPTOPHYTES						

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	1	2	3	X	S.E.	REL AB%
0	CRYPTOMONAS REFLEXA	0.40	0.51	0.6	0.30	0.15	5.0
0	CRYPTOMONAS (LPIL)	0.06	0.0	0.12	0.06	0.03	1.0
0	RHODOMONAS MINUTA	0.04	0.13	0.25	0.14	0.06	2.3
0	CHROOMONAS (LPIL)	0.02	0.0	0.06	0.02	0.02	0.4
TOTAL		7.89	7.46	2.82	6.06	1.63	100.0
DIVERSITY (H PRIME)		2.62	2.34	3.33	2.76	0.30	
DIVERSITY (J PRIME)		0.71	0.64	0.87	0.74	0.07	
NUMBER OF TAXA		21	16	20	27		

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11	12	21	22
31	32		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	- X	S.E.	REL AB%
NUMBER OF TAXA		13	10			16

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (4-720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL AB%
0	CRYPTOMONAS MARSSONII	0.0	0.18	0.09	0.09	1.1
0	CRYPTOMONAS REFLEXA	0.0	0.75	0.38	0.38	4.8
0	CRYPTOMONAS (LPIL)	0.0	0.07	0.03	0.03	0.4
0	RHODOMONAS MINUTA	0.38	0.16	0.27	0.11	3.5
0	CHROMONAS (LPIL)	0.0	0.06	0.03	0.03	0.4
0	CYANOMONAS (LPIL)	0.01	0.0	0.01	0.01	0.1
TOTAL		6.38	9.33	7.85	1.48	100.0
DIVERSITY (H PRIME)		2.88	2.95	2.91	0.04	
DIVERSITY (J PRIME)		0.72	0.74	0.73	0.01	
NUMBER OF TAXA		16	16	24		

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL ABZ
0	UNIDENTIFIED ALGAE	0.0	0.0	0.00	0.00	0.00	0.0
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.0	0.00	0.00	0.00	0.0
0	CYANOPHYTA	0.04	0.01	0.07	0.04	0.02	0.8
0	CHLOCOCCACEAE						
0	GOMPHOSPHAERIA LACUSIRIS	0.0	0.01	0.0	0.00	0.00	0.0
0	OSCILLATORIACEAE						
0	OSCILLATORIA (LPIL)	0.0	0.0	0.07	0.02	0.02	0.5
0	LYMBEYA CONTORTA	0.04	0.0	0.0	0.01	0.01	0.3
0	CHLOROPHYTA	0.59	0.31	0.24	0.38	0.11	7.5
0	CHLOROCOCYTES						
0	CHLAMYDOMONAS (LPIL)	0.58	0.30	0.23	0.37	0.11	7.4
0	CHLAMYDOMONAS						
0	WETTEREDINUS FALCATUS	0.01	0.00	0.01	0.00	0.00	0.1
0	WETTEREDINUS QUADRICAUDA	0.01	0.0	0.0	0.00	0.00	0.1
0	CHRYSOCHYTA	0.14	0.06	0.0	0.07	0.04	1.3
0	CHRYSOCHYTALES						
0	MALLANUS (LPIL)	0.0	0.05	0.0	0.02	0.02	0.3
0	CHRYSOCCUS (LPIL)	0.0	0.00	0.0	0.00	0.00	0.0
0	SYRRA (LPIL)	0.06	0.0	0.0	0.02	0.02	0.4
0	DINERTON SOCIALE	0.07	0.0	0.0	0.02	0.02	0.5
0	MONOSIGALES						
0	STELXONHAS DICHOTOMA	0.01	0.01	0.0	0.01	0.00	0.1
0	BACILLARIOPHYTA-CENTRIC	0.89	1.21	1.34	1.11	0.16	22.1
0	EUFODISCALES						
0	NELOSIRA (LPIL)	0.35	0.53	0.87	0.59	0.15	11.6
0	STEPHANODISCUS BINDERHIA	0.21	0.0	0.0	0.07	0.07	1.4
0	STEPHANODISCUS NIAGARAE	0.0	0.16	0.0	0.05	0.05	1.0
0	STEPHANODISCUS (LPIL)	0.04	0.09	0.32	0.15	0.09	3.0
0	EUPODISCALES (LPIL)	0.01	0.04	0.02	0.02	0.01	0.4
0	RHIZOLEPTALES						
0	RHIZOLEPTA ERIENSIS	0.19	0.39	0.13	0.24	0.08	4.7
0	BACILLARIOPHYTA-PENNATE	0.80	5.39	2.35	2.85	1.35	56.4
0	FRAGILARIACEAE						
0	ASTERIONELLA FORMOSA	0.43	0.89	0.73	0.69	0.13	13.6
0	DIATOMA TENUE	0.0	0.07	0.0	0.02	0.02	0.4
0	FRAGILARIA CROTHERSIS	0.0	0.80	1.01	0.60	0.31	11.9
0	FRAGILARIA (LPIL)	0.0	1.22	0.0	0.41	0.41	8.0
0	BACILLARIACEAE						
0	HITZCHIA (LPIL)	0.0	0.0	0.49	0.16	0.16	3.2
0	SARITRELLAE						
0	CYTHOPIEURA SOLEA	0.0	0.94	0.0	0.31	0.31	6.2
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.36	1.48	0.12	0.65	0.42	12.9

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	4	5	6	- X	S.E.	REL AB%
0	PYRRHOPHYTA-DINOPHYCEAE	0.24	0.07	0.0	0.10	0.07	2.0
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	0.24	0.07	0.0	0.10	0.07	2.0
0	CRYPTOPHYTA	0.32	0.81	0.36	0.50	0.16	9.8
0	CRYPTOMONADALES						
0	CRYPTOMONAS HARSSONII	0.0	0.09	0.03	0.04	0.03	0.8
0	CRYPTOMONAS REFLEXA	0.0	0.38	0.0	0.13	0.13	2.5
0	CRYPTOMONAS (LPIL)	0.0	0.03	0.10	0.04	0.03	0.9
0	RHODOMONAS MINUTA	0.32	0.27	0.23	0.27	0.02	5.4
0	CHROOMONAS (LPIL)	0.0	0.03	0.0	0.01	0.01	0.2
0	CYANOMONAS (LPIL)	0.0	0.01	0.0	0.00	0.00	0.0
TOTAL		2.92	7.85	4.36	5.04	1.46	100.0
DIVERSITY (H PRIME)		2.95	2.91	2.59	2.82	0.11	
DIVERSITY (J PRIME)		0.84	0.73	0.74	0.77	0.04	
NUMBER OF TAXA		16	24	15	32		

ABOVE COMPUTED USING SAMPLE IDS

41	42	51	52
61	62		

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RAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

PL IC 6C LOC

5 56 56 0 0 20

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TON	SAMP	VOL	C	SECH	W	Y	SC	DI	WIND	CURRENT		TEMP		BT	TURB	COND	DO	PH	SALIN	P								
																				CL	SP	DI	AIR								WAT	REL	ABZ					
101	4/16/80	1105	3	0.0	0	1.0	1.5	0.0	0	2.0	4	0.2	6.0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0								
102	4/16/80	1105	0	0.0	0	1.0	1.5	0.0	0	2.0	4	0.2	6.0	7	2	5	0.0	0	7.2	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0								
15	TAXA																		S.E.		REL		S.E.		REL		ABZ		ABZ									
0	CHLOROPHYTA																		1		2		3.03		2.60		45.7		2.60		45.7		2.60		45.7			
0	VOLVOCALES																		0.43		5.64		0.96		0.54		14.5		0.54		14.5		0.54		14.5			
0	CHLOROCOCCALES																		0.42		1.50																	
0	SPHAEROCESTIS SCHROETERI																		0.0		4.13		2.07		2.07		31.1		2.07		31.1		2.07		31.1			
0	ARTISTRODESNIUS FALCATUS																		0.01		0.0		0.00		0.00		0.00		0.00		0.00		0.00		0.00			
0	CHRYSOPHYTA																		0.0		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01			
0	HETERODINIALES																		0.0		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01			
0	STELERODONNAS DICHOTOMA																		0.0		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01			
0	BACILLARIOPHYTA-CENTRIC																		1.40		0.82		1.11		0.29		16.7		0.29		16.7		0.29		16.7			
0	EUFODISCALES																																					
0	HELOSIRA (LPIL)																		0.28		0.79		0.53		0.53		8.0		0.53		8.0		0.53		8.0			
0	STEPHANODISCUS BINDERANA																		0.13		0.0		0.06		0.06		1.0		0.06		1.0		0.06		1.0			
0	STEPHANODISCUS (LPIL)																		0.69		0.0		0.45		0.45		6.7		0.45		6.7		0.45		6.7			
0	RHIZOSOLENIALES																																					
0	RHIZOSOLENIA ERIENSIS																		0.09		0.04		0.07		0.07		1.0		0.07		1.0		0.07		1.0			
0	BACILLARIOPHYTA-PERRATE																		3.43		0.35		1.90		1.53		28.6		1.53		28.6		1.53		28.6			
0	FRAGILARIALES																																					
0	ASTERIGHELLA FORMOSA																		0.0		0.22		0.11		0.11		1.7		0.11		1.7		0.11		1.7			
0	FRAGILARIA (LPIL)																		3.43		0.0		1.72		1.72		25.9		1.72		25.9		1.72		25.9			
0	BACILLARIOPHYTA-PERRATE (LPIL)																		0.0		0.14		0.07		0.07		1.0		0.07		1.0		0.07		1.0			
0	CRYPTOPHYTA																		0.94		0.25		0.59		0.35		8.9		0.35		8.9		0.35		8.9			
0	CRYPTOPHYTODALES																																					
0	CRYPTONONNAS (LPIL)																		0.62		0.0		0.31		0.31		4.7		0.31		4.7		0.31		4.7			
0	RHODONONNAS MIRUTA																		0.32		0.21		0.26		0.06		3.9		0.06		3.9		0.06		3.9			
0	CHROONONNAS (LPIL)																		0.0		0.04		0.02		0.02		0.3		0.02		0.3		0.02		0.3			
TOTAL																			6.20		7.03		6.64		0.44		100.0		0.44		100.0		0.44		100.0			
DIVERSITY (H PRIME)																			2.11		1.79		1.95		0.16		0.16		0.05		0.16		0.16		0.05		0.16	
DIVERSITY (J PRIME)																			0.67		0.57		0.62		0.05		0.05		0.05		0.05		0.05		0.05		0.05	
NUMBER OF TAXA																			9		9		9		9		9		9		9		9		9		9	

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	10	X	S.E.	REL AB%
0	CHLOROPHYTA	3.03	3.03	-1.00	45.7
0	VOLVOCALES				
0	CHLAMYDOMONAS (LPIL)	0.96	0.96	-1.00	14.5
0	CHLOROCOCCALES				
0	SPHAEROCYSTIS SCHROETERI	2.07	2.07	-1.00	31.1
0	ANKISTRODESMIUS FALCATUS	0.00	0.00	-1.00	0.0
0	CHRYSOPHYTA	0.01	0.01	-1.00	0.1
0	MONOSIGALES				
0	STELXOMONAS DICHOTOMA	0.01	0.01	-1.00	0.1
0	BACILLARIOPHYTA-CENTRIC	1.11	1.11	-1.00	16.7
0	EUPODISCALES				
0	HELOSIRA (LPIL)	0.53	0.53	-1.00	8.0
0	STEPHANODISCUS BINDERANA	0.06	0.06	-1.00	1.0
0	STEPHANODISCUS (LPIL)	0.45	0.45	-1.00	6.7
0	RHIZOSOLENIALES				
0	RHIZOSOLENIA ERIENSIS	0.07	0.07	-1.00	1.0
0	BACILLARIOPHYTA-PENNATE	1.90	1.90	-1.00	28.6
0	FRAGILARIALES				
0	ASTERIONELLA FORMOSA	0.11	0.11	-1.00	1.7
0	FRAGILARIA (LPIL)	1.72	1.72	-1.00	25.9
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.07	0.07	-1.00	1.0
0	CRYPTOPHYTA	0.59	0.59	-1.00	8.9
0	CRYPTONHODALES				
0	CRYPTONHODAS (LPIL)	0.31	0.31	-1.00	4.7
0	RHODONHODAS MINUTA	0.26	0.26	-1.00	3.9
0	CHROCOHODAS (LPIL)	0.02	0.02	-1.00	0.3
	TOTAL	6.64	6.64	-1.00	100.0
	DIVERSITY (H PRIME)	1.95	1.95	-1.00	
	DIVERSITY (J PRIME)	0.62	0.62	-1.00	
	NUMBER OF TAXA	14	14		

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DAILY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

IS	TAXA	3	6	10	X	S.E.	REL ABZ
0	UNIDENTIFIED ALGAE	0.0	0.00	0.0	0.00	0.00	0.0
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.00	0.0	0.00	0.00	0.0
0	CYANOPHYTA	0.17	0.04	0.0	0.07	0.05	1.2
0	CHROCOCCACEAE						
0	CHROCOCCUS (LPIL)	0.13	0.0	0.0	0.04	0.04	0.7
0	GOMPHOSPHERIA LACUSIRIS	0.02	0.00	0.0	0.01	0.01	0.1
0	OSCILLATORIACEAE						
0	OSCILLATORIA (LPIL)	0.02	0.02	0.0	0.02	0.01	0.3
0	LYNGBYA CONTORTA	0.0	0.01	0.0	0.00	0.00	0.1
0	CHLOPAPHYA	0.41	0.38	3.03	1.27	0.88	21.5
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	0.39	0.37	0.96	0.57	0.19	9.7
0	TEIPASPORALES						
0	ELAKATOTRUX (LPIL)	0.01	0.0	0.0	0.00	0.00	0.1
0	CHLOROCOCCALES						
0	SPHAEROCYSTIS SCHROETERI	0.0	0.0	2.07	0.69	0.69	11.6
0	ANKISTYPODESINUS FAUCATUS	0.00	0.00	0.00	0.00	0.00	0.1
0	SCHEDESINUS QUADRICAUDA	0.0	0.00	0.0	0.00	0.00	0.0
0	CHRYSOPHYTA	0.11	0.07	0.01	0.06	0.03	1.0
0	CORTICORHIZALES						
0	HALLAMONAS (LPIL)	0.04	0.02	0.0	0.02	0.01	0.3
0	CHRYSOCCUS (LPIL)	0.0	0.00	0.0	0.00	0.00	0.0
0	SHURA (LPIL)	0.0	0.02	0.0	0.01	0.01	0.1
0	DICRYTON SOCIALE	0.06	0.02	0.0	0.03	0.02	0.4
0	MONOSIGALES						
0	STELXORHYNAS DICHOTOMA	0.01	0.01	0.01	0.01	0.00	0.1
0	BACILLARIOPHYTA-CENTRIC	2.28	1.11	1.11	1.50	0.39	25.4
0	EUPODISCALES						
0	HELOSIRA (LPIL)	0.67	0.59	0.53	0.60	0.04	10.1
0	STEPHANODISCUS BIRDERANA	0.19	0.07	0.06	0.11	0.04	1.8
0	STEPHANODISCUS NIAGARAE	0.92	0.05	0.0	0.32	0.30	5.5
0	STEPHANODISCUS (LPIL)	0.05	0.15	0.45	0.22	0.12	3.6
0	EUPODISCALES (LPIL)	0.29	0.02	0.0	0.11	0.09	1.8
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIENSIS	0.17	0.24	0.07	0.16	0.05	2.6
0	BACILLARIOPHYTA-PERIANE	2.57	2.85	1.90	2.74	0.28	41.2
0	FRAGILARIACEAE						
0	ACTINOTHELLA FORMOSA	0.56	0.69	0.11	0.46	0.18	7.7
0	DIATOMA TENUE	0.0	0.02	0.0	0.01	0.01	0.1
0	FRAGILARIA CROTONENSIS	0.54	0.60	0.0	0.38	0.19	6.5
0	FRAGILARIA (LPIL)	0.0	0.41	1.72	0.71	0.52	12.0
0	FRAGILARIACEAE (LPIL)	0.05	0.0	0.0	0.02	0.02	0.3

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL AB%
0	NAVICULALES						
0	NAVICULA (LPIL)	0.07	0.0	0.0	0.02	0.02	0.4
0	PILULARIA (LPIL)	0.05	0.0	0.0	0.02	0.02	0.3
0	CINCELIA (LPIL)	0.01	0.0	0.0	0.00	0.00	0.0
0	BACILLARIALES						
0	NITZSCHIA (LPIL)	1.11	0.16	0.0	0.42	0.35	7.2
0	SURIRELLALES						
0	CHATOPLEURA SOLEA	0.0	0.31	0.0	0.10	0.10	1.8
0	BACILLARIOPHYTA-PENIATE (LPIL)	0.16	0.65	0.07	0.29	0.18	5.0
0	PERIDINIALES	0.0	0.10	0.0	0.03	0.03	0.6
0	PERIDINIUM INCONSPICUUM	0.0	0.10	0.0	0.03	0.03	0.6
0	CRYPTOPHYTA	0.52	0.50	0.59	0.54	0.03	9.1
0	CRYPTOPHYCEAE						
0	CRYPTOPHYCEAE	0.0	0.04	0.0	0.01	0.01	0.2
0	CRYPTOPHYCEAE REFLEXA	0.30	0.13	0.0	0.14	0.09	2.4
0	CRYPTOPHYCEAE (LPIL)	0.06	0.04	0.31	0.14	0.09	2.3
0	RHODOPHYCEAE	0.14	0.27	0.26	0.22	0.04	3.8
0	CHROCOCHIAS (LPIL)	0.02	0.01	0.02	0.02	0.00	0.3
0	CYANOPHYCEAE	0.0	0.00	0.0	0.00	0.00	0.0
TOTAL		6.06	5.04	6.64	5.92	0.47	100.0
DIVERSITY (H PRIME)		2.76	2.82	1.95	2.51	0.28	
DIVERSITY (J PRIME)		0.74	0.77	0.62	0.71	0.05	
NUMBER OF TAXA		27	32	14	39		

ABOVE COMPUTED USING SAMPLE IDS

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31	41	42
51	61	62
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NORTHERN INDIAN PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

PC	TC	GC	LOC
5	56	56	0 1 00

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	SAMP VOL	WIND		CURRENT				TEMP		BT	TURB	COND	DO	PH	SAIN	P		
											SC	DI	CL	SP	DI	WAT	AIR										
31	4/16/80	1125	0	0.0	0	1.0	9.1	0.0	0	2.0	4	7	2	5	0.0	0	7.2	5.0	0	0.0	0.0	0.0	0.0	0.0	0.0		
32	4/16/80	1125	0	0.0	0	1.0	9.1	0.0	0	2.0	4	7	2	5	0.0	0	7.2	5.0	0	0.0	0.0	0.0	0.0	0.0	0.0		
LS	TAXA																										
0	CYANOPHYTA																										
0	CHROOCOCCACEAE																										
0	MICROCYSTIS (LPIL)																										
0	OSILLATORIACEAE																										
0	OSCILLATORIA LIMNETICA																										
0	CHLOROPHYTA																										
0	VOLVOCALES																										
0	CHLAMYDOMONAS (LPIL)																										
0	CHLOCOCCALES																										
0	ABIESIRODESNIUS FALCATUS																										
0	CHRYSOPHYTA																										
0	CHRYSOMONADALES																										
0	CHRYSOCOCCUS (LPIL)																										
0	DINERTON SOCIALE																										
0	CHRYSOPHYTA (LPIL)																										
0	BACILLARIOPHYTA-CENTRIC																										
0	EUPODISCALES																										
0	HELOSIRA (LPIL)																										
0	STEPHANODISCUS NIAGRAE																										
0	STEPHANODISCUS (LPIL)																										
0	EUPODISCALES (LPIL)																										
0	RHIZOSOLENIALES																										
0	PHIZOSOLENIA ERIENSIS																										
0	BACILLARIOPHYTA-PERRIATE																										
0	FRAGILARIACEAE																										
0	ASTERIONELLA FORNOSA																										
0	DIATOMA TERRE																										
0	FRAGILARIA CROTONENSIS																										
0	FRAGILARIA (LPIL)																										
0	TABELLARIA FLOCCULOSA																										
0	HABICULALES																										
0	PIRRULARIA (LPIL)																										
0	BACILLARIOPHYTA-PERRIATE (LPIL)																										
0	PIRRHOPHYTA-DINOPHYCEAE																										
0	PERIDINIALES																										
0	PERIDINIUM INCONSPICUUM																										

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL AB%
0	CRYPTOPHYTA	0.32	0.31	0.32	0.01	8.8
0	CRYPTONHODALES					
0	RHODONHODAS MINUTA	0.32	0.29	0.31	0.02	8.5
0	CHROONHODAS (LPIL)	0.0	0.02	0.01	0.01	0.3
	TOTAL	4.14	3.13	3.64	0.51	100.0
	DIVERSITY (H PRIME)	3.21	2.80	3.00	0.21	
	DIVERSITY (J PRIME)	0.87	0.72	0.79	0.08	
	NUMBER OF TAXA	13	15	22		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (497201

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA			-	REL
		1	2	X	S.E. AB%
TOTAL		3.72	2.34	3.03	0.69 100.0
DIVERSITY (H PRIME)		2.79	2.90	2.64	0.06
DIVERSITY (J PRIME)		0.78	0.78	0.78	0.00
NUMBER OF TAXA		12	13	18	

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AB%
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.0	0.91	0.00	0.00	0.1
0	UNIDENTIFIED ALGAE (LPIL)	0.0	0.0	0.01	0.00	0.00	0.1
0	CYANOPHYTA	0.0	0.02	0.08	0.03	0.02	1.0
0	CHROCOCCACEAE						
0	MICROCYSTIS (LPIL)	0.0	0.0	0.0	0.00	0.00	0.1
0	GOMPHOSPHERIA LACUSTRIS	0.0	0.0	0.08	0.03	0.03	0.8
0	OSILLATORACEAE						
0	OSCILLATORIA LIMNETICA	0.0	0.01	0.0	0.00	0.00	0.1
0	CHLOROPHYTA	0.38	0.16	0.21	0.25	0.07	7.6
0	VOLVOCALES						
0	CHLAMYDOMONAS (LPIL)	0.38	0.16	0.17	0.24	0.07	7.3
0	TETRAPORALES						
0	ELAKATOPHIX (LPIL)	0.0	0.0	0.03	0.01	0.01	0.3
0	CHLOROCOCCALES						
0	ANKISTRODESINUS FALCATUS	0.0	0.00	0.00	0.00	0.00	0.0
0	CHRYSOPHYTA	0.01	0.20	0.01	0.07	0.06	2.1
0	CHRYSMONADALES						
0	CHRYSOCCUS (LPIL)	0.0	0.00	0.0	0.00	0.00	0.0
0	DINOBRYON SOCIALE	0.0	0.20	0.0	0.07	0.07	2.0
0	MOROSIGALES						
0	STELXOMONAS DICHOTOMA	0.01	0.0	0.01	0.00	0.00	0.1
0	CHRYSOPHYTA (LPIL)	0.0	0.00	0.0	0.00	0.00	0.0
0	BACILLARIOPHYTA-CENTRIC	0.94	0.84	0.41	0.73	0.16	22.2
0	EUPODISCALES						
0	HELOSIRA (LPIL)	0.14	0.34	0.28	0.25	0.06	7.6
0	STEPHANODISCUS BINDERHANA	0.05	0.0	0.0	0.02	0.02	0.5
0	STEPHANODISCUS NIAGARAE	0.0	0.20	0.0	0.07	0.07	2.0
0	STEPHANODISCUS (LPIL)	0.36	0.07	0.06	0.16	0.10	4.9
0	EUPODISCALES (LPIL)	0.0	0.01	0.0	0.00	0.00	0.1
0	RHIZOSOLENIALES						
0	RHIZOSOLENIA ERIEHSIS	0.40	0.23	0.07	0.23	0.09	7.0
0	BACILLARIOPHYTA-PENNATE	1.66	2.02	1.27	1.65	0.22	50.1
0	FRAGILARIALES						
0	ASTERIOGELLA FORMOSA	0.69	0.61	0.26	0.52	0.13	15.8
0	DIATOMA TENUE	0.0	0.36	0.02	0.13	0.12	3.8
0	FRAGILARIA CROTCHENSIS	0.32	0.06	0.43	0.27	0.11	8.1
0	FRAGILARIA (LPIL)	0.0	0.25	0.0	0.08	0.08	2.5
0	TABELLARIA FLOCCUOSA	0.0	0.63	0.27	0.30	0.18	9.1
0	HAVICUALES						
0	HAVICULA (LPIL)	0.06	0.0	0.0	0.02	0.02	0.6
0	PIRULARIA (LPIL)	0.0	0.07	0.0	0.02	0.02	0.7
0	BACILLARIALES						

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AB%
0	NIYZCHIA (LPIL)	0.57	0.0	0.0	0.19	0.19	5.7
0	BACILLARIOPHYTA-PEINATE (LPIL)	0.02	0.05	0.30	0.12	0.09	3.7
0	PERIDOPHYTA-DINOPHYCEAE	0.0	0.06	0.62	0.23	0.20	6.9
0	PERIDINIALES	0.0	0.06	0.62	0.23	0.20	6.9
0	PERIDINIUM INCOGNITUM	0.23	0.32	0.44	0.33	0.06	10.0
0	CRYPTOPHYTES	0.0	0.0	0.21	0.07	0.07	2.1
0	CRYPTOPHYTES REFLEXA	0.12	0.0	0.06	0.06	0.03	1.8
0	CRYPTOPHYTES (LPIL)	0.11	0.31	0.17	0.20	0.06	6.0
0	CHROOCYTES MINUTA	0.0	0.01	0.0	0.00	0.00	0.1
0	CHROOCYTES (LPIL)	0.0	0.01	0.0	0.00	0.00	0.1
TOTAL		3.22	3.64	3.03	3.30	0.18	100.0
DIVERSITY (H PRIME)		2.59	3.00	2.84	2.61	0.12	
DIVERSITY (J PRIME)		0.82	0.79	0.78	0.80	0.01	
NUMBER OF TAXA		13	22	18	31		

ABOVE COMPUTED USING SAMPLE IDS

71 72 81 82
91 92

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA		- X	S.E.	REL AB%
		9			
0	UNIDENTIFIED ALGAE	0.00	0.00	-1.00	0.1
0	UNIDENTIFIED ALGAE (LPIL)	0.00	0.00	-1.00	0.1
0	CYANOPHYTA	0.03	0.03	-1.00	1.0
0	CHROCOCCACEAE				
0	MICROCYSTIS (LPIL)	0.00	0.00	-1.00	0.1
0	GOMPHOSPHERIA LACUSTRIS	0.03	0.03	-1.00	0.8
0	OSCILLATORIA				
0	OSCILLATORIA LIMNETICA	0.00	0.00	-1.00	0.1
0	CHLOROPHYTA	0.25	0.25	-1.00	7.6
0	VOLVOCALES				
0	CHLAMYDOMONAS (LPIL)	0.24	0.24	-1.00	7.3
0	TETRASPORALES				
0	ELAPHOTHRIX (LPIL)	0.01	0.01	-1.00	0.3
0	CHLOROCOCCALES				
0	ANKISTRODESNIUS FALCATUS	0.00	0.00	-1.00	0.0
0	CHRYSOPHYTA	0.07	0.07	-1.00	2.1
0	CHRYSOMONADALES				
0	CHRYSOCOCCLUS (LPIL)	0.00	0.00	-1.00	0.0
0	DINERYON SOCIALE	0.07	0.07	-1.00	2.0
0	MONOSIGALES				
0	STELIXOMONAS DICHOTOMA	0.00	0.00	-1.00	0.1
0	CHRYSOPHYTA (LPIL)	0.00	0.00	-1.00	0.0
0	BACILLARIOPHYTA-CENTRIC	0.73	0.73	-1.00	22.2
0	EUPODISCALES				
0	HELOSIRA (LPIL)	0.25	0.25	-1.00	7.6
0	STEPHANODISCUS BINDERANA	0.02	0.02	-1.00	0.5
0	STEPHANODISCUS NIAGARAE	0.07	0.07	-1.00	2.0
0	STEPHANODISCUS (LPIL)	0.16	0.16	-1.00	4.9
0	EUPODISCALES (LPIL)	0.00	0.00	-1.00	0.1
0	RHIZOSOLENIALES				
0	RHIZOSOLENIA ERIENSIS	0.23	0.23	-1.00	7.0
0	BACILLARIOPHYTA-PENNATE	1.65	1.65	-1.00	50.1
0	FRAGILARIALES				
0	ASTERIONELLA FORMOSA	0.52	0.52	-1.00	15.8
0	DIATOMA TENUE	0.13	0.13	-1.00	3.8
0	FRAGILARIA CROTONENSIS	0.27	0.27	-1.00	8.1
0	FRAGILARIA (LPIL)	0.08	0.08	-1.00	2.5
0	TABELLARIA FLOCCULOSA	0.30	0.30	-1.00	9.1
0	NAVICULALES				
0	NAVICULA (LPIL)	0.02	0.02	-1.00	0.6
0	PINNULARIA (LPIL)	0.02	0.02	-1.00	0.7
0	BACILLARIALES				

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DAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITTERS PER LITER

STATION REPORT

LS	TAXA	9	X	S.E.	REL AB%
0	ALIZCHIA (LPIL)	0.19	0.19	-1.00	5.7
0	BACILLARIOPHYTA-PERRATE (LPIL)	0.12	0.12	-1.00	3.7
0	PHYCOPHYTA-FIOFHYCEAE	0.23	0.23	-1.00	6.9
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	0.23	0.23	-1.00	6.9
0	CRYPTOPHYTA	0.33	0.33	-1.00	10.0
0	CRYPTOPHYTOIDALES				
0	CRYPTOPHYTHAS REFLEXA	0.07	0.07	-1.00	2.1
0	CRYPTOPHYTHAS (LPIL)	0.06	0.06	-1.00	1.8
0	RHODOPHYTHAS HIRIOTA	0.20	0.20	-1.00	6.0
0	CHROCOCHTHAS (LPIL)	0.00	0.00	-1.00	0.1
TOTAL		3.30	3.30	-1.00	100.0
DIVERSITY (H PRIME)		2.81	2.81	-1.00	
DIVERSITY (J PRIME)		0.80	0.80	-1.00	
NUMBER OF TAXA		31	31		

ABOVE COMPUTED USING SAMPLE IDS

71	81	82
91		

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

SITE SUMMARY

15	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	\bar{x}	S.E.	REL ABZ
0	UNIDENTIFIED ALGAE	0	0	0.00	0.00	0.0
0	UNIDENTIFIED ALGAE (LPIL)	0.00	0.00	0.00	0.00	0.0
0	CYANOPHYTA	0.07	0.03	0.05	0.02	1.1
0	CHROOCOCCEAE					
0	CHROOCOCCLUS (LPIL)	0.04	0.0	0.02	0.02	0.5
0	MICROCYSTIS (LPIL)	0.0	0.00	0.00	0.00	0.0
0	GOMPHOSPHERIA LACUSTRIS	0.01	0.03	0.02	0.01	0.4
0	OSCILLATORIACEAE					
0	OSCILLATORIA LIMNETICA	0.0	0.00	0.00	0.00	0.1
0	OSCILLATORIA (LPIL)	0.02	0.0	0.01	0.01	0.2
0	LYNGBYA CONTORTA	0.00	0.0	0.00	0.00	0.1
0	CHLOROPHYTA	1.27	0.25	0.76	0.51	16.5
0	VOLVOCALES					
0	CHLAMYDOMONAS (LPIL)	0.57	0.24	0.41	0.17	8.8
0	TETRASPORALES					
0	ELAKATONRIX (LPIL)	0.00	0.01	0.01	0.00	0.2
0	CHLOROCOCCALES					
0	SPHAEROCYSTIS SCHROETERI	0.69	0.0	0.34	0.34	7.5
0	ARTISTRODESINUS FALCATUS	0.00	0.00	0.00	0.00	0.1
0	SCHNEDESINUS QUADRICAUDA	0.00	0.0	0.00	0.00	0.0
0	CHRYSOPHYTA	0.06	0.07	0.06	0.01	1.4
0	CHRYSOMONADALES					
0	HALLAPORAS (LPIL)	0.02	0.0	0.01	0.01	0.2
0	CHRYSOCOCCLUS (LPIL)	0.00	0.00	0.00	0.00	0.0
0	STIRRA (LPIL)	0.01	0.0	0.00	0.00	0.1
0	DINERYON SOCIALE	0.03	0.07	0.05	0.02	1.0
0	MOROSIGALES					
0	SV - EXORHNAS DICHOLOMA	0.01	0.00	0.01	0.00	0.1
0	CHRYSOPHYTA (LPIL)	0.0	0.00	0.00	0.00	0.0
0	BACILLARIOPHYTA-CENTRIC	1.50	0.73	1.12	0.39	24.2
0	EUPHOSCALES					
0	HELOSIRA (LPIL)	0.60	0.25	0.42	0.17	9.2
0	STEPHANODISCUS 3HEDERANA	0.11	0.02	0.06	0.04	1.3
0	STEPHANODISCUS NIAGARAE	0.32	0.07	0.19	0.13	4.2
0	STEPHANODISCUS (LPIL)	0.22	0.16	0.19	0.03	4.1
0	EUPHOSCALES (LPIL)	0.11	0.00	0.05	0.05	1.2
0	PHIZOSOLETHALES					
0	PHYZOSOLETHA ERIEENSIS	0.16	0.23	0.19	0.04	4.2
0	BACILLARIOPHYTA-PENNATE	2.44	1.65	2.04	0.39	44.4
0	FRAGILARIALES					
0	ASTERIORELLA FORTIOFA	0.46	0.52	0.49	0.03	10.6
0	DIAIONA TERRE	0.01	0.13	0.07	0.06	1.4

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

SITE SUMMARY

LS	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	- X	S.E.	REL AB%
0	FRAGILARIA CROTONENSIS	0.38	0.27	0.32	0.06	7.1
0	FRAGILARIA (LPIL)	0.71	0.08	0.40	0.31	8.6
0	TABELLARIA FLOCCULOSA	0.0	0.30	0.15	0.15	3.3
0	FRAGILARIAS (LPIL)	0.02	0.0	0.01	0.01	0.2
0	NAVICULAS					
0	HAVICULA (LPIL)	0.02	0.02	0.02	0.00	0.5
0	PINNULARIA (LPIL)	0.02	0.02	0.00	0.00	0.4
0	CYDOLIA (LPIL)	0.00	0.0	0.00	0.00	0.0
0	BACILLARIAS					
0	RITZCHIA (LPIL)	0.42	0.19	0.31	0.12	6.6
0	SURIRELLAS					
0	CHATOPLEURA SOLFA	0.10	0.0	0.05	0.05	1.1
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.29	0.12	0.21	0.09	4.5
0	PHYCOPHYTA-DIROMYCEAE	0.03	0.23	0.13	0.10	2.8
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	0.03	0.23	0.13	0.10	2.8
0	CRYPTOPHYTA	0.54	0.33	0.43	0.10	9.4
0	CRYPTOPHYTES					
0	CRYPTOPHYTAS HAPSOCHIT	0.01	0.0	0.01	0.01	0.1
0	CRYPTOPHYTAS PELEA	0.14	0.07	0.11	0.04	2.3
0	CRYPTOPHYTAS (LPIL)	0.14	0.06	0.10	0.04	2.1
0	RHOZOPHYTAS RHIZA	0.22	0.20	0.21	0.01	4.6
0	CHROOCOPHYTAS (LPIL)	0.02	0.00	0.01	0.01	0.2
0	CYANOPHYTAS (LPIL)	0.00	0.0	0.00	0.00	0.0
TOTAL		5.92	3.30	4.61	1.31	100.0
DIVERSITY (H PRIME)		2.51	2.81	2.66	0.15	
DIVERSITY (J PRIME)		0.71	0.80	0.75	0.04	
NUMBER OF TAXA		39	31	43		

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
31	32	41	42
51	52	61	62
101	102	71	72
81	82	91	92

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL ABZ
0	RHODOSPIRILLUM RUBRUM	0.0	0.01	0.01	0.01	0.2
0	CHLOROPHYLL A (CPL)	0.0	0.07	0.04	0.04	0.9
TOTAL		2.96	4.90	3.93	0.97	100.0
DIVERSITY (H PRIME)		2.44	2.08	2.26	0.18	
DIVERSITY (J PRIME)		0.64	0.56	0.60	0.04	
NUMBER OF TAXA		14	13	22		

ADDITIONAL COMMENTS USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

PC IC GC LOC
5 56 56 1 1 00

SID	DATE	TIME	D/H	DURATION		SD	WD	TOW		SAMP		VOL		WIND		CURRENT		TEMP		BT	TURBID	COND	DO	PH	SALIN	REL		
				UNITS	C			D	SP	UNITS	C	SECH	W	T	SC	DI	CL	SP	DI								AIR	WAT
181	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0.0	2.0	4	1.0	8.0	4	1	5	0.0	0	178.1	55.9	0	0.0	0	9.1	0.0	0.0		
182	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0.0	2.0	4	1.0	8.0	4	1	5	0.0	0	17.8	15.5	0	0.0	0	9.1	0.0	0.0		
15	TAXA																											
0	CYANOPHYTA																											
0	NOSTOCACEAE																											
0	ARABAEIA (LPIL)																											
0	CHLOROPHYTA																											
0	CHLOROCOCCALES																											
0	GOCYSTIS (LPIL)																											
0	SCENEDESERUS QUADRICAUDA																											
0	SCENEDESERUS ECHINUS																											
0	SCENEDESERUS SPINOSUS																											
0	PEDIASTRUM DUPLEX																											
0	ZYGHEATALES																											
0	MOUSEOTIA (LPIL)																											
0	EUGLEPHOTIA																											
0	EUGLENALES																											
0	TRACHELOMONAS (LPIL)																											
0	CHRYSOPHYTA																											
0	CHRYSOCHORDALES																											
0	CHRYSOCOCCUS (LPIL)																											
0	DITHORION SERTULARIA																											
0	KEPHYRION (LPIL)																											
0	BACILLARIOPHYTA-PERINATE																											
0	FRAGILARIALES																											
0	FRAGILARIA (LPIL)																											
0	TABULARIA FLOCCULOSA																											
0	NAVICULALES																											
0	HEIDUTH (LPIL)																											
0	BACILLARIAPLES																											
0	NITZSCHIA (LPIL)																											
0	BACILLARIOPHYTA-PERINATE (LPIL)																											
0	CRYPTOPHYTA																											
0	CRYPTOPHYTES																											
0	CRYPTOPHYTES (LPIL)																											
0	PHODOPHYTES (LPIL)																											
0	CHROOCYTES (LPIL)																											
TOTAL																												
DIVERSITY (H PRIME)																												

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA			~ X	S.E.	REL AB%
		1	2			
DIVERSITY (J PRIME)		0.64	0.73	0.68	0.04	
NUMBER OF TAXA		11	14	19		

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	17	18	X	S.E.	REL ABZ
0	CYANOPHYTA	0.00	0.00	0.00	0.00	0.1
0	OSCILLATORIACEAE					
0	OSCILLATORIA (LPIL)	0.00	0.0	0.00	0.00	0.0
0	ROSTOCACEAE					
0	ANAGATHA (LPIL)	0.0	0.00	0.00	0.00	0.0
0	CHLOROPHYTA	0.85	1.35	1.10	0.25	21.8
0	CHLOROCOCCALES					
0	OCYSTIS (LPIL)	0.0	0.02	0.01	0.01	0.2
0	SCENEDESMUS QUADRICAUDA	0.39	0.20	0.29	0.10	5.9
0	SCENEDESMUS ECGRIS	0.03	0.02	0.02	0.01	0.5
0	SCENEDESMUS SPIRISUS	0.00	0.00	0.00	0.00	0.1
0	FEDIASTRUM DUPLEX	0.0	0.51	0.25	0.25	5.0
0	TETRAEDRON CAUDATUM	0.02	0.0	0.01	0.01	0.2
0	OEDOGONIALES					
0	OEDOGONIUM (LPIL)	0.21	0.0	0.10	0.10	2.1
0	ZYGEMATALES					
0	ROUGEOTIA (LPIL)	0.07	0.61	0.34	0.27	6.8
0	CLOSTERIUM MOHILIFERUM	0.06	0.0	0.03	0.03	0.6
0	STAUROSPORIUM (LPIL)	0.06	0.0	0.03	0.03	0.6
0	EUGLENOPHYTA	0.15	0.07	0.11	0.04	2.1
0	EUGLENALES					
0	TRACHELOMONAS (LPIL)	0.15	0.07	0.11	0.04	2.1
0	CHRYSOPHYTA	1.64	1.03	1.34	0.30	26.6
0	CHRYSOCHONDALES					
0	CHRYSOCCUS (LPIL)	0.13	0.53	0.33	0.20	6.5
0	DINODRYON SERTULARIA	1.46	0.50	0.98	0.48	19.5
0	EPIPYXIS UTRICULUS	0.06	0.0	0.03	0.03	0.6
0	KE HYRION (LPIL)	0.00	0.00	0.00	0.00	0.0
0	BACILLARIOPHYTA-PERINATE	0.64	3.60	2.22	1.38	44.1
0	FRAGILARIALES					
0	FRAGILARIA (LPIL)	0.0	0.05	0.03	0.03	0.5
0	TABELLARIA FLOCCULOSA	0.72	0.02	0.37	0.35	7.4
0	ACHNATHALES					
0	ACHNATHES MINUTISSIMA	0.01	0.0	0.00	0.00	0.1
0	ACHNATHES (LPIL)	0.00	0.0	0.00	0.00	0.0
0	NAVICULALES					
0	HEIDIM (LPIL)	0.0	0.92	0.46	0.46	9.1
0	BACILLARIALES					
0	HITZCHIA (LPIL)	0.0	2.35	1.18	1.18	23.4
0	SURIRELLALES					
0	SURIRELLA (LPIL)	0.08	0.0	0.04	0.04	0.8
0	BACILLARIOPHYTA-PERINATE (LPIL)	0.03	0.26	0.14	0.11	2.6

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	16	17	18	REL AB%
0	CRYPTOPHYTA	0.08	0.44	0.26	0.18
0	CRYPTOPHYTOIDALES				
0	CRYPTOPHYTHAS (LPIL)	0.06	0.40	0.23	0.17
0	RHODOPHYTHAS MIRUTA	0.00	0.01	0.00	0.00
0	CHROCOPHYTHAS (LPIL)	0.02	0.04	0.03	0.01
	TOTAL	6.14	3.93	5.03	1.10
	DIVERSITY (H PRIME)	2.48	2.26	2.37	0.11
	DIVERSITY (J PRIME)	0.68	0.60	0.64	0.04
	NUMBER OF TAXA	19	22	28	

ABOVE COMPUTED USING SAMPLE IDS

171 172 181 182

DATE 03/09/81
PAGE NO 37
T600AQUA 9/28/77

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	18	X	S.E.	REL AB%
0	CYANOPHYTA	0.00	0.00	-1.00	0.1
0	OSCILLATOIRIACEAE	0.00	0.00	-1.00	0.0
0	OSCILLATORIA (LPIL)	0.00	0.00	-1.00	0.0
0	NOSTOCACEAE	0.00	0.00	-1.00	0.0
0	ARABAEIA (LPIL)	1.10	1.10	-1.00	21.0
0	CHLOROPHYTA	0.00	0.00	-1.00	0.0
0	CHLOPCCOCCALES	0.01	0.01	-1.00	0.2
0	OOCYSTIS (LPIL)	0.29	0.29	-1.00	5.9
0	SCENEDESMUS QUADRICAUDA	0.02	0.02	-1.00	0.5
0	SCENEDESMUS EGERNIS	0.00	0.00	-1.00	0.1
0	SCENEDESMUS SPINOSUS	0.25	0.25	-1.00	5.0
0	PEDICULUS DUPLEX	0.01	0.01	-1.00	0.2
0	TETRAEDRON CAUDATUM	0.10	0.10	-1.00	2.1
0	OEDOGONIALES	0.10	0.10	-1.00	2.1
0	OEDOGONIUM (LPIL)	0.34	0.34	-1.00	6.8
0	ZYGURHATALES	0.03	0.03	-1.00	0.6
0	HURGEOITA (LPIL)	0.03	0.03	-1.00	0.6
0	CLOSTERIUM HOMILIFERUM	0.11	0.11	-1.00	2.1
0	STABASTRUM (LPIL)	0.11	0.11	-1.00	2.1
0	EUGLEPHYTA	0.11	0.11	-1.00	2.1
0	EUGLEHALES	1.34	1.34	-1.00	26.6
0	TRACHELOPHAS (LPIL)	0.33	0.33	-1.00	6.5
0	CHRYCOPHYTA	0.90	0.90	-1.00	19.5
0	CHRYCOTRADALES	0.03	0.03	-1.00	0.6
0	CHRYCOCOCUS (LPIL)	0.00	0.00	-1.00	0.0
0	DINOCYON SERTULARIA	2.22	2.22	-1.00	44.1
0	EPIYXIS UTRICULUS	0.03	0.03	-1.00	0.5
0	PERIPYON (LPIL)	0.03	0.03	-1.00	0.5
0	BACILLARIOPHYTA-PENIATE	0.03	0.03	-1.00	0.5
0	FRAGILARIALES	0.37	0.37	-1.00	7.4
0	FRAGILARIA (LPIL)	0.00	0.00	-1.00	0.1
0	TAPELLARIA FLOCCULOSA	0.00	0.00	-1.00	0.0
0	ACHRANHIALES	0.46	0.46	-1.00	9.1
0	ACHRANHES MINUTISSIMA	1.18	1.18	-1.00	23.4
0	ACHRANHES (LPIL)	0.04	0.04	-1.00	0.8
0	NAVICULALES	0.14	0.14	-1.00	2.8
0	NEIDUM (LPIL)	0.04	0.04	-1.00	0.8
0	BACILLARIALES	0.14	0.14	-1.00	2.8
0	HITZCHIA (LPIL)	0.04	0.04	-1.00	0.8
0	SURIRELLALES	0.14	0.14	-1.00	2.8
0	SURIRELLA (LPIL)	0.04	0.04	-1.00	0.8
0	BACILLARIOPHYTA-PENIATE (LPIL)	0.14	0.14	-1.00	2.8

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

PC TC GC LOC
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SID	DATE	TIME	DURATION		SD	WD	TOM		SAMP VOL	WIND	CURRENT		TEMP		BT	TURB	COND	DO	PH	SALIN P	
			D/H	UNITS			SP	D			CL	SP	DI	SI							AIR
191	4/20/80	1055	0	0.0	0	1.0	0.0	0	2.0	4	1	5	0.0	178.1	9.5	0	0.0	0	8.5	0.0	0.0
192	4/20/80	1055	0	0.0	0	1.0	0.0	0	2.0	4	1	5	0.0	178.2	19.5	0	0.0	0	8.5	0.0	0.0
LS	TAXA	1	2																S.E.	ABX	
0	CYANOPHYTA	0.00	0.0																0.00	0.0	
0	CHROOCOCCACEAE																		0.00	0.0	
0	AGGELLUM (LPIL)	0.00	0.0																0.00	0.0	
0	CHLOROPHYTA	0.09	0.09																0.00	0.9	
0	VOLVOCALES																		0.00	0.7	
0	CHLAMYDOMONAS (LPIL)	0.06	0.07																0.00	0.0	
0	CHLOROCOCCALES																		0.00	0.0	
0	ANKISTRODESINUS FALCATUS	0.0	0.01																0.01	0.1	
0	SCENEDESINUS GUADRICAUDA	0.0	0.01																0.01	0.1	
0	SCENEDESINUS EORNIS	0.03	0.0																0.01	0.1	
0	EUGLENOPHYTA	0.96	0.56																0.20	7.9	
0	EUGLENALES																		0.00	1.2	
0	TRACHELOMONAS VOLVOCHINA	0.12	0.11																0.19	6.7	
0	TRACHELOMONAS (LPIL)	0.84	0.45																0.48	65.8	
0	CHRYSOPHYTA	6.64	5.88																0.03	0.4	
0	CHRYSORHIZALES																		0.04	0.4	
0	CHRYSOCOCCUS (LPIL)	0.07	0.01																0.46	61.4	
0	DINERYON SERTULARIA	6.39	5.48																0.09	0.9	
0	DINERYON DIVERGENS	0.00	0.18																0.09	0.9	
0	OCHROMONAS (LPIL)	0.37	0.21																0.08	3.0	
0	KEPHRYON (LPIL)	0.01	0.00																0.00	0.1	
0	BACILLARIOPHYTA-PERRIATE	0.16	0.33																0.09	2.5	
0	FRAGILARIALES																		0.04	0.5	
0	FRAGILARIA (LPIL)	0.09	0.0																0.17	1.7	
0	TABELLARIA FLOCCULOSA	0.0	0.33																0.03	0.4	
0	BACILLARIOPHYTA-PERRIATE (LPIL)	0.07	0.0																0.05	13.5	
0	PYRROPHYTA-DINOPHYCEAE	1.84	1.74																0.33	14.6	
0	PERRIDINIALES																		0.38	3.9	
0	PERRIDINIUM INCONSPICUUM	1.08	1.74																0.16	4.4	
0	PERRIDINIUM CINCTUM	0.75	0.0																0.15	4.1	
0	CRYPTOPHYTA	0.27	0.53																0.00	0.3	
0	CRYPTOPHYDALES																		0.49	100.0	
0	CRYPTOPHYTES (LPIL)	0.24	0.54																0.01	0.01	
0	CHROCHONAS (LPIL)	0.03	0.03																		
TOTAL		10.15	9.17																		

-TOTAL

-DIVERSITY (H PRIDE)

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA			-	X	S.E.	REL
		1	2				AB%
DIVERSITY (J PRIME)		0.51	0.51		0.51	0.00	
NUMBER OF TAXA		15	14		19		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	- X	S.E.	REL ABZ
DIVERSITY (H PRIME)		2.73	2.22	2.48		0.25
DIVERSITY (J PRIME)		0.74	0.57	0.65		0.08
NUMBER OF TAXA		13	15	20		

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BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	19	20	X	S.E.	REL ABZ
0	CYANOPHYTA	0.00	0.01	0.00	0.00	0.0
0	CHROCOCCACEAE					
0	AGRIHULLUM (LPIL)	0.00	0.0	0.00	0.00	0.0
0	NOSTOCACEAE					
0	ARABAEHA (LPIL)	0.0	0.01	0.00	0.00	0.0
0	CHLOROPHYTA	0.09	0.10	0.09	0.00	1.0
0	VOLVOCALES					
0	CHLAMYDOMONAS (LPIL)	0.07	0.08	0.08	0.01	0.8
0	CHLOROCOCCALES					
0	ARISTRODESIRUS FALCATUS	0.00	0.00	0.00	0.00	0.0
0	SCHEDESIRUS ACUTUS	0.0	0.00	0.00	0.00	0.0
0	SCHEDESIRUS QUADRICAUDA	0.01	0.01	0.01	0.00	0.1
0	SCHEDESIRUS ECCRISUS	0.01	0.0	0.01	0.01	0.1
0	EUGLENOPHYTA	0.76	1.35	1.06	0.29	11.6
0	EUGLENALES					
0	TRACHELOMONAS VOLVOCHINA	0.12	0.18	0.15	0.03	1.6
0	TRACHELOMONAS (LPIL)	0.64	1.18	0.91	0.27	10.0
0	CHRYSOPHYTA	6.36	3.63	5.00	1.36	55.0
0	CHRYSOCHADDALES					
0	CHRYSOCCOCUS (LPIL)	0.04	0.03	0.03	0.01	0.4
0	SYNCRYPYA (LPIL)	0.0	0.09	0.04	0.04	0.5
0	DICHOBYON SERTULARIA	5.93	2.69	4.31	1.62	47.5
0	DICHOBYON DIVERGENS	0.09	0.0	0.05	0.05	0.5
0	DICHOBYON (LPIL)	0.0	0.09	0.04	0.04	0.5
0	CHROCHONAS (LPIL)	0.29	0.69	0.49	0.20	9.4
0	EPIPYXIS UTRICULUS	0.0	0.04	0.02	0.02	2
0	KETPHYION (LPIL)	0.00	0.00	0.00	0.00	0.0
0	BACILLARIOPHYTA-PENNATE	0.25	0.03	0.14	0.11	1.5
0	FRAGILARIAPLES					
0	FRAGILARIA (LPIL)	0.04	0.0	0.02	0.02	0.2
0	TACELLARIA FLOCCULOSA	0.17	0.0	0.08	0.08	0.9
0	BACILLARIAPLES					
0	MITZONIA (LPIL)	0.0	0.03	0.00	0.00	0.0
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.03	0.02	0.03	0.01	0.3
0	PYRROPHYTA-DIOPHYCEAE	1.79	2.83	2.31	0.52	25.4
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	1.41	1.66	1.54	0.13	16.9
0	PERIDINIUM CHITUM	0.33	1.17	0.77	0.40	8.5
0	CRYPTOPHYTA	0.42	0.55	0.49	0.07	5.4
0	CRYPTOCHODALES					
0	CRYPTOCHODAS (LPIL)	0.39	0.54	0.47	0.08	5.2
0	CHROCHONAS (LPIL)	0.03	0.01	0.02	0.01	0.2

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA			-	REL
		19	20	X	S.E. AB%
TOTAL		9.66	8.50	9.08	0.58 100.0
DIVERSITY (H PRIME)		1.97	2.48	2.22	0.26
DIVERSITY (J PRIME)		0.51	0.65	0.58	0.07
NUMBER OF TAXA		19	20	25	

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DAILY GENERATING PLANT

PHYTOPLANKTON BIOLOGIE

MICROLITERS PER LITER

STATION REPORT

IS	TAXA	20	X	S.E.	REL ABZ
0	CYANOPHYTA	0.00	0.00	-1.00	0.9
0	CHROCOCCACEAE	0.00	0.00	-1.00	0.9
0	AGNETHILLUM (LPIL)	0.00	0.00	-1.00	0.9
0	NOSTOCACEAE	0.00	0.00	-1.00	0.9
0	ANABAENA (LPIL)	0.00	0.00	-1.00	0.9
0	CHLOPOTPHYTA	0.09	0.09	-1.00	1.0
0	VOLVOCALES	0.08	0.08	-1.00	0.8
0	CHLADYTHONAS (LPIL)	0.00	0.00	-1.00	0.8
0	CHROCOCCALES	0.00	0.00	-1.00	0.8
0	AFISTRODESUS FALCATUS	0.00	0.00	-1.00	0.8
0	SCHEDESUS ACUTUS	0.01	0.01	-1.00	0.1
0	SCHEDESUS QUADRICAUDA	0.01	0.01	-1.00	0.1
0	SCHEDESUS ECORNIS	1.06	1.06	-1.00	11.6
0	EUGLEPHYTA	0.15	0.15	-1.00	1.6
0	EUGLEHALES	0.91	0.91	-1.00	10.0
0	TRACHELOTHONAS VOLVOCHINA	5.00	5.00	-1.00	55.0
0	TRACHELOTHONAS (LPIL)	0.03	0.03	-1.00	0.4
0	CHRYSONOMADALES	0.04	0.04	-1.00	0.5
0	CHRYSOCCUS (LPIL)	4.31	4.31	-1.00	47.5
0	SHERRYPTA (LPIL)	0.05	0.05	-1.00	0.5
0	DIRERYCH SERTULARIA	0.04	0.04	-1.00	0.5
0	DIRERYCH DIVERGENS	0.49	0.49	-1.00	5.4
0	DIRERYCH (LPIL)	0.02	0.02	-1.00	0.2
0	OCCHRONAS (LPIL)	0.00	0.00	-1.00	0.0
0	EPIPAIS UTRICULUS	0.14	0.14	-1.00	1.5
0	KEPHIRION (LPIL)	0.02	0.02	-1.00	0.2
0	BACILLARIOPHYTA-PENNATE	0.02	0.02	-1.00	0.2
0	FRAGILARIALES	0.08	0.08	-1.00	0.9
0	FRAGILARIA (LPIL)	0.00	0.00	-1.00	0.0
0	TAELLARIA FLOCCULOSA	0.03	0.03	-1.00	0.3
0	BACILLARIALES	2.31	2.31	-1.00	25.4
0	MITZCHIA (LPIL)	1.54	1.54	-1.00	16.9
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.77	0.77	-1.00	8.5
0	PYRROPHYTA-DINOPHYCEAE	0.49	0.49	-1.00	5.4
0	PERIDINIALES	0.47	0.47	-1.00	5.2
0	PERIDINIUM INCONSPICUUM	0.02	0.02	-1.00	0.2
0	PERIDINIUM CINCTUM	0.00	0.00	-1.00	0.0
0	CRYPTOPHYTA	0.00	0.00	-1.00	0.0
0	CRYPTOPHYTES	0.00	0.00	-1.00	0.0
0	CRYPTOPHYTES (LPIL)	0.00	0.00	-1.00	0.0
0	CHROCHONAS (LPIL)	0.00	0.00	-1.00	0.0

NORTHERN INDIANA PUBLIC SERVICE COMPANY (497-0)

DALEY GENERATING PLANT

PHOTOPHOTOMETER BIOLOGICAL

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	20	REL	ABZ
TOTAL		9.08	-1.00	100.0
DIVERSITY (H PRIME)		2.22	-1.00	
DIVERSITY (J PRIME)		0.58	-1.00	
NUMBER OF TAXA		25		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROPOLLUTANTS PER LITER

REPLICATE REPORT

PL TC GC LOC

5 56 56 1 3 00

SID	DATE	TIME D/H	UNITS C	SD	WD	SP	D	TON	SAMP VOL	C SECH	W T	SC	DI	WIND	CURRENT	TEMP	WAT	BY	TURBID	COND	DO	PH	SALIN P	REL	ABZ																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

REPLICATE REPORT

LS	TAXA	1	2	- X	S.E.	REL ABZ
0	PYRROPHYTA-DINOPHYCEAE	0.25	0.0	0.12	0.12	0.3
0	PERIDINIALES					
0	PERIDINIUM INCONSPICUUM	0.25	0.0	0.12	0.12	0.3
TOTAL		69.67	5.78	37.73	31.94	100.0
DIVERSITY (H PRIME)		1.97	1.91	1.94	0.03	
DIVERSITY (J PRIME)		0.49	0.64	0.56	0.07	
NUMBER OF TAXA		16	3	20		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA		- X	S.E.	REL ABZ
		21			
0	CYANOPHYTA	0.08	0.08	-1.00	0.2
0	OSCILLATORIACEAE				
0	OSCILLATORIA (LPIL)	0.06	0.06	-1.00	0.2
0	NOSTOCACEAE				
0	ANABAEINA (LPIL)	0.01	0.01	-1.00	0.0
0	RIVULARIACEAE				
0	RAPHIDIOPSIS CURVATA	0.01	0.01	-1.00	0.0
0	CHLOROPHYTA	12.09	12.09	-1.00	32.1
0	GEOGONIALES				
0	GEOGONIUM (LPIL)	0.66	0.66	-1.00	1.7
0	ZYGNEATALES				
0	SPIROGYRA (LPIL)	9.88	9.88	-1.00	26.2
0	CLOSTERIUM (LPIL)	1.55	1.55	-1.00	4.1
0	EUGLENOPHYTA	0.48	0.48	-1.00	1.3
0	EUGLENALES				
0	TRACHELOMONAS (LPIL)	0.48	0.48	-1.00	1.3
0	CHRYSOPHYTA	0.00	0.00	-1.00	0.0
0	CHRYSONOMADALES				
0	CHRYSONOCOCUS (LPIL)	0.00	0.00	-1.00	0.0
0	BACILLARIOPHYTA-CENTRIC	0.24	0.24	-1.00	0.6
0	EUPODISCALES				
0	HELOSIRA (LPIL)	0.24	0.24	-1.00	0.6
0	BACILLARIOPHYTA-PENNATE	24.71	24.71	-1.00	65.5
0	FRAGILARIALES				
0	FRAGILARIA CROTONENSIS	0.30	0.30	-1.00	0.8
0	FRAGILARIA (LPIL)	1.95	1.95	-1.00	5.2
0	SYNEGRA (LPIL)	2.77	2.77	-1.00	7.3
0	NAVICULALES				
0	NAVICULA (LPIL)	0.51	0.51	-1.00	1.4
0	HEIDIUM (LPIL)	0.19	0.19	-1.00	0.5
0	PINNULARIA (LPIL)	18.44	18.44	-1.00	48.9
0	GOMPHONEMA (LPIL)	0.19	0.19	-1.00	0.5
0	AMPHORA (LPIL)	0.05	0.05	-1.00	0.1
0	EPITHEMIALES				
0	RHOPOLODIA GIBBA	0.11	0.11	-1.00	0.3
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.20	0.20	-1.00	0.5
0	PYRRHOPHYTA-DINOPHYCEAE	0.12	0.12	-1.00	0.3
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	0.12	0.12	-1.00	0.3
	TOTAL	37.73	37.73	-1.00	100.0
	-DIVERSITY (H PRIME)	1.94	1.94	-1.00	
	-DIVERSITY (J PRIME)	0.56	0.56	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA	21		-		REL
				X	S.E.	ABZ
NUMBER OF TAXA		20				
				20		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS	TAXA		X	S.E.	REL AB%
		21			
0	CYANOPHYTA	0.08	0.08	-1.00	0.2
0	OSCILLATORIACEAE				
0	OSCILLATORIA (LPIL)	0.06	0.06	-1.00	0.2
0	NOSTOCACEAE				
0	ANABAENA (LPIL)	0.01	0.01	-1.00	0.0
0	RI'ULARIACEAE				
0	RAPHIDIOPSIS CURVATA	0.01	0.01	-1.00	0.0
0	CHLOROPHYTA	12.09	12.09	-1.00	32.1
0	OEDOGONIALES				
0	OEDOGONIUM (LPIL)	0.66	0.66	-1.00	1.7
0	ZYGHEMATALES				
0	SPIROGYRA (LPIL)	9.88	9.88	-1.00	26.2
0	CLOSTERIUM (LPIL)	1.55	1.55	-1.00	4.1
0	EUGLENOPHYTA	0.48	0.48	-1.00	1.3
0	EUGLENALES				
0	TRACHELOMONAS (LPIL)	0.48	0.48	-1.00	1.3
0	CHRYSOPHYTA	0.00	0.00	-1.00	0.0
0	CHRYSONOMADALES				
0	CHRYSOCOCCLUS (LPIL)	0.00	0.00	-1.00	0.0
0	BACILLARIOPHYTA-CENTRIC	0.24	0.24	-1.00	0.6
0	EUPODISCALES				
0	NELOSTRA (LPIL)	0.24	0.24	-1.00	0.6
0	BACILLARIOPHYTA-PENNATE	24.71	24.71	-1.00	65.5
0	FRAGILARIALES				
0	FRAGILARIA CROTONENSIS	0.30	0.30	-1.00	0.8
0	FRAGILARIA (LPIL)	1.95	1.95	-1.00	5.2
0	SYNEDRA (LPIL)	2.77	2.77	-1.00	7.3
0	NAVICULES				
0	NAVICULA (LPIL)	0.51	0.51	-1.00	1.4
0	NEIDIUM (LPIL)	0.19	0.19	-1.00	0.5
0	PIRULARIA (LPIL)	18.44	18.44	-1.00	48.9
0	GONPHORENA (LPIL)	0.19	0.19	-1.00	0.5
0	AMPHORA (LPIL)	0.05	0.05	-1.00	0.1
0	EPITHEMIALES				
0	RHOPOLODIA GIBBA	0.11	0.11	-1.00	0.3
0	BACILLARIOPHYTA-PENNATE (LPIL)	0.20	0.20	-1.00	0.5
0	PERIDINIOPHYTA-DINOPHYCEAE	0.12	0.12	-1.00	0.3
0	PERIDINIALES				
0	PERIDINIUM INCONSPICUUM	0.12	0.12	-1.00	0.3
	TOTAL	37.73	37.73	-1.00	100.0
	-DIVERSITY (H PRIME)	1.94	1.94	-1.00	
	-DIVERSITY (J PRIME)	0.56	0.56	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

STATION REPORT

LS TAXA

21

-
X

REL
S.E. ABZ

NUMBER OF TAXA

20

20

ABOVE COMPUTED USING SAMPLE IDS

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212

DATE 03/09/81
PAGE NO 53
T600AQUA 9/28/77

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

SITE SUMMARY

LS	TAXA	Nearshore Ponds					X	S.E.	REL ABZ
		Pond B 1	Pond C 1	Cowles Bog 1					
0	CYANOPHYTA	0.00	0.00	0.08			0.03	0.03	0.2
0	CHROCOCCACEAE								
0	ACHETELLUM (LPIL)	0.0	0.00	0.0			0.00	0.00	0.0
0	OSCILLATORIACEAE								
0	OSCILLATORIA (LPIL)	0.00	0.0	0.06			0.02	0.02	0.1
0	NOSTOCACEAE								
0	ANABAEHA (LPIL)	0.00	0.00	0.01			0.00	0.00	0.0
0	RIVULARIACEAE								
0	RAPIDIOPSIS CURVATA	0.0	0.0	0.01			0.00	0.00	0.0
0	CHLOROPHYTA	1.10	0.09	12.09			4.43	3.84	25.6
0	VOLVOCALES								
0	CHLARIODROMAS (LPIL)	0.0	0.08	0.0			0.03	0.03	0.1
0	CHLOPOCCALES								
0	AKISTRODESCHUS FALCATUS	0.0	0.00	0.0			0.00	0.00	0.0
0	OOCYSTIS (LPIL)	0.0	0.0	0.0			0.00	0.00	0.0
0	SCENEDESCHUS ACUTUS	0.0	0.00	0.0			0.00	0.00	0.0
0	SCENEDESCHUS QUADRICAUDA	0.29	0.01	0.0			0.10	0.10	0.6
0	SCENEDESCHUS EORNIS	0.02	0.01	0.0			0.01	0.01	0.1
0	SCENEDESCHUS SPINOSUS	0.00	0.0	0.0			0.00	0.00	0.0
0	PLEDASTRUM DUPLEX	0.25	0.0	0.0			0.08	0.08	0.5
0	TETRAEDRON CAUDATUM	0.0	0.0	0.0			0.00	0.00	0.0
0	OEDOGONIALES								
0	OEDOGONIUM (LPIL)	0.10	0.0	0.66			0.25	0.20	1.5
0	ZYGHNATALES								
0	FRUGETIA (LPIL)	0.34	0.0	0.0			0.11	0.11	0.7
0	SPIROGIRA (LPIL)	0.0	0.0	9.88			3.29	3.29	19.1
0	CLOSTERIUM MONILIFERUM	0.03	0.0	0.0			0.01	0.01	0.1
0	CLOSTERIUM (LPIL)	0.0	0.0	1.55			0.52	0.52	3.0
0	STAUROPSTROM (LPIL)	0.03	0.0	0.0			0.01	0.01	0.1
0	EUGLEPHYTA	0.11	1.06	0.48			0.55	0.28	3.2
0	EUGLENALES								
0	TRACHELOPHIAS VOLVOICINA	0.0	0.15	0.0			0.05	0.05	0.3
0	TRACHELOPHIAS (LPIL)	0.11	0.91	0.48			0.50	0.23	2.9
0	CHRYSOPLITA	1.34	5.00	0.00			2.11	1.49	12.2
0	CHRYSDRIMDALES								
0	CHRYSOCCUS (LPIL)	0.33	0.03	0.00			0.12	0.10	0.7
0	STICRYPTA (LPIL)	0.0	0.04	0.0			0.01	0.01	0.1
0	DINODRION SERTULARIA	0.98	4.31	0.0			1.76	1.31	10.2
0	DINODRION DIVERGENS	0.0	0.05	0.0			0.02	0.02	0.1
0	DINODRION (LPIL)	0.0	0.04	0.0			0.01	0.01	0.1
0	OCROPHIAS (LPIL)	0.0	0.49	0.0			0.16	0.16	0.9
0	EPIPYXIS UTRICULUS	0.03	0.02	0.0			0.02	0.01	0.1

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

SITE SUMMARY

Nearshore Ponds

IS	TAXA	Pond B 1	Pond C 1	Cowles Bog 1	X	S.E.	REL ABZ
0	KEPHIRION (LPIL)	0.00	0.00	0.0	0.00	0.00	0.0
0	BACILLARIOPHYTA-CENTRIC	0.0	0.0	0.24	0.08	0.08	0.5
0	EUFODISCALES						
0	HELOSIRA (LPIL)	0.0	0.0	0.24	0.08	0.08	0.5
0	BACILLARIOPHYTA-PENIATE	2.22	0.14	24.71	9.02	7.87	52.2
0	FRAGILARIALES						
0	FRAGILARIA CROTCHENSIS	0.0	0.0	0.30	0.10	0.10	0.6
0	FRAGILARIA (LPIL)	0.03	0.02	1.95	0.67	0.64	3.9
0	SYNDORA (LPIL)	0.0	0.0	2.77	0.92	0.92	5.3
0	TABELLARIA FLOCCULOSA	0.37	0.08	0.0	0.15	0.11	0.9
0	ACHANNALES						
0	ACHANATHES MIRITISSIMA	0.00	0.0	0.0	0.00	0.00	0.0
0	ACHANATHES (LPIL)	0.00	0.0	0.0	0.00	0.00	0.0
0	NAVICULALES						
0	NAVICULA (LPIL)	0.0	0.0	0.51	0.17	0.17	1.0
0	HEIDIUM (LPIL)	0.46	0.0	0.19	0.22	0.13	1.3
0	PIRULADIA (LPIL)	0.0	0.0	18.44	6.15	6.15	35.6
0	GOPHORENA (LPIL)	0.0	0.0	0.19	0.06	0.06	0.4
0	AMPHORA (LPIL)	0.0	0.0	0.05	0.02	0.02	0.1
0	EPITHEMIALES						
0	RHOLODIA GIBBA	0.0	0.0	0.11	0.04	0.04	0.2
0	BACILLARIALES						
0	NIITZCHIA (LPIL)	1.18	0.00	0.0	0.39	0.39	2.3
0	SURIRELLALES						
0	SURIRELLA (LPIL)	0.04	0.0	0.0	0.01	0.0	0.1
0	BACILLARIOPHYTA-PENIATE (LPIL)	0.14	0.03	0.20	0.12	0.08	0.7
0	PIRROPHYTA-DINOPHYCEAE	0.0	2.31	0.12	0.81	0.75	4.7
0	PERIDINIALES						
0	PERIDINIUM INCONSPICUUM	0.0	1.54	0.12	0.55	0.49	3.2
0	PERIDINIUM CINCTUM	0.0	0.77	0.0	0.26	0.26	1.5
0	CRYPTOPHYTA	0.26	0.49	0.0	0.25	0.14	1.4
0	CRYPTOPHYTES						
0	CRYPTOPHYTES (LPIL)	0.23	0.47	0.0	0.23	0.14	1.3
0	RHOZODONAS MIRUTA	0.00	0.0	0.0	0.00	0.00	0.0
0	CHROOCYTHAS (LPIL)	0.03	0.02	0.0	0.02	0.01	0.1
TOTAL		5.03	9.08	37.73	17.28	10.29	100.0
DIVERSITY (H PRIME)		2.37	2.32	1.94	2.18	0.13	
DIVERSITY (J PRIME)		0.64	0.13	0.56	0.60	0.02	
NUMBER OF TAXA		28	21	20	50		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

PHYTOPLANKTON BIOVOLUME

MICROLITERS PER LITER

SITE SUMMARY

ABOVE COMPUTED USING SAMPLE IDS			
171	172	181	182
191	192	201	202
211	212		

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Correction to:

APPENDIX I

ZOOPLANKTON DENSITY REPLICATE REPORTS.
BAILLY STUDY AREA, JUNE 1980

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

PEPLICATE REPORT

PC TC GC LOC
5 51 51 0 0 00

SID	DATE	TIME	D/H	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN P					
				UNITS	C			SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP							DI	AIR	WAT		
11	6/11/80	1732	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1	0	4	3	0	0.0	0	22.8	19.0	0	0.0	0	7.6	0.0	0.0	0
12	6/11/80	1732	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1	0	4	3	0	0.0	0	22.8	19.0	0	0.0	0	7.6	0.0	0.0	0
13	6/11/80	1732	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1	0	4	3	0	0.0	0	22.8	19.0	0	0.0	0	7.6	0.0	0.0	0
14	6/11/80	1732	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1	0	4	3	0	0.0	0	22.8	19.0	0	0.0	0	7.6	0.0	0.0	0

LS	TAXA	1	2	3	4	X	S.E.	ABX
0	NEMATODA (TOTAL)	0.0	92.59	55.56	222.22	92.59	47.21	0.7
1	NEMATODA (LPIL)	0.0	92.59	55.56	222.22	92.59	47.21	0.7
0	OLIGOCHAETA (TOTAL)	0.0	0.0	55.56	0.0	13.89	13.89	0.1
0	NAIDIDAE							
1	NAIDIDAE (LPIL)	0.0	0.0	55.56	0.0	13.89	13.89	0.1
0	CLADOCERA (TOTAL)	5291.66	5879.62	6166.66	4944.44	5570.59	276.99	40.3
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	5083.33	5787.03	5833.33	4888.88	5398.14	241.36	39.0
0	CHYDORIDAE							
1	CHYDORUS (LPIL)	208.33	46.30	277.78	0.0	133.10	65.73	1.0
1	EURYCERCUS LAMELLATUS	0.0	46.30	0.0	55.56	25.46	14.82	0.2
0	DAFNIIDAE							
6	DAFНИЯ (LPIL)	0.0	0.0	55.56	0.0	13.89	13.89	0.1
0	COPEPODA (TOTAL)	8874.99	4675.92	9999.99	8944.43	8123.83	1177.77	58.8
0	CALANOIDA (TOTAL)							
1	DIAPYCNUS ASHLANDI	41.67	46.30	55.56	111.11	63.66	16.08	0.5
1	DIAPYCNUS MINUTUS	41.67	46.30	0.0	55.56	35.88	12.30	0.3
1	EURYTEMORA AFFINIS	83.33	0.0	55.56	222.22	90.28	47.27	0.7
1	LIHNOCALANUS MACRURUS	0.0	0.0	55.56	0.0	13.89	13.89	0.1
14	CALANOIDA (LPIL)	2833.33	0.0	3055.55	2500.00	2097.22	708.33	15.2
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS BICUSPIDATUS THOMASI	83.33	0.0	166.67	55.56	76.39	34.72	0.6
1	CYCLOPS VERNALIS	83.33	0.0	166.67	333.33	145.83	71.16	1.1
14	CYCLOPOIDA (LPIL)	5700.33	4583.33	6444.44	5666.66	5600.69	383.28	40.5
0	DIPTERA NEMATOCERA (TOTAL)	0.0	92.59	0.0	0.0	23.15	23.15	0.2
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	0.0	92.59	0.0	0.0	23.15	23.15	0.2
	TOTAL	14166.65	10740.71	16277.75	14111.09	13824.05	1144.82	100.0
	DIVERSITY (H PRIME)	1.79	1.26	1.92	1.97	1.73	0.16	
	DIVERSITY (J PRIME)	0.57	0.42	0.53	0.59	0.53	0.04	
	NUMBER OF TAXA	9	8	12	10	15		

ABOVE COMPUTED USING SAMPLE IDS

11 12 13 14

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC 1UC

5 51 51 0 0 06

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	M	T	SC	DI	CL	SP	DI	AIR	WAT	BT	TUBED	COND	DO	PH	SALIN P	REL
0	HEMATODA (TOTAL)							1	0.0			112.68			2		3			4			28.17	0.2	28.17	0.2		
1	HEMATODA (LPII)							0.0				112.68					0.0			0.0			28.17	0.2	28.17	0.2		
0	CLADOCERA (TOTAL)							4169.01				3746.48					3485.91			2194.36			3398.94	425.48	20.2	425.48	20.2	
0	BOSPHINIDAE																											
1	BOSPHINIDAE (LPII)							4112.67				3577.46					3450.70			2344.36			3333.80	406.00	19.8	406.00	19.8	
0	CHYDORIDAE																											
1	ALONA AFFINIS							0.0				28.17					0.0			0.0			7.04	0.0	7.04	0.0		
1	ALONA (LPII)							0.0				0.0					35.21			0.0			8.80	0.1	8.80	0.1		
1	CHYDORUS (LPII)							0.0				28.17					0.0			0.0			7.04	0.0	7.04	0.0		
0	DAPHNIDAE																											
1	DAPHNIA GALEATA MENIDOTAE							0.0				28.17					0.0			0.0			7.04	0.0	7.04	0.0		
1	DAPHNIA RETROCURVA							56.34				0.0					0.0			0.0			14.08	0.1	14.08	0.1		
1	CERIODAPHNIA (LPII)							0.0				56.34					0.0			0.0			14.08	0.1	14.08	0.1		
0	POLYHEMIDAE																											
1	POLYHEMUS PEDICULUS							0.0				28.17					0.0			0.0			7.04	0.0	7.04	0.0		
0	COPEPODA (TOTAL)							16901.38				13014.08					12289.72			11346.46			13387.66	1219.97	79.6	1219.97	79.6	
0	CALANOIDA (TOTAL)																											
1	DIAPYCNUS ASHLANDI							56.34				28.17					105.63			107.04			74.30	19.37	0.4	19.37	0.4	
1	DIAPYCNUS MINUTUS							394.37				253.52					140.85			53.52			210.56	73.68	1.3	73.68	1.3	
1	EPIPOCURA LACUSTRIS							0.0				0.0					35.21			0.0			8.80	0.1	8.80	0.1		
14	CALANOIDA (LPII)							3943.66				2760.56					3169.01			2033.60			2976.76	398.72	17.7	398.72	17.7	
0	CYCLOPOIDA (TOTAL)																											
1	CYCLOPS BICUSPIDATUS THOMASI							901.41				760.56					352.11			588.73			650.70	118.29	3.9	118.29	3.9	
1	CYCLOPS VERNALIS							169.01				84.51					35.21			214.03			125.70	40.39	0.7	40.39	0.7	
1	CYCLOPS BICUSPIDATUS							0.0				0.0					0.0			53.52			13.38	13.38	0.1	13.38	0.1	
14	CYCLOPOIDA (LPII)							11380.27				9126.76					8450.70			8242.25			9259.99	716.66	55.3	716.66	55.3	
0	HARPACTICOIDA (TOTAL)																											
1	HARPACTICOIDA (LPII)							56.34				0.0					0.0			0.0			14.08	0.1	14.08	0.1		
14	HARPACTICOIDA (LPII)							0.0				0.0					0.0			53.52			13.38	13.38	0.1	13.38	0.1	
0	DIPTERA HEMATOCERA (TOTAL)																											
0	CHIRONOMIDAE																											
2	CHIRONOMIDAE (LPII)																											
TOTAL								21070.39				16901.39					15774.63			13540.83			16821.81	1578.98	100.0	1578.98	100.0	
DIVERSITY (H PPIRE)								1.82				1.82					1.72			1.71			1.73	0.04	0.04	0.04	0.04	
DIVERSITY (J PPIRE)								0.57				0.49					0.54			0.54			0.54	0.02	0.02	0.02	0.02	
NUMBER OF TAXA								9				14					9			9			9	9	9	9	9	

REL	ABZ	S.E.	X	BT	TUBED	COND	DO	PH	SALIN P
28.17	0.2	28.17	0.2	0.0	0.0	0.0	0.0	8.1	0.0
425.48	20.2	425.48	20.2	0.0	0.0	0.0	0.0	8.1	0.0
406.00	19.8	406.00	19.8	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
8.80	0.1	8.80	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0.0	0.0	0.0	0.0	8.1	0.0
14.08	0.1	14.08	0.1	0.0	0.0	0.0	0.0	8.1	0.0
13.38	0.1	13.38	0.1	0.0	0.0	0.0	0.0	8.1	0.0
7.04	0.0	7.04	0.0	0					

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DE JITY

REPLICATE REPORT

PC TC GC LOC

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SID	DATE	TIME	D/N	DURATION		WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURB	COND	DO	PH	SALN	P					
				UNITS	C		SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP								DI	AIR	WAT		
31	6/11/80	1535	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.5	1	0	4	3	0	0.0	0	23.3	16.8	0	0.0	0	8.5	0.0	0.0	0
32	6/11/80	1535	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.5	1	0	4	3	0	0.0	0	23.3	16.8	0	0.0	0	8.5	0.0	0.0	0
33	6/11/80	1535	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.5	1	0	4	3	0	0.0	0	23.3	16.8	0	0.0	0	8.5	0.0	0.0	0
34	6/11/80	1535	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.5	1	0	4	3	0	0.0	0	23.3	16.8	0	0.0	0	8.5	0.0	0.0	0

LS	TAXA	1	2	3	4	X	S.E.	REL	ABZ
0	OLIGOCHAETA (TOTAL)	30.25	0.0	0.0	0.0	7.56	7.56	0.1	
1	OLIGOCHAETA (LPIL)	30.25	0.0	0.0	0.0	7.56	7.56	0.1	
0	CLADOCERA (TOTAL)	877.31	1527.73	2042.02	1966.39	1603.36	267.25	11.8	
0	BOSMINIDAE								
1	BOSMINA LONGIROSTRIS	0.0	0.0	37.82	0.0	9.45	9.45	0.1	
1	BOSMINIDAE (LPIL)	816.81	1482.35	2004.20	1928.57	1557.98	272.57	11.4	
0	CHYDORIDAE								
1	ALONA RECTANGULA	30.25	15.13	0.0	37.82	20.80	8.38	0.2	
1	CHYDORUS (LPIL)	0.0	15.13	0.0	0.0	3.78	3.78	0.0	
6	CHYDORIDAE (LPIL)	0.0	15.13	0.0	0.0	3.78	3.78	0.0	
0	DAPHNIDAE								
1	DAPHNIA RETROCURVA	30.25	0.0	0.0	0.0	7.56	7.56	0.1	
0	COPEPODA (TOTAL)	10346.21	10860.50	15617.64	11268.90	12023.31	1212.89	88.1	
0	CALANOIDA (TOTAL)								
1	DIAPYCNUS ASHLANDI	30.25	60.50	37.82	37.82	41.60	6.55	0.3	
1	DIAPYCNUS MINUTUS	0.0	0.0	37.82	0.0	9.45	9.45	0.1	
1	EURYTEMORA AFFINIS	0.0	30.25	37.82	0.0	17.02	9.95	0.1	
1	EPISCHURA LACUSTRIS	0.0	0.0	0.0	37.82	9.45	9.45	0.1	
14	CALANOIDA (LPIL)	2662.18	2843.70	4235.29	2949.58	3172.69	359.14	23.3	
0	CYCLOPOIDA (TOTAL)								
1	CYCLOPS BICUSPIDATUS THOMASI	363.02	257.14	226.89	226.89	268.49	32.31	2.0	
1	CYCLOPS VERNALIS	90.76	60.50	113.45	37.82	75.63	16.63	0.6	
14	CYCLOPOIDA (LPIL)	7169.74	7532.77	10090.75	7941.18	8303.61	850.44	61.5	
0	HARPACTICOIDA (TOTAL)								
14	MACROSETELLA GRACILIS	0.0	75.63	0.0	0	18.91	18.91	0.1	
1	HARPACTICOIDA (LPIL)	0.0	0.0	0.0	3	9.45	9.45	0.1	
14	HARPACTICOIDA (LPIL)	30.25	0.0	37.82	0.0	17.02	9.95	0.1	
0	DIPTERA NEMATOCERA (TOTAL)	0.0	30.25	0.0	0.0	7.56	7.56	0.1	
0	CHIRONOMIDAE								
2	CHIRONOMIDAE (LPIL)	0.0	30.25	0.0	0.0	7.56	7.56	0.1	
TOTAL		11253.77	12418.47	17659.64	13235.28	13641.79	1399.63	100.0	
DIVERSITY (H PRIME)		1.51	1.60	1.50	1.55	1.54	0.02		
DIVERSITY (J PRIME)		0.46	0.45	0.45	0.49	0.46	0.01		
NUMBER OF TAXA		10	12	10	9	18			

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

ABOVE COMPUTED USING SAMPLE IDS

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LG	TAXA	1	2	3	X	S.E.	REL AB%
0	NEMATODA (TOTAL)	92.59	28.17	0.0	40.25	27.40	0.3
1	NEMATODA (LPIL)	92.59	28.17	0.0	40.25	27.40	0.3
0	OLIGOCHAETA (TOTAL)	13.89	0.0	7.56	7.15	4.01	0.0
0	HAIDIDAE						
1	HAIDIDAE (LPIL)	13.89	0.0	0.0	4.63	4.63	0.0
1	OLIGOCHAETA (LPIL)	0.0	0.0	7.56	2.52	2.52	0.0
0	CLADOCERA (TOTAL)	5570.59	3398.94	1603.36	3524.30	1146.96	23.9
0	BOSMINIDAE						
1	BOSMINA LONGIROSTRIS	0.0	0.0	9.45	3.15	3.15	0.0
1	BOSMINIDAE (LPIL)	5398.14	3333.80	1557.98	3429.97	1109.60	23.2
0	CHYDROIDAE						
1	ALONA RECTANGULA	0.0	0.0	20.80	6.93	6.93	0.0
1	ALONA AFFINIS	0.0	7.04	0.0	2.35	2.35	0.0
1	ALONA (LPIL)	0.0	8.80	0.0	2.93	2.93	0.0
1	CHYDORUS (LPIL)	133.10	7.04	3.78	47.98	42.57	0.3
1	EURYCERCUS LAMELLATUS	25.46	0.0	0.0	8.49	8.49	0.1
0	CHYDROIDAE (LPIL)	0.0	0.0	3.78	1.26	1.26	0.0
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	0.0	7.04	0.0	2.35	2.35	0.0
1	DAPHNIA RETROCURVA	0.0	14.08	7.56	7.22	4.07	0.0
0	DAPHNIA (LPIL)	13.89	0.0	0.0	4.63	4.63	0.0
1	CERIODAPHNIA (LPIL)	0.0	14.08	0.0	4.69	4.69	0.0
0	POLYPHEMIDAE						
1	POLYPHEMUS PEDICULUS	0.0	7.04	0.0	2.35	2.35	0.0
0	COPEPODA (TOTAL)	8123.63	13387.66	12023.31	11178.27	1577.19	75.7
0	CALANOIDA (TOTAL)						
1	DIAPTOMUS ASHLANDI	63.66	74.30	41.60	59.85	9.63	0.4
1	DIAPTOMUS MINUTUS	35.88	210.56	9.45	85.30	63.10	0.6
1	EURYTEMORA AFFINIS	90.28	0.0	17.02	35.76	27.70	0.2
1	LEPTOCALANUS MACRURUS	13.89	0.0	0.0	4.63	4.63	0.0
1	EPISCHURA LACUSTRIS	0.0	8.80	9.45	6.09	3.05	0.0
14	CALANOIDA (LPIL)	2097.22	2976.76	3172.69	2748.89	330.71	18.6
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	76.39	650.70	268.49	331.80	168.79	2.2
1	CYCLOPS VERNALIS	145.83	125.70	75.63	115.72	20.87	0.8
1	CYCLOPS BICUSPIDATUS	0.0	13.38	0.0	4.46	4.46	0.0
14	CYCLOPOIDA (LPIL)	5600.69	9299.99	8383.61	7761.43	1112.29	52.6
0	HARPACTICOIDA (TOTAL)						
14	MACROSETELLA GP SCILIS	0.0	0.0	18.91	6.30	6.30	0.0
1	HARPACTICOIDA (LPIL)	0.0	14.08	9.45	7.85	4.14	0.1
14	HARPACTICOIDA (LPIL)	0.0	13.38	17.02	10.13	5.17	0.1
0	DIPTERA NEMATOCERA (TOTAL)	23.15	7.04	7.56	12.58	5.28	0.1
0	CHIRONOMIDAE						
2	CHIRONOMIDAE (LPIL)	23.15	7.04	7.56	12.58	5.28	0.1

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49726)

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ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	1	2	3	- X	S.E.	REL ABZ
TOTAL		13824.05	16821.31	13641.79	14762.55	1030.97	100.0
DIVERSITY (H PRIME)		1.73	1.78	1.54	1.69	0.07	
DIVERSITY (J PRIME)		0.53	0.54	0.46	0.51	0.02	
NUMBER OF TAXA		15	19	18	29		

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

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SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALIN	P
41	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1.0	4	3	0	0.0	0	25.6	17.8	0	0.0	0	8.4	0.0	0.0	0
42	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1.0	4	3	0	0.0	0	25.6	17.8	0	0.0	0	8.4	0.0	0.0	0
43	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1.0	4	3	0	0.0	0	25.6	17.8	0	0.0	0	8.4	0.0	0.0	0
44	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	3.6	3	1.0	1.0	4	3	0	0.0	0	25.6	17.8	0	0.0	0	8.4	0.0	0.0	0

15	TAXA	1	2	3	4	X	S.E.	REL	ABZ
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0	CLADOCERA (TOTAL)	1375.00	1600.00	1178.57	1675.00	1557.14	167.46	13.1	
0	BOSMINIDAE								
1	BOSMINIDAE (LPIL)	1333.33	1700.00	1107.14	1666.67	1451.79	141.60	12.2	
0	CHYDORIDAE								
1	CHYDORUS (LPIL)	0.0	100.00	71.43	166.67	84.52	34.52	0.7	
0	DAPHNIDAE								
6	DAPHNIA (LPIL)	0.0	0.0	0.0	41.57	10.42	10.42	0.1	
0	POLYPHERIDAE								
1	POLYPHERUS PEDICULUS	41.67	0.0	0.0	0.0	10.42	10.42	0.1	
0	COPEPODA (TOTAL)	9625.00	11599.99	7535.71	12416.66	10294.34	1090.38	86.9	
0	CALANOIDA (TOTAL)								
1	DIAPTOMUS ASHLANDI	41.67	0.0	0.0	0.0	10.42	10.42	0.1	
1	DIAPTOMUS CLAVIPES	0.0	50.00	0.0	0.0	12.50	12.50	0.1	
1	EURYTEMORA AFFINIS	83.33	50.00	0.0	0.0	33.33	20.41	0.3	
14	CALANOIDA (LPIL)	2333.33	3300.00	1571.43	2916.67	2530.36	376.38	21.4	
0	CYCLOPOIDA (TOTAL)								
1	CYCLOPS BICUSPIDATUS THOMASI	166.67	50.00	35.71	41.67	73.51	31.19	0.6	
1	CYCLOPS VERNALIS	83.33	0.0	35.71	41.67	40.18	17.06	0.3	
14	CYCLOPOIDA (LPIL)	6916.66	8150.00	5892.86	9416.66	7594.04	762.88	64.1	
	TOTAL	10999.99	13399.97	8714.27	14291.65	11851.47	1255.63	100.0	
	DIVERSITY (H PRIME)	1.52	1.46	1.33	1.37	1.42	0.04		
	DIVERSITY (J PRIME)	0.51	0.52	0.51	0.49	0.51	0.01		
	NUMBER OF TAXA	8	7	6	5	11			

ABOVE COMPUTED USING SAMPLE IDS

41 42 43 44

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC CC LOC
5 51 51 0 0 10

SID	DATE	TIME	D/H	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALN	P																										
				UNITS	C			SP	D	UNITS	C	SC	DI	CL	SP	DI	AIR								WAT																									
51	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.3	1	0	4	3	0	0.0	0	23.3	16.0	0	0.0	0	0.0																									
52	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.3	1	0	4	3	0	0.0	0	23.3	16.0	0	0.0	0	0.0																									
53	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.3	1	0	4	3	0	0.0	0	23.3	16.0	0	0.0	0	0.0																									
54	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.3	1	0	4	3	0	0.0	0	23.3	16.0	0	0.0	0	0.0																									
LS	TAXA																			X	S.E.		REL																											
								1								2								3								4																		
0	CLADOCERA (TOTAL)							1952.11							3327.46							2040.49							1457.75							2194.45							398.84							13.0
0	BOSMINIDAE																																																	
1	BOSMINIDAE (LPIL)							1876.05							3264.08							2007.04							1362.68							2127.46							403.58							12.6
0	CHYDORIDAE																																																	
1	ALONA RECTANGULA							0.0							31.69							0.0							31.69							15.85							9.15							0.1
1	CHYDORUS (LPIL)							25.35							0.0							0.0							31.69							14.26							8.33							0.1
1	EURYCERCUS LAMELIATUS							25.35							0.0							0.0							0.0							6.34							6.34							0.0
0	DAPHNIDAE																																																	
6	DAPHNIA RETICULATA							25.35							31.69							0.0							0.0							14.26							8.33							0.1
1	CEPHODAPHNIA (LPIL)							0.0							0.0							33.45							0.0							8.36							8.36							0.0
6	CLADOCERA (LPIL)							0.0							0.0							0.0							31.69							7.92							7.92							0.0
0	COPEPODA (TOTAL)							12802.80							20154.91							13514.08							12485.91							14739.42							1617.92							87.0
0	CALANOIDA (TOTAL)																																																	
1	DIAPYCNUS ASHMEADI							50.70							63.38							0.0							31.69							36.44							13.78							0.2
1	DIAPYCNUS MONOPUS							0.0							0.0							33.45							0.0							8.36							8.36							0.0
1	EURYTENORA AFFINIS							0.0							0.0							33.45							63.38							24.21							15.25							0.1
14	CALANOIDA (LPIL)							2078.87							4088.03							3646.13							2757.04							3142.52							449.77							18.6
0	CYCLOPOIDA (TOTAL)																																																	
1	CYCLOPS BICUSPIDATUS THOMASI							181.41							570.42							234.15							95.07							250.26							111.43							1.5
1	CYCLOPS VERNALIS							25.35							31.69							0.0							95.07							38.03							20.21							0.2
14	CYCLOPOIDA (LPIL)							10546.47							15401.40							9566.90							9443.66							11239.61							1409.03							66.4
TOTAL								14754.91							23482.37							15554.56							13943.64							16933.87							2207.46							100.0
DIVERSITY (H PRIME)								1.26							1.43							1.45							1.38							1.38							0.04							
DIVERSITY (J PRIME)								6.40							0.48							0.52							0.42							0.45							0.03							
NUMBER OF TAXA								9							8							7							10							14														

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL ABZ
0	CLADOCERA (TOTAL)	1557.14	2194.45	1566.70	1772.77	210.06	11.6
0	POSHINIDAE						
1	BOSMINIDAE (LPIL)	1451.79	2127.46	1566.70	1715.32	208.73	11.2
0	CHYDORIDAE						
1	ALONA RECTANGULA	0.0	15.85	0.0	5.28	5.28	0.0
1	CHYDORUS (LPIL)	64.52	14.26	0.0	32.93	26.12	0.2
1	EURYCERCUS LAMELLATUS	0.0	6.34	0.0	2.11	2.11	0.0
0	DAPHNIDAE						
6	DAPHNIA RETROCURVA	0.0	14.26	0.0	4.75	4.75	0.0
6	DAPHNIA (LPIL)	10.42	0.0	0.0	3.47	3.47	0.0
1	CERIODAPHNIA (LPIL)	0.0	8.36	0.0	2.79	2.79	0.0
0	POLYPHERIDAE						
1	POLYPHERUS PEDICULUS	10.42	0.0	0.0	3.47	3.47	0.0
6	CLADOCERA (LPIL)	0.0	7.92	0.0	2.64	2.64	0.0
0	OSTRACODA (TOTAL)	0.0	0.0	4.73	1.58	1.58	0.0
1	OSTRACODA (LPIL)	0.0	0.0	4.73	1.58	1.58	0.0
0	COPEPODA (TOTAL)	10294.34	14739.42	15585.07	13539.61	1640.90	88.4
0	CALANOIDA (TOTAL)						
1	DIAPYCNUS ASHLANDI	10.42	36.44	9.98	18.95	8.75	0.1
1	DIAPYCNUS CLAVIPES	12.50	0.0	0.0	4.17	4.17	0.0
1	DIAPYCNUS MINUTUS	0.0	6.36	56.72	21.70	17.68	0.1
1	EURYTEMORA AFFINIS	33.33	24.21	0.0	19.18	9.95	0.1
14	CALANOIDA (LPIL)	2530.36	3142.52	5089.81	3587.56	771.63	23.4
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	73.51	250.26	369.75	231.17	86.05	1.5
1	CYCLOPS VERHALIS	40.18	38.03	47.27	41.83	2.79	0.3
14	CYCLOPOIDA (LPIL)	7594.04	11239.61	10011.55	9615.07	1070.89	62.8
	TOTAL	11851.47	16933.87	17156.50	15313.95	1732.43	100.0
	DIVERSITY (H PRIME)	1.42	1.38	1.46	1.42	0.02	
	DIVERSITY (J PRIME)	0.51	0.45	0.58	0.51	0.04	
	NUMBER OF TAXA	11	14	8	18		

ABOVE COMPUTED USING SAMPLE IDS

41	42	43	44
51	52	53	54
61	62	63	64

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA		X	S.E.	REL AB%
		10			
0	CLADOCERA (TOTAL)	5418.81	5418.81	-1.00	30.9
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	5223.34	5223.34	-1.00	29.8
0	CHYDORIDAE				
1	ALONA RECTANGULA	18.75	18.75	-1.00	0.1
1	CHYDORUS (LPIL)	135.82	135.82	-1.00	0.8
0	DAPHNIDAE				
1	DAPHNIA RETROCURVA	20.45	20.45	-1.00	0.1
6	DAPHNIA (LPIL)	20.45	20.45	-1.00	0.1
0	COPEPODA (TOTAL)	12100.70	12100.70	-1.00	69.1
0	CALANOIDA (TOTAL)				
1	DIAPYCNUS ASHLANDI	77.66	77.66	-1.00	0.4
1	EURYTEMORA AFFINIS	74.45	74.45	-1.00	0.4
14	CALANOIDA (LPIL)	2765.93	2765.93	-1.00	15.8
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS BICUSPIDATUS THOMAS	600.48	600.48	-1.00	3.4
1	CYCLOPS VERNALIS	285.27	285.27	-1.00	1.6
14	CYCLOPOIDA (LPIL)	8276.45	8276.45	-1.00	47.2
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	20.45	20.45	-1.00	0.1
	TOTAL	17519.51	17519.51	-1.00	100.0
	DIVERSITY (H PRIME)	1.85	1.85	-1.00	
	DIVERSITY (J PRIME)	0.63	0.63	-1.00	
	NUMBER OF TAXA	12	12		

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BAILEY GENERATING PLANT

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LS	TAXA	5	6	10	X	S.E.	REL AB%
0	NEMATODA (TOTAL)	40.25	0.0	0.0	13.42	13.42	0.1
1	NEMATODA (LPIL)	40.25	0.0	0.0	13.42	13.42	0.1
0	OLIGOCHAETA (TOTAL)	7.15	0.0	0.0	2.38	2.38	0.0
0	NAIDIDAE						
1	NAIDIDAE (LPIL)	4.63	0.0	0.0	1.54	1.54	0.0
1	OLIGOCHAETA (LPIL)	2.52	0.0	0.0	0.84	0.84	0.0
0	CLADOCERA (TOTAL)	3524.30	1772.77	5418.81	3571.96	1052.79	22.5
0	BOSMINIDAE						
1	BOSMINA LONGIROSTRIS	3.15	0.0	0.0	1.05	1.05	0.0
1	BOSMINIDAE (LPIL)	3429.97	1715.32	5223.34	3456.21	1012.76	21.8
0	CHYDORIDAE						
1	ALONA RECTANGULA	6.93	5.28	18.75	10.32	4.24	0.1
1	ALONA AFFINIS	2.35	0.0	0.0	0.78	0.78	0.0
1	ALONA (LPIL)	2.93	0.0	0.0	0.98	0.98	0.0
1	CHYDORUS (LPIL)	47.98	32.93	135.82	72.24	32.08	0.5
1	EURYCERCUS LAMELLATUS	8.49	2.11	0.0	3.53	2.55	0.0
6	CHYDORIDAE (LPIL)	1.26	0.0	0.0	0.42	0.42	0.0
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	2.35	0.0	0.0	0.78	0.78	0.0
1	DAPHNIA RETROCURVA	7.22	0.0	20.45	9.22	5.99	0.1
6	DAPHNIA RETROCURVA	0.0	4.75	0.0	1.58	1.58	0.0
6	DAPHNIA (LPIL)	4.63	3.47	20.45	9.52	5.48	0.1
1	CERIODAPHNIA (LPIL)	4.69	2.79	0.0	2.49	1.36	0.0
0	POLYPHEMIDAE						
1	POLYPHEMUS PEDICULUS	2.35	3.47	0.0	1.94	1.02	0.0
6	CLADOCERA (LPIL)	0.0	2.64	0.0	0.88	0.88	0.0
0	OSTRACODA (TOTAL)	0.0	1.58	0.0	0.53	0.53	0.0
1	OSTRACODA (LPIL)	0.0	1.58	0.0	0.53	0.53	0.0
0	COPEPODA (TOTAL)	11178.27	13539.61	12100.70	12272.86	687.07	77.4
0	CALANOIDA (TOTAL)						
1	DIAPYCNUS ASHLANDI	59.85	18.95	77.66	52.15	17.38	0.3
1	DIAPYCNUS CLAVIPES	0.0	4.17	0.0	1.39	1.39	0.0
1	DIAPYCNUS MINUTUS	85.30	21.70	0.0	35.66	25.60	0.2
1	EURYTEMORA AFFINIS	35.76	19.18	74.45	43.13	16.38	0.3
1	LIHNOCALANUS MACRURUS	4.63	0.0	0.0	1.54	1.54	0.0
1	EPISCHURA LACUSTRIS	6.09	0.0	0.0	2.03	2.03	0.0
14	CALANOIDA (LPIL)	2748.89	3587.56	2765.93	3034.13	276.76	19.1
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	331.86	231.17	600.48	387.64	110.22	2.4
1	CYCLOPS VERNALIS	115.72	41.83	285.27	147.61	72.06	0.9
1	CYCLOPS BICUSPIDATUS	4.46	0.0	0.0	1.49	1.49	0.0
14	CYCLOPOIDA (LPIL)	7761.43	9615.07	8276.45	8550.98	552.42	53.9
0	HARPACTICOIDA (TOTAL)						
14	MACROSETELLA GRACILIS	6.30	0.0	0.0	2.10	2.10	0.0

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	3	6	10	- X	S.E.	REL AB%
1	HARPACTICOIDA (LPIL)	7.85	0.0	20.45	9.43	5.96	0.1
14	HARPACTICOIDA (LPIL)	10.13	0.0	0.0	3.38	3.38	0.0
0	DIPTERA NEMATOCERA (TOTAL)	12.58	0.0	0.0	4.19	4.19	0.0
0	CHIRONOMIDAE						
2	CHIRONOMIDAE (LPIL)	12.58	0.0	0.0	4.19	4.19	0.0
TOTAL		14762.55	15313.95	17519.51	15865.33	842.27	100.0
DIVERSITY (H PRIME)		1.69	1.42	1.85	1.65	0.13	
DIVERSITY (J PRIME)		0.51	0.51	0.63	0.55	0.04	
NUMBER OF TAXA		29	18	12	32		

ABOVE COMPUTED USING SAMPLE IDS

11	12	13	14
21	22	23	24
31	32	33	34
41	42	43	44
51	52	53	54
61	62	63	64
101	102	103	104

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PC	TC	GC	LOC
5	51	11	0 1 00

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TOM	SHIP	VOL	HIND			CURRENT			TEMP	BT	TURNED	COND	DO	PH	SALIN	REL	
													SC	DI	Y	CL	SP	DI									ALP
71	6/11/80	1155	0	0.0	0	4.6	4.6	0.0	0.0	3.6	3	1.5	0.0	1	7	0	0.0	0	23.3	15.0	0	0.0	0	9.6	0.0	0.0	0
72	6/11/80	1155	0	0.0	0	4.6	4.6	0.0	0.0	3.6	3	1.5	0.0	1	7	0	0.0	0	23.3	15.0	0	0.0	0	9.6	0.0	0.0	0
73	6/11/80	1155	0	0.0	0	4.6	4.6	0.0	0.0	3.6	3	1.5	0.0	1	7	0	0.0	0	23.3	15.0	0	0.0	0	9.6	0.0	0.0	0
74	6/11/80	1155	0	0.0	0	4.6	4.6	0.0	0.0	3.6	3	1.5	0.0	1	7	0	0.0	0	23.3	15.0	0	0.0	0	9.6	0.0	0.0	0
15	TAXA							1		2			3		4									S.E.	ABX		
0	CLADOCEPA (TOTAL)							2876.39		4075.00			4274.99		166.67		2848.26					945.70	44.0				
0	EUSMINIDAE																										
1	EUSMINIDAE (LPIL)							2823.61		4050.00			4200.00		0.0		2768.40					972.93	42.8				
0	CHYGORIDAE																										
1	ALONA PECTANGULA							0.0		0.0			0.0				6.94					6.94	0.1				
1	CHYGORUS (LPIL)							52.78		0.0			50.00				46.53					17.25	0.7				
0	DAPHNIDAE																										
6	DAPHNIA (LPIL)							0.0		25.00			25.00				26.39					11.37	0.4				
0	COPEPODA (TOTAL)							2533.33		2750.00			2750.00				3619.44					943.05	56.0				
0	CALANOIDA (TOTAL)																										
1	DIAPYCNUS ASHLANDI							0.0		0.0			25.00				13.19					7.64	0.2				
1	EURYTEMORA AFFINIS							52.78		150.00			0.0				50.69					35.36	0.8				
14	CALANOIDA (LPIL)							765.28		775.00			900.00				755.90					65.19	11.7				
1	CALANOIDA (LPIL)							0.0		0.0			0.0				1090.28					1040.28	16.9				
0	CYCLOPOIDA (TOTAL)																										
1	CYCLOPS BICUSPIDATUS THOMASI							0.0		25.00			0.0				6.25					6.25	0.1				
1	CYCLOPS VERNALIS							0.0		25.00			50.00				32.64					12.75	0.5				
14	CYCLOPOIDA (LPIL)							1688.69		1775.00			1775.00				1663.69					84.87	25.7				
0	HARPACTICOIDA (TOTAL)																										
1	HARPACTICOIDA (LPIL)							26.39		0.0			0.0				6.60					6.60	0.1				
TOTAL								5409.71		6824.98			7024.98		6611.10		6467.69					362.64	100.0				
DIVERSITY (H PRIME)								1.58		1.52			1.43		1.05		1.41					0.12					
DIVERSITY (J PRIME)								5.61		0.54			0.53		0.37		0.51					0.05					
NUMBER OF TAXA								6		7			7		7		7					11					

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC

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		DURATION				TOW				SAMP VOL				WIND				CURRENT				TEMP																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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ABOVE COMPUTED USING SAMPLE IDS

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PAGE NO 17

T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BATT - GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

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		DURATION				TOW		SAMP VOL				WIND		CURRENT		TEMP												
SID	DATE	TIME	D/N	UNITS	C	SG	WD	SP	D	UNITS	C	SECH	N	T	SC	DI	CL	CP	DI	AIR	WAT	BT	TURBO	COND	DO	PH	SALN	P
91	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	1	7	0	0.0	0	21.1	14.9	0	0.0	0	10.7	0.0	0.0	0
92	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	1	7	0	0.0	0	21.1	14.9	0	0.0	0	10.7	0.0	0.0	0
93	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	1	7	0	0.0	0	21.1	14.9	0	0.0	0	10.7	0.0	0.0	0
94	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	1	7	0	0.0	0	21.1	14.9	0	0.0	0	10.7	0.0	0.0	0
																								-			REL	
																								X			S.E.	ABX
LS TAXA								1		2		3		4														
0	OLIGOCHAETA (TOTAL)							0.0		0.0		37.82		0.0				9.45				9.45		0.1				
1	OLIGOCHAETA (LPIL)							0.0		0.0		37.82		0.0				9.45				9.45		0.1				
0	CLADOCERA (TOTAL)							1512.60		222.97		1701.68		2042.02				1369.82				397.66		10.7				
0	ECHINIDAE																											
1	BOSMINIDAE (LPIL)							1474.79		218.99		1701.68		1966.39				1340.46				387.08		10.4				
0	CHYDORIDAE																											
1	ALONA RECTANGULA							37.82		0.0		0.0		0.0				9.45				9.45		0.1				
0	DAPHNIDAE																											
6	DAPHNIA (LPIL)							0.0		3.98		0.0		37.82				10.45				9.17		0.1				
6	CLADOCERA (LPIL)							0.0		0.0		0.0		37.82				9.45				9.45		0.1				
0	COPEPODA (TOTAL)							15655.46		1568.73		14823.52		13878.14				11481.46				3324.13		89.3				
0	CALANOIDA (TOTAL)																											
1	DIAPYCNUS ASHLANDI							113.45		3.98		75.63		75.63				67.17				22.87		0.5				
14	CALANOIDA (LPIL)							5142.86		501.68		4348.74		5294.12				3821.85				1125.97		29.7				
0	CYCLOPOIDA (TOTAL)																											
1	CYCLOPS BICUSPIDATUS THOMASI							151.26		39.82		226.89		0.0				104.49				51.86		0.8				
1	CYCLOPS VERNALIS							113.45		3.98		37.82		37.82				48.26				23.14		0.4				
14	CYCLOPOIDA (LPIL)							10134.45		1015.30		9983.19		8470.59				7400.88				2161.42		57.5				
0	HARPACTICOIDA (TOTAL)																											
1	HARPACTICOIDA (LPIL)							0.0		0.0		151.26		0.0				37.82				37.82		0.3				
14	HARPACTICOIDA (LPIL)							0.0		3.98		0.0		0.0				1.00				1.00		0.0				
TOTAL								17168.06		1791.70		16563.01		15920.15				12860.73				3698.46		100.0				
DIVERSITY (H PRIME)								1.45		1.55		1.51		1.48				1.50				0.02						
DIVERSITY (J PRIME)								0.52		0.52		0.50		0.53				0.52				0.01						
NUMBER OF TAXA								7		8		8		7				11										

ABOVE COMPUTED USING SAMPLE IDS
91 92 93 94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AD%
0	OLIGOCHAETA (TOTAL)	0.0	0.0	9.45	3.15	3.15	0.0
0	OLIGOCHAETA (LPIL)	0.0	0.0	9.45	3.15	3.15	0.0
0	CLADOCERA (TOTAL)	2848.26	5120.15	1369.82	3112.74	1090.67	27.1
0	BOSMINIDAE						
1	BOSMINIDAE (LPIL)	2768.40	5056.33	1340.46	3055.06	1082.21	26.6
0	CHYDORIDAE						
1	ALONA RECTANGULA	6.94	15.85	9.45	10.75	2.65	0.1
1	CHYDORUS (LPIL)	46.53	24.21	0.0	23.58	13.44	0.2
1	EURYCERCUS LAMELLATUS	0.0	7.92	0.0	2.64	2.64	0.0
0	DAPHNIDAE						
6	DAPHNIA (LPIL)	26.39	7.92	10.45	14.92	5.78	0.1
6	CLADOCERA (LPIL)	0.0	7.92	9.45	5.79	2.93	0.1
0	COPEPODA (TOTAL)	3619.44	9951.13	11481.46	8350.68	2406.51	72.8
0	CALANOIDA (TOTAL)						
1	DIAPTOMUS ASHLANDI	13.19	135.56	67.17	71.98	35.41	0.6
1	EURYTEMORA AFFINIS	50.69	7.92	0.0	19.54	15.74	0.2
14	CALANOIDA (LPIL)	755.90	2332.75	3821.85	2303.50	685.18	20.1
1	CALANOIDA (LPIL)	1090.28	0.0	0.0	363.43	363.43	3.2
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	6.25	506.16	104.49	205.63	152.92	1.8
1	CYCLOPS VERNALIS	32.64	40.05	48.26	40.32	4.51	0.4
14	CYCLOPOIDA (LPIL)	1663.89	6912.85	7400.88	5325.87	1836.40	46.4
0	HARPACTICOIDA (TOTAL)						
1	HARPACTICOIDA (LPIL)	6.60	7.92	37.82	17.44	10.19	0.2
14	HARPACTICOIDA (LPIL)	0.0	7.92	1.00	2.97	2.49	0.0
TOTAL		6467.69	15071.28	12860.73	11466.57	2579.61	100.0
DIVERSITY (H PRIME)		1.41	1.75	1.50	1.55	0.10	
DIVERSITY (J PRIME)		0.51	0.57	0.52	0.53	0.02	
NUMBER OF TAXA		11	13	11	14		

ABOVE COMPUTED USING SAMPLE IDS

71	72	73	74
81	82	83	84
91	92	93	94

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

15	TAXA	9	X	S.E.	REL AB%
0	OLIGOCHAETA (TOTAL)	3.15		-1.00	0.0
1	OLIGOCHAETA (LPIL)	3.15		-1.00	0.0
0	CLADOCERA (TOTAL)	3112.74		-1.00	27.1
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	3055.06		-1.00	26.6
0	CHYDORIDAE				
1	ALGUA RECTANGULA	10.75		-1.00	0.1
1	CHYDORUS (LPIL)	23.58		-1.00	0.2
1	EUTYCERUS LABELLATUS	2.64		-1.00	0.0
0	DAPHNIDAE				
6	DAPHNIA (LPIL)	14.92		-1.00	0.1
6	CLADOCERA (LPIL)	5.79		-1.00	0.1
0	COPEPODA (TOTAL)	8350.68		-1.00	72.8
0	CALANOIDA (TOTAL)				
1	DIAPYCNUS ASHLANDI	71.98		-1.00	0.6
1	EURYTEMORA AFFINIS	19.54		-1.00	0.2
14	CALANOIDA (LPIL)	2303.50		-1.00	20.1
1	CALANOIDA (LPIL)	363.43		-1.00	3.2
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS BICUSPIDATUS THOMASI	205.63		-1.00	1.8
1	CYCLOPS VERNALIS	40.32		-1.00	0.4
14	CYCLOPOIDA (LPIL)	5325.87		-1.00	46.4
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	17.44		-1.00	0.2
14	HARPACTICOIDA (LPIL)	2.97		-1.00	0.0
	TOTAL	11466.57		-1.00	100.0
	DIVERSITY (H PRIME)	1.55		-1.00	
	DIVERSITY (J PRIME)	0.53		-1.00	
	NUMBER OF TAXA	14			

ABOVE COMPUTED USING SAMPLE IDS

71	72	73	74
81	82	83	84
91	92	93	94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

LS	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	- X	S.E.	REL ABZ
0	NEMATODA (TOTAL)	0	0			
1	NEMATODA (LPIL)	13.42	0.0	6.71	6.71	0.0
0	OLIGOCHAETA (TOTAL)	13.42	0.0	6.71	6.71	0.0
0	HAIDIDAE	2.38	3.15	2.77	0.38	0.0
1	HAIDIDAE (LPIL)	1.54	0.0	0.77	0.77	0.0
1	OLIGOCHAETA (LPIL)	0.04	3.15	2.00	1.16	0.0
0	CLADOCERA (TOTAL)	3571.96	3112.74	3342.35	229.61	24.5
0	BOSMINIDAE					
1	BOSMINA LONGIROSTRIS	1.05	0.0	0.53	0.53	0.0
1	BOSMINIDAE (LPIL)	3456.21	3055.06	3255.64	200.57	23.8
0	CHYDORIDAE					
1	ALONA RECTANGULA	10.32	10.75	10.53	0.21	0.1
1	ALONA AFFINIS	0.78	0.0	0.39	0.39	0.0
1	ALONA (LPIL)	0.98	0.0	0.49	0.49	0.0
1	CHYDORUS (LPIL)	72.24	23.58	47.91	24.33	0.4
1	EMBYCERCUS LAMELLATUS	3.53	2.64	3.09	0.45	0.0
6	CHYDORIDAE (LPIL)	0.42	0.0	0.21	0.21	0.0
0	DAPHNIDAE					
1	DAPHNIA GALEATA MENDOTAE	0.78	0.0	0.39	0.39	0.0
1	DAPHNIA RETROCURVA	9.22	0.0	4.61	4.61	0.0
6	DAPHNIA RETROCURVA	1.58	0.0	0.79	0.79	0.0
6	DAPHNIA (LPIL)	9.52	14.92	12.22	2.70	0.1
1	CERIODAPHNIA (LPIL)	2.49	0.0	1.25	1.25	0.0
0	POLYPHERIDAE					
1	POLYPHERUS PEDICULUS	1.94	0.0	0.97	0.97	0.0
6	CLADOCERA (LPIL)	0.88	5.79	3.34	2.46	0.0
0	OSTRACODA (TOTAL)	0.53	0.0	0.26	0.26	0.0
1	OSTRACODA (LPIL)	0.53	0.0	0.26	0.26	0.0
0	COPEPODA (TOTAL)	12272.86	8350.68	10311.77	1961.09	75.5
0	CALANOIDA (TOTAL)					
1	DIAPYCNUS ASHLANDI	52.15	71.98	62.06	9.91	0.5
1	DIAPYCNUS CLAVIPES	1.39	0.0	0.69	0.69	0.0
1	DIAPYCNUS HIRUTUS	35.66	0.0	17.83	17.83	0.1
1	EURYTEMORA AFFINIS	43.13	19.54	31.34	11.80	0.2
1	LIMNOCALANUS MACRURUS	1.54	0.0	0.77	0.77	0.0
1	EPISCHURA LACUSTRIS	2.03	0.0	1.01	1.01	0.0
14	CALANOIDA (LPIL)	3034.13	2303.50	2668.81	365.31	19.5
1	CALANOIDA (LPIL)	0.0	363.43	181.71	181.71	1.3
0	CYCLOPOIDA (TOTAL)					
1	CYCLOPS BICUSPIDATUS THOMASI	387.84	205.63	296.74	91.10	2.2
1	CYCLOPS VERNALIS	147.61	40.32	93.96	53.64	0.7
1	CYCLOPS BICUSPIDATUS	1.49	0.0	0.74	0.74	0.0
14	CYCLOPOIDA (LPIL)	8550.98	5325.87	6933.43	1612.55	50.8
0	HARPACTICOIDA (TOTAL)					

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

LS	TAXA	Nearfield	Farfield	-	S.E.	REL
		(1-6, 10)	(7-9)	X		ABZ
		0	0			
14	MACROSETELLA GRACILIS	2.10	0.0	1.05	1.05	0.0
1	HARPACTICOIDA (LPIL)	9.43	17.44	13.44	4.01	0.1
14	HARPACTICOIDA (LPIL)	3.38	2.97	3.18	0.20	0.0
0	DIPTERA NEMATOCERA (TOTAL)	4.19	0.0	2.10	2.10	0.0
0	CHIRONOMIDAE					
2	CHIRONOMIDAE (LPIL)	4.19	0.0	2.10	2.10	0.0
TOTAL		15865.33	11466.57	13665.95	2199.38	100.0
DIVERSITY (H PRIME)		1.65	1.55	1.60	0.05	
DIVERSITY (J PRIME)		0.55	0.53	0.54	0.01	
NUMBER OF TAXA		32	14	32		

ABOVE COMPUTED USING SAMPLE IDS

11	12	13	14
21	22	23	24
31	32	33	34
41	42	43	44
51	52	53	54
61	62	63	64
101	102	103	104
71	72	73	74
81	82	83	84
91	92	93	94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	- X	S.E.	REL AB%
1	LONGIPEDIA HELGOLANDICA	0.0	0.0	4.53	0.0	1.13	1.13	0.1
14	HARPACTICOIDA (LPIL)	2.17	0.0	4.53	0.0	1.68	1.08	0.2
0	EPHEMEROPTERA (TOTAL)	2.17	0.0	0.0	17.39	4.89	4.20	0.5
13	EPHEMEROPTERA (LPIL)	2.17	0.0	0.0	17.39	4.89	4.20	0.5
0	DIPTERA NEMATOCERA (TOTAL)	32.61	47.55	208.33	260.87	137.34	57.25	14.0
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	32.61	47.55	208.33	260.87	137.34	57.25	14.0
TOTAL		560.87	1718.75	708.78	947.62	984.06	257.54	100.0
DIVERSITY (H PRIME)		2.71	2.30	2.93	3.01	2.73	0.16	
DIVERSITY (J PRIME)		0.64	0.54	0.66	0.74	0.64	0.04	
NUMBER OF TAXA		19	19	22	17	30		

ABOVE COMPUTED USING SAMPLE IDS

171 172 173 174

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	- X	S.E.	REL ABZ
1	DIAPYCNUS OREGONENSIS	0.0	0.0	1.55	0.07	0.61	0.39	0.2
1	DIAPYCNUS FALLIDUS	0.0	0.0	1.55	2.61	1.04	0.64	0.3
14	CALANOIDA (LPIL)	12.35	1.55	7.76	3.48	6.29	2.40	1.9
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS VERNALIS	7.41	0.0	0.0	0.0	1.85	1.85	0.6
1	EUCYCLOPS AGILIS	2.47	3.11	3.11	0.87	2.39	0.53	0.7
1	RESOCYCLOPS EDAX	2.47	0.0	0.0	0.0	0.62	0.62	0.2
14	CYCLOPOIDA (LPIL)	29.64	6.21	6.21	6.96	12.26	5.80	3.7
0	HARPACTICOIDA (TOTAL)							
14	HARPACTICOIDA (LPIL)	12.35	3.11	7.76	0.0	5.81	2.70	1.7
0	AMPHIPODA (TOTAL)	0.0	0.0	1.55	0.0	0.39	0.39	0.1
6	AMPHIPODA (LPIL)	0.0	0.0	1.55	0.0	0.39	0.39	0.1
0	ETHEROPTERA (TOTAL)	4.94	6.21	1.55	0.87	3.39	1.29	1.0
0	CAERIDAE							
13	CAERIDAE (LPIL)	0.0	0.0	1.55	0.0	0.39	0.39	0.1
13	ETHEROPTERA (LPIL)	4.94	6.21	0.0	0.87	3.01	1.52	0.9
0	TRICHOPTERA (TOTAL)	0.0	1.55	0.0	0.0	0.39	0.39	0.1
2	TRICHOPTERA (LPIL)	0.0	1.55	0.0	0.0	0.39	0.39	0.1
0	DIPTERA HEMITOCERA (TOTAL)	74.11	52.79	59.01	31.30	54.30	8.88	16.3
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	74.11	52.79	59.01	31.30	54.30	8.88	16.3
TOTAL		538.53	316.77	291.93	182.61	332.46	74.62	100.0
DIVERSITY (H PRIME)		3.57	3.39	3.48	3.46	3.47	0.04	
DIVERSITY (J PRIME)		0.81	0.77	0.78	0.78	0.79	0.01	
NUMBER OF TAXA		21	21	22	22	33		

ABOVE COMPUTED USING SAMPLE IDS

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	17	18	X	S.E.	REL ABZ
0	CNIDARIA (TOTAL)	0.0	2.01	1.01	1.01	0.2
0	HYDROZOA					
19	HYDRA (LPIL)	0.0	2.01	1.01	1.01	0.2
0	NEMATODA (TOTAL)	0.0	1.61	0.81	0.81	0.1
1	NEMATODA (LPIL)	0.0	1.61	0.81	0.81	0.1
0	OLIGOCHAETA (TOTAL)	0.0	8.30	4.15	4.15	0.6
1	OLIGOCHAETA (LPIL)	0.0	8.30	4.15	4.15	0.6
0	ARACHNIDA (TOTAL)	0.0	0.78	0.39	0.39	0.1
0	PROSTIGMATA					
19	HYDRACARINA (LPIL)	0.0	0.78	0.39	0.39	0.1
0	CLADOCERA (TOTAL)	746.60	228.84	487.72	258.88	74.1
0	BOSMINIDAE					
1	BOSMINIDAE (LPIL)	325.50	13.97	169.73	155.77	25.8
13	BOSMINIDAE (LPIL)	0.0	1.16	0.58	0.58	0.1
0	CHYDORIDAE					
1	ALONA RECTANGULA	21.51	42.20	31.86	10.35	4.8
1	ALONA AFFINIS	27.38	51.17	39.27	11.90	6.0
1	ALONA GUTTATA	4.53	1.44	2.98	1.54	0.5
1	ALONA (LPIL)	0.0	1.16	0.58	0.58	0.1
6	ALONA (LPIL)	0.0	1.30	0.65	0.65	0.1
1	CAMPTOCERCUS RECTIROSTRIS	6.11	0.0	3.06	3.06	0.5
1	CHYDORUS (LPIL)	43.27	36.96	40.12	3.16	6.1
1	ALONELLA (LPIL)	2.72	0.78	1.75	0.97	0.3
1	GRAPTOLEBERIS TESTUDINARIA	1.13	1.01	1.07	0.06	0.2
1	LEYDIGIA QUADRANGULARIS	1.09	0.99	1.04	0.05	0.2
1	PLEUROXUS DENTICULATUS	13.54	28.94	21.24	7.70	3.2
1	PLEUROXUS PROCURVUS	0.54	0.0	0.27	0.27	0.0
1	CHYDORIDAE (LPIL)	4.51	2.47	3.49	1.02	0.5
0	DAPHNIDAE					
1	DAPHNIA AMBIGUA	3.94	0.22	2.08	1.86	0.3
6	DAPHNIA (LPIL)	5.10	0.0	2.55	2.55	0.4
1	DAPHNIA (LPIL)	0.57	0.0	0.28	0.28	0.0
1	SINOCEPHALUS (LPIL)	1.07	0.22	0.65	0.43	0.1
1	CERIODAPHNIA (LPIL)	266.78	43.19	154.95	111.60	23.5
0	SIDIDAE					
1	DIAPHANOSOMA (LPIL)	13.90	1.66	7.78	6.12	1.2
6	SIDIDAE (LPIL)	3.40	0.0	1.70	1.70	0.3
0	OSTRACODA (TOTAL)	0.0	1.60	0.80	0.80	0.1
19	OSTRACODA (LPIL)	0.0	1.60	0.80	0.80	0.1
0	COPEPODA (TOTAL)	95.22	30.85	63.04	32.18	9.6
0	CALANOIDA (TOTAL)					
1	DIAPYCNUS OREGONENSIS	7.16	0.61	3.88	3.28	0.6
1	DIAPYCNUS PALLIDUS	14.83	1.04	7.94	6.90	1.2
14	CALANOIDA (LPIL)	19.81	6.29	13.05	6.76	2.0

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STATION REPORT

LS	TAXA	17	18	- X	S.E.	REL ABZ
0	CYCLOPOIDA (TOTAL)					
1	CYCLOPS VERNALIS	3.40	1.05	2.62	0.77	0.4
1	EUCYCLOPS AGILIS	1.70	2.39	2.04	0.34	0.3
1	MESOCYCLOPS EDAX	5.55	0.62	3.08	2.47	0.5
1	TROPOCYCLOPS FRASINUS MEXICANA	0.57	0.0	0.28	0.28	0.0
14	CYCLOPOIDA (LPIL)	39.40	12.26	25.63	13.57	3.9
0	HARPACTICOIDA (TOTAL)					
1	LONGIPELIA HELGOLANDICA	1.13	0.0	0.57	0.57	0.1
14	HARPACTICOIDA (LPIL)	1.68	5.81	3.74	2.06	0.6
0	AMPHIPODA (TOTAL)	0.0	0.39	0.19	0.19	0.0
6	AMPHIPODA (LPIL)	0.0	0.39	0.19	0.19	0.0
0	EPHEMEROPTERA (TOTAL)	4.89	3.39	4.14	0.75	0.6
0	CAENIDAE					
13	CAENIDAE (LPIL)	0.0	0.39	0.19	0.19	0.0
13	EPHEMEROPTERA (LPIL)	4.89	3.01	3.95	0.94	0.6
0	TRICHOPTERA (TOTAL)	0.0	0.39	0.19	0.19	0.0
2	TRICHOPTERA (LPIL)	0.0	0.39	0.19	0.19	0.0
0	DIPTERA NEMATOCERA (TOTAL)	137.34	54.30	95.82	41.52	14.6
0	CHIRONOMIDAE					
2	CHIRONOMIDAE (LPIL)	137.34	54.30	95.82	41.52	14.6
	TOTAL	984.06	332.46	658.26	325.80	100.0
	DIVERSITY (H PRIME)	2.73	3.47	3.10	0.37	
	DIVERSITY (J PRIME)	0.64	0.79	0.71	0.07	
	NUMBER OF TAXA	30	33	39		

ABOVE COMPUTED USING SAMPLE IDS

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181	182	183	184

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BAILEY GENERATING PLANT

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STATION REPORT

LS	TAXA		X	S.E.	REL AB%
		18			
0	CNIDARIA (TOTAL)	1.01	1.01	-1.00	0.2
0	HYDROZOA				
19	HYDRA (LPIL)	1.01	1.01	-1.00	0.2
0	NEMATODA (TOTAL)	0.81	0.81	-1.00	0.1
1	NEMATODA (LPIL)	0.81	0.81	-1.00	0.1
0	OLIGOCHAETA (TOTAL)	4.15	4.15	-1.00	0.6
1	OLIGOCHAETA (LPIL)	4.15	4.15	-1.00	0.6
0	ARACHNIDA (TOTAL)	0.39	0.39	-1.00	0.1
0	PROSTIGMATA				
19	HYDRACARINA (LPIL)	0.39	0.39	-1.00	0.1
0	CLADOCERA (TOTAL)	487.72	487.72	-1.00	74.1
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	169.73	169.73	-1.00	25.8
13	BOSMINIDAE (LPIL)	0.58	0.58	-1.00	0.1
0	CHYDORIDAE				
1	ALONA RECTANGULA	31.86	31.86	-1.00	4.8
1	ALONA AFFINIS	39.27	39.27	-1.00	6.0
1	ALONA GUTTATA	2.98	2.98	-1.00	0.5
1	ALONA (LPIL)	0.58	0.58	-1.00	0.1
6	ALONA (LPIL)	0.65	0.65	-1.00	0.1
1	CAMPTOCERCUS RECTIROSTRIS	3.06	3.06	-1.00	0.5
1	CHYDORUS (LPIL)	40.12	40.12	-1.00	6.1
1	ALONELLA (LPIL)	1.75	1.75	-1.00	0.3
1	GRAPTOLIBERIS TESTUDINARIA	1.07	1.07	-1.00	0.2
1	LEYDIGIA QUADRANGULARIS	1.04	1.04	-1.00	0.2
1	PLEUROXUS DENTICULATUS	21.24	21.24	-1.00	3.2
1	PLEUROXUS PROCURVUS	0.27	0.27	-1.00	0.0
1	CHYDORIDAE (LPIL)	3.49	3.49	-1.00	0.5
0	DAPHNIDAE				
1	DAPHNIA AMBIGUA	2.08	2.08	-1.00	0.3
6	DAPHNIA (LPIL)	2.55	2.55	-1.00	0.4
1	DAPHNIA (LPIL)	0.28	0.28	-1.00	0.0
1	SIMOCEPHALUS (LPIL)	0.65	0.65	-1.00	0.1
1	CERIODAPHNIA (LPIL)	154.98	154.98	-1.00	23.5
0	SIDIDAE				
1	DIAPHANOSOMA (LPIL)	7.78	7.78	-1.00	1.2
6	SIDIDAE (LPIL)	1.70	1.70	-1.00	0.3
0	OSTRACODA (TOTAL)	0.80	0.80	-1.00	0.1
19	OSTRACODA (LPIL)	0.80	0.80	-1.00	0.1
0	COPEPODA (TOTAL)	63.04	63.04	-1.00	9.6
0	CALANOIDA (TOTAL)				
1	DIAPTOMUS OREGONENSIS	3.88	3.88	-1.00	0.6
1	DIAPTOMUS PALLIDUS	7.94	7.94	-1.00	1.2
14	CALANOIDA (LPIL)	13.05	13.05	-1.00	2.0

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LS	TAXA		-		REL
			X	S.E.	ABZ
		18			
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VERNALIS	2.62	2.62	-1.00	0.4
1	EUCYCLOPS AGILIS	2.04	2.04	-1.00	0.3
1	MESOCYCLOPS EDAX	3.08	3.08	-1.00	0.5
1	TROPPOCYCLOPS FRASINUS MEXICANA	0.28	0.28	-1.00	0.0
14	CYCLOPOIDA (LPIL)	25.83	25.83	-1.00	3.9
0	HARPACTICOIDA (TOTAL)				
1	LONGISPEDIA HELGOLANDICA	0.57	0.57	-1.00	0.1
14	HARPACTICOIDA (LPIL)	3.74	3.74	-1.00	0.6
0	AMPHIPODA (TOTAL)	0.19	0.19	-1.00	0.0
6	AMPHIPODA (LPIL)	0.19	0.19	-1.00	0.0
0	EPHEMEROPTERA (TOTAL)	4.14	4.14	-1.00	0.6
0	CAENIDAE				
13	CAENIDAE (LPIL)	0.19	0.19	-1.00	0.0
13	EPHEMEROPTERA (LPIL)	3.95	3.95	-1.00	0.6
0	TRICHOPTERA (TOTAL)	0.19	0.19	-1.00	0.0
2	TRICHOPTERA (LPIL)	0.19	0.19	-1.00	0.0
0	DIPTERA NEMATOCERA (TOTAL)	95.82	95.82	-1.00	14.6
0	CHIRONOMIDAE				
2	CHIRONOMIDAE (LPIL)	95.82	95.82	-1.00	14.6
	TOTAL	658.26	658.26	-1.00	100.0
	DIVERSITY (H PRIME)	3.10	3.10	-1.00	
	DIVERSITY (J PRIME)	0.71	0.71	-1.00	
	NUMBER OF TAXA	39	39		

ABOVE COMPUTED USING SAMPLE IDS

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181	182	183	184

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC IC GC LOC

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SID	DATE	TIME	D/H	UNITS C	SD	WD	SP	D	UNITS C	SECH	W	T	SC	DI	CL	SP	DI	AIR	WAT	BT	TURED	COND	DO	PH	SALIN	P	
191	6/14/80	1255	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	8.2	0.0	0.0	0
192	6/14/80	1255	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	8.2	0.0	0.0	0
193	6/14/80	1255	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	8.2	0.0	0.0	0
194	6/14/80	1255	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	8.2	0.0	0.0	0

LS	TAXA	1	2	3	4	X	S.E.	AB%
0	CHIDARIA (TOTAL)	11.51	6.52	0.0	1.63	4.92	2.60	1.0
0	HYDROZOA							
19	HYDRA (LPIL)	11.51	6.52	0.0	1.63	4.92	2.60	1.0
0	HEMATODA (TOTAL)	0.0	0.0	0.0	1.63	0.41	0.41	0.1
1	NEMATODA (LPIL)	0.0	0.0	0.0	1.63	0.41	0.41	0.1
0	OLIGOCHAETA (TOTAL)	9.59	6.52	6.99	3.26	6.59	1.30	1.3
0	NAIDIDAE							
1	NAIDIDAE (LPIL)	0.0	0.0	2.33	0.0	0.58	0.58	0.1
1	OLIGOCHAETA (LPIL)	9.59	6.52	4.66	3.26	6.01	1.37	1.2
0	CLADOCERA (TOTAL)	197.57	456.52	456.52	319.56	357.5	62.33	71.3
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	34.53	260.87	302.79	226.63	206.21	59.31	41.1
0	CHYDORIDAE							
1	ALONA RECTANGULA	17.26	9.78	11.65	0.0	9.67	3.59	1.9
1	ALONA AFFINIS	1.92	0.0	2.33	0.0	1.06	0.62	0.2
1	ALONA GUITATA	0.0	0.0	2.33	1.63	0.99	0.59	0.2
6	ALONA (LPIL)	0.0	0.0	6.99	0.0	1.75	1.75	0.3
1	CAMPTOCERCUS RECTIROSTRIS	1.92	0.0	0.0	0.0	0.08	0.48	0.1
1	CHYDORUS (LPIL)	51.79	136.96	83.85	57.07	82.42	19.49	16.4
1	LEYDIGIA QUADRANGULARIS	3.84	0.0	0.0	0.0	0.96	0.96	0.2
1	PLEUROXUS DENTICULATUS	15.35	9.78	9.32	8.15	10.65	1.60	2.1
0	DAPHNIDAE							
1	SIMOCEPHALUS (LPIL)	2.59	3.26	0.0	0.0	3.21	2.26	0.6
1	CERIODAPHNIA (LPIL)	44.12	19.57	23.29	14.67	25.41	6.48	5.1
0	MACROTHRICIDAE							
1	ILYOCRYPTUS SORDIDUS	1.92	0.0	0.0	0.0	0.48	0.48	0.1
6	MACROTHRIX (LPIL)	1.92	0.0	0.0	0.0	0.48	0.48	0.1
1	MACROTHRIX (LPIL)	0.0	3.26	2.33	0.0	1.40	0.83	0.3
0	SIIDAE							
1	DIAPHANOSOMA (LPIL)	13.43	13.04	11.65	11.41	12.38	0.50	2.5
0	OSTRACODA (TOTAL)	34.53	26.09	4.66	4.89	17.54	7.57	3.5
19	OSTRACODA (LPIL)	34.53	26.09	4.66	4.89	17.54	7.57	3.5
0	COPEPODA (TOTAL)	117.01	78.26	55.90	37.50	72.17	17.11	14.4
0	CALANOIDA (TOTAL)							
1	DIAPTONUS GREGORIENSIS	1.92	0.0	0.0	0.0	0.48	0.48	0.1
14	CALANOIDA (LPIL)	3.84	9.78	0.0	4.89	4.63	2.01	0.9

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REPLICATE REPORT

IS	TAXA	1	2	3	4	X	S.E.	REL AB%
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS VERNALIS	7.67	0.0	0.0	0.0	1.92	1.92	0.4
1	EUCYCLOPS AGILIS	7.67	6.52	2.33	0.0	4.13	1.79	0.8
1	MACROCYCLOPS ALBIDUS	0.0	3.26	0.0	0.0	0.82	0.82	0.2
1	MESOCYCLOPS LEUKARTI	0.0	0.0	2.33	0.0	0.58	0.58	0.1
14	CYCLOPOIDA (LPIL)	93.99	58.70	51.24	32.61	59.13	12.85	11.8
0	HARPACTICOIDA (TOTAL)							
1	HARPACTICOIDA (LPIL)	1.92	0.0	0.0	0.0	0.48	0.48	0.1
0	EPHEMEROPTERA (TOTAL)	3.84	0.0	2.33	1.63	1.95	0.80	0.4
13	EPHEMEROPTERA (LPIL)	3.84	0.0	2.33	1.63	1.95	0.80	0.4
0	DIPTERA NEMATOCERA (TOTAL)	30.69	94.57	32.61	4.89	40.69	19.04	8.1
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	30.69	94.57	32.61	4.89	40.69	19.04	8.1
	TOTAL	404.73	668.48	559.00	375.00	501.80	68.65	100.0
	DIVERSITY (H PRIME)	3.67	2.72	2.39	2.06	2.71	0.35	
	DIVERSITY (J PRIME)	0.81	0.68	0.57	0.54	0.65	0.06	
	NUMBER OF TAXA	23	16	16	14	29		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC
5 51 51 1 2 00

SID	DATE	TIME	D/N	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURB	COND	DO	PH	SALIN	P				
				UNITS	C			SP	D	UNITS	C	SECH	W	T	S/C	DI	CL								SP	DI	AIR	WAT
201	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.8	0.0	0.0	0
202	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.8	0.0	0.0	0
203	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.8	0.0	0.0	0
204	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0	9.2	3	0.9	0	0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.8	0.0	0.0	0

LS	TAXA	1	2	3	4	X	S.E.	REL AB%
0	OLIGOCHAETA (TOTAL)	0.60	0.0	0.0	0.0	0.15	0.15	0.1
0	NAIDIDAE							
1	NAIDIDAE (LPIL)	0.60	0.0	0.0	0.0	0.15	0.15	0.1
0	ARACHNIDA (TOTAL)	0.60	0.0	0.0	0.0	0.15	0.15	0.1
0	PROSTIGNATA							
19	HYDRACARINA (LPIL)	0.60	0.0	0.0	0.0	0.15	0.15	0.1
0	CLADOCERA (TOTAL)	106.83	139.43	159.67	54.77	115.19	22.89	72.2
0	DOSHIINIDAE							
1	DOSHIINIDAE (LPIL)	44.08	67.47	71.21	30.52	53.32	9.68	33.4
0	CHYDORIDAE							
1	ALONA RECTANGULA	0.0	0.0	1.50	0.0	0.37	0.37	0.2
1	ALONA AFFINIS	0.0	0.0	0.0	0.42	0.10	0.10	0.1
1	ALONA GUTTATA	2.42	3.37	6.00	0.42	3.05	1.16	1.9
1	CAMPTOCERCUS RECTIROSTRIS	1.21	4.50	1.50	0.0	1.80	0.90	1.1
1	CHYDORUS (LPIL)	51.93	43.85	73.46	21.74	47.75	10.69	29.9
1	PLEUROXUS DENTICULATUS	0.60	0.0	1.50	0.84	0.73	0.31	0.5
0	DAPHNIDAE							
1	SINOCEPHALUS (LPIL)	0.0	2.25	0.0	0.0	0.56	0.56	0.4
1	CERZODAPHNIA (LPIL)	6.04	16.87	2.25	0.84	6.50	3.63	4.1
0	SIDIDAE							
1	DIAPHANOSOMA (LPIL)	0.60	1.12	2.25	0.0	0.99	0.48	0.6
0	OSTRACODA (TOTAL)	0.60	3.37	1.50	0.0	1.37	0.74	0.9
19	OSTRACODA (LPIL)	0.60	3.37	1.50	0.0	1.37	0.74	0.9
0	COPEROIDA (TOTAL)	30.80	60.72	23.99	30.52	36.51	8.22	22.9
0	CALANOIDA (TOTAL)							
1	DIAPYCNUS OREGONENSIS	0.0	4.50	0.0	0.0	1.12	1.12	0.7
1	DIAPYCNUS (LPIL)	0.0	0.0	0.0	0.42	0.10	0.10	0.1
14	CALANOIDA (LPIL)	14.49	25.86	1.50	24.67	16.63	5.65	10.4
0	CYCLOPOIDA (TOTAL)							
1	EUCYCLOPS AGILIS	0.60	2.25	0.75	0.0	0.90	0.48	0.6
1	MESOCYCLOPS EDAX	0.0	1.12	0.0	0.0	0.28	0.28	0.2
1	MESOCYCLOPS LEUKARTII	0.60	0.0	0.0	0.0	0.15	0.15	0.1
14	CYCLOPOIDA (LPIL)	15.10	26.99	21.74	5.43	17.31	4.65	10.9
0	EPHEMEROPTERA (TOTAL)	0.0	0.0	0.75	0.0	0.19	0.19	0.1
13	EPHEMEROPTERA (LPIL)	0.0	0.0	0.75	0.0	0.19	0.19	0.1
0	DIPTERA NEMATOCERA (TOTAL)	3.62	16.87	3.00	0.42	5.98	3.70	3.7

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DALEY GENERATING PLANT

ZOOPLANKTON DENSITY

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LS	TAXA	1	2	3	4	X	S.E.	REL AB%
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (PIL)	3.62	16.07	3.00	0.42	5.98	3.70	3.7
TOTAL		143.12	220.39	180.91	85.70	159.53	29.28	100.0
DIVERSITY (H PRIME)		2.45	2.91	2.16	2.08	2.40	0.19	
DIVERSITY (J PRIME)		0.63	0.77	0.57	0.63	0.65	0.04	
NUMBER OF TAXA		15	14	14	10	22		

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DAILY GENERATING PLANT

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LS	T ¹ / ₄	19	20	X	S.E.	REL AB%
0	CHIDARIA (TOTAL)	4.92	0.0	2.46	2.46	0.7
0	HYDROZOA					
19	HYDRA (LPIL)	4.92	0.0	2.46	2.46	0.7
0	NEHATODA (TOTAL)	0.41	0.0	0.20	0.20	0.1
1	NEHATODA (LPIL)	0.41	0.0	0.20	0.20	0.1
0	OLIGOCHAETA (TOTAL)	6.59	0.15	3.37	3.22	1.0
0	HAUIDAE					
1	HAUIDAE (LPIL)	0.58	0.15	0.37	0.22	0.1
1	OLIGOCHAETA (LPIL)	6.01	0.0	3.00	3.00	0.9
0	ARACHNIDA (TOTAL)	0.0	0.15	0.08	0.08	0.0
0	PROSTIGMATA					
19	HYDRACARINA (LPIL)	0.0	0.15	0.00	0.08	0.0
0	CLADOCERA (TOTAL)	357.54	115.19	236.37	121.18	71.5
0	EUSHINIDAE					
1	EUSHINIDAE (LPIL)	206.21	53.32	129.76	76.44	39.2
0	CHYDRIIDAE					
1	ALPHA PECTANGULA	9.67	0.37	5.02	4.65	1.5
1	ALPHA AFFINIS	1.06	0.10	0.58	0.48	0.2
1	ALPHA GUTTATA	0.99	3.05	2.02	1.03	0.6
6	ALPHA (LPIL)	1.75	0.0	0.87	0.67	0.3
1	CAMPIDOCERCUS RECTIROSTRIS	0.48	1.80	1.14	0.66	0.3
1	CHYDORUS (LPIL)	82.42	47.75	65.08	17.33	19.7
1	LENDIGIA QUADRANGULARIS	0.96	0.0	0.48	0.48	0.1
1	PLEUROUS DENTICULATUS	10.65	0.73	5.69	4.96	1.7
0	DAPHNIDAE					
1	SINOCEPHALUS (LPIL)	3.21	0.56	1.69	1.33	0.6
1	CERIODAPHNIA (LPIL)	25.41	6.50	15.95	9.46	4.8
0	MACROTHRICIDAE					
1	LYGGRYPUS SORDIDUS	0.48	0.0	0.24	0.24	0.1
6	MACROTHRIX (LPIL)	0.48	0.0	0.24	0.24	0.1
1	MACROTHRIX (LPIL)	1.40	0.0	0.70	0.70	0.2
0	SIDIIDAE					
1	DIAPHANOSOMA (LPIL)	12.39	0.99	6.69	5.69	2.0
0	OSTRACODA (TOTAL)	17.54	1.37	9.45	8.09	2.9
19	OSTRACODA (LPIL)	17.54	1.37	9.45	8.09	2.9
0	COPEPODA (TOTAL)	72.17	36.51	54.34	17.83	16.4
0	CALANOIDA (TOTAL)					
1	DIAPYCNUS GREGORIENSIS	0.48	1.12	0.80	0.32	0.2
1	DIAPYCNUS (LPIL)	0.0	0.10	0.05	0.05	0.0
14	CALANOIDA (LPIL)	4.63	16.63	10.63	6.00	3.2
0	CYCLOPIDA (TOTAL)					
1	CYCLOPS VERNALIS	1.92	0.0	0.96	0.96	0.3
1	EUCYCLOPS AGILIS	4.13	0.90	2.52	1.62	0.3
1	MACROCYCLOPS ALBIDUS	0.82	0.0	0.41	0.41	0.1

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15	TAXA	19	20	X	S.E.	REL ABZ
1	MESOCYCLOPS EDAX	0.0	0.28	0.14	0.14	0.0
1	MESOCYCLOPS LEUKARTI	0.58	0.15	0.37	0.22	0.1
14	CYCLOPOIDA (LPIL)	59.13	17.31	36.22	20.91	11.6
0	HARPACTICOIDA (TOTAL)					
1	HARPACTICOIDA (LPIL)	0.46	0.0	0.24	0.24	0.1
0	EPHENEROPTERA (TOTAL)	1.95	0.19	1.07	0.88	0.3
13	EPHENEROPTERA (LPIL)	1.95	0.19	1.07	0.88	0.3
0	DIPTERA NEHAIOCERA (TOTAL)	40.69	5.98	23.33	17.36	7.1
0	CHIRONOMIDAE					
2	CHIRONOMIDAE (LPIL)	40.69	5.98	23.33	17.36	7.1
	TOTAL	501.80	159.55	330.67	171.14	100.0
	DIVERSITY (H PRIME)	2.71	2.40	2.56	0.15	
	DIVERSITY (J PRIME)	0.65	0.65	0.65	0.00	
	NUMBER OF TAXA	29	22	32		

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LS	TAXA	20	X	S.E.	REL AB%
0	CHIDARIA (TOTAL)	2.46	2.46	-1.00	0.7
0	HYDROZOA				
19	HYDRA (LPIL)	2.46	2.46	-1.00	0.7
0	HEMATELUS (TOTAL)	0.20	0.20	-1.00	0.1
1	HEMATELUS (LPIL)	0.20	0.20	-1.00	0.1
0	OLIGOCHAETA (TOTAL)	3.37	3.37	-1.00	1.0
0	HAIDIDAE				
1	HAIDIDAE (LPIL)	0.37	0.37	-1.00	0.1
1	OLIGOCHAETA (LPIL)	3.00	3.00	-1.00	0.9
0	ARACHNIDA (TOTAL)	0.08	0.08	-1.00	0.0
0	PROSTIGNATA				
19	HYDRACAPINA (LPIL)	0.08	0.08	-1.00	0.0
0	CLADOCEPA (TOTAL)	236.37	236.37	-1.00	71.5
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	129.76	129.76	-1.00	39.2
0	CHYDORIDAE				
1	ALPHA RECTANGULA	5.02	5.02	-1.00	1.5
1	ALPHA AFFINIS	0.58	0.58	-1.00	0.2
1	ALPHA GUITATA	2.02	2.02	-1.00	0.6
6	ALPHA (LPIL)	0.87	0.87	-1.00	0.3
1	CAMPLOERCUS RECTIROSTRIS	1.14	1.14	-1.00	0.3
1	CHYDORUS (LPIL)	65.08	65.08	-1.00	19.7
1	LEPIDIGIA QUADRANGULARIS	0.48	0.48	-1.00	0.1
1	PLEUROCUS DENTICULATUS	5.69	5.69	-1.00	1.7
0	DAPHNIDAE				
1	SHOCEPHALUS (LPIL)	1.89	1.89	-1.00	0.6
1	CERIODAPHNIA (LPIL)	15.95	15.95	-1.00	4.8
0	MACROTHRICIDAE				
1	LYCOTRYPUS SORDIDUS	0.24	0.24	-1.00	0.1
6	MACROTHRIX (LPIL)	0.24	0.24	-1.00	0.1
1	MACROTHRIX (LPIL)	0.70	0.70	-1.00	0.2
0	SIDIIDAE				
1	DIAPHANOSOMA (LPIL)	6.69	6.69	-1.00	2.0
0	OSTRACODA (TOTAL)	9.45	9.45	-1.00	2.9
19	OSTRACODA (LPIL)	9.45	9.45	-1.00	2.9
0	COPEPODA (TOTAL)	54.34	54.34	-1.00	16.4
0	CALANOIDA (TOTAL)				
1	DIAPYCNUS OREGONENSIS	0.80	0.80	-1.00	0.2
1	DIAPYCNUS (LPIL)	0.05	0.05	-1.00	0.0
19	CALANOIDA (LPIL)	10.63	10.63	-1.00	3.2
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VERNALIS	0.96	0.96	-1.00	0.3
1	EUCYCLOPS AGILIS	2.52	2.52	-1.00	0.8
1	MACROCYCLOPS ALBIDUS	0.41	0.41	-1.00	0.1

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LS	TAXA		-		REL
			X	S.E.	AB%
		20			
1	HESOCYCLOPS EDAX	0.14	0.14	-1.00	0.0
1	HESOCYCLOPS LEUKARTI	0.37	0.37	-1.00	0.1
14	CYCLOPOIDA (LPIL)	38.22	38.22	-1.00	11.6
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	0.24	0.24	-1.00	0.1
0	EPHEMEROPTERA (TOTAL)	1.07	1.07	-1.00	0.3
13	EPHEMEROPTERA (LPIL)	1.07	1.07	-1.00	0.3
0	DIPTERA HEMATOCERA (TOTAL)	23.33	23.33	-1.00	7.1
0	CHIRONOMIDAE				
2	CHIRONOMIDAE (LPIL)	23.33	23.33	-1.00	7.1
	TOTAL	330.67	330.67	-1.00	100.0
	DIVERSITY (H PRIME)	2.56	2.56	-1.00	
	DIVERSITY (J PRIME)	0.65	0.65	-1.00	
	NUMBER OF TAXA	32	32		

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FC TC GC LOC

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SID	DATE	TIME	DURATION	WIND	TEMP	BY	COND	DO	PH	SAIN	P	REL
15	TAXA	1	2	3	4	5	6	7	8	9	10	11
0	CHIDARIA (TOTAL)	0.0	0.0	0.0	0.22	0.05	0.05	1.1	0.05	1.1	0.05	1.1
0	HYDROZOA	0.0	0.0	0.0	0.22	0.05	0.05	1.1	0.05	1.1	0.05	1.1
19	HYDRA (LPIL)	0.0	0.0	0.0	0.22	0.05	0.05	1.1	0.05	1.1	0.05	1.1
0	NEMATODA (TOTAL)	0.11	0.33	0.22	0.0	0.16	0.16	0.07	0.07	0.07	0.07	0.07
1	NEMATODA (LPIL)	0.11	0.33	0.22	0.0	0.16	0.16	0.07	0.07	0.07	0.07	0.07
0	OLIGOCHAETA (TOTAL)	0.0	0.76	1.41	1.30	0.87	0.87	0.32	0.32	0.32	0.32	0.32
1	OLIGOCHAETA (LPIL)	0.0	0.76	1.41	1.30	0.87	0.87	0.32	0.32	0.32	0.32	0.32
0	APACHIDA (TOTAL)	0.11	0.0	0.0	0.11	0.05	0.05	0.03	0.03	0.03	0.03	0.03
0	FROSTICHTA	0.11	0.0	0.0	0.11	0.05	0.05	0.03	0.03	0.03	0.03	0.03
19	HYDRACARINA (LPIL)	0.11	0.0	0.0	0.11	0.05	0.05	0.03	0.03	0.03	0.03	0.03
0	CLADOCEPA (TOTAL)	0.98	0.33	1.30	1.63	1.06	1.06	0.28	0.28	0.28	0.28	0.28
0	BOSHIHIDAE	0.22	0.11	0.0	0.0	0.08	0.08	0.05	0.05	0.05	0.05	0.05
1	CHYDORIDAE	0.22	0.11	0.0	0.0	0.08	0.08	0.05	0.05	0.05	0.05	0.05
1	ALONA RECTANGULA	0.22	0.0	0.11	0.22	0.14	0.14	0.05	0.05	0.05	0.05	0.05
1	ALONA AFFINIS	0.11	0.11	0.33	0.11	0.16	0.16	0.05	0.05	0.05	0.05	0.05
1	CHYDORUS (LPIL)	0.22	0.0	0.11	0.22	0.14	0.14	0.05	0.05	0.05	0.05	0.05
1	PLEUROXUS DENTICULATUS	0.0	0.0	0.0	0.11	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1	PLEUROXUS PROCURVUS	0.0	0.0	0.11	0.11	0.05	0.05	0.03	0.03	0.03	0.03	0.03
0	DAPHNIDAE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	SIROCEPHALUS (LPIL)	0.0	0.11	0.54	0.87	0.38	0.38	0.20	0.20	0.20	0.20	0.20
1	CERIGUAFFERIA (LPIL)	0.22	0.0	0.0	0.0	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1	SCAPHOLEBERIS (LPIL)	0.0	0.0	0.11	0.0	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0	OSIRACODA (TOTAL)	0.11	1.09	0.33	0.22	0.43	0.43	0.22	0.22	0.22	0.22	0.22
19	OSIRACODA (LPIL)	0.11	1.09	0.33	0.22	0.43	0.43	0.22	0.22	0.22	0.22	0.22
0	COPEPODA (TOTAL)	0.65	0.76	3.04	3.70	2.04	2.04	0.78	0.78	0.78	0.78	0.78
0	CALANOIDA (TOTAL)	0.22	0.0	0.0	0.22	0.11	0.11	0.06	0.06	0.06	0.06	0.06
14	CALANOIDA (LPIL)	0.22	0.0	0.0	0.22	0.11	0.11	0.06	0.06	0.06	0.06	0.06
0	CYCLOPOIDA (TOTAL)	0.22	0.0	0.11	0.11	0.11	0.11	0.04	0.04	0.04	0.04	0.04
1	CYCLOPS VARIANS RUBELLUS	0.0	0.0	0.11	0.11	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1	CYCLOPS VERNALIS	0.0	0.0	0.0	0.11	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1	EUCYCLOPS AGILLIS	0.11	0.0	0.33	0.76	0.30	0.30	0.17	0.17	0.17	0.17	0.17
1	ECTOCYCLOPS PHALERATUS	0.0	0.0	0.11	0.0	0.03	0.03	0.03	0.03	0.03	0.03	0.03
14	CYCLOPOIDA (LPIL)	0.11	0.76	1.52	1.09	0.67	0.67	0.30	0.30	0.30	0.30	0.30
0	HARPACTICOIDA (TOTAL)	0.0	0.0	0.22	0.0	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1	HARPACTICOIDA (LPIL)	0.0	0.0	0.22	0.0	0.05	0.05	0.05	0.05	0.05	0.05	0.05

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LS	TAXA	1	2	3	4		S.E.	REL ABZ
14	HARPACTICOIDA (LPIL)	0.0	0.0	0.76	1.41	0.54	0.34	10.8
0	AMPHIPODA (TOTAL)	0.11	0.0	0.0	0.0	0.03	0.03	0.5
6	AMPHIPODA (LPIL)	0.11	0.0	0.0	0.0	0.03	0.03	0.5
0	COLLEMBOLA (TOTAL)	0.0	0.0	0.0	0.11	0.03	0.03	0.5
19	COLLEMBOLA (LPIL)	0.0	0.0	0.0	0.11	0.03	0.03	0.5
0	TRICHOPTERA (TOTAL)	0.0	0.0	0.11	0.0	0.03	0.03	0.5
2	TRICHOPTERA (LPIL)	0.0	0.0	0.11	0.0	0.03	0.03	0.5
0	DIPTERA NEMATOCERA (TOTAL)	0.11	0.0	0.54	0.54	0.30	0.14	5.9
0	CERATOPOGONIDAE							
2	CERATOPOGONIDAE (LPIL)	0.0	0.0	0.0	0.11	0.03	0.03	0.5
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	0.11	0.0	0.54	0.43	0.27	0.13	5.4
TOTAL		2.17	3.26	6.96	7.83	5.05	1.38	100.0
DIVERSITY (H PRIME)		3.72	2.33	3.35	3.59	3.25	0.32	
DIVERSITY (J PRIME)		0.98	0.83	0.84	0.84	0.67	0.04	
NUMBER OF TAXA		14	7	16	19	26		

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DAILY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	21	X	S.E.	REL ABX
0	CHITONIA (TOTAL)	0.05	0.05	-1.00	1.1
0	HYDROZOA				
19	HYDRA (LPIL)	0.05	0.05	-1.00	1.1
0	NEMATODA (TOTAL)	0.16	0.16	-1.00	3.2
1	NEMATODA (LPIL)	0.16	0.16	-1.00	3.2
0	OLIGOCHAETA (TOTAL)	0.87	0.87	-1.00	17.2
1	OLIGOCHAETA (LPIL)	0.87	0.87	-1.00	17.2
0	APACHIDA (TOTAL)	0.05	0.05	-1.00	1.1
0	PROSTIGNATA				
19	HYDRACARINA (LPIL)	0.05	0.05	-1.00	1.1
0	CLADOCERA (TOTAL)	1.06	1.06	-1.00	21.0
0	ECHINIDAE				
1	ECHINIDAE (LPIL)	0.08	0.08	-1.00	1.6
0	CHYDORIDAE				
1	ALONIA RECTANGULA	0.14	0.14	-1.00	2.7
1	ALONIA AFFINIS	0.16	0.16	-1.00	3.2
1	CHYDORUS (LPIL)	0.14	0.14	-1.00	2.7
1	PLEURONUS DENTICULATUS	0.03	0.03	-1.00	0.5
1	PLEURONUS PROCURVUS	0.05	0.05	-1.00	1.1
0	DAPHNIDAE				
1	STENOCEPHALUS (LPIL)	0.39	0.39	-1.00	7.5
1	CERIODAPHNIA (LPIL)	0.05	0.05	-1.00	1.1
1	SCAPHOLEBERIS (LPIL)	0.03	0.03	-1.00	0.5
0	OSTRACODA (TOTAL)	0.43	0.43	-1.00	8.6
19	OSTRACODA (LPIL)	0.43	0.43	-1.00	8.6
0	COPEPUDA (TOTAL)	2.04	2.04	-1.00	40.3
0	CALANOIDA (TOTAL)				
14	CALANOIDA (LPIL)	0.11	0.11	-1.00	2.2
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VARICANS RUBELLUS	0.11	0.11	-1.00	2.2
1	CYCLOPS VERNALIS	0.03	0.03	-1.00	0.5
1	EUCYCLOPS AGILIS	0.30	0.30	-1.00	5.9
1	EUCYCLOPS FRALERATUS	0.03	0.03	-1.00	0.5
14	CYCLOPOIDA (LPIL)	0.87	0.87	-1.00	17.2
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	0.03	0.03	-1.00	1.1
14	HARPACTICOIDA (LPIL)	0.54	0.54	-1.00	10.8
0	AMPHIPODA (TOTAL)	0.03	0.03	-1.00	0.5
6	AMPHIPODA (LPIL)	0.03	0.03	-1.00	0.5
0	COLLEMBOLA (TOTAL)	0.03	0.03	-1.00	0.5
19	COLLEMBOLA (LPIL)	0.03	0.03	-1.00	0.5
0	TRICHOPTERA (TOTAL)	0.03	0.03	-1.00	0.5
2	TRICHOPTERA (LPIL)	0.03	0.03	-1.00	0.5
0	DIPTERA NEMATOCERA (TOTAL)	0.30	0.30	-1.00	5.9

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STATION REPORT

LS	TAXA		-		REL
			X	S.E.	ABZ
		21			
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIL)	0.03	0.03	-1.00	0.5
0	CHIRONOMIDAE				
2	CHIRONOMIDAE (LPIL)	0.27	0.27	-1.00	5.4
TOTAL		5.05	5.05	-1.00	109.0
DIVERSITY (H PRIME)		3.25	3.25	-1.00	
DIVERSITY (J PRIME)		0.87	0.87	-1.00	
NUMBER OF TAXA		26	26		

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IS	TAXA	21	X	S.E.	REL AD%
0	CNIDARIA (TOTAL)	0.05	0.05	-1.00	1.1
0	HYDROZOA				
19	HYDRA (LPIL)	0.05	0.05	-1.00	1.1
0	NEMATODA (TOTAL)	0.16	0.16	-1.00	3.2
1	NEMATODA (LPIL)	0.16	0.16	-1.00	3.2
0	OLIGOCHAETA (TOTAL)	0.87	0.87	-1.00	17.2
1	OLIGOCHAETA (LPIL)	0.87	0.87	-1.00	17.2
0	ARACHNIDA (TOTAL)	0.05	0.05	-1.00	1.1
0	PROSTIGMATA				
19	HYDRACARINA (LPIL)	0.05	0.05	-1.00	1.1
0	CLADOCERA (TOTAL)	1.06	1.06	-1.00	21.0
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	0.08	0.08	-1.00	1.6
0	CHYDORIDAE				
1	ALONA RECTANGULA	0.14	0.14	-1.00	2.7
1	ALONA AFFINIS	0.16	0.16	-1.00	3.2
1	CHYDORUS (LPIL)	0.14	0.14	-1.00	2.7
1	PLEUROXUS DENTICULATUS	0.03	0.03	-1.00	0.5
1	PLEUROXUS PROCURVUS	0.05	0.05	-1.00	1.1
0	DAPHNIDAE				
1	SIMOCEPHALUS (LPIL)	0.38	0.38	-1.00	7.5
1	CERIODAPHNIA (LPIL)	0.05	0.05	-1.00	1.1
1	SCAPHOLEBERIS (LPIL)	0.03	0.03	-1.00	0.5
0	OSTRACODA (TOTAL)	0.43	0.43	-1.00	8.6
19	OSTRACODA (LPIL)	0.43	0.43	-1.00	8.6
0	COPEPODA (TOTAL)	2.04	2.04	-1.00	40.3
0	CALANOIDA (TOTAL)				
14	CALANOIDA (LPIL)	0.11	0.11	-1.00	2.2
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VARICANS RUBELLUS	0.11	0.11	-1.00	2.2
1	CYCLOPS VERNALIS	0.03	0.03	-1.00	0.5
1	EUCYCLOPS AGILIS	0.30	0.30	-1.00	5.9
1	ECTOCYCLOPS FHALERATUS	0.03	0.03	-1.00	0.5
14	CYCLOPOIDA (LPIL)	0.87	0.87	-1.00	17.2
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	0.05	0.05	-1.00	1.1
14	HARPACTICOIDA (LPIL)	0.54	0.54	-1.00	10.8
0	AMPHIPODA (TOTAL)	0.03	0.03	-1.00	0.5
6	AMPHIPODA (LPIL)	0.03	0.03	-1.00	0.5
0	COLLEMBOLA (TOTAL)	0.03	0.03	-1.00	0.5
19	COLLEMBOLA (LPIL)	0.03	0.03	-1.00	0.5
0	TRICHOPTERA (TOTAL)	0.03	0.03	-1.00	0.5
2	TRICHOPTERA (LPIL)	0.03	0.03	-1.00	0.5
0	DIPTERA NEMATOCERA (TOTAL)	0.30	0.30	-1.00	5.9

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STATION REPORT

LS	TAXA		-		FEL
			X	S.E.	ABX
		21			
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIL)	0.03	0.03	-1.00	0.5
0	CHIRONOMIDAE				
2	CHIRONOMIDAE (LPIL)	0.27	0.27	-1.00	5.4
TOTAL		5.05	5.05	-1.00	100.0
DIVERSITY (H PRIME)		3.25	3.25	-1.00	
DIVERSITY (J PRIME)		0.87	0.87	-1.00	
NUMBER OF TAXA		26	26		

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Nearshore Ponds			Σ X	S.E.	REL ABZ	
		Pond B 1	Pond C 1	Cowles Bog 1				
0	CHODARIA (TOTAL)	1.01	2.46	0.05	1.17	0.70	0.4	
0	HYDROZOA							
19	HYDRA (LPIL)	2.02	2.46	0.05	1.17	0.70	0.4	
0	HEMATODA (TOTAL)	0.81	0.20	0.16	0.39	0.21	0.1	
1	HEMATODA (LPIL)	0.81	0.20	0.16	0.39	0.21	0.1	
0	OLIGOCHEATA (TOTAL)	4.15	3.37	0.87	2.80	0.99	0.8	
0	NAIDIDAE							
1	NAIDIDAE (LPIL)	0.0	0.37	0.0	0.12	0.12	0.0	
1	OLIGOCHEATA (LPIL)	4.15	3.00	0.67	2.67	0.96	0.8	
0	ARACHNIDA (TOTAL)	0.39	0.08	0.05	0.17	0.11	0.1	
0	PROSTIGNATA							
19	HYDRACARINA (LPIL)	0.39	0.08	0.05	0.17	0.11	0.1	
0	CLADOCERA (TOTAL)	487.72	236.37	1.06	241.72	140.51	73.0	
0	ECHINIDAE							
1	BOSMINIDAE (LPIL)	169.73	129.76	0.08	99.86	51.21	30.1	
13	ECHINIDAE (LPIL)	0.58	0.0	0.0	0.19	0.19	0.1	
0	CHYDORIDAE							
1	ALPHA RECTANGULA	31.56	5.02	0.14	12.34	9.86	3.7	
1	ALPHA AFFINIS	39.27	0.58	0.16	13.30	12.97	4.0	
1	ALPHA GUTTATA	2.98	2.02	0.0	1.67	0.88	0.5	
1	ALPHA (LPIL)	0.58	0.0	0.0	0.19	0.19	0.1	
6	ALPHA (LPIL)	0.65	0.87	0.0	0.51	0.26	0.2	
1	CARPTOCERCUS RECTIROSTRIS	3.06	1.14	0.0	1.40	0.89	0.4	
1	CHIRONOMUS (LPIL)	40.12	65.08	0.14	35.11	18.91	10.6	
1	ALPHIDIA (LPIL)	1.75	0.0	0.0	0.58	0.58	0.2	
1	GRAPTIDAE TESTUDINARIA	1.07	0.0	0.0	0.36	0.36	0.1	
1	LEYDIGIA QUADRANGULARIS	1.04	0.48	0.0	0.51	0.30	0.2	
1	PLEURONUS DENTICULATUS	21.24	5.69	0.03	8.99	6.34	2.7	
1	PLEURONUS PROCURVUS	0.27	0.0	0.05	0.11	0.08	0.0	
1	CHYDORIDAE (LPIL)	3.49	0.0	0.0	1.16	1.16	0.4	
0	DAPHNIDAE							
1	DAPHNIA AMBIGUA	2.08	0.0	0.0	0.69	0.69	0.2	
6	DAPHNIA (LPIL)	2.55	0.0	0.0	0.85	0.85	0.3	
1	DAPHNIA (LPIL)	0.28	0.0	0.0	0.09	0.09	0.0	
1	SINOLEPHALUS (LPIL)	0.65	1.89	0.38	0.97	0.46	0.3	
1	CERIODAPHNIA (LPIL)	154.98	15.9	0.05	57.00	49.21	17.2	
1	SCAPHOLEBERIS (LPIL)	0.0	0.0	0.03	0.01	0.01	0.0	
0	MACROTHRICIDAE							
1	HYOCRYPTUS SORDIDUS	0.0	0.24	0.0	0.08	0.08	0.0	
6	MACROTHRIX (LPIL)	0.0	0.24	0.0	0.08	0.08	0.0	
1	MACROTHRIX (LPIL)	0.0	0.70	0.0	0.23	0.23	0.1	
0	SIDIIDAE							
1	DIAPHANOSOMA (LPIL)	7.78	6.69	0.0	4.82	2.43	1.5	
6	SIDIIDAE (LPIL)	1.70	0.0	0.0	0.57	0.57	0.2	

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

LS	TAXA	Nearshore Ponds				X	S.E.	REL ABZ
		Pond B 1	Pond C 1	Cowles Bog 1				
0	OSTRACODA (TOTAL)	0.80	9.45	0.43		3.56	2.95	1.1
19	OSTRACODA (LPII)	6.00	9.45	0.43		3.56	2.95	1.1
0	COPEPODA (TOTAL)	63.04	54.34	2.04		39.80	19.05	12.0
0	CALANOIDA (TOTAL)							
1	DIAPHORUS OREGONENSIS	3.88	0.80	0.0		1.56	1.18	0.5
1	DIAPHORUS PALLIDUS	7.94	0.0	0.0		2.65	2.65	0.8
1	DIAPHORUS (LPII)	0.0	0.05	0.0		0.02	0.02	0.0
14	CALANOIDA (LPII)	13.05	10.63	0.11		7.93	3.97	2.4
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS VARICATUS RUBELLUS	0.0	0.0	0.11		0.0	0.04	0.0
1	CYCLOPS VERNALIS	2.62	0.5	0.03		1.20	6.76	0.4
1	EUCYCLOPS AGILIS	2.04	1.52	0.30		1.62	0.67	0.5
1	MACROCYCLOPS ALBIGUS	0.0	0.0	0.0		0.14	0.14	0.0
1	MESOCYCLOPS EDAX	3.08	6.14	0.0		1.07	1.00	0.3
1	MESOCYCLOPS LEUKARTI	0.0	0.37	0.0		0.12	0.12	0.0
1	THOUCYCLOPS FRASERIUS MEXICANA	0.28	0.0	0.0		0.09	0.09	0.0
1	ECTOCYCLOPS FRATERATUS	0.0	0.0	0.03		0.01	0.01	0.0
14	CYCLOPOIDA (LPII)	25.83	38.22	0.87		21.64	10.92	6.5
0	HARPACTICOIDA (TOTAL)							
1	LONGIPEDIA HELGOLANDICA	0.57	0.0	0.0		0.19	0.19	0.1
1	HARPACTICOIDA (LPII)	0.0	0.24	0.05		0.10	0.07	0.0
14	HARPACTICOIDA (LPII)	3.74	0.0	0.54		1.43	1.17	0.4
0	AMPHIPODA (TOTAL)	0.19	0.0	0.03		0.07	0.06	0.0
6	AMPHIPODA (LPII)	0.19	0.0	0.03		0.07	0.06	0.0
0	COLLEMBOLA (TOTAL)	0.0	0.0	0.03		0.01	0.01	0.0
19	COLLEMBOLA (LPII)	0.0	0.0	0.03		0.01	0.01	0.0
0	EPHEMEROPTERA (TOTAL)	4.14	1.07	0.0		1.74	1.24	0.5
0	CAENIDAE							
13	CAENIDAE (LPII)	0.19	0.0	0.0		0.06	0.06	0.0
13	EPHEMEROPTERA (LPII)	3.95	1.07	0.0		1.67	1.18	0.5
0	TRICHOPTERA (TOTAL)	0.19	0.0	0.03		0.07	0.06	0.0
2	TRICHOPTERA (LPII)	0.19	0.0	0.03		0.07	0.06	0.0
0	DIPTERA REDUTOCERA (TOTAL)	95.82	23.33	0.30		39.82	28.78	12.0
0	CERATOPOGONIDAE							
2	CERATOPOGONIDAE (LPII)	0.0	0.0	0.03		0.01	0.01	0.0
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPII)	95.82	23.33	0.27		39.81	28.79	12.0
TOTAL		659.26	330.67	5.05		331.33	189.56	100.0
DIVERSITY (H PRIME)		3.10	2.56	3.25		2.97	0.21	
DIVERSITY (J PRIME)		0.71	0.65	0.67		0.75	0.07	
NUMBER OF TAXA		39	32	26		50		

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BAILEY GENERATING PLANT

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SITE SUMMARY

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191	192	193	194
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Corrections to:

APPENDIX A

ZOOPLANKTON DENSITY REPLICATE REPORTS,
BAILLY STUDY AREA, NOVEMBER 1980

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC 1C GC LOC

5 51 51 0 0 00

SID	DATE	TIME	D/H	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURED	COND	DO	PH	SALIN P			
				UNITS	C			SP	D	UNITS	C	SECH	M	T	SC	DI	CL							SP	DI	AIR
31	11/17/80	855	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	0	0.0	0	3.0	7.5	0	0.0	0	12.4	0.0	0.0	0
32	11/17/80	855	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	0	0.0	0	3.0	7.5	0	0.0	0	12.4	0.0	0.0	0
33	11/17/80	855	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0	0	0	0.0	0	3.0	7.5	0	0.0	0	12.4	0.0	0.0	0
34	11/17/80	855	0	0.0	9	15.2	15.2	0.0	0	11.9	3	2.0	0	0	0	0.0	0	3.0	7.5	0	0.0	0	12.4	0.0	0.0	0
LS	TAXA																			X		S T.		REL		
								1		2		3		4												
0	CLADOCERA (TOTAL)							3966.38		3831.93		4773.10		3428.57				4000.00				281.90		21.7		
0	BOSMINIDAE																									
1	BOSMINIDAE (LPIL)							3831.93		3361.34		4302.52		2823.53				3579.83				316.96		19.4		
0	DAPHNIDAE																									
1	DAPHNIA GALEATA MENDOTAE							67.23		0.0		134.45		268.91				117.65				57.41		0.6		
1	DAPHNIA RETROCURVA							67.23		268.91		134.45		201.68				168.07				43.39		0.9		
6	DAPHNIA (LPIL)							0.0		201.68		201.68		134.45				134.45				47.54		0.7		
0	COPEPODA (TOTAL)							14924.36		11563.02		17210.07		14184.86				14470.57				1163.55		78.3		
0	CALANOIDA (TOTAL)																									
1	DIAPYCNUS OREGONENSIS							403.36		470.59		470.59		336.13				420.17				32.18		2.3		
1	DIAPYCNUS ASHLANDI							1075.63		605.04		1344.54		1210.00				1058.82				160.91		5.7		
1	DIAPYCNUS SICILIS							605.04		134.45		537.81		268.91				386.55				111.06		2.1		
1	DIAPYCNUS MINUTUS							67.23		134.45		268.91		201.68				168.07				43.39		0.9		
1	EURYTHERA AFFINIS							67.23		0.0		0.0		0.0				16.81				16.81		0.1		
1	EPISCHURA LACUSTRIS							67.23		0.0		134.45		0.0				50.42				32.18		0.3		
14	CALANOIDA (LPIL)							2689.07		2285.71		3092.44		3092.44				2789.91				193.09		15.1		
0	CYCLOPOIDA (TOTAL)																									
1	CYCLOPS BICUSPIDATUS THOMASI							806.72		537.81		1344.54		672.27				840.34				176.80		4.5		
1	TROPYCYCLOPS FRASINUS MEXICANA							67.23		67.23		67.23		336.13				134.45				67.23		0.7		
14	CYCLOPOIDA (LPIL)							9075.62		7327.73		9549.57		8067.22				8605.04				573.73		46.6		
TOTAL								18890.73		15394.94		21983.16		17613.42				18470.56				1375.65		100.6		
DIVERSITY (H PRIME)								2.26		2.24		2.42		2.43			2.34				0.05					
DIVERSITY (J PRIME)								0.61		0.65		0.65		0.68			0.65				0.01					
NUMBER OF TAXA								13		11		13		12			14									

ABOVE COMPUTED USING SAMPLE IDS

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33

34

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 T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	1	2	3	X	S.E.	REL ABZ
0	CLADOCERA (TOTAL)	15023.14	11323.94	4000.00	10115.69	3238.95	36.4
0	BOSMINIDAE						
1	BOSMINIDAE (LPIL)	13787.03	10704.22	3579.83	9357.02	3022.58	33.6
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	0.0	140.85	117.65	86.16	43.60	0.3
1	DAPHNIA RETROCURVA	907.41	338.03	168.07	471.17	223.57	1.7
1	DAPHNIA (LPIL)	55.56	0.0	0.0	18.52	18.52	0.1
6	DAPHNIA (LPIL)	0.0	112.68	134.45	82.38	41.67	0.3
0	HOLOPEIDAE						
1	HOLOPEIDIUM GIBBERUM	273.15	28.17	0.0	100.44	86.74	0.4
0	COPEPODA (TOTAL)	18518.51	20140.83	14470.57	17709.97	1686.05	63.6
0	CALANOIDA (TOTAL)						
1	DIAPYLOS OREGONENSIS	458.33	309.86	420.17	396.12	44.52	1.4
1	DIAPYLOS ASHLANDI	259.26	535.21	1058.82	617.76	234.48	2.2
1	DIAPYLOS PALLIDUS	55.56	0.0	0.0	18.52	18.52	0.1
1	DIAPYLOS SICILIS	300.93	591.55	386.55	426.34	86.22	1.5
1	DIAPYLOS MINUTUS	27.78	56.34	168.07	84.06	42.80	0.3
1	EURYTEMORA AFFINIS	0.0	28.17	16.81	14.99	8.18	0.1
1	EPISCHIURA LACUSTRIS	412.04	169.01	50.42	210.49	106.43	0.8
14	CALANOIDA (LPIL)	340.74	3211.27	2789.91	3163.97	203.69	11.4
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	1726.85	1802.82	840.34	1456.67	306.95	5.2
1	TROPYCYCLOPS FRASINUS MEXICANA	0.0	28.17	134.45	54.21	27.94	0.2
14	CYCLOPOIDA (LPIL)	11787.03	13403.44	8605.04	11266.84	1710.81	40.5
	TOTAL	33541.63	31464.77	18470.56	27825.65	4715.81	100.0
	DIVERSITY (H PRIME)	1.95	2.07	2.34	2.12	0.11	
	DIVERSITY (J PRIME)	0.59	0.62	0.65	0.62	0.02	
	NUMBER OF TAXA	13	15	14	16		

ABOVE COMPUTED USING SAMPLE IDS

11	12	13	14
21	22	23	24
31	32	33	34

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T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC
5 51 51 0 0 10

		DURATION		TOW		SAMP VOL		WIND		CURRENT		TEMP																
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALIN	P	
51	11/17/80	1210	0	0.0	0	9.1	9.1	0.0	0	7.1	3	1.5	0.0	0	0	0	0.0	0	6.0	7.5	0	0.0	0	11.9	0.0	0.0	0	
52	11/17/80	1210	0	0.0	0	9.1	9.1	0.0	0	7.1	3	1.5	0.0	0	0	0	0.0	0	6.0	7.5	0	0.0	0	11.9	0.0	0.0	0	
53	11/17/80	1210	0	0.0	0	9.1	9.1	0.0	0	7.1	3	1.5	0.0	0	0	0	0.0	0	6.0	7.5	0	0.0	0	11.9	0.0	0.0	0	
54	11/17/80	1210	0	0.0	0	9.1	9.1	0.0	0	7.1	3	1.5	0.0	0	0	0	0.0	0	6.0	7.5	0	0.0	0	11.9	0.0	0.0	0	
LS	TAXA																				X				S.E.		REL ABZ	
0	CLADOCERA (TOTAL)								11167.11				6197.18				8450.70				7774.64				8402.41		1061.39 37.3	
0	BOSMINIDAE																											
1	BOSMINIDAE (LPIL)								9255.53				5070.42				7774.64				6535.21				7158.95		890.96 31.8	
0	DAPHNIDAE																											
1	DAPHNIA RETROCURVA								965.79				450.70				450.70				288.73				663.98		128.33 2.9	
1	DAPHNIA PULEX								80.48				0.0				0.0				0.0				20.12		20.12 0.1	
1	DAPHNIA (LPIL)								724.35				0.0				0.0				338.03				265.59		172.43 1.2	
6	DAPHNIA (LPIL)								0.0				450.70				225.35				0.0				169.01		107.88 0.7	
0	HOLOPEDIDAE																											
1	HOLOPEDIDUM GIBBERUM								160.97				225.35				0.0				0.0				96.58		57.29 0.6	
6	CLADOCERA (LPIL)								0.0				0.0				0.0				112.68				28.17		28.17 0.1	
0	COPEPODA (TOTAL)								20040.23				11154.93				11943.65				13408.45				14136.81		2022.42 62.7	
0	CALANOIDA (TOTAL)																											
1	DIAPYCNUS OREGONENSIS								965.79				225.35				563.38				225.35				494.97		176.01 2.2	
1	DIAPYCNUS ASHLANDI								885.31				901.41				1577.46				1690.14				1263.58		215.01 5.6	
1	DIAPYCNUS SICILIS								563.38				0.0				112.68				0.0				169.01		134.11 0.7	
1	DIAPYCNUS HINGTUS								80.48				0.0				112.68				112.68				76.46		26.59 0.3	
1	EURYTHERA AFFINIS								0.0				112.68				0.0				0.0				28.17		28.17 0.1	
1	EPISCHURA LACUSTRIS								0.0				225.35				112.68				0.0				34.51		53.94 0.4	
14	CALANOIDA (LPIL)								3058.35				1802.82				2140.84				2028.17				2257.54		276.03 10.0	
0	CYCLOPOIDA (TOTAL)																											
1	CYCLOPS BICUSPIDATUS THOMASI								1529.17				450.70				1014.08				1352.11				1086.52		237.34 4.8	
1	TROPYCYCLOPS PRASINUS MEXICANA								160.97				0.0				112.68				112.68				96.58		34.15 0.4	
14	CYCLOPOIDA (LPIL)								12796.77				7436.62				6197.18				7387.32				8579.47		1450.46 38.1	
TOTAL									31227.33				17352.10				20394.35				21183.08				22539.21		3011.49 100.0	
DIVERSITY (H PRIME)									2.40				2.31				2.40				2.38				2.37		0.02	
DIVERSITY (J PRIME)									0.65				0.67				0.67				0.69				0.67		0.01	
NUMBER OF TAXA									13				11				12				11				16			

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC CC LOC
5 51 51 0 0 10

SID	DATE	TIME	D/N	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN F		
				UNITS	C			SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP							DI	AIR
61	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	11.9	3	1.5	0.0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
62	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	11.9	3	1.5	0.0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
63	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	11.9	3	1.5	0.0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
64	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	11.9	3	1.5	0.0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
15	TAXA																	X		S.E.		REL AB%			
0	CLADOCERA (TOTAL)							3159.66		3745.50		2521.01		3649.46		3268.91		280.36		19.6					
0	BOSMINIDAE																								
1	BOSMINIDAE (LPIL)							3025.21		3361.34		2016.81		2881.15		2821.13		286.36		16.9					
0	DAPHNIDAE																								
1	DAPHNIA GALEATA MENDOTAE							0.0		0.0		168.07		288.11		114.05		70.26		0.7					
1	DAPHNIA RETROCURVA							134.45		288.11		252.10		288.11		240.70		36.42		1.4					
1	DAPHNIA (LPIL)							0.0		6.0		84.03		0.0		21.01		21.01		0.1					
6	DAPHNIA (LPIL)							0.0		0.0		0.0		192.08		48.02		48.02		0.3					
6	CLADOCERA (LPIL)							0.0		96.04		0.0		0.0		24.01		24.01		0.1					
0	COPEPODA (TOTAL)							10689.06		14597.82		13697.47		14597.83		13395.54		926.78		80.4					
0	CALANOIDA (TOTAL)																								
1	DIAPYLOMUS OREGONENSIS							403.36		480.19		1008.40		576.23		617.05		135.16		3.7					
1	DIAPYLOMUS ASHLANDI							1344.54		1344.54		2941.18		2208.88		1959.78		385.38		11.8					
1	DIAPYLOMUS SICILIS							336.13		192.08		0.0		0.0		132.05		81.71		0.8					
1	DIAPYLOMUS MINUTUS							67.23		304.15		84.03		192.08		181.87		72.88		1.1					
14	CALANOIDA (LPIL)							3025.21		4033.61		3865.55		3361.34		3571.43		231.41		21.4					
0	CYCLOPOIDA (TOTAL)																								
1	CYCLOPS BICUSPIDATUS THOMASI							1008.40		672.27		924.37		1536.61		1035.41		181.69		6.2					
1	TROPICOCYCLUS FRASINUS MEXICANA							67.23		96.04		84.03		0.0		61.82		21.44		0.4					
14	CYCLOPOIDA (LPIL)							4436.97		7394.95		4789.91		6722.68		5836.13		722.73		35.0					
TOTAL								13848.72		18343.30		16218.46		18247.27		10664.44		1058.74		100.0					
DIVERSITY (H PRIME)								2.51		2.41		2.60		2.55		2.52		0.04							
DIVERSITY (J PRIME)								0.75		0.70		0.75		0.77		0.74		0.02							
NUMBER OF TAXA								10		11		11		10		13									

ABOVE COMPUTED USING SAMPLE IDS

61 62 63 64

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL ABZ
0	CLADOCERA (TOTAL)	11405.08	8402.41	3268.97	7692.13	2375.41	38.3
0	BOSMINIDAE						
1	BOSMINIDAE (LPIL)	10810.18	7158.95	2821.13	6930.08	2309.08	34.5
0	CHIDORIDAE						
1	CHIDORIDAE (LPIL)	27.78	0.0	0.0	9.26	9.26	0.0
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	111.11	0.0	114.05	75.05	37.54	0.4
1	DAPHNIA RETROCURVA	61.73	663.98	240.70	322.14	178.56	1.6
1	DAPHNIA PULEX	0.0	20.12	0.0	6.71	6.71	0.0
1	DAPHNIA (LPIL)	117.28	265.59	21.01	134.63	71.14	0.7
6	DAPHNIA (LPIL)	0.0	169.01	48.02	72.34	50.28	0.4
0	HOLOPEIDIDAE						
1	HOLOPEIDIUM GIBBERUM	246.14	96.58	0.0	114.24	71.60	0.6
6	CLADOCERA (LPIL)	30.86	28.17	24.01	27.68	1.99	0.1
0	COPEPODA (TOTAL)	9716.04	14136.81	13395.54	12416.13	1366.90	61.7
0	CALANOIDA (TOTAL)						
1	DIAPYCNUS OREGONENSIS	158.95	494.97	617.05	423.66	136.96	2.1
1	DIAPYCNUS ASHLANDI	1078.70	1263.58	1959.78	1434.02	268.24	7.1
1	DIAPYCNUS SICILIOIDES	27.78	0.0	0.0	9.26	9.26	0.0
1	DIAPYCNUS SICILIIS	113.43	169.01	132.05	138.16	16.34	0.7
1	DIAPYCNUS MINUTUS	231.41	76.46	161.87	163.27	45.71	0.8
1	EURYTEMORA AFFINIS	0.0	28.17	0.0	9.39	9.39	0.0
1	EPISCHURA LACUSTRIS	312.50	84.51	0.0	132.34	93.33	0.7
14	CALANOIDA (LPIL)	2970.68	2257.54	3571.43	2933.22	379.75	14.6
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	706.79	1086.52	1035.41	942.91	118.98	4.7
1	TROPOCYCLOPS FRASINUS MEXICANA	65.59	96.58	61.82	74.66	11.01	0.4
14	CYCLOPOIDA (LPIL)	4050.15	8579.47	5836.13	6155.25	1377.00	30.6
	TOTAL	21121.11	22539.21	16664.44	20108.25	1769.90	100.0
	DIVERSITY (H PRIME)	2.17	2.37	2.52	2.35	0.10	
	DIVERSITY (J PRIME)	0.61	0.67	0.74	0.67	0.04	
	NUMBER OF TAXA	17	16	13	19		

ABOVE COMPUTED USING SAMPLE IDS

41	42	43	44
51	52	53	54
61	62	63	64

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC

5 51 51 0 0 20

SID	DATE	TIME	D/N	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBID	COND	DO	PH	SALIN	
				UNITS	C			SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP							DI
101	11/17/80	1750	0	0.0	0	0.0	0.0	0.0	0	2.8	3	0.0	0	0	0.0	0	6.0	10.5	0	0.0	0	10.0	0.0	0.0
102	11/17/80	1750	0	0.0	0	0.0	0.0	0.0	0	2.9	3	0.0	0	0	0.0	0	6.0	10.5	0	0.0	0	10.0	0.0	0.0
103	11/17/80	1750	0	0.0	0	0.0	0.0	0.0	0	2.8	3	0.0	0	0	0.0	0	6.0	10.5	0	0.0	0	10.0	0.0	0.0
104	11/17/80	1750	0	0.0	0	0.0	0.0	0.0	0	2.7	3	0.0	0	0	0.0	0	6.0	10.5	0	0.0	0	10.0	0.0	0.0

LS	TAXA	1	2	3	4	X	S.E.	REL AB%
0	CHIDARIA (TOTAL)	214.29	0.0	109.89	148.15	118.08	44.88	0.9
0	HYDROZOA							
19	HYDRA (LPIL)	214.29	0.0	109.89	0.0	81.04	51.41	0.6
1	HYDRA (LPIL)	0.0	0.0	0.0	148.15	37.04	37.04	0.3
0	NEMATODA (TOTAL)	0.0	0.0	0.0	74.07	18.52	18.52	0.1
1	NEMATODA (LPIL)	0.0	0.0	0.0	74.07	18.52	18.52	0.1
0	ANNELIDA (TOTAL)	71.43	0.0	0.0	0.0	17.86	17.86	0.1
1	ANNELIDA (LPIL)	71.43	0.0	0.0	0.0	17.86	17.86	0.1
0	CLADOCERA (TOTAL)	9785.70	11793.10	7472.51	10444.42	9873.93	902.92	72.5
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	8785.71	11310.34	6373.62	9037.04	8876.68	1009.21	65.2
0	CHYDORIDAE							
1	CHYDORIDAE (LPIL)	0.0	0.0	0.0	74.07	18.52	18.52	0.1
0	DAPHNIDAE							
1	DAPHNIA GALEATA MENDOTAE	285.71	275.86	274.73	296.30	283.15	5.03	2.1
1	DAPHNIA RETROCURVA	142.86	206.90	219.78	518.52	272.01	83.87	2.0
1	DAPHNIA PULEX	142.86	0.0	0.0	74.07	54.23	34.32	0.4
6	DAPHNIA (LPIL)	142.86	0.0	219.78	74.07	109.18	47.01	0.8
0	HOLOPEDIDAE							
1	HOLOPEDIDAE GIBBERUM	285.71	0.0	384.62	296.30	241.66	83.55	1.8
6	CLADOCERA (LPIL)	0.0	0.0	0.0	74.07	18.52	18.52	0.1
0	COPEPODA (TOTAL)	4285.71	3103.45	2472.53	4518.52	3595.05	485.76	26.4
0	CALANOIDA (TOTAL)							
1	DIAPYCNUS OREGONENSIS	71.43	68.97	109.89	74.07	81.09	9.66	0.6
1	DIAPYCNUS ASHLANDI	285.71	137.93	54.95	74.07	138.17	52.28	1.0
1	DIAPYCNUS SICILIS	0.0	0.0	0.0	74.07	18.52	18.52	0.1
1	DIAPYCNUS MINUTUS	0.0	0.0	54.95	0.0	13.74	13.74	0.1
1	EPISCHURA LACUSTRIS	142.86	137.93	109.89	74.07	116.19	15.80	0.9
14	CALANOIDA (LPIL)	1357.14	758.62	824.18	1333.33	1068.32	160.51	7.8
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS BICUSPIDATUS THOMASI	428.57	413.79	439.56	1111.11	598.26	171.03	4.4
14	CYCLOPOIDA (LPIL)	2000.00	1586.21	879.12	1777.78	1560.78	242.44	11.5
	TOTAL	14357.12	14896.54	10054.93	15185.14	13623.43	1201.81	100.0
	DIVERSITY (H PRIME)	2.07	1.36	2.02	2.18	1.92	0.19	
	DIVERSITY (J PRIME)	0.54	0.43	0.56	0.53	0.52	0.03	
	NUMBER OF TAXA	14	9	13	17	19		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	- X	S.E.	REL ABZ
ABOVE COMPUTED USING SAMPLE 105								
	101	102	103	104				

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T600AQUA	9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA		X	S.E.	REL AB%
		10			
0	CNIDARIA (TOTAL)	118.98	118.08	-1.00	0.9
0	HYDROZOA				
19	HYDRA (LPIL)	81.04	81.04	-1.00	0.6
1	HYDRA (LPIL)	37.04	37.04	-1.00	0.3
0	NEMATODA (TOTAL)	18.52	18.52	-1.00	0.1
1	NEMATODA (LPIL)	18.52	18.52	-1.00	0.1
0	ANNELIDA (TOTAL)	17.86	17.86	-1.00	0.1
1	ANNELIDA (LPIL)	17.86	17.86	-1.00	0.1
0	CLADOCERA (TOTAL)	9873.93	9873.93	-1.00	72.5
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	8876.68	8876.68	-1.00	65.2
0	CHYDORIDAE				
1	CHYDORIDAE (LPIL)	18.52	18.52	-1.00	0.1
0	DAPHNIDAE				
1	DAPHNIA GALEATA MENDOTAE	283.15	283.15	-1.00	2.1
1	DAPHNIA RETROCURVA	272.01	272.01	-1.00	2.0
1	DAPHNIA PULEX	54.23	54.23	-1.00	0.4
6	DAPHNIA (LPIL)	109.18	109.18	-1.00	0.8
0	HOLOPEIDIDAE				
1	HOLOPEIDIUM GIBBERUM	241.66	241.66	-1.00	1.8
6	CLADOCERA (LPIL)	18.52	18.52	-1.00	0.1
0	COPEPODA (TOTAL)	3595.05	3595.05	-1.00	26.4
0	CALANOIDA (TOTAL)				
1	DIAPYCNUS OREGONENSIS	81.09	81.09	-1.00	0.6
1	DIAPYCNUS ASHLANDI	138.17	138.17	-1.00	1.0
1	DIAPYCNUS SICILIS	18.52	18.52	-1.00	0.1
1	DIAPYCNUS MINUTUS	13.74	13.74	-1.00	0.1
1	EPISCHURA LACUSTRIS	116.19	116.19	-1.00	0.9
14	CALANOIDA (LPIL)	1068.32	1068.32	-1.00	7.8
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS BICUSPIDATUS THOMASI	598.26	598.26	-1.00	4.4
14	CYCLOPOIDA (LPIL)	1560.78	1560.78	-1.00	11.5
	TOTAL	13623.43	13623.43	-1.00	100.0
	DIVERSITY (H PRIME)	1.92	1.92	-1.00	
	DIVERSITY (J PRIME)	0.52	0.52	-1.00	
	NUMBER OF TAXA	19	19		

ABOVE COMPUTED USING SAMPLE IDS

101 102 103 104

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49770)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL AB%
0	CHITIDARIA (TOTAL)	0.0	0.0	118.08	39.36	29.36	0.2
0	HYDROZOA						
19	HYDRA (LPIL)	0.0	0.0	81.04	27.01	27.01	0.1
1	HYDRA (LPIL)	0.0	0.0	37.04	12.35	12.35	0.1
0	NEMATODA (TOTAL)	0.0	0.0	18.52	6.17	6.17	0.0
1	NEMATODA (LPIL)	0.0	0.0	18.52	6.17	6.17	0.0
0	ANNELIDA (TOTAL)	0.0	0.0	17.86	5.95	5.95	0.0
1	ANNELIDA (LPIL)	0.0	0.0	17.86	5.95	5.95	0.0
0	CLADOCERA (TOTAL)	10115.69	7692.13	9873.93	9227.25	770.73	45.0
0	BOEHRMIDAE						
1	BOEHRMIDAE (LPIL)	9357.02	6930.08	8876.68	8387.93	741.99	40.9
0	CHYDORIDAE						
1	CHYDORIDAE (LPIL)	0.0	9.26	18.52	9.26	5.35	0.0
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	86.16	75.05	283.15	148.12	67.59	0.7
1	DAPHNIA RETROCURVA	471.17	322.14	272.01	355.11	59.81	1.7
1	DAPHNIA PULEX	0.0	6.71	54.23	20.31	17.07	0.1
1	DAPHNIA (LPIL)	18.52	134.63	0.0	51.05	42.13	0.2
6	DAPHNIA (LPIL)	62.38	72.34	109.18	67.97	10.99	0.4
0	HOLOPEDIDAE						
1	HOLOPEDIDAE GIBBERUM	100.44	114.24	241.66	152.11	44.95	0.7
6	CLADOCERA ('LL)	0.0	27.68	18.52	15.40	8.14	0.1
0	COPEPODA (TOTAL)	17709.97	12416.13	3595.05	11240.38	4116.81	54.6
0	CALANOIDA (TOTAL)						
1	DIAPYCNUS OREGONENSIS	396.12	423.66	81.09	300.29	109.89	1.5
1	DIAPYCNUS ASHLANDI	617.76	1434.02	138.17	729.98	378.27	3.6
1	DIAPYCNUS SICILIOIDES	0.0	9.26	0.0	3.09	3.09	0.0
1	DIAPYCNUS PALLIDUS	18.52	0.0	0.0	6.17	6.17	0.0
1	DIAPYCNUS SICILIS	426.34	138.16	18.52	194.34	121.03	0.9
1	DIAPYCNUS MINUTUS	84.06	163.27	13.74	87.02	43.19	0.4
1	EURYTEMORA AFFINIS	14.99	9.39	0.0	8.13	4.37	0.0
1	EPISCHURA LACUSTRIS	210.49	132.34	116.19	153.00	29.12	0.7
14	CALANOIDA (LPIL)	3163.97	2933.22	1068.32	2388.50	663.44	11.6
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	1456.67	942.91	598.26	999.28	249.40	4.9
1	TROPOCYCLOPS FRASINUS MEXICANA	54.21	74.66	0.0	42.96	22.28	0.2
14	CYCLOPOIDA (LPIL)	11266.84	6155.25	1560.78	6327.62	2803.22	30.8
	TOTAL	27825.65	20108.25	13623.43	20519.11	4104.97	100.0
	DIVERSITY (H PRIME)	2.12	2.35	1.92	2.13	0.12	
	DIVERSITY (J PRIME)	0.62	0.67	0.52	0.60	0.05	
	NUMBER OF TAXA	16	19	19	23		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

ABOVE: COMPUTED USING SAMPLE IDS

11	12	13	14
21	22	23	24
31	32	33	34
41	42	43	44
51	52	53	54
61	62	63	64
101	102	103	104

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC
5 51 51 0 1 00

SID	DATE	TIME	D/H	DURATION		WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURB	COND	DO	PH	SALIN	P		
				UNITS	C		SP	D	UNITS	C	SECH	M	T	SC	DI	CL								SP	DI
71	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	3.6	3	1.5	0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
72	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	3.6	3	1.5	0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
73	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	3.6	3	1.5	0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0
74	11/17/80	1300	0	0.0	0	15.2	15.2	0.0	0	3.6	3	1.5	0	0	0	0.0	0	7.0	6.5	0	0.0	0	10.8	0.0	0.0

LS	TAXA	1	2	3	4	X	S.E.	ABZ
0	CLADOCERA (TOTAL)	15555.55	6999.99	7777.77	9841.25	10043.64	1932.62	27.6
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	11111.11	6000.00	5079.36	7777.77	7492.06	1329.99	20.6
0	DAPHNIDAE							
1	DAPHNIA GALEATA MENDOTAE	1555.56	444.44	634.92	158.73	698.41	302.00	1.9
1	DAPHNIA RETROCURVA	1555.56	444.44	1587.30	1111.11	1174.60	266.55	3.2
1	DAPHNIA (LPIL)	0.0	0.0	0.0	158.73	39.68	39.68	0.1
0	HOLOPEDIDAE							
1	HOLOPEDIDUM GIBBERUM	1333.33	111.11	476.19	634.92	638.89	256.14	1.8
0	COPEPODA (TOTAL)	30444.42	23888.87	26031.73	25079.35	26361.09	1429.94	72.4
0	CALANOIDA (TOTAL)							
1	DIAPYCNUS OREGONENSIS	2222.22	1000.00	2539.68	1428.57	1797.62	353.95	4.9
1	DIAPYCNUS ASHLANDI	4688.89	2333.33	3968.25	3650.79	3710.32	528.77	10.2
1	DIAPYCNUS SICILI'	2666.67	1111.11	1587.30	1746.03	1777.78	325.56	4.9
1	DIAPYCNUS MINUTUS	444.44	111.11	158.73	158.73	213.25	76.23	0.6
1	EPISCHURA LACUSTRIS	1111.11	222.22	0.0	0.0	333.33	264.50	0.9
14	CALANOIDA (LPIL)	9111.11	9444.44	10476.19	7936.50	9242.06	523.26	25.4
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS BICUSPIDATUS THOMASI	2888.89	1777.78	1428.57	2222.22	2079.36	314.94	5.7
1	TROPYCLOPS PRASINUS MEXICANA	444.44	111.11	0.0	0.0	138.89	105.16	0.4
14	CYCLOPOIDA (LPIL)	6666.66	7777.77	5873.01	7936.50	7063.49	487.09	19.4
	TOTAL	45999.97	30888.86	33809.50	34920.61	36404.73	3309.47	100.0
	DIVERSITY (H PRIME)	3.14	2.65	2.85	2.82	2.87	0.10	
	DIVERSITY (J PRIME)	0.85	0.72	0.83	0.79	0.79	0.03	
	NUMBER OF TAXA	13	13	11	12	14		

ABOVE COMPUTED USING SAMPLE IDS

71 72 73 74

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC
5 51 51 0 1 00

SID	DATE	TIME	D/H	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURBD	COND	DO	PH	SALIN	P		
				UNITS	C			SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP								DI	AIR
81	11/17/80	1445	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.0	0	0	0	0.0	0	607.0	0.0	0	0.0	0	8.4	0.0	0.0	0
82	11/17/80	1445	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.0	0	0	0	0.0	0	6.0	7.0	0	0.0	0	8.4	0.0	0.0	0
83	11/17/80	1445	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.0	0	0	0	0.0	0	6.0	7.0	0	0.0	0	8.4	0.0	0.0	0
84	11/17/80	1445	0	0.0	0	9.1	9.1	0.0	0	7.1	3	2.0	0	0	0	0.0	0	6.0	7.0	0	0.0	0	8.4	0.0	0.0	0

LS	TAXA	1	2	3	4	X	S.E.	ABZ
1	CLADOCERA (TOTAL)	3605.63	6948.35	5774.64	3605.63	4983.56	630.84	18.4
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	3267.60	6384.97	4507.04	3154.93	4328.63	750.76	15.9
0	DAPHNIDAE							
1	DAPHNIA GALEATA MENDOTAE	0.0	0.0	422.54	112.68	133.80	99.84	0.5
1	DAPHNIA RETROCURVA	0.0	187.79	845.07	225.35	314.55	183.58	1.2
6	DAPHNIA (LPIL)	225.35	187.79	0.0	0.0	103.29	60.12	0.4
0	HOLOPEIDAE							
1	HOLOPEIDIUM GIBBERUM	112.68	187.79	0.0	112.68	103.29	38.71	0.4
0	COPEPODA (TOTAL)	17915.48	29295.75	22394.36	19042.24	22161.96	2561.09	81.6
0	CALANOIDA (TOTAL)							
1	DIAPYCNUS OREGONENSIS	338.03	1502.35	422.54	676.06	734.74	265.76	2.7
1	DIAPYCNUS ASHLANDI	2253.52	4131.45	2394.37	1690.14	2617.37	527.12	9.6
1	DIAPYCNUS SICILIS	225.35	938.97	422.54	1577.46	791.08	302.23	2.9
1	DIAPYCNUS MINUTUS	0.0	375.59	140.85	225.35	185.45	78.59	0.7
1	EPISCURA LACUSTRIS	0.0	187.79	0.0	0.0	46.95	46.95	0.2
14	CALANOIDA (LPIL)	5295.77	5821.59	4225.35	4056.34	4849.76	424.54	17.9
0	CYCLOPOIDA (TOTAL)							
1	CYCLOPS BICUSPIDATUS THOMASI	901.41	1502.35	1690.14	1239.44	1333.33	171.09	4.9
1	TROPYCYCLOPS PRASINUS MEXICANA	112.68	0.0	281.69	0.0	98.59	66.56	0.4
14	CYCLOPOIDA (LPIL)	8788.73	14835.68	12816.90	9577.46	11504.69	1411.50	42.4
	TOTAL	21521.11	36244.11	28169.08	22647.86	27145.52	3362.72	100.0
	DIVERSITY (H PRIME)	2.28	2.49	2.43	2.50	2.43	0.05	
	DIVERSITY (J PRIME)	0.69	0.70	0.70	0.72	0.70	0.01	
	NUMBER OF TAXA	10	12	11	11	14		

ABOVE COMPUTED USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (4720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PL TC GC LOC
5 51 51 0 1 00

				DURATION				TOW				SAMP VOL				WIND				CURRENT				TEMP																																
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CI	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P																													
91	11/17/80	1400	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0.0	0	0	0	0.0	0	7.0	7.5	0	0.0	0	9.2	0.0	0.0	0																													
92	11/17/80	1400	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0.0	0	0	0	0.0	0	7.0	7.5	0	0.0	0	9.2	0.0	0.0	0																													
93	11/17/80	1400	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0.0	0	0	0	0.0	0	7.0	7.5	0	0.0	0	9.2	0.0	0.0	0																													
94	11/17/80	1400	0	0.0	0	15.2	15.2	0.0	0	11.9	3	2.0	0.0	0	0	0	0.0	0	7.0	7.5	0	0.0	0	9.2	0.0	0.0	0																													
15	TAXA																							X	S.E.			AB%																												
								1								2								3								4																								
0	CLADOCERA (TOTAL)							5109.23							3361.3							4417.75							6722.68							4902.75							705.10							20.0						
0	BOSMINIDAE																																																							
1	BOSMINIDAE (LPIL)							4168.06							2785.11							3649.46							6184.87							4196.87							721.44							17.1						
0	DAPHNIDAE																																																							
1	DAPHNIA GALEATA MENDOTAE							0.0							96.04							192.08							134.45							105.64							40.37							0.4						
1	DAPHNIA RETROCURVA							537.81							288.11							480.19							269.91							393.76							67.68							1.6						
1	DAPHNIA (LPIL)							268.91							0.0							0.0							0.0							67.23							67.23							0.3						
6	DAPHNIA (LPIL)							0.0							192.08							0.0							134.45							81.63							48.58							0.3						
0	HOLOPEIDAE																																																							
1	HOLOPEIDIUM GIBBERUM							134.45							0.0							96.04							0.0							57.62							34.18							0.2						
0	COPEPODA (TOTAL)							18420.16							19495.79							18919.56							21512.59							19587.02							670.43							30.0						
0	CALANOIDA (TOTAL)																																																							
1	DIAPYCNUS OREGONENSIS							806.72							864.35							384.15							1075.63							782.71							144.68							3.2						
1	DIAPYCNUS ASHLANDI							2554.62							2304.92							2689.07							2554.62							2525.81							80.16							10.3						
1	DIAPYCNUS SICILIS							672.27							480.19							768.31							941.18							715.49							96.16							2.9						
1	DIAPYCNUS MINUTUS							403.36							192.08							96.04							537.81							307.32							100.11							1.3						
1	EPISCURA LACUSTRIS							134.45							96.04							0.0							134.45							91.24							31.73							0.4						
14	CALANOIDA (LPIL)							4436.97							4321.73							4033.61							4436.97							4307.32							95.19							17.6						
0	CYCLOPOIDA (TOTAL)																																																							
1	CYCLOPS BICUSPIDATUS THOMASI							537.81							1440.58							480.19							806.72							816.33							219.91							3.3						
1	TROPOCYCLOPS PRASINUS MEXICANA							134.45							0.0							0.0							0.0							33.61							33.61							0.1						
14	CYCLOPOIDA (LPIL)							8739.49							9795.91							10468.18							11025.21							10007.20							491.64							40.9						
TOTAL								23529.38							22857.11							23337.31							28235.27							24489.77							1256.48							100.0						
DIVERSITY (H PRIME)								2.64							2.49							2.35							2.52							2.50							0.06													
DIVERSITY (J PRIME)								0.71							0.69							0.68							0.70							0.70							0.01													
NUMBER OF TAXA								13							12							11							12							14																				

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL AB%
0	CLADOCERA (TOTAL)	10043.64	4983.56	4052.75	6647.32	1700.32	22.6
0	BOSMINIDAE						
1	BOSMINIDAE (LPIL)	7492.06	4328.63	4196.87	5339.19	1077.11	18.2
0	DAPHNIDAE						
1	DAPHNIA GALEATA MENDOTAE	698.41	133.80	105.64	312.62	193.07	1.1
1	DAPHNIA RETICULATA	1174.60	314.55	393.76	627.64	274.44	2.1
1	DAPHNIA HYALINA	39.68	0.0	67.23	35.64	19.51	0.1
6	DAPHNIA (L)	0.0	103.29	81.63	61.64	31.45	0.2
0	HOLOPELID						
1	HOLOPELID, GIBBERUM	638.89	103.29	57.62	266.60	186.61	0.9
0	COPEPODA (TOTAL)	26361.09	22161.96	19587.02	22703.36	1974.15	77.4
0	CALANOIDA (TOTAL)						
1	DIAPYCNUS OREGONENSIS	1797.62	734.74	782.71	1105.02	346.57	3.8
1	DIAPYCNUS ASHLANDI	3710.32	2617.37	2525.81	2951.17	360.49	10.1
1	DIAPYCNUS SICILIS	1777.78	791.08	715.49	1094.78	342.19	3.7
1	DIAPYCNUS MINUTUS	218.25	185.45	307.32	237.01	36.41	0.8
1	EPISCHURA LACUSTRIS	333.33	46.95	91.24	157.17	89.00	0.5
14	CALANOIDA (LPIL)	9242.06	4849.76	4307.32	6133.05	1562.37	20.9
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS BICUSPIDATUS THOMASI	2079.36	1333.33	816.33	1409.67	366.60	4.8
1	TROPICOCYCLUS PRASINUS MEXICANA	138.89	98.59	33.61	90.36	30.67	0.3
14	CYCLOPOIDA (LPIL)	7063.49	11504.69	10007.20	9525.12	1304.53	32.5
	TOTAL	36404.73	27145.52	24489.77	29346.67	3611.34	100.0
	DIVERSITY (H PRIME)	2.87	2.43	2.50	2.60	0.14	
	DIVERSITY (J PRIME)	0.79	0.70	0.70	0.73	0.03	
	NUMBER OF TAXA	14	14	14	14		

ABOVE COMPUTED USING SAMPLE IDS

71	72	73	74
81	82	83	84
91	92	93	94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA		X	S.E.	REL ABZ
		9			
0	CLADOCERA (TOTAL)	6643.32	6643.32	-1.00	22.6
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	5339.19	5339.19	-1.00	18.2
0	DAPHNIDAE				
1	DAPHNIA GALEATA MENDOTAE	312.62	312.62	-1.00	1.1
1	DAPHNIA RETROCURVA	627.64	627.64	-1.00	2.1
1	DAPHNIA (LPIL)	35.64	35.64	-1.00	0.1
6	DAPHNIA (LPIL)	61.64	61.64	-1.00	0.2
0	HOLOPEIDIDAE				
1	HOLOPEIDIUM GIBBERUM	266.60	266.60	-1.00	0.9
0	COPEPODA (TOTAL)	22703.36	22703.36	-1.00	77.4
0	CALANOIDA (TOTAL)				
1	DIAPYCNUS OREGONENSIS	1105.02	1105.02	-1.00	3.8
1	DIAPYCNUS ASHLANDI	2951.17	2951.17	-1.00	10.1
1	DIAPYCNUS SICILIS	1094.78	1094.78	-1.00	3.7
1	DIAPYCNUS MINUTUS	237.01	237.01	-1.00	0.8
1	EPISCHURA LACUSTRIS	157.17	157.17	-1.00	0.5
14	CALANOIDA (LPIL)	6133.05	6133.05	-1.00	20.9
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS BICUSPIDATUS THOMASI	1409.67	1409.67	-1.00	4.8
1	TROPICOCYCLOPS PRASINUS MEXICANA	90.36	90.36	-1.00	0.3
14	CYCLOPOIDA (LPIL)	9525.12	9525.12	-1.00	32.5
	TOTAL	29346.67	29346.67	-1.00	100.0
	DIVERSITY (H PRIME)	2.60	2.60	-1.00	
	DIVERSITY (J PRIME)	0.73	0.73	-1.00	
	NUMBER OF TAXA	14	14		

ABOVE COMPUTED USING SAMPLE IDS

71	72	73	74
81	82	83	84
91	92	93	94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

LS	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	- X	S.E.	REL ABZ
0	CHIDARIA (TOTAL)	0	0			
0	HYDROZOA	39.36	0.0	19.68	19.68	0.1
19	HYDRA (LPIL)	27.01	0.0	13.51	13.51	0.1
1	HYDRA (LPIL)	12.35	0.0	6.17	6.17	0.0
0	NEMATODA (TOTAL)	6.17	0.0	3.09	3.09	0.0
1	NEMATODA (LPIL)	6.17	0.0	3.09	3.09	0.0
0	ANNELIDA (TOTAL)	5.95	0.0	2.98	2.98	0.0
1	ANNELIDA (LPIL)	5.95	0.0	2.98	2.98	0.0
0	CLADOCERA (TOTAL)	9227.25	6643.32	7935.28	1291.96	31.8
0	BOSMINIDAE					
1	BOSMINIDAE (LPIL)	8387.93	5339.19	6863.55	1524.37	27.5
0	CHYDORIDAE					
1	CHYDORIDAE (LPIL)	9.26	0.0	4.63	4.63	0.0
0	DAPHNIDAE					
1	DAPHNIA GALEATA MENDOTAE	148.12	312.62	230.37	82.25	0.9
1	DAPHNIA RETROCURVA	355.11	627.64	491.37	136.27	2.0
1	DAPHNIA PULEX	20.31	0.0	10.16	10.16	0.0
1	DAPHNIA (LPIL)	51.05	35.64	43.34	7.71	0.2
6	DAPHNIA (LPIL)	87.97	51.64	74.80	13.16	0.3
0	HOLOPEIDAE					
1	HOLOPEIDIUM GIBBERUM	152.11	266.60	209.36	57.24	0.8
6	CLADOCERA (LPIL)	15.40	0.0	7.70	7.70	0.0
0	COPEPODA (TOTAL)	11240.38	22703.36	16971.87	5731.49	68.1
0	CALANOIDA (TOTAL)					
1	DIAPYCNUS OREGONENSIS	300.29	1105.02	702.66	402.37	2.8
1	DIAPYCNUS ASHLANDI	729.98	2951.17	1840.57	1110.59	7.4
1	DIAPYCNUS SICULOIDES	3.09	0.0	1.54	1.54	0.0
1	DIAPYCNUS PALLIDUS	6.17	0.0	3.09	3.09	0.0
1	DIAPYCNUS SICILIS	194.34	1094.78	644.56	450.22	2.6
1	DIAPYCNUS MINUTUS	87.02	237.01	162.02	74.99	0.6
1	EURYTEMORA AFFINIS	8.13	0.0	4.06	4.06	0.0
1	EPISCHURA LACUSTRIS	153.00	157.17	155.09	2.08	0.6
14	CALANOIDA (LPIL)	2388.50	6133.05	4260.77	1872.27	17.1
0	CYCLOPOIDA (TOTAL)					
1	CYCLOPS BICUSPIDATUS THOMASI	999.28	1409.67	1204.48	205.20	4.8
1	TROPOCYCLOPS FRASINUS MEXICANA	42.96	90.36	66.66	23.70	0.3
14	CYCLOPOIDA (LPIL)	6327.62	9525.12	7926.37	1598.75	31.8
	TOTAL	20519.11	29346.67	24932.89	4413.78	100.0
	DIVERSITY (H PRIME)	2.13	2.60	2.36	0.23	
	DIVERSITY (J PRIME)	0.60	0.73	0.67	0.06	
	NUMBER OF TAXA	23	14	23		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

ABOVE COMPUTED USING SAMPLE IDS

11	12	13	14
21	22	23	24
31	32	33	34
41	42	43	44
51	52	53	54
61	62	63	64
101	102	103	104
71	72	73	74
81	82	83	84
91	92	93	94

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC IC GC LOC

5 51 51 1 1 00

SID	DATE	TIME D/H	DURATION		TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURED	COND	DC	PH	SALIN	P
			UNITS	C	HD	SP	D	UNITS	C	SC	DI	T	CL	SP							
171	0/0/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	0/0/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0/0/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0/0/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

15 TAXA

	1	2	3	4	X	S.E.	REL
TOTAL	-0.00	-0.00	-0.00	-0.00	-0.00	-1.00	100.0
DIVERSITY (H PRIME)	0.0	0.0	0.0	0.0	0.0	0.0	
DIVERSITY (J PRIME)	0.0	0.0	0.0	0.0	0.0	0.0	
NUMBER OF TAXA	0	0	0	0	0	0	

MISSSED SAMPLE IDS

171 172 173 174

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC 1C 6C 10C

5 51 51 1 1 00

SID	DATE	TIME	DURATION		WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BY	TURBO	COND	DO	PH	SALIN P
			D/N	UNITS C		SP	UNITS C	SC	DI	CL	SP	DI	AIR	MAT							
181	0/0/0	0	0	0.0	0	0.0	0.0	0.0	0	0	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
182	0/0/0	0	0	0.0	0	0.0	0.0	0.0	0	0	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
183	0/0/0	0	0	0.0	0	0.0	0.0	0.0	0	0	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
184	0/0/0	0	0	0.0	0	0.0	0.0	0.0	0	0	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
LS TAXA																					
TOTAL																					

LS TAXA

	1	2	3	4																		
TOTAL	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
DIVERSITY (H PRIME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DIVERSITY (J PRIME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NUMBER OF TAXA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MISSSED SAMPLE IDS

181 182 183 184

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

IS	TAXA	17	18	- X	S.E.	REL ADZ
TOTAL		-0.00	-0.00	-0.00	-1.00	100.0
DIVERSITY (H PRIME)		0.0	0.0	0.0	0.0	
DIVERSITY (J PRIME)		0.0	0.0	0.0	0.0	
NUMBER OF TAXA		0	0	0		

MISSSED SAMPLE IDS

171	172	173	174
181	182	183	184

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA		-	REL
			X	S.E. AB%
		18		
TOTAL		-0.00	-0.00	-1.00 100.0
DIVERSITY (H PRIME)		0.0	0.0	0.0
DIVERSITY (J PRIME)		0.0	0.0	0.0
NUMBER OF TAXA		0	0	

MISSSED SAMPLE IDS

171	172	173	174
181	182	183	184

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC
5 51 51 1 2 00

SID	DATE	TIME	D/N	DURATION		SD	WD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TUBED	COND	DO	PH	SALIN	P	
				UNITS	C			SP	D	UNITS	C	SECH	WT	SC	LI	CL	SP								DI
191	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0.0	0	4.0	4.0	0	0.0	0	10.9	0.0	0.0	0
192	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0.0	0	4.0	4.0	0	0.0	0	10.9	0.0	0.0	0
193	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0.0	0	4.0	4.0	0	0.0	0	10.9	0.0	0.0	0
194	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0.0	0	4.0	4.0	0	0.0	0	10.9	0.0	0.0	0

LS	TAXA	REL		S.E.	AB%			
		X						
0	CHIDARIA (TOTAL)	23.33	0.0	66.67	25.13	28.78	13.86	1.3
0	HYDROZOA							
19	HYDRA (LPIL)	23.33	0.0	66.67	25.13	28.78	13.86	1.3
0	NEMATODA (TOTAL)	6.67	0.0	0.0	8.38	3.76	2.20	0.2
1	NEMATODA (LPIL)	6.67	0.0	0.0	8.38	3.76	2.20	0.2
0	OLIGOCHAETA (TOTAL)	116.67	66.67	160.00	159.13	125.62	22.10	5.7
0	NAIDIDAE							
1	CHAETOGASTER (LPIL)	0.0	0.0	0.0	16.75	4.19	4.19	0.2
1	OLIGOCHAETA (LPIL)	116.67	66.67	160.00	142.38	121.43	20.31	5.5
0	ANNELIDA (TOTAL)	8.33	46.67	13.33	25.13	23.36	8.53	1.1
1	ANNELIDA (LPIL)	8.33	46.67	13.33	25.13	23.36	8.53	1.1
0	CLADOCERA (TOTAL)	476.67	1726.67	2386.67	1247.91	1509.48	416.20	68.3
0	BOSMINIDAE							
1	BOSMINIDAE (LPIL)	1.67	13.33	26.67	50.25	22.98	10.43	1.0
0	CHYDORIDAE							
1	ALONA RECTANGULA	41.67	60.00	0.0	0.0	25.42	15.14	1.1
1	ALONA AFFINIS	30.00	66.67	93.33	41.88	57.97	14.05	2.6
1	ALONA GUTTATA	25.00	0.0	0.0	0.0	6.25	6.25	0.3
20	ALONA (LPIL)	261.67	0.0	0.0	0.0	65.42	65.42	3.0
1	ALONA (LPIL)	0.0	453.33	906.67	737.02	524.25	198.20	23.7
1	CAMPTOCEPUS RECTIROSTRIS	3.33	26.67	26.67	0.0	14.17	7.25	0.6
1	CHYDORUS (LPIL)	45.00	893.33	933.33	309.88	545.39	219.36	24.7
1	PLEUROXUS DENTICULATUS	0.0	220.00	293.33	41.08	130.80	70.20	6.3
1	PLEUROXUS (LPIL)	20.00	73.33	40.00	25.13	39.61	12.01	1.8
0	DAPHNIDAE							
1	SINOCEPHALUS (LPIL)	13.33	93.33	66.67	41.68	53.80	17.10	2.4
0	MACROTHRICIDAE							
1	ILYCRYPTUS SPINIFER	1.67	0.0	0.0	0.0	0.42	0.42	0.0
6	CLADOCERA (LPIL)	0.0	26.67	0.0	0.0	6.67	6.67	0.3
3	CLADOCERA (LPIL)	33.33	0.0	0.0	0.0	8.33	8.33	0.4
0	OSTRACODA (TOTAL)	13.33	33.33	13.33	16.75	19.19	4.78	0.9
19	OSTRACODA (LPIL)	13.33	33.33	13.33	16.75	19.19	4.78	0.9
0	COPEPODA (TOTAL)	86.67	1233.33	306.67	293.13	479.95	256.12	21.7
0	CALANOIDA (TOTAL)							
14	CALANOIDA (LPIL)	1.67	0.0	0.0	25.13	6.70	6.16	0.3
0	CYCLOPOIDA (TOTAL)							

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	- X	S.E.	REL AB%
1	CYCLOPS VERNALIS	0.0	33.33	40.00	16.75	22.52	8.96	1.0
1	EUCYCLOPS AGILIS	8.33	266.67	26.67	50.25	87.98	60.16	4.0
1	EUCYCLOPS SPERATUS	1.67	20.00	13.33	8.38	10.84	3.88	0.5
1	MACROCYCLOPS ALBIDUS	6.67	260.00	40.00	33.50	85.04	58.76	3.8
14	CYCLOPOIDA (LPIL)	65.00	646.67	106.67	159.13	264.37	130.07	12.0
0	HARPACTICOIDA (TOTAL)							
1	HARPACTICOIDA (LPIL)	3.33	0.0	0.0	0.0	0.83	0.83	0.0
14	HARPACTICOIDA (LPIL)	0.0	6.67	0.0	0.0	1.67	1.67	0.1
0	EPHEMEROPTERA (TOTAL)							
1	EPHEMEROPTERA (LPIL)	0.0	6.67	13.33	0.0	5.00	3.19	0.2
14	EPHEMEROPTERA (LPIL)	0.0	6.67	13.33	0.0	5.00	3.19	0.2
0	DIPTERA NEMATOCERA (TOTAL)							
0	CHIRONOMIDAE	11.67	13.33	26.67	8.38	15.01	4.02	0.7
2	CHIRONOMIDAE (LPIL)	11.67	13.33	26.67	8.38	15.01	4.02	0.7
	TOTAL	743.33	3326.66	2986.66	1783.92	2210.14	590.40	100.0
	DIVERSITY (H PRIME)	3.30	3.27	3.89	2.99	3.11	0.10	
	DIVERSITY (J PRIME)	0.73	0.74	0.65	0.69	0.71	0.02	
	NUMBER OF TAXA	23	21	19	20	27		

ABOVE COMPUTED USING SAMPLE IDS

191 192 193 194

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC 10C

5 51 51 1 2 00

SID	DATE	TIME	DURATION		SD	TOW		SAMP VOL		WIND		CURRENT		TEMP		BT	TURB	COND	DO	PH	SALIN P						
			D/N	UNITS		C	D	SP	D	UNITS	C	SECH	W	T	SC							DI	CL	SP	DI	ATP	WAT
201	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0	0.0	0	3.0	4.0	0	0.0	0	10.2	0.0	0.0	0	
202	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0	0.0	0	3.0	4.0	0	0.0	0	10.2	0.0	0.0	0	
203	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0	0.0	0	3.0	4.0	0	0.0	0	10.2	0.0	0.0	0	
204	11/15/80	1710	0	0.0	0	1.0	1.0	0.0	0	0.6	3	1.0	0.0	0	0	0.0	0	3.0	4.0	0	0.0	0	10.2	0.0	0.0	0	
15																					X	S.E.	REL	ABX			
0	TAXA																										
0	CHIDARIA (TOTAL)																				53.33	15.15	88.89	37.04	48.60	15.54	0.9
0	HYDROZOA																										
19	HYDRA (LPIL)																				53.33	15.15	88.89	37.04	48.60	15.54	0.9
0	NEMATODA (TOTAL)																				426.67	151.52	88.89	111.11	194.55	78.45	3.7
1	NEMATODA (LPIL)																				426.67	151.52	88.89	111.11	194.55	78.45	3.7
0	OLIGOCHAETA (TOTAL)																				266.67	0.0	44.44	37.04	87.04	60.66	1.6
1	OLIGOCHAETA (LPIL)																				266.67	0.0	44.44	37.04	87.04	60.66	1.6
0	ANNELIDA (TOTAL)																				373.33	0.0	22.22	0.0	93.89	91.63	1.9
1	ANNELIDA (LPIL)																				373.33	0.0	22.22	0.0	93.89	91.63	1.9
0	CLADOCERA (TOTAL)																				4160.00	1787.88	2688.89	2333.33	2742.52	507.52	51.7
0	BOSMINIDAE																										
1	BOSMINIDAE (LPIL)																				0.0	0.0	66.67	74.07	35.19	20.37	0.7
0	CHYDORIDAE																										
1	ALONA RECTANGULA																				53.33	0.0	0.0	0.0	13.33	13.33	0.3
1	ALONA AFFINIS																				53.33	121.21	111.11	18.52	76.04	24.32	1.4
1	ALONA (LPIL)																				960.00	545.45	311.11	185.19	500.44	170.40	9.4
1	CAMPTOCERCUS RECTIROSTRIS																				160.00	15.15	0.0	0.0	43.79	38.90	0.8
1	CHYDORUS (LPIL)																				2453.33	954.55	2022.22	1833.33	1815.86	315.06	34.2
1	PLEUROXUS DENTICULATUS																				0.0	45.45	66.67	18.52	32.66	14.68	0.6
1	PLEUROXUS (LPIL)																				213.33	15.15	22.22	0.0	62.68	50.43	1.2
0	DAFNIIDAE																										
1	DAFANIA RETROCURVA																				0.0	15.15	0.0	0.0	3.79	3.79	0.1
1	SINOCEPHALUS (LPIL)																				266.67	75.76	88.89	129.63	140.24	43.68	2.6
1	SCAPHOLEBERIS (LPIL)																				0.0	0.0	0.0	55.56	13.89	13.89	0.3
6	CLADOCERA (LPIL)																				0.0	0.0	0.0	18.52	4.63	4.63	0.1
0	OSTRACODA (TOTAL)																				266.67	30.30	0.0	74.07	92.76	59.93	1.7
19	OSTRACODA (LPIL)																				266.67	30.30	0.0	74.07	92.76	59.93	1.7
0	COPEPODA (TOTAL)																				5280.00	813.18	1000.00	700.74	1959.73	1108.09	37.0
0	CYCLOPOIDA (TOTAL)																										
1	CYCLOPS VERNALIS																				106.67	60.61	88.89	92.59	87.19	9.65	1.6
1	EUCYCLOPS AGASSIS																				533.33	45.45	88.89	92.59	190.07	114.92	3.6
1	MACROCYCLOPS ALBIUS																				830.00	136.36	244.44	240.74	355.39	150.31	6.7
14	CYCLOPOIDA (LPIL)																				3840.00	560.61	555.56	277.78	1308.48	846.42	24.7
0	HARPACTICOIDA (TOTAL)																										
1	HARPACTICOIDA (LPIL)																				0.0	15.15	22.22	37.04	18.60	7.70	0.4
0	DIPTERA NEMATOCERA (TOTAL)																				160.00	4.45	88.89	18.52	78.22	30.83	1.5

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	X	S.E.	REL ABZ
0	CHIRONOMIDAE	160.00	45.45	80.89	18.52	78.22	30.88	1.5
2	CHIRONOMIDAE (LPII)							
TOTAL		10986.64	2348.48	4012.22	3351.05	5302.29	1909.97	100.0
DIVERSITY (H PRIME)		3.01	2.89	2.69	2.63	2.80	0.09	
DIVERSITY (J PRIME)		6.74	0.71	0.66	3.63	0.68	0.02	
NUMBER OF TAXA		17	17	17	18	23		

ABOVE COMPUTED USING SAMPLE IDS

201 202 203 204

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA	19	20	X	S.E.	REL ABZ
0	Cnidaria (TOTAL)	28.78	48.60	38.69	9.91	1.0
0	HYDROZOA					
19	HYDRA (LPIL)	28.78	48.60	38.69	9.91	1.0
0	NEMATODA (TOTAL)	3.76	194.55	99.15	95.39	2.6
1	NEMATODA (LPIL)	3.76	194.55	99.15	95.39	2.6
0	OLIGOCHAETA (TOTAL)	125.62	87.04	106.33	19.29	2.8
0	HAIRIDAE					
1	CHAETOGASTER (LPIL)	4.19	0.0	2.09	2.09	0.1
1	OLIGOCHAETA (LPIL)	121.43	87.04	104.23	17.20	2.8
0	ANNELIDA (TOTAL)	23.36	98.89	61.13	37.76	1.6
1	ANNELIDA (LPIL)	23.36	98.89	61.13	37.76	1.6
0	CLADOCERA (TOTAL)	1509.48	2742.52	2126.00	616.52	56.6
0	BOSMINIDAE					
1	BOSMINIDAE (LPIL)	22.98	35.19	29.08	6.10	0.8
0	CHYDORIDAE					
1	ALONA RECTANGULA	25.42	13.33	19.37	6.04	0.5
1	ALONA AFFINIS	57.97	76.04	67.01	9.04	1.8
1	ALONA GUTTATA	6.25	0.0	3.12	3.12	0.1
20	ALONA (LPIL)	65.42	0.0	32.71	32.71	0.9
1	ALONA (LPIL)	524.25	500.44	512.35	11.91	13.6
1	CAMPTOCERCUS RECTIROSTRIS	14.17	43.79	28.98	14.81	0.8
1	CHYDORUS (LPIL)	545.39	1815.86	1180.62	635.24	31.4
1	PLEUROXUS DENTICULATUS	138.80	32.66	85.73	53.07	2.3
1	PLEUROXUS (LPIL)	39.61	62.68	51.15	11.53	1.4
0	DAPHNIDAE					
1	DAPHNIA RETROCURVA	0.0	3.79	1.89	1.89	0.1
1	SIMOCEPHALUS (LPIL)	53.80	140.24	97.02	43.22	2.6
1	SCAPHOLEBERIS (LPIL)	0.0	13.89	6.94	6.94	0.2
0	MACROTHRICIDAE					
1	ILYCRYPUS SPINIFER	0.42	0.0	0.21	0.21	0.0
6	CLADOCERA (LPIL)	6.67	4.63	5.65	1.02	0.2
3	CLADOCERA (LPIL)	8.33	0.0	4.17	4.17	0.1
0	OSTRACODA (TOTAL)	19.19	92.76	55.97	36.79	1.5
19	OSTRACODA (LPIL)	19.19	92.76	55.97	36.79	1.5
0	COPEPODA (TOTAL)	479.95	1959.73	1219.84	739.89	32.5
0	CALANOIDA (TOTAL)					
14	CALANOIDA (LPIL)	6.70	0.0	3.35	3.35	0.1
0	CYCLOPOIDA (TOTAL)					
1	CYCLOPS VERNALIS	22.52	87.19	54.85	32.33	1.5
1	EUCYCLOPS AGILIS	87.98	190.07	139.02	51.04	3.7
1	EUCYCLOPS SPERATUS	10.84	0.0	5.42	5.42	0.1
1	MACROCYCLOPS ALBIDUS	85.04	355.39	220.21	135.17	5.9
14	CYCLOPOIDA (LPIL)	264.37	1308.48	786.42	522.06	20.9
0	HARPACTICOIDA (TOTAL)					

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BAILEY GENERATING PLANT

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STATION REPORT

LS	TAXA	19	20	- X	S.E.	REL AB%
1	HARPACTICOIDA (LPIL)	0.83	18.60	9.72	8.88	0.3
14	HARPACTICOIDA (LPIL)	1.67	0.0	0.83	0.83	0.0
0	EPHEMEROPTERA (TOTAL)	5.00	0.0	2.50	2.50	0.1
13	EPHEMEROPTERA (LPIL)	5.00	0.0	2.50	2.50	0.1
0	DIPTERA NEMATOCERA (TOTAL)	15.01	78.22	46.61	31.60	1.2
0	CHIRONOMIDAE					
2	CHIRONOMIDAE (LPIL)	15.01	78.22	46.61	31.60	1.2
TOTAL		2210.14	5302.29	3756.22	1546.07	100.0
DIVERSITY (H PRIME)		3.11	2.80	2.96	0.15	
DIVERSITY (J PRIME)		0.71	0.68	0.70	0.01	
NUMBER OF TAXA		27	23	29		

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LS	TAXA		- X	S.E.	REL ABZ
		20			
0	CHIDARIA (TOTAL)	38.69	38.69	-1.00	1.0
0	HYDROZOA				
19	HYDRA (LPIL)	38.69	38.69	-1.00	1.0
0	NEMATODA (TOTAL)	99.15	99.15	-1.00	2.6
1	NEMATODA (LPIL)	99.15	99.15	-1.00	2.6
0	OLIGOCHAETA (TOTAL)	106.33	106.33	-1.00	2.8
0	NAIDIDAE				
1	CHAETOGASTER (LPIL)	2.09	2.09	-1.00	0.1
1	OLIGOCHAETA (LPIL)	104.23	104.23	-1.00	2.8
0	ANNELIDA (TOTAL)	61.13	61.13	-1.00	1.6
1	ANNELIDA (LPIL)	61.13	61.13	-1.00	1.6
0	CLADOCERA (TOTAL)	2126.00	2126.00	-1.00	56.6
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	29.08	29.08	-1.00	0.8
0	CHYDORIDAE				
1	ALONA RECTANGULA	19.37	19.37	-1.00	0.5
1	ALONA AFFINIS	67.01	67.01	-1.00	1.8
1	ALONA GUTTATA	3.12	3.12	-1.00	0.1
20	ALONA (LPIL)	32.71	32.71	-1.00	0.9
1	ALONA (LPIL)	512.35	512.35	-1.00	13.6
1	CAMPTOCERCUS RECTIROSTRIS	28.98	28.98	-1.00	0.8
1	CHYDORUS (LPIL)	1180.62	1180.62	-1.00	31.4
1	PLEUROKUS DENTICULATUS	85.73	85.73	-1.00	2.3
1	PLEUROKUS (LPIL)	51.15	51.15	-1.00	1.4
0	DAPHNIDAE				
1	DAPHNIA RETROCURVA	1.89	1.89	-1.00	0.1
1	SINOCEPHALUS (LPIL)	97.02	97.02	-1.00	2.6
1	SCAPHOLEBERIS (LPIL)	6.94	6.94	-1.00	0.2
0	MACROTHRICIDAE				
1	ILYCRYPTUS SPINIFER	0.21	0.21	-1.00	0.0
6	CLADOCERA (LPIL)	5.65	5.65	-1.00	0.2
3	CLADOCERA (LPIL)	4.17	4.17	-1.00	0.1
0	OSTRACODA (TOTAL)	55.97	55.97	-1.00	1.5
19	OSTRACODA (LPIL)	55.97	55.97	-1.00	1.5
0	COPEPODA (TOTAL)	1219.84	1219.84	-1.00	32.5
0	CALANOIDA (TOTAL)				
14	CALANOIDA (LPIL)	3.35	3.35	-1.00	0.1
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VERNALIS	54.85	54.85	-1.00	1.5
1	EUCYCLOPS AGILIS	139.02	139.02	-1.00	3.7
1	EUCYCLOPS SPERATUS	5.42	5.42	-1.00	0.1
1	MACROCYCLOPS ALBIDUS	220.21	220.21	-1.00	5.9
14	CYCLOPOIDA (LPIL)	786.42	786.42	-1.00	20.9
0	HARPACTICOIDA (TOTAL)				

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LS	TAXA		- X	S.E.	REL ABZ
		20			
1	HARPACTICOIDA (LPIL)	9.72	9.72	-1.00	0.3
14	HARPACTICOIDA (LPIL)	0.83	0.83	-1.00	0.0
6	HEMEROPTERA (TOTAL)	2.50	2.50	-1.00	0.1
13	HEMEROPTERA (LPIL)	2.50	2.50	-1.00	0.1
0	DIPTERA NEMATOCERA (TOTAL)	46.61	46.61	-1.00	1.2
0	CHIRONOMIDAE				
4	CHIRONOMIDAE (LPIL)	46.61	46.61	-1.00	1.2
TOTAL		3756.22	3756.22	-1.00	100.0
DIVERSITY (H PRIME)		2.96	2.96	-1.00	
DIVERSITY (J PRIME)		0.70	0.70	-1.00	
NUMBER OF TAXA		29	29		

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DAILY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

PC TC GC LOC

5 51 51 1 3 00

SYD	DATE	TIME	D/N	UNITS	C	SD	HD	TOW		SAMP	VOL	C	SECH	W	I	WIND		CURRENT		TEMP	BT	TURBD	COND	DO	PH	SALN	P	
								SP	D							CL	SP	DI	AIR									WAT
211	11/15/80	2000	0	0.0	0	1.0	1.0	0.0	0.0	0.6	3	1.0	0.0	0	0	0	0	0	0	2.0	4.0	0	0.0	0	4.0	0.0	0.0	0.0
212	11/15/80	2000	0	0.0	0	1.0	1.0	0.0	0.0	0.6	3	1.0	0.0	0	0	0	0	0	0	2.0	4.0	0	0.0	0	4.0	0.0	0.0	0.0
213	11/15/80	2000	0	0.0	0	1.0	1.0	0.0	0.0	0.6	3	1.0	0.0	0	0	0	0	0	0	2.0	4.0	0	0.0	0	4.0	0.0	0.0	0.0
214	11/15/80	2000	0	0.0	0	1.0	1.0	0.0	0.0	0.6	3	1.0	0.0	0	0	0	0	0	0	2.0	4.0	0	0.0	0	4.0	0.0	0.0	0.0
LS	TAXA																											
0	CNIDARIA (TOTAL)																											
0	HYDROZOA																											
19	HYDRA (LPIL)																											
0	OLIGOCHAETA (TOTAL)																											
1	OLIGOCHAETA (LPIL)																											
0	ANNELIDA (TOTAL)																											
1	ANNELIDA (LPIL)																											
0	GASTROPODA (TOTAL)																											
2	GASTROPODA (LPIL)																											
0	ARACHNIDA (TOTAL)																											
19	ARACHNIDA (LPIL)																											
0	CLADOCERA (TOTAL)																											
0	BOBINIDAE																											
1	BOBINIDAE (LPIL)																											
0	CHYDORIDAE																											
1	CHYDORUS (LPIL)																											
1	PLEUROXUS DENTICULATUS																											
1	PLEUROXUS (LPIL)																											
0	DAPHNIDAE																											
1	SYMPHYLAUS (LPIL)																											
1	SCAPHOLEBERIS KINGI																											
1	SCAPHOLEBERIS (LPIL)																											
3	CLADOCERA (LPIL)																											
0	OSTRACODA (TOTAL)																											
0	OSTRACODA (LPIL)																											
19	OSTRACODA (TOTAL)																											
0	COPEPODA (TOTAL)																											
0	CYCLOFOIDA (TOTAL)																											
0	CYCLOPS VERNALIS																											
1	CYCLOPS AGILIS																											
1	MACROCYCLOPS ALBIDUS																											
1	ORTHOLCYCLOPS HOBESUS																											
14	CYCLOFOIDA (LPIL) *																											
0	HARPACTICOIDA (TOTAL)																											
1	HARPACTICOIDA (LPIL)																											
14	HARPACTICOIDA (LPIL)																											
0	EPHEMEROPTERA (TOTAL)																											

NORTHERN INDIANA PUBLIC SERVICE COMPANY (497201

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

REPLICATE REPORT

LS	TAXA	1	2	3	4	- X	S.E.	REL AB%
13	EPHEMEROPTERA (LPIL)	0.0	1.67	0.0	0.0	0.42	0.42	0.3
0	TRICHOPTERA (TOTAL)	0.0	1.67	0.0	0.0	0.42	0.42	0.3
2	TRICHOPTERA (LPIL)	0.0	1.67	0.0	0.0	0.42	0.42	0.3
0	DIPTERA NEMATOCERA (TOTAL)	0.0	0.0	1.67	0.0	0.42	0.42	0.3
0	CHIRONOMIDAE							
2	CHIRONOMIDAE (LPIL)	0.0	0.0	1.67	0.0	0.42	0.42	0.3
0	DIPTERA (TOTAL)	1.67	0.0	0.0	0.0	0.42	0.42	0.3
2	DIPTERA (LPIL)	1.67	0.0	0.0	0.0	0.42	0.42	0.3
TOTAL		63.33	103.33	75.00	160.00	120.42	30.06	100.0
DIVERSITY (H PRIME)		2.41	2.31	2.25	2.05	2.26	0.07	
DIVERSITY (J PRIME)		0.72	0.59	0.65	0.62	0.65	0.03	
NUMBER OF TAXA		10	15	11	10	24		

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ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA			S.E.	REL ABZ
		21			
0	CHIDARIA (TOTAL)	0.83	0.83	-1.00	0.7
0	HYDROZOA				
19	HYDRA (LPIL)	0.83	0.83	-1.00	0.7
0	OLIGOCHAETA (TOTAL)	4.17	4.17	-1.00	3.5
1	OLIGOCHAETA (LPIL)	4.17	4.17	-1.00	3.5
0	ANNELIDA (TOTAL)	0.83	0.83	-1.00	0.7
1	ANNELIDA (LPIL)	0.83	0.83	-1.00	0.7
0	GASTROPODA (TOTAL)	0.42	0.42	-1.00	0.3
2	GASTROPODA (LPIL)	0.42	0.42	-1.00	0.3
0	ARACHNIDA (TOTAL)	0.42	0.42	-1.00	0.3
19	ARACHNIDA (LPIL)	0.42	0.42	-1.00	0.3
0	CLADOCERA (TOTAL)	22.50	22.50	-1.00	18.7
0	BOSMINIDAE				
1	BOSMINIDAE (LPIL)	0.83	0.83	-1.00	0.7
0	CHYDORIDAE				
1	CHYDORUS (LPIL)	0.83	0.83	-1.00	0.7
1	PLEUROXUS DENTICULATUS	10.42	10.42	-1.00	8.7
1	PLEUROXUS (LPIL)	5.00	5.00	-1.00	4.2
0	DAPHNIDAE				
1	SINOCEPHALUS (LPIL)	0.83	0.83	-1.00	0.7
1	SCAPHOLEBERIS KINGI	1.25	1.25	-1.00	1.0
1	SCAPHOLEBERIS (LPIL)	2.50	2.50	-1.00	2.1
3	CLADOCERA (LPIL)	0.83	0.83	-1.00	0.7
0	OSTRACODA (TOTAL)	1.25	1.25	-1.00	1.0
19	OSTRACODA (LPIL)	1.25	1.25	-1.00	1.0
0	COPEPODA (TOTAL)	88.33	88.33	-1.00	73.4
0	CYCLOPOIDA (TOTAL)				
1	CYCLOPS VERNALIS	2.08	2.08	-1.00	1.7
1	EUCYCLOPS AGILIS	0.83	0.83	-1.00	0.7
1	MACROCYCLOPS ALBIDUS	1.25	1.25	-1.00	1.0
1	ORTHOCYCLOPS MODESTUS	0.42	0.42	-1.00	0.3
14	CYCLOPOIDA (LPIL)	18.33	18.33	-1.00	15.2
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPIL)	53.33	53.33	-1.00	44.3
14	HARPACTICOIDA (LPIL)	12.00	12.00	-1.00	10.0
0	EPHEMEROPTERA (TOTAL)	0.42	0.42	-1.00	0.3
13	EPHEMEROPTERA (LPIL)	0.42	0.42	-1.00	0.3
0	TRICHOPTERA (TOTAL)	0.42	0.42	-1.00	0.3
2	TRICHOPTERA (LPIL)	0.42	0.42	-1.00	0.3
0	DIPTERA NEMATOCERA (TOTAL)	0.42	0.42	-1.00	0.3
0	CHIRONOMIDAE				
2	CHIRONOMIDAE (LPIL)	0.42	0.42	-1.00	0.3
0	DIPTERA (TOTAL)	0.42	0.42	-1.00	0.3
2	DIPTERA (LPIL)	0.42	0.42	-1.00	0.3

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IS	TAXA	21	REL	S.E.	ABZ
TOTAL		120.42		-1.00	100.0
DIVERSITY (H PRIME)		2.26		-1.00	
DIVERSITY (J PRIME)		0.65		-1.00	
NUMBER OF TAXA		24			

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15	TAZA	21	-	X	S.E.	REL ABZ
0	CHIDARIA (TOTAL)	0.83	0.83		-1.00	0.7
0	HYDROPHORA					
19	HYDROPHORA (LPIL)	0.83	0.83		-1.00	0.7
0	OLIGOCHEATA (TOTAL)	4.17	4.17		-1.00	3.5
1	OLIGOCHEATA (LPIL)	4.17	4.17		-1.00	3.5
0	AMELIDA (TOTAL)	0.83	0.83		-1.00	0.7
1	AMELIDA (LPIL)	0.83	0.83		-1.00	0.7
0	GASTROPODA (TOTAL)	0.42	0.42		-1.00	0.3
2	GASTROPODA (LPIL)	0.42	0.42		-1.00	0.3
0	ARACHNIDA (TOTAL)	0.42	0.42		-1.00	0.3
19	ARACHNIDA (LPIL)	0.42	0.42		-1.00	0.3
0	CLADOCERA (TOTAL)	22.50	22.50		-1.00	18.7
0	BOSMINIDAE					
1	BOSMINIDAE (LPIL)	0.83	0.83		-1.00	0.7
0	CHYDORIDAE					
1	CHYDORUS (LPIL)	0.83	0.83		-1.00	0.7
1	PLEUROXUS DENTICULATUS	10.42	10.42		-1.00	8.7
1	PLEUROXUS (LPIL)	5.00	5.00		-1.00	4.2
0	DAPHNIDAE					
1	STHOCEPHALUS (LPIL)	0.83	0.83		-1.00	0.7
1	SCAPHOLEBERIS KINGI	1.25	1.25		-1.00	1.0
1	SCAPHOLEBERIS (LPIL)	2.50	2.50		-1.00	2.1
3	CLADOCERA (LPIL)	0.83	0.83		-1.00	0.7
0	OSTRACODA (TOTAL)	1.25	1.25		-1.00	1.0
19	OSTRACODA (LPIL)	3.25	1.25		-1.00	1.0
0	COPEPODA (TOTAL)	86.33	68.33		-1.00	73.4
0	CYCLOPOIDA (TOTAL)					
1	CYCLOPS VERNALIS	2.08	2.08		-1.00	1.7
1	EUCYCLOPS AGILIS	0.83	0.83		-1.00	0.7
1	MACROCYCLOPS ALBIDUS	1.25	1.25		-1.00	1.0
1	ORTHOCYCLOPS HODESTUS	0.42	0.42		-1.00	0.3
14	CYCLOPOIDA (LPIL)	18.33	18.33		-1.00	15.2
0	HARPACTICOIDA (TOTAL)					
1	HARPACTICOIDA (LPIL)	53.33	53.33		-1.00	44.3
14	HARPACTICOIDA (LPIL)	12.03	12.03		-1.00	10.0
0	EPHEMEROPTERA (TOTAL)	0.42	0.42		-1.00	0.3
13	EPHEMEROPTERA (LPIL)	0.42	0.42		-1.00	0.3
0	TRICHOPTERA (TOTAL)	0.42	0.42		-1.00	0.3
2	TRICHOPTERA (LPIL)	0.42	0.42		-1.00	0.3
0	DIPTERA NEMATOCERA (TOTAL)	0.42	0.42		-1.00	0.3
0	CHIRONOMIDAE					
2	CHIRONOMIDAE (LPIL)	0.42	0.42		-1.00	0.3
0	DIPTERA (TOTAL)	0.42	0.42		-1.00	0.3
2	DIPTERA (LPIL)	0.42	0.42		-1.00	0.3

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

STATION REPORT

LS	TAXA			-		REL
				X	S.E.	AB%
		21				
TOTAL		120.42		120.42	-1.00	100.0
DIVERSITY (H PRIME)		2.26		2.26	-1.00	
DIVERSITY (J PRIME)		0.65		0.65	-1.00	
NUMBER OF TAXA		24		24		

ABOVE COMPUTED USING SAMPLE IDS

211 212 213 214

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BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B	Pond C	Cowles Bog	X	S.E.	REL ABZ
		1	1	1			
0	CNIDARIA (TOTAL)	0.0	38.69	0.83	19.76	18.93	1.0
0	HYDROZOA						
19	HYDRA (LPIL)	0.0	38.69	0.83	19.76	18.93	1.0
0	NEMATODA (TOTAL)	0.0	99.15	0.0	49.58	49.58	2.6
1	NEMATODA (LPIL)	0.0	99.15	0.0	49.58	49.58	2.6
0	OLIGOCHAETA (TOTAL)	0.0	106.33	4.17	55.25	51.08	2.9
0	HAIDIDAE						
1	CHAETOGASTER (LPIL)	0.0	2.09	0.0	1.05	1.05	0.1
1	OLIGOCHAETA (LPIL)	0.0	104.23	4.17	54.20	50.03	2.8
0	ANNELIDA (TOTAL)	0.0	61.13	0.83	30.98	30.15	1.6
1	ANNELIDA (LPIL)	0.0	61.13	0.83	30.98	30.15	1.6
0	GASTROPODA (TOTAL)	0.0	0.0	0.42	0.21	0.21	0.0
2	GASTROPODA (LPIL)	0.0	0.0	0.42	0.21	0.21	0.0
0	TRACHINIDA (TOTAL)	0.0	0.0	0.42	0.21	0.21	0.0
19	TRACHINIDA (LPIL)	0.0	0.0	0.42	0.21	0.21	0.0
0	CLADOCERA (TOTAL)	0.0	2126.00	22.50	1074.25	1051.75	55.4
0	EOSMINIDAE						
1	EOSMINIDAE (LPIL)	0.0	29.08	0.83	14.96	14.12	0.8
0	CHYDORIDAE						
1	ALONA RECTANGULA	0.0	19.37	0.0	9.69	9.69	0.5
1	ALONA AFFINIS	0.0	67.01	0.0	33.50	33.50	1.7
1	ALONA GUTTATA	0.0	3.12	0.0	1.56	1.56	0.1
20	ALONA (LPIL)	0.0	32.71	0.0	16.35	16.35	0.8
1	ALONA (LPIL)	0.0	512.35	0.0	256.17	256.17	13.2
1	CAMPTOCERCUS RECTIROSTRIS	0.0	28.98	0.0	14.49	14.49	0.7
1	CHYDORUS (LPIL)	0.0	1180.62	0.83	590.73	589.89	30.5
1	PLEUROXUS DENTICULATUS	0.0	85.73	10.42	48.07	37.66	2.5
1	PLEUROXUS (LPIL)	0.0	51.15	5.00	28.07	23.07	1.4
0	DAPHNIDAE						
1	DAPHNIA RETROCURVA	0.0	1.89	0.0	0.95	0.95	0.0
1	SINOCEPHALUS (LPIL)	0.0	97.02	0.83	48.93	48.09	2.5
1	SCAPHOLEBERIS KINGI	0.0	0.0	1.25	0.62	0.62	0.0
1	SCAPHOLEBERIS (LPIL)	0.0	6.94	2.50	4.72	2.22	0.2
0	MACROTHRICIDAE						
1	ILYCRYPTUS SPINIFER	0.0	0.21	0.0	0.10	0.10	0.0
6	CLADOCERA (LPIL)	0.0	5.65	0.0	2.82	2.82	0.1
3	CLADOCERA (LPIL)	0.0	4.17	0.83	2.50	1.67	0.1
0	OSTRACODA (TOTAL)	0.0	55.97	1.25	28.61	27.36	1.5
19	OSTRACODA (LPIL)	0.0	55.97	1.25	28.61	27.36	1.5
0	COPEPODA (TOTAL)	0.0	1219.84	88.33	654.09	565.75	33.7
0	CALANOIDA (TOTAL)						
14	CALANOIDA (LPIL)	0.0	3.35	0.0	1.67	1.67	0.1
0	CYCLOPOIDA (TOTAL)						
1	CYCLOPS VERNALIS	0.0	54.85	2.08	28.47	26.39	1.5

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

ZOOPLANKTON DENSITY

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B	Pond C	Cowles Bog	- X	S.E.	REL AD%
		1	1	1			
1	EUCYCLOPS AGILIS	0.0	139.02	0.83	69.93	69.10	3.6
1	EUCYCLOPS SPERATUS	0.0	5.42	0.0	2.71	2.71	0.1
1	MACROCYCLOPS ALBIUS	0.0	220.21	1.25	110.73	109.48	5.7
1	ORTHOCYCLOPS MODESTUS	0.0	0.0	0.42	0.21	0.21	0.0
14	CYCLOPOIDA (LPIL)	0.0	786.42	18.33	402.38	384.05	20.8
0	HARPACTICOIDA (TOTAL)						
1	HARPACTICOIDA (LPIL)	0.0	9.72	53.33	31.53	21.81	1.6
14	HARPACTICOIDA (LPIL)	0.0	0.83	12.08	6.46	5.62	0.3
0	EPIHEMEROPTERA (TOTAL)	0.0	2.50	0.42	1.46	1.04	0.1
13	EPIHEMEROPTERA (LPIL)	0.0	2.50	0.42	1.46	1.04	0.1
0	TRICHOPTERA (TOTAL)	0.0	0.0	0.42	0.21	0.21	0.0
2	TRICHOPTERA (LPIL)	0.0	0.0	0.42	0.21	0.21	0.0
0	DIPTERA NEMATOCERA (TOTAL)	0.0	46.61	0.42	23.51	23.10	1.2
0	CHIRONOMIDAE						
2	CHIRONOMIDAE (LPIL)	0.0	46.61	0.42	23.51	23.10	1.2
0	DIPTERA (TOTAL)	0.0	0.0	0.42	0.21	0.21	0.0
2	DIPTERA (LPIL)	0.0	0.0	0.42	0.21	0.21	0.0
	TOTAL	-0.00	3756.22	120.42	1938.32	1817.90	100.0
	DIVERSITY (H PRIME)	0.0	2.96	2.26	2.61	0.35	
	DIVERSITY (J PRIME)	0.0	0.70	0.65	0.67	0.03	
	NUMBER OF TAXA	0	29	24	35		

ABOVE COMPUTED USING SAMPLE IDS

191	192	193	194
201	202	203	204
211	212	213	214

MISSED SAMPLE IDS

171	172	173	174
181	182	183	184

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Corrections to:

APPENDIX K

BENTHIC MACROINVERTEBRATE REPLICATE REPORTS,
BAILLY STUDY AREA, JUNE 1980

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 0 0 00

				DURATION			TOW			SAMP VOL			WIND			CURRENT			TEMP										
SJD	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNIT'S	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P		
21	6/11/80	1651	0	0.0	0	9.1	9.1	0.0	0	0.1	6	1.2	10	4	3	0	0.0	0	23.9	15.3	0	0.0	0	8.8	0.0	0.0	0		
22	6/11/80	1651	0	0.0	0	9.1	9.1	0.0	0	0.1	6	1.2	10	4	3	0	0.0	0	23.9	15.3	0	0.0	0	8.8	0.0	0.0	0		
15																							X	S.E.		REL AB%			
0	OLIGOCHAETA (TOTAL)						1	2												9.62				9.62				3.8	
0	TUBIFICIDAE						19.23	0.0																					
1	TUBIFICIDAE (LPIL)						19.23	0.0												9.62				9.62				3.8	
0	HIRUDINEA (TOTAL)						0.0	19.23												9.62				9.62				3.8	
5	HIRUDINEA (LPIL)						0.0	19.23												9.62				9.62				3.8	
0	AMPHIPODA (TOTAL)						76.92	134.62												105.77				28.85				42.3	
0	NAUSTORIIDAE																												
5	PONTOPOREIA AFFINIS						76.92	134.62												105.77				28.85				42.3	
0	DIPTERA NEMATOCERA (TOTAL)						115.33	134.62												125.00				9.62				50.0	
0	CHIRONOMIDAE																												
2	CRYPTOCHIRONOMUS (LPIL)						76.92	57.69												67.31				9.62				26.9	
2	HARNISCHIA (LPIL)						38.46	19.23												28.85				9.62				11.5	
3	CHIRONOMIDAE (LPIL)						0.0	57.69												28.85				28.85				11.5	
TOTAL							211.54	288.46												250.00				38.46				100.0	
DIVERSITY (H PRIME)							1.82	1.96												1.89				0.07					
DIVERSITY (J PRIME)							0.91	0.85												0.88				0.03					
NUMBER OF TAXA							4	5												6									
BOTTOM TYPE							0																						

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ. M)

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL ABZ
NUMBER OF TAXA		14	11			
SECTION TYPE	0			17		
ABOVE COMPUTED USING SAMPLE IDS						
	31	32				

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BATLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	1	2	3	X	S.E.	REL ABZ
0	PLATYHELMINTHES (TOTAL)	9.62	0.0	96.15	35.26	30.57	1.0
5	TURBELLARIA-(LPIL)	9.62	0.0	0.0	3.21	3.21	0.1
1	TURBELLARIA-(LPIL)	0.0	0.0	96.15	32.05	32.05	0.9
0	HEMATODA (TOTAL)	0.0	0.0	86.54	28.85	28.85	0.8
1	HEMATODA (LPIL)	0.0	0.0	86.54	28.85	28.85	0.8
0	OLIGOCHAETA (TOTAL)	0.0	9.62	9432.68	3147.43	3142.63	87.1
0	NAIDIDAE						
1	NAIDIDAE (LPIL)	0.0	0.0	105.77	35.26	35.26	1.0
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	0.0	9.62	9326.91	3112.18	3107.37	86.2
0	HIRUDINEA (TOTAL)	0.0	9.62	442.31	150.64	145.86	4.2
0	GLOSSIPHONIIDAE						
1	HELOSDELLA STAGNALIS	0.0	0.0	336.54	112.18	112.18	3.1
5	GLOSSIPHONIIDAE (LPIL)	0.0	0.0	67.31	22.44	22.44	0.6
5	HIPUDINEA (LPIL)	0.0	9.62	38.46	16.03	11.56	0.4
0	ANNELIDA (TOTAL)	0.0	0.0	28.85	9.62	9.62	0.3
5	ANNELIDA (LPIL)	0.0	0.0	28.85	9.62	9.62	0.3
0	BIVALVIA (TOTAL)	0.0	0.0	57.69	19.23	19.23	0.5
0	SPHAERIIDAE						
1	SPHAERIUM (LPIL)	0.0	0.0	9.62	3.21	3.21	0.1
5	SPHAERIUM (LPIL)	0.0	0.0	28.85	9.62	9.62	0.3
1	PISIDIUM (LPIL)	0.0	0.0	19.23	6.41	6.41	0.2
0	ISOPODA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.1
5	ISOPODA (LPIL)	0.0	0.0	9.62	3.21	3.21	0.1
0	AMPHIPODA (TOTAL)	48.08	105.77	19.23	57.69	25.44	1.6
0	HAUSTORIIDAE						
5	PONTOPOREIA AFFINIS	48.08	105.77	19.23	57.69	25.44	1.6
0	DIPTERA NEMATOCERA (TOTAL)	163.46	125.00	182.69	157.05	16.96	4.3
0	CHIRONOMIDAE						
2	CRYPTOCHIRONOMUS (LPIL)	57.69	67.31	76.92	67.31	5.55	1.9
2	PROCLADIUS (LPIL)	0.0	0.0	9.62	3.21	3.21	0.1
2	HABRISCHIA (LPIL)	96.15	28.85	0.0	41.67	28.49	1.2
2	PSECTROCLADIUS (LPIL)	0.0	0.0	76.92	25.64	25.64	0.7
3	CHIRONOMIDAE (LPIL)	9.62	28.85	0.0	12.82	8.48	0.4
2	CHIRONOMIDAE (LPIL)	0.0	0.0	19.23	6.41	6.41	0.2
0	ECTOPROCTA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.1
0	CRISTATELLIDAE						
8	CRISTATELLA MUCEDO	0.0	0.0	9.62	3.21	3.21	0.1
TOTAL		221.15	250.00	10365.37	3612.18	3376.61	100.0
DIVERSITY (H PRIME)		1.79	1.89	1.21	1.61	0.21	
DIVERSITY (J PRIME)		0.89	0.88	0.34	0.70	0.18	
NUMBER OF TAXA		5	6	17	18		

BOTTOM TYPE 0

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 0 0 10

		DURATION			TOW			SAMP VOL			WIND			CURRENT			TEMP																															
SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURB	COND	DO	PH	SALN	P																					
41	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	0.1	6	1.0	1.0	4	3	0	0.0	0	25.6	11.0	0	0.0	0	8.8	0.0	0.0	0																					
42	6/11/80	1453	0	0.0	0	4.6	4.6	0.0	0	0.1	6	1.0	1.0	4	3	0	0.0	0	25.6	11.0	0	0.0	0	8.8	0.0	0.0	0																					
																							-																									
																							X																									
LS	TAXA																																															
										1																																						
										2																																						
0	AMPHIPODA (TOTAL)										19.23																																					
0	HAUSTORIIDAE																																															
1	PONTOPOREIA AFFINIS										19.23																																					
0	DIPTERA NEMATOCERA (TOTAL)										461.54																																					
0	CHIRONOMIDAE																																															
2	CRYPTOCHIRONOMUS (LPIL)										0.0																																					
2	POLYPEDILUM (LPIL)										19.23																																					
2	HARNISCHIA (LPIL)										442.31																																					
TOTAL										480.77																																						
DIVERSITY (H PRIME)										0.48																																						
DIVERSITY (J PRIME)										0.30																																						
NUMBER OF TAXA										3																																						
BOTTOM TYPE										0																																						

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 0 0 10

STD	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P
51	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	0.1	6	2.3	4	4	3	0	0.0	0	23.3	15.0	0	0.0	0	9.2	0.0	0.0	0
52	6/11/80	1409	0	0.0	0	9.1	9.1	0.0	0	0.1	6	2.3	1	4	3	0	0.0	0	23.3	15.0	0	0.0	0	9.2	0.0	0.0	0

IS	TAXA	1	2	REL	S.E.	ABZ
0	NEMATODA (TOTAL)	19.23	0.0	9.62	9.62	1.1
1	NEMATODA (LPIL)	19.23	0.0	9.62	9.62	1.1
0	OLIGOCHAETA (TOTAL)	153.85	153.85	153.85	0.0	17.0
0	TUBIFICIDAE					
1	TUBIFICIDAE (LPIL)	153.85	153.85	153.85	0.0	17.0
0	AMPHIPODA (TOTAL)	634.61	480.77	557.69	76.92	61.7
0	HAUSTORIIDAE					
5	PONTOPOREIA AFFINIS	0.0	480.77	240.38	240.38	26.6
1	PONTOPOREIA AFFINIS	634.61	0.0	317.31	317.31	35.1
0	DIPTERA NEMATOCERA (TOTAL)	115.38	250.00	162.69	67.31	20.2
0	CHIRONOMIDAE					
2	CRYPTOCHIRONOMUS (LPIL)	96.15	250.00	173.08	76.92	19.1
2	CHIRONOMIDAE (LPIL)	19.23	0.0	9.62	9.62	1.1

TOTAL	923.08	884.61	903.85	19.23	100.0
DIVERSITY (H PRIME)	1.38	1.43	1.40	0.03	
DIVERSITY (J PRIME)	0.59	0.90	0.75	0.16	
NUMBER OF TAXA	5	3	5		
BOTTOM TYPE	0				

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BAILY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC IC GC LOC
5 71 71 0 0 10

SID	DATE	TIME	D/H	UNITS	C	SO	RD	SP	D	SAMP	VOL	TOM	SC	DI	HIND	CURRENT	TEMP	BT	TUROD	CONID	DO	PH	SALH	P	REL
61	6/11/80	1313	0	0.0	0	15.2	15.2	0.0	0	0.1	6	2.0	0.0	4	3	0	0.0	23.9	14.2	0	0.0	10.0	0.0	0.0	0
62	6/11/80	1313	0	0.0	0	15.2	15.2	0.0	0	0.1	6	2.0	0.0	4	6	0	0.0	23.9	14.2	0	0.0	10.0	0.0	0.0	0
LS	TAXA																								
0	NEMATODA (TOTAL)																								
1	NEMATODA (LPII)																								
0	OLIGOCHAETA (TOTAL)																								
0	NAIADAE																								
1	NAIADAE (LPII)																								
0	TUBIFICIDAE																								
1	TUBIFICIDAE (LPII)																								
0	HIRUDINEA (TOTAL)																								
0	GLOSSIPHIGIIDAE																								
1	HELODIELLA STAGNALIS																								
5	HIRUDINEA (LPII)																								
0	BIVALVIA (TOTAL)																								
0	SPHAERIIDA																								
1	SPHAERIIDA (LPII)																								
5	SPHAERIIDA (LPII)																								
1	PISIDIUM (LPII)																								
5	PISIDIUM (LPII)																								
5	SPHAERIIDA (LPII)																								
0	ARACHNIDA (TOTAL)																								
0	PROSTIGNATA																								
1	HYDRACAPIDA (LPII)																								
0	AMPHIPODA (TOTAL)																								
0	HAUSTORIIDAE																								
5	PONTOPOREIA AFFINIS																								
1	PONTOPOREIA AFFINIS																								
0	DIPTERA NEMATOCERA (TOTAL)																								
0	CERATOPOGONIDAE																								
2	CERATOPOGONIDAE (LPII)																								
0	CHIRONOMIDAE																								
2	CRYPTOCHIRONOMUS (LPII)																								
2	HABESCHIA (LPII)																								
2	HEMIDANESA (LPII)																								
3	CHIRONOMIDAE (LPII)																								
TOTAL																									
DIVERSITY (H PRIME)																									
DIVERSITY (J PRIME)																									
NUMBER OF TAXA																									
-BOTTOM TYPE																									

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

REPLICATE REPORT

ABOVE COMPUTED USING SAMPLE IDS

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1600AQUA	9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL ABZ
0	NEMATODA (TOTAL)	0.0	9.62	182.69	64.10	59.36	3.7
1	NEMATODA (LPIL)	0.0	9.62	182.69	64.10	59.36	3.7
0	OLIGOCHAETA (TOTAL)	0.0	153.85	2375.00	842.95	767.31	49.3
0	HAIDIDAE						
1	HAIDIDAE (LPIL)	0.0	0.0	38.46	12.82	12.82	0.7
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	0.0	153.85	2336.54	830.13	754.51	48.5
0	HIRUDINEA (TOTAL)	0.0	0.0	134.62	44.87	44.87	2.6
0	GLOSSIPHONIIDAE						
1	HELOBDELLA STAGNALIS	0.0	0.0	9.62	3.21	3.21	0.2
5	HIRUDINEA (LPIL)	0.0	0.0	125.00	41.67	41.67	2.4
0	BIVALVIA (TOTAL)	0.0	0.0	289.46	96.15	96.15	5.6
0	SPHAERIIDAE						
1	SPHAERIUM (LPIL)	0.0	0.0	48.08	16.03	16.03	0.9
5	SPHAERIUM (LPIL)	0.0	0.0	19.23	6.41	6.41	0.4
1	PISIDIUM (LPIL)	0.0	0.0	28.85	9.62	9.62	0.6
5	PISIDIUM (LPIL)	0.0	0.0	96.15	32.05	32.05	1.9
5	SPHAERIIDAE (LPIL)	0.0	0.0	96.15	32.05	32.05	1.9
0	ARACHNIDA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.2
0	PROSTIGNATA						
1	HYDRACARINA (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
0	AMPHIPODA (TOTAL)	19.23	557.69	721.15	432.69	212.05	25.3
0	HAUSTORIIDAE						
5	PONTOPOREIA AFFINIS	0.0	240.38	253.08	179.49	91.28	10.5
1	PONTOPOREIA AFFINIS	19.23	317.31	423.08	253.20	120.91	14.8
0	DIPTERA NEMATOCERA (TOTAL)	298.08	182.69	201.92	227.56	35.69	13.3
0	CERATOPOGONIDAE						
2	CERATOPOGONIDAE (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
0	CHIRONOMIDAE						
2	CRYPTOCHIRONOMUS (LPIL)	28.85	173.08	134.62	112.18	43.12	6.6
2	POLYPEDILUM (LPIL)	9.62	0.0	0.0	3.21	3.21	0.2
2	HARNISCHIA (LPIL)	259.61	0.0	28.85	96.15	82.15	5.6
2	MONODIAHESA (LPIL)	0.0	0.0	19.23	6.41	6.41	0.4
3	CHIRONOMIDAE (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
2	CHIRONOMIDAE (LPIL)	0.0	9.62	0.0	3.21	3.21	0.2
	TOTAL	317.31	903.85	3913.45	1711.53	1113.90	100.0
	DIVERSITY (H PRIME)	0.94	1.40	2.06	1.47	0.32	
	DIVERSITY (J PRIME)	0.60	0.75	0.57	0.64	0.05	
	NUMBER OF TAXA	4	5	15	16		
	BOTTOM TYPE	0					

ABOVE COMPUTED USING SAMPLE IDS

41 42 51 52
61 62

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/5Q H)

REPLICATE REPORT

PC TC GC LOC
5 71 71 0 0 20

SID	DATE	DURATION		WD	TOM		SAMP VOL		WIND		CURRENT		TEMP		DO	PH	SALIN P											
		TIME	D/N		UNITS	C	SC	DI	CL	SP	DI	AIR	WAT															
101	6/18/80	1642	0	0.0	0	2.5	0.0	0.16	0.0	0	1.7	0.0	0.0	21.0	20.4	0	0.0	0.0										
102	6/18/80	1642	0	0.0	0	2.5	0.0	0.16	0.0	0	1.7	0.0	0.0	21.0	20.4	0	0.0	0.0										
REL																												
S.E. ABZ																												
X																												
TAXA																												
15																												
0	OLIGOCHAETA (TOTAL)				1	115.38	2	134.62											125.00	9.62	61.2							
0	TUBIFICIDAE																											
1	TUBIFICIDAE (LPII)					115.38		134.62											125.00	9.62	61.2							
0	AMPHIPODA (TOTAL)					38.46		0.0											19.23	12.5								
0	HAUSTORIIDAE																											
5	POMPHOREIA AFFINIS					19.23		0.0											9.62	6.2								
0	HYALELLIDAE																											
1	HYALELLA AZTECA					19.23		0.0											9.62	4.2								
0	DIPTERA REMATOCERA (TOTAL)					0.0		19.23											9.62	6.2								
0	CHIRONOMIDAE																											
2	TRICHOCLADIUS (LPII)					0.0		19.23											9.62	6.2								
TOTAL																			153.85		153.85					153.85	0.0	100.0
DIVERSITY (H PRIME)																			1.06		0.54					0.80	0.26	
DIVERSITY (J PRIME)																			0.67		0.54					0.61	0.06	
NUMBER OF TAXA																			3		2					4		
LOTION TYPE																			0									

ABOVE COMPUTED USING SAMPLE IDS
101 102

DATE 03/09/81
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TODQAQA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

IS	TAXA	10	X	S.E.	REL AB%
0	OLIGOCOAETA (TOTAL)	125.00	125.00	-1.00	81.2
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	125.00	125.00	-1.00	81.2
0	AMPHIPODA (TOTAL)	19.23	19.23	-1.00	12.5
0	HAUSTORIIDAE				
5	PONTOCOREIA AFFINIS	9.62	9.62	-1.00	6.2
0	HYALELLIDAE				
1	HYALELLA AZTECA	9.62	9.62	-1.00	6.2
0	DIPTERA NEMATOCERA (TOTAL)	9.62	9.62	-1.00	6.2
0	CHIRONOMIDAE				
2	TRICHOCLADIUS (LPIL)	9.62	9.62	-1.00	6.2
	TOTAL	153.85	153.85	-1.00	100.0
	DIVERSITY (H PRIME)	0.80	0.80	-1.00	
	DIVERSITY (J PRIME)	0.61	0.61	-1.00	
	NUMBER OF TAXA	4	4		
	BOTTOM TYPE	0			

ABOVE COMPUTED USING SAMPLE IDS
101 102

DATE 03/09/81
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T600AQUA 9/28/77

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND/SQ M)

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL ABZ
0	PLATHEMINTHES (TOTAL)	35.26	0.0	0.0	11.75	11.75	0.6
5	TUBELLARIA (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
1	TUBELLARIA (LPII)	32.05	0.0	0.0	10.68	10.68	0.6
0	NEMATODA (TOTAL)	28.85	64.10	0.0	30.93	16.54	1.7
1	NEMATODA (LPII)	28.85	64.10	0.0	30.93	16.54	1.7
0	OLIGOCHAETA (TOTAL)	3147.43	642.95	125.00	1371.79	911.69	75.1
0	HAIRIDAE	35.26	12.82	0.0	16.03	10.30	0.9
1	HAIRIDAE (LPII)	3112.18	830.13	125.00	1355.77	901.49	74.3
0	TUBIFICIDAE (TOTAL)	150.64	44.87	0.0	65.17	44.65	3.6
0	GLISSIPHIDIIDAE	112.18	3.21	0.0	33.46	36.87	2.1
5	GLISSIPHIDIIDAE (LPII)	22.44	0.0	0.0	7.48	7.48	0.4
5	HIRUDINEA (LPII)	16.03	41.67	0.0	19.23	12.13	1.1
0	ARIELIDA (TOTAL)	9.62	0.0	0.0	3.21	3.21	0.2
5	ARIELIDA (LPII)	9.62	0.0	0.0	3.21	3.21	0.2
0	DIVALVIA (TOTAL)	19.23	96.15	0.0	33.46	29.38	2.1
0	Sphaeriidae	3.21	16.03	0.0	6.41	4.90	0.4
1	Sphaerium (LPII)	9.62	6.41	0.0	5.34	2.83	0.3
1	Pisidium (LPII)	6.41	9.62	0.0	5.34	2.83	0.3
5	Pisidium (LPII)	0.0	32.05	0.0	10.68	10.68	0.6
5	Sphaeriidae (LPII)	0.0	32.05	0.0	10.68	10.68	0.6
0	APACIIDAE (TOTAL)	0.0	3.21	0.0	1.07	1.07	0.1
0	PROSTIGMATA	0.0	3.21	0.0	1.07	1.07	0.1
1	HYDRACARINA (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
0	ISOPODA (TOTAL)	3.21	0.0	0.0	1.07	1.07	0.1
5	ISOPODA (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
0	AMPHIPODA (TOTAL)	57.69	432.69	19.23	169.87	131.88	9.3
0	HAUSTORIIDAE	57.69	179.49	9.62	82.26	50.55	4.5
5	PHOTOPHORETA AFFINIS	0.0	253.20	0.0	84.40	84.40	4.6
1	PHOTOPHORETA AFFINIS	0.0	0.0	0.0	0.0	0.0	0.0
0	HYALELLIDAE	0.0	0.0	0.0	0.0	0.0	0.0
1	HYALELLA AZTECA	0.0	0.0	0.0	0.0	0.0	0.0
0	DIPTERA NEMATOCERA (TOTAL)	7.05	227.56	9.62	131.41	64.21	7.2
0	CERATOPOGONIDAE	0.0	0.0	0.0	0.0	0.0	0.0
2	CERATOPOGONIDAE (LPII)	0.0	0.0	0.0	0.0	0.0	0.0
0	CHIRONOMIDAE	67.31	112.18	0.0	59.83	32.60	3.3
2	CRIPTOCHIRONOMUS (LPII)	0.0	0.0	0.0	0.0	0.0	0.0
2	POLYPTILUM (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
2	FRULADUS (LPII)	41.67	96.15	0.0	45.94	27.84	2.5
2	HEMNISCHIA (LPII)	25.64	0.0	0.0	6.55	6.55	0.5
2	PSEUDOCYCLADUS (LPII)	0.0	0.0	0.0	0.0	0.0	0.0

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	3	6	10	- X	S.E.	REL ABZ
2	MONODIAMESA (LPIL)	0.0	6.41	0.0	2.14	2.14	0.1
2	TRICHOCLADIUS (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
3	CHIRONOMIDAE (LPIL)	12.82	3.21	0.0	5.34	3.85	0.3
2	CHIRONOMIDAE (LPIL)	6.41	3.21	0.0	3.21	1.85	0.2
0	ECTOPROCTA (TOTAL)	3.21	0.0	0.0	1.07	1.07	0.1
0	CRISTATELLIDAE						
8	CRISTATELLA MUCEDO	3.21	0.0	0.0	1.07	1.07	0.1
TOTAL		3612.18	1711.53	153.85	1825.85	999.97	100.0
DIVERSITY (H PRIME)		1.61	1.47	0.80	1.27	0.25	
DIVERSITY (J PRIME)		0.70	0.64	0.61	0.65	0.03	
NUMBER OF TAXA		18	16	4	25		
BOTTOM TYPE		0					

ABOVE COMPUTED USING SAMPLE IDS

11	12	21	22
31	32	41	42
51	52	61	62
101	102		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC
5 71 71 0 1 00

				DURATION		TOW		SAMP VOL		WIND		CURRENT		TEMP																																													
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALIN	P																																
81	6/11/80	1115	0	0.0	0	9.1	9.1	0.0	0	0.1	6	1.8	0.0	1	7	0	0.0	0	23.9	14.2	0	0.0	0	10.6	0.0	0.0	0																																
82	6/11/80	1115	0	0.0	0	9.1	9.1	0.0	0	0.1	6	1.8	0.0	1	7	0	0.0	0	23.9	14.2	0	0.0	0	10.6	0.0	0.0	0																																
																									-																																		
15	TAXA																									X																																	
																									1																																		
0	NEMATODA (TOTAL)																									38.46																																	
1	NEMATODA (LPIL)																									38.46																																	
0	OLIGOCHAETA (TOTAL)																									0.0																																	
0	Naididae																																																										
1	Naididae (LPIL)																									0.0																																	
0	Tubificidae																																																										
1	Tubificidae (LPIL)																									0.0																																	
0	Hirudinea (TOTAL)																									57.69																																	
5	Hirudinea (LPIL)																									57.69																																	
0	Arachnida (TOTAL)																									0.0																																	
0	Prostigmata																																																										
1	Hydracarina (LPIL)																									0.0																																	
0	Amphipoda (TOTAL)																									1000.00																																	
0	Haustoriidae																																																										
5	Pontoporeia affinis																									1000.00																																	
0	Diptera Nematocera (TOTAL)																									0.0																																	
0	Chironomidae																																																										
2	Cryptochironomus (LPIL)																									0.0																																	
2	Harnischia (LPIL)																									0.0																																	
TOTAL																									1096.15																																		
DIVERSITY (H PRIME)																									0.51																																		
DIVERSITY (J PRIME)																									0.32																																		
NUMBER OF TAXA																									3																																		
BOTTOM TYPE																									0																																		

ABOVE COMPUTED USING SAMPLE IDS
81 82

DATE 03/09/81
PAGE NO 18
T600AQJA 9/28/77

DAILY GENERATING PLAN

BENTHIC MACROINVERTEBRATE CHEMICAL ABUNDANCE (NO./SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 0 1 00

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TOT	SAMP	VOL	CURPENT				TEMP			BT	TURED	COHD	OD	PH	SALIN	P
													CL	SP	DI	AIR	WAT									
91	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0.0	0.16	2.0	0.0	1	7	0	21.1	13.9	0	0.0	0	0.0	0	11.6	0.0	0.0	0.0
92	6/11/80	945	0	0.0	0	15.2	15.2	0.0	0.0	0.16	2.0	0.0	1	7	0	21.1	13.9	0	0.0	0	0.0	0	11.6	0.0	0.0	0.0
REL																										
S.E. ABZ																										
LS	TAXA																									
0	REHATODA (TOTAL)																									
1	REHATODA (LPIL)																									
0	OLIGOCHAETA (TOTAL)																									
0	NAIDUS																									
1	NAIDUS (LPIL)																									
0	TUBIFICIDAE																									
1	TUBIFICIDAE (LPIL)																									
0	HIPUDINCA (TOTAL)																									
0	GLOSSIPHIDIIDAE																									
1	HELODDELLA STAGNALLIS																									
1	HELODDELLA (LPIL)																									
0	BIVALVIA (TOTAL)																									
0	SPHAERIIDAE																									
1	SPHAERIUM (LPIL)																									
5	SPHAERIUM (LPIL)																									
0	ARACHNIDA (TOTAL)																									
0	PROSTIGMATA																									
1	PROSTIGMATA (LPIL)																									
0	ISOPODA (TOTAL)																									
0	ASELLIDAE																									
5	ASELLUS (LPIL)																									
0	ARHIFUDA (TOTAL)																									
0	HAUSTORIIDAE																									
1	PORTOFOREIA AFFINIS																									
0	DIPTERA HEMATOCERA (TOTAL)																									
0	CHIRONOMIDAE																									
2	CRYPTOCHEIRONOMUS (LPIL)																									
2	PROCLADUS (LPIL)																									
2	CHIRONOMIDAE (LPIL)																									
TOTAL	TOTAL																									
DIVERSITY (H PRIME)	DIVERSITY (H PRIME)																									
DIVERSITY (J PRIME)	DIVERSITY (J PRIME)																									
NUMBER OF TAXA	NUMBER OF TAXA																									
EGGTON TYPE	EGGTON TYPE																									

ABOVE COMPUTED USING SAMPLE IDS

91

92

DATE 03/09/81

PAGE NO 19

T600A00A 9/23/77

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL ADZ
0	NEMATODA (TOTAL)	48.08	48.08	76.92	57.69	9.62	3.7
1	NEMATODA (LPII)	48.08	48.08	76.92	57.69	9.62	3.7
0	ELIGOSCHAETA (TOTAL)	557.69	182.69	1423.08	721.15	367.28	46.0
0	HAIDIDAE	0	0	0	0	0	0
1	HAIDIDAE (LPII)	0.0	9.62	28.85	12.82	8.48	0.8
0	TUBIFICIDAE	0	0	0	0	0	0
1	TUBIFICIDAE (LPII)	557.69	173.08	1394.23	708.33	360.47	45.2
0	HIRUDINEA (TOTAL)	38.46	57.69	48.08	48.08	5.55	3.1
0	GLOSSYNOGHIIDAE	0	0	0	0	0	0
1	HELODELLA STAGNALIS	0.0	0.0	30.46	12.82	12.82	0.8
1	HELODELLA (LPII)	0.0	0.0	9.62	3.21	3.21	0.2
5	HIRUDINEA (LPII)	38.46	57.69	0.0	32.05	16.96	2.6
0	BIVALVIA (TOTAL)	38.46	0.0	57.69	32.05	16.96	2.0
0	SPHAERIIDAE	0	0	0	0	0	0
1	SPHAERIUM (LPII)	0.0	0.0	28.85	9.62	9.62	0.6
5	SPHAERIUM (LPII)	13.3	0.0	28.85	16.03	8.48	1.0
5	PISIDIUM (LPII)	19.23	0.0	0.0	6.41	6.41	0.4
0	ARACHNIDA (TOTAL)	0.0	9.62	9.62	6.41	3.21	0.4
0	PROSTIGMATA	0	0	0	0	0	0
1	HYDRACARINA (LPII)	0.0	9.62	0.0	3.21	3.21	0.2
1	PROSTIGMATA (LPII)	0.0	0.0	9.62	3.21	3.21	0.2
0	ISOPODA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.2
0	ASELLIDAE	0	0	0	0	0	0
5	ASELLUS (LPII)	0.0	0.0	9.62	3.21	3.21	0.2
0	AMPHIPODA (TOTAL)	653.85	980.77	19.23	551.28	282.27	35.2
0	HAUSTORIIDAE	0	0	0	0	0	0
5	FORTEPOREIA AFFINIS	653.85	980.77	0.0	544.87	283.32	34.8
1	FORTEPOREIA AFFINIS	0.0	0.0	19.23	6.41	6.41	0.4
0	DIPIERA NEMALOCERA (TOTAL)	125.00	125.00	173.08	141.03	16.03	9.0
0	CHIRONOMIDAE	0	0	0	0	0	0
2	CRYPTOCHIRONOMUS (LPII)	48.08	96.15	48.08	64.10	16.03	4.1
2	PROCLADUS (LPII)	0.0	0.0	115.38	38.46	33.46	2.5
2	HABRISCHIA (LPII)	76.92	28.85	0.0	35.26	22.44	2.2
2	CHIRONOMIDAE (LPII)	0.0	0.0	9.62	3.21	3.21	0.2
0	ECTOPROCTIA (TOTAL)	19.23	0.0	0.0	6.41	6.41	0.4
0	CRISTATELLIDAE	0	0	0	0	0	0
0	CRISTATELLA RUCEO	19.23	0.0	0.0	6.41	6.41	0.4
TOTAL		1460.77	1403.84	1817.31	1567.31	126.96	100.0
DIVERSITY (H PRIME)		1.87	1.22	1.33	1.47	0.20	
DIVERSITY (J PRIME)		0.72	0.43	0.44	0.55	0.09	
NUMBER OF TAXA		9	8	12	17		
BOTTOM TYPE		0					

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

ABOVE COMPUTED USING SAMPLE IDS

71	72	81	82
91	92		

DATE	03/09/81
PAGE NO	21
T600AQUA	9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA		- X	S.E.	REL AB%
		9			
0	NEMATODA (TOTAL)	57.69	57.69	-1.00	3.7
1	NEMATODA (LPIL)	57.69	57.69	-1.00	3.7
0	OLIGOCHAETA (TOTAL)	721.15	721.15	-1.00	46.0
0	HAIDIDAE				
1	HAIDIDAE (LPIL)	12.82	12.82	-1.00	0.8
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	708.33	708.33	-1.00	45.2
0	HIRUDINEA (TOTAL)	48.08	48.08	-1.00	3.1
0	GLOSSIPHONIIDAE				
1	HELODELLA STAGNALIS	12.82	12.82	-1.00	0.8
1	HELODELLA (LPIL)	3.21	3.21	-1.00	0.2
5	HIRUDINEA (LPIL)	32.05	32.05	-1.00	2.0
0	BIVALVIA (TOTAL)	32.05	32.05	-1.00	2.0
0	SPHAERIIDAE				
1	SPHAERIUM (LPIL)	9.62	9.62	-1.00	0.6
5	SPHAERIUM (LPIL)	16.03	16.03	-1.00	1.0
5	PISIDIUM (LPIL)	6.41	6.41	-1.00	0.4
0	ARACHNIDA (TOTAL)	6.41	6.41	-1.00	0.4
0	PROSTIGNATA				
1	HYDRACARINA (LPIL)	3.21	3.21	-1.00	0.2
1	PROSTIGNATA (LPIL)	3.21	3.21	-1.00	0.2
0	ISOPODA (TOTAL)	3.21	3.21	-1.00	0.2
0	APELLIDAE				
5	APELLUM (LPIL)	3.21	3.21	-1.00	0.2
0	AMPHIPODA (TOTAL)	551.28	551.28	-1.00	35.2
0	HAUSTORIIDAE				
5	PONTOPOREIA AFFINIS	544.87	544.87	-1.00	34.8
1	PONTOPOREIA AFFINIS	6.41	6.41	-1.00	0.4
0	DIPTERA NEMATOCERA (TOTAL)	141.03	141.03	-1.00	9.0
0	CHIRONOMIDAE				
2	CRYPTOCHIRONOMUS (LPIL)	64.10	64.10	-1.00	4.1
2	PROCLADIUS (LPIL)	38.46	38.46	-1.00	2.5
2	HARNISCHIA (LPIL)	35.26	35.26	-1.00	2.2
2	CHIRONOMIDAE (LPIL)	3.21	3.21	-1.00	0.2
0	ECTOPROCTA (TOTAL)	6.41	6.41	-1.00	0.4
0	CRISTATELLIDAE				
8	CRISTATELLA MUCEDO	6.41	6.41	-1.00	0.4
	TOTAL	1567.31	1567.31	-1.00	100.0
	DIVERSITY (H PRIME)	1.47	1.47	-1.00	
	DIVERSITY (J PRIME)	0.55	0.55	-1.00	
	NUMBER OF TAXA	17	17		
	BOTTOM TYPE	0			

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

ABOVE COMPUTED USING SAMPLE IDS

71	72	81	82
91	92		

DATE	03/09/81
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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND/SQ M)

SITE SUMMARY

LS	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	- X	S.E.	REL AB%
0	PLATYHELMINTHES (TOTAL)	0	0	5.08	5.08	0.3
5	TURBELLARIA (LPIL)	11.75	0.0	0.53	0.53	0.0
1	TURBELLARIA (LPIL)	1.07	0.0	5.34	5.34	0.3
0	NEMATODA (TOTAL)	30.93	57.69	44.34	13.35	2.6
1	NEMATODA (LPIL)	30.93	57.69	44.34	13.35	2.6
0	OLIGOCHAETA (TOTAL)	1371.79	721.15	1046.47	325.32	61.7
0	HAUTORIIDAE					
1	HAUTORIIDAE (LPIL)	16.03	12.82	14.42	1.60	0.9
0	TURBELLICIDAE					
1	TURBELLICIDAE (LPIL)	1355.77	708.33	1032.05	323.72	60.8
0	MINURIDAE (TOTAL)	65.17	48.08	56.62	8.55	3.3
0	GLOSSIPHONIIDAE					
1	HELODIELLA STAGNALIS	38.46	12.82	25.64	12.82	1.5
1	HELODIELLA (LPIL)	0.0	3.21	1.60	1.60	0.1
5	GLOSSIPHONIIDAE (LPIL)	7.48	0.0	3.74	3.74	0.2
5	HIRUDINEA (LPIL)	19.23	32.05	25.64	6.41	1.5
0	ARBELEA (TOTAL)	3.21	0.0	1.60	1.60	0.1
5	ARBELEA (LPIL)	3.21	0.0	1.60	1.60	0.1
0	BIVALVIA (TOTAL)	38.46	32.05	35.26	3.21	2.1
0	SPHAERIIDAE					
1	SPHAERIUM (LPIL)	6.41	9.62	8.01	1.60	0.5
5	SPHAERIUM (LPIL)	5.34	16.03	10.68	5.34	0.6
1	PISIDIUM (LPIL)	5.34	0.0	2.67	2.67	0.2
5	PISIDIUM (LPIL)	10.68	6.41	8.55	2.14	0.5
5	SPHAERIIDAE (LPIL)	10.68	0.0	5.34	5.34	0.3
0	ARACHNIDA (TOTAL)	1.07	6.41	3.74	2.67	0.2
0	FROSTIGHATA					
1	HYDRACARINA (LPIL)	1.07	3.21	2.14	1.07	0.1
1	FROSTIGHATA (LPIL)	0.0	3.21	1.60	1.60	0.1
0	ISOPODA (TOTAL)	1.07	3.21	2.14	1.07	0.1
0	ASELLIDAE					
5	ASELLUS (LPIL)	0.0	3.21	1.60	1.60	0.1
5	ISOPODA (LPIL)	1.07	0.0	0.53	0.53	0.0
0	AMPHIPODA (TOTAL)	169.87	551.28	360.58	190.70	21.3
0	HAUSTORIIDAE					
5	PONTOPOREIA AFFINIS	82.26	544.87	313.57	231.30	18.5
1	PONTOPOREIA AFFINIS	84.40	6.41	45.41	39.00	2.7
0	HYALELLIDAE					
1	HYALELLA AZTECA	5.21	0.0	1.60	1.60	0.1
0	DIPTERA NEMATOCERA (TOTAL)	131.41	141.03	136.22	4.81	0.0
0	CERATOPOGONIDAE					
2	CERATOPOGONIDAE (LPIL)	1.07	0.0	0.53	0.53	0.0
0	CHIRONOMIDAE					
2	CRYPTOCHIRONOMUS (LPIL)	59.03	64.10	61.97	2.14	3.7

VALLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE MATERIAL ABUNDANCE (NO./SQ M)

SITE SUMMARY

15	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	- X	S.E.	REL AB%
0		0	0	0.53	0.53	0.0
2	POLYDORUM (LPIL)	1.07	0.0	19.76	18.70	1.2
2	PROCLADUS (LPIL)	1.07	38.46	40.60	5.34	2.4
2	HEMISCHIA (LPIL)	45.94	35.26	4.27	4.27	0.3
2	PECIOCLADUS (LPIL)	6.55	0.0	1.07	1.07	0.1
2	PHREDIANESA (LPIL)	2.14	0.0	1.60	1.60	0.1
2	TRICHOCLADUS (LPIL)	3.21	0.0	2.67	2.67	0.2
3	CHIRONOMIDAE (LPIL)	5.34	0.0	3.21	0.0	0.2
2	CHIRONOMIDAE (LPIL)	3.21	3.21	3.74	2.67	0.2
0	ECTOPROCTA (TOTAL)	1.07	6.41	3.74	2.67	0.2
0	CRISTATELLIDAE					
0	CRISTATELLA HUXEDO	1.07	6.41	3.74	2.67	0.2
TOTAL		1825.85	1567.31	1696.58	129.27	100.0
DIVERSITY (H PRIME)		1.29	1.47	1.38	0.09	
DIVERSITY (J PRIME)		0.65	0.55	0.60	0.05	
NUMBER OF TAXA		25	17	20		
BOTTOM TYPE	0					

ABOVE COMPUTED USING SAMPLE IDS

11	11	21	22
31	31	41	42
51	51	61	62
101	101	71	72
61	61	91	92

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC
5 71 71 1 1 00

				DURATION			TOW				SAMP VOL				WIND				CURRENT				TEMP								
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	W	T	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P			
171	6/14/80	1115	0	0.0	0	0.9	0.9	0.0	0	0.1	6	0.9	0	0	1	6	0	0.0	0	35.0	22.0	0	0.0	0	5.4	0.0	0.0	0			
172	6/14/80	1115	0	0.0	0	0.9	0.9	0.0	0	0.1	6	0.9	0	0	1	6	0	0.0	0	35.0	22.0	0	0.0	0	5.4	0.0	0.0	0			
																							-					REL			
LS	TAXA																					X	S.E.		ABZ						
								1				2																			
0	OLIGOCHAETA (TOTAL)								57.69				76.92										67.31				9.62		17.5		
0	NAIDIDAE																														
1	NAIDIDAE (LPIL)								57.69				76.92										67.31				9.62		17.5		
0	AMPHIPODA (TOTAL)								19.23				19.23										19.23				0.0		5.0		
0	HYALELLIDAE																														
1	HYALELLA AZTECA								19.23				19.23										19.23				0.0		5.0		
0	EPHEMEROPTERA (TOTAL)								19.23				0.0										9.62				9.62		2.5		
0	CAENIDAE																														
10	CAENIS (LPIL)								19.23				0.0										9.62				9.62		2.5		
0	DIPTERA NEMATOCERA (TOTAL)								96.15				480.77										288.46				192.31		75.0		
0	CHIRONOMIDAE																														
2	CHIRONOMUS (LPIL)								19.23				0.0										9.62				9.62		2.5		
2	TANYTARSUS (LPIL)								38.46				326.92										182.69				144.23		47.5		
2	DIPTERODIPES (LPIL)								0.0				38.46										19.23				19.23		5.0		
2	ABLAESNIA (LPIL)								0.0				38.46										19.23				19.23		5.0		
2	PROCLADUS (LPIL)								0.0				38.46										19.23				19.23		5.0		
3	CHIRONOMIDAE (LPIL)								0.0				19.23										9.62				9.62		2.5		
2	CHIRONOMIDAE (LPIL)								38.46				19.23										28.85				9.62		7.5		
TOTAL										192.31				576.92										384.61				192.31		100.0	
DIVERSITY (H PRIME)										2.45				2.06										2.25				0.19			
DIVERSITY (J PRIME)										0.95				0.73										0.84				0.11			
NUMBER OF TAXA										6				7														9			
BOTTOM TYPE										0																					

ABOVE COMPUTED USING SAMPLE IDS
171 172

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL ABZ
TOTAL		1134.61	2211.54	1673.07	538.46	100.0
DIVERSITY (H PRIME)		2.57	2.76	2.67	0.10	
DIVERSITY (J PRIME)		0.72	0.71	0.71	0.00	
NUMBER OF TAXA		12	15	18		
BOTTOM TYPE	0					

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

15	TAXA	17	18	X	S.E.	REL ABZ
0	Cnidaria (TOTAL)	0.0	509.61	254.81	254.81	24.8
0	Hydrozoa					
1	Hydra (LPIL)	0.0	509.61	254.81	254.81	24.8
0	Nematoda (TOTAL)	0.0	9.62	4.81	4.81	0.5
1	Nematoda (LPIL)	0.0	9.62	4.81	4.81	0.5
0	Oligochaeta (TOTAL)	67.31	269.23	168.27	100.96	16.4
0	Naididae					
1	Chaetogaster (LPIL)	0.0	9.62	4.81	4.81	0.5
1	Naididae (LPIL)	67.31	250.00	158.65	91.35	15.4
0	Tubificidae					
1	Tubificidae (LPIL)	0.0	9.62	4.81	4.81	0.5
0	Gastropoda (TOTAL)	0.0	9.62	4.81	4.81	0.5
0	Ancylidae					
1	Ancylidae (LPIL)	0.0	9.62	4.81	4.81	0.5
0	Bivalvia (TOTAL)	0.0	38.46	19.23	19.23	1.9
0	Sphaeriidae					
1	Pisidium (LPIL)	0.0	19.23	9.62	9.62	0.9
5	Pisidium (LPIL)	0.0	19.23	9.62	9.62	0.9
0	Amphipoda (TOTAL)	19.23	76.92	48.08	28.85	4.7
0	Hyalellidae					
1	Hyalella azteca	19.23	57.69	38.46	19.23	3.7
5	Hyalella azteca	0.0	19.23	9.62	9.62	0.9
0	Ephemeroptera (TOTAL)	9.62	76.92	43.27	33.65	4.2
0	Baetidae					
10	Baetidae (LPIL)	0.0	9.62	4.81	4.81	0.5
0	Caenidae					
10	Caenis (LPIL)	9.62	67.31	38.46	28.85	3.7
0	Diptera Nematocera (TOTAL)	288.46	602.69	485.58	197.12	47.2
0	Chironomidae					
2	Chironomus (LPIL)	9.62	9.62	9.62	0.0	0.9
2	Tanytarsus (LPIL)	182.69	480.77	331.73	149.04	32.2
2	Dicrotendipes (LPIL)	19.23	28.85	24.04	4.81	2.3
2	Ablabesmyia (LPIL)	19.23	57.69	38.46	19.23	3.7
2	Procladius (LPIL)	19.23	38.46	28.85	9.62	2.8
2	Harnischia (LPIL)	0.0	19.23	9.62	9.62	0.9
2	Nilotanjapus (LPIL)	0.0	9.62	4.81	4.81	0.5
3	Chironomidae (LPIL)	9.62	28.85	19.23	9.62	1.9
2	Chironomidae (LPIL)	28.85	9.62	19.23	9.62	1.9
	TOTAL	384.61	1673.07	1028.84	644.23	100.0
	DIVERSITY (H PRIME)	2.25	2.67	2.46	0.21	
	DIVERSITY (J PRIME)	0.84	0.71	0.78	0.06	
	NUMBER OF TAXA	9	18	18		
	BOTTOM TYPE	0				

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

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171 172 181 182

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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE HORIZONTAL ABUNDANCE (NO/5Q M)

STATION REPORT

LS	TAXA	18	\bar{X}	S.E.	REL AB%
0	CHIDARIA (TOTAL)	254.81	254.81	-1.00	24.8
0	HYDROZOA				
1	HYDRA (LPII)	254.81	254.81	-1.00	24.8
0	HEMATODA (TOTAL)	4.81	4.81	-1.00	0.5
1	HEMATODA (LPII)	4.81	4.81	-1.00	0.5
0	OLIGOCHAETA (TOTAL)	168.27	168.27	-1.00	16.4
0	NAIDIDE				
1	CHAROGASTER (LPII)	4.81	4.81	-1.00	0.5
1	NAIDIDE (LPII)	158.65	158.65	-1.00	15.4
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPII)	4.81	4.81	-1.00	0.5
0	GASTROPODA (TOTAL)	4.81	4.81	-1.00	0.5
0	ANCYLIDAE				
1	ANCYLIDAE (LPII)	4.81	4.81	-1.00	0.5
0	EIVALVIA (TOTAL)	19.23	19.23	-1.00	1.9
0	SPHAERIIDAE				
1	PISIDIUM (LPII)	9.62	9.62	-1.00	0.9
5	PISIDIUM (LPII)	9.62	9.62	-1.00	0.9
0	AMPHIPODA (TOTAL)	48.08	48.08	-1.00	4.7
0	HYALELLIDAE				
1	HYALELLA AZTECA	38.46	38.46	-1.00	3.7
5	HYALELLA AZTECA	9.62	9.62	-1.00	0.9
0	EPHEMEROPTERA (TOTAL)	43.27	43.27	-1.00	4.2
0	EPTIDAE				
10	EPTIDAE (LPII)	4.81	4.81	-1.00	0.5
0	CAENIDAE				
10	CAENIS (LPII)	38.46	38.46	-1.00	3.7
0	DIPTERA HEMATOCEPA (TOTAL)	485.58	485.58	-1.00	47.2
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPII)	9.62	9.62	-1.00	0.9
2	TANYTARSUS (LPII)	331.73	331.73	-1.00	32.2
2	DICNOMERIDIPES (LPII)	24.04	24.04	-1.00	2.3
2	ABLAESCHIA (LPII)	38.46	38.46	-1.00	3.7
2	PROCLADIOS (LPII)	20.85	20.85	-1.00	2.0
2	HAPHESCHIA (LPII)	9.62	9.62	-1.00	0.9
2	NELOTARFUS (LPII)	4.81	4.81	-1.00	0.5
3	CHIRONOMIDAE (LPII)	19.23	19.23	-1.00	1.9
2	CHIRONOMIDAE (LPII)	19.23	19.23	-1.00	1.9
	TOTAL	1028.84	1028.84	-1.00	100.0
	DIVERSITY (H PRIME)	2.46	2.46	-1.00	
	DIVERSITY (J PRIME)	0.78	0.78	-1.00	
	NUMBER OF TAXA	18	18		
	BOTTOM TYPE	0			

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49723)

BAILEY - HEATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

ABOVE COMPUTED USING SAMPLE IDS

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REPLICATE REPORT

FC IC GC LOC			DURATION			TOT4		SAMP VOL		HIND		CUREHT		TEMP		BT		TURID		CORD		DO		PH		SALH P	
SID	DATE	TIME	0-H	UNITIS C	50	40	SP	0	UNITIS C	SECH	W	T	5C	01	CL	5P	01	WAT	ATP	01	REL	S.E.	REL	ABZ			
191	6/14/80	1255	0	0.0	0.9	0.9	0.0	0.0	0.16	0.9	0.0	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	0.2	0.0	0.0	0.0	
192	6/14/80	1255	0	0.0	0.9	0.9	0.0	0.0	0.16	0.9	0.0	0	1	6	0	0.0	0	35.0	24.9	0	0.0	0	0.2	0.0	0.0	0.0	
15	TAXA				1		2																				
0	OLIGOCHAETA (TOTAL)				1269.23		500.00														884.61		304.61		47.7		
0	NEMATOEA																										
1	NEMATOEA (LPII)				365.38		153.05														259.61		105.77		14.0		
0	TUBIFICIDAE																										
1	TUBIFICIDAE (LPII)				903.85		346.15														625.00		278.05		33.7		
0	BIVALVIA (TOTAL)				153.85		57.69														105.77		48.08		5.7		
0	SPHAERIIDAE																										
1	SPHAERIUM (LPII)				19.23		19.23														19.23		0.0		1.0		
5	SPHAERIUM (LPII)				134.62		0.0														67.31		67.31		3.6		
2	SPHAERIUM (LPII)				0.0		19.23														9.62		9.62		0.5		
5	SPHAERIUM (LPII)				0.0		19.23														9.62		9.62		0.5		
0	EPHEMEROPTERA (TOTAL)				19.23		0.0														9.62		9.62		0.5		
0	CAENIDAE																										
10	CAENIS (LPII)				19.23		0.0														9.62		9.62		0.5		
0	COLLEPTERA ADELPHAGA (TOTAL)				19.23		0.0														9.62		9.62		0.5		
0	HALIPIDAE																										
2	HALIPLUS (LPII)				19.23		0.0														9.62		9.62		0.5		
0	DIPTERA NEMATOCERA (TOTAL)				1211.54		423.00														817.31		394.23		44.0		
0	CERATOPOGONIDAE																										
2	CERATOPOGONIDAE (LPII)				38.46		19.23														28.85		9.62		1.6		
0	CHIRONOMIDAE																										
2	TANYTARSUS (LPII)				288.46		19.23														153.85		134.62		8.3		
2	DICTIOERIPES (LPII)				519.23		192.31														355.77		163.46		19.2		
2	ADAEESHWIA (LPII)				192.31		0.0														96.15		96.15		5.2		
2	PROCLADUS (LPII)				57.69		57.69														57.69		0.0		3.1		
2	PARACHIRONOMUS (LPII)				0.0		19.23														9.62		9.62		0.5		
2	TANYTUS (LPII)				57.69		96.15														76.92		19.23		4.1		
2	PSEUCROGLADIUS (LPII)				0.0		19.23														9.62		9.62		0.5		
3	CHIRONOMIDAE (LPII)				38.46		0.0														19.23		19.23		1.0		
2	CHIRONOMIDAE (LPII)				19.23		0.0														9.62		9.62		0.5		
0	DIPTERA BRACHYCERA (TOTAL)				0.0		19.23														9.62		9.62		0.5		
0	TANAHIDAE																										
2	CHRYSOIDS (LPII)				0.0		19.23														7.62		9.62		0.5		
0	DIPTERA (TOTAL)				38.46		0.0														19.23		19.23		1.0		
2	DIPTERA (LPII)				38.46		0.0														19.23		19.23		1.0		
TOTAL					2711.54		1000.00														1855.77		855.77		100.0		
DIVERSITY (H PRIME)					2.85		2.60														2.83		0.03		0.03		
DIVERSITY (J PRIME)					0.77		0.78														0.78		0.01		0.01		

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS TAXA

NUMBER OF TAXA

BOTTOM TYPE 0

ABOVE COMPUTED USING SAMPLE IDS

191 192

1 13

2 12

-
X

S.E.

REL
ABZ

17

DATE 03/09/81
PAGE NO 34
T600AQUA 9/28/77

DAILY GENERATING PLANT

RENNIC MACROINVERTIBRATE NUMERICAL ABUNDANCE (IND/SQ FT)

REPLICATE REPORT

PC TC 6C LOC

5 71 71 1 2 00

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	SAMP	VOL	SECH	H	T	WIND	CURR	TEMP	BT	TURB	CORD	DO	PH	SALIN	P	REL	ADZ		
201	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0.0	0.16	0.9	0.0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.8	0.0	0.0	0	0.0	
202	6/14/80	1310	0	0.0	0	0.9	0.9	0.0	0.0	0.16	0.9	0.0	1	6	0	0.0	0	35.0	25.0	0	0.0	0	5.0	0.0	0.0	0	0.0	
LS	TAXA																											
0	REHATODA (TOTAL)																											
1	REHATODA (LPII)																											
0	OLIGOCHAETA (TOTAL)																											
0	HAIDODA																											
1	HAIDODA (LPII)																											
0	TUBIFICIDAE																											
1	TUBIFICIDAE (LPII)																											
0	BIVALVIA (TOTAL)																											
0	SPHAERIIDAE																											
5	PISIDIUM (LPII)																											
0	ODONATA (TOTAL)																											
10	ODONATA (LPII)																											
0	DIPTERA REHATOCERA (TOTAL)																											
0	CEPHALOPODIDAE																											
0	CEPHALOPODIDAE (LPII)																											
0	CHIRONIDAE																											
2	CHIRONIDAE (LPII)																											
2	TANYTARSUS (LPII)																											
2	DICTIOLEPIDES (LPII)																											
2	ABLAESBIA (LPII)																											
2	PARACHIRONIDAE (LPII)																											
2	EUCHIRONIDAE (LPII)																											
3	CHIRONIDAE (LPII)																											
2	CHIRONIDAE (LPII)																											
TOTAL																												
DIVERSITY (H PRIME)																												
DIVERSITY (J PRIME)																												
NUMBER OF TAXA																												
BOTTOM TYPE																												

ABOVE COMPUTED USING SAMPLE IDS

201

202

DATE 03/09/81

PAGE NO 35

TODAY 9/28/77

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	19	20	- X	S.E.	KEL ABZ
0	NEMATODA (TOTAL)	0.0	9.62	4.81	4.81	0.2
1	NEMATODA (LPIL)	0.0	9.62	4.81	4.81	0.2
0	OLIGOCHAETA (TOTAL)	884.61	971.15	927.83	43.27	46.5
0	HAUDIDAE					
1	HAUDIDAE (LPIL)	259.61	894.23	576.02	317.31	28.9
0	TUBIFICIDAE					
1	TUBIFICIDAE (LPIL)	625.00	76.92	350.96	274.04	17.6
0	BIVALVIA (TOTAL)	105.77	9.62	57.69	40.08	2.9
0	SPHAERIIDAE					
1	SPHAERIUM (LPIL)	19.23	0.0	9.62	9.62	0.5
5	SPHAERIUM (LPIL)	67.31	0.0	33.65	33.65	1.7
2	SPHAERIUM (LPIL)	9.62	0.0	4.81	4.81	0.2
5	PISIDIUM (LPIL)	0.0	9.62	4.81	4.81	0.2
5	SPHAERIIDAE (LPIL)	9.62	0.0	4.81	4.81	0.2
0	EPHEMEROPTERA (TOTAL)	9.62	0.0	4.81	4.81	0.2
0	CAENIDAE					
10	CAENIS (LPIL)	9.62	0.0	4.81	4.81	0.2
0	ODONATA (TOTAL)	0.0	9.62	4.81	4.81	0.2
10	ODONATA (LPIL)	0.0	9.62	4.81	4.81	0.2
0	COLEOPTERA ADEPHAGA (TOTAL)	9.62	0.0	4.81	4.81	0.2
0	HALIPIDAE					
2	HALIPIUS (LPIL)	9.62	0.0	4.81	4.81	0.2
0	DIPTERA NEMATOCERA (TOTAL)	817.31	1134.61	975.96	158.65	48.9
0	CERATOPOGONIDAE					
2	CERATOPOGONIDAE (LPIL)	28.85	9.62	19.23	9.62	1.0
0	CHIRONOMIDAE					
2	CHIRONOMUS (LPIL)	0.0	48.03	24.04	24.04	1.2
2	TANYTARSUS (LPIL)	153.85	769.23	461.54	307.69	23.1
2	DICROTENDIPES (LPIL)	355.77	67.31	211.54	144.23	10.6
2	ADAEPSITHIA (LPIL)	96.15	9.62	52.88	43.27	2.7
2	PROCLADUS (LPIL)	57.69	0.0	28.85	28.85	1.4
2	PARACHIRONOMUS (LPIL)	9.62	96.15	52.88	43.27	2.7
2	TANYTARSUS (LPIL)	76.92	0.0	39.46	36.46	1.9
2	PSEUDOCALADUS (LPIL)	9.62	0.0	4.81	4.81	0.2
2	EPHOCHEPUS (LPIL)	0.0	48.03	24.04	24.04	1.2
3	CHIRONOMIDAE (LPIL)	19.23	57.69	33.46	19.23	1.9
2	CHIRONOMIDAE (LPIL)	9.62	28.05	19.23	9.62	1.0
0	DIPTERA BRACHYCERA (TOTAL)	9.62	0.0	4.81	4.81	0.2
0	TABANIDAE					
2	CHRYSOPS (LPIL)	9.62	0.0	4.81	4.81	0.2
0	DIPTERA (TOTAL)	19.23	0.0	9.62	9.62	0.5
2	DIPTERA (LPIL)	19.23	0.0	9.62	9.62	0.5
-	TOTAL	1855.77	2134.61	1995.19	139.42	100.0
-	DIVERSITY (H HINE)	2.03	1.94	2.33	0.45	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	19	20	-	S.E.	REL
				X		ABZ
DIVERSITY (J PRIME)		0.78	0.60	0.69	0.09	
NUMBER OF TAXA		17	13	22		
BOTTOM TYPE	0					

ABOVE COMPUTED USING SAMPLE IDS

191 192 201 202

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T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

IS	TAXA		X	S.E.	REL AB%
		20			
0	NEMATODA (TOTAL)	4.81	4.81	-1.00	0.2
1	NEMATODA (LPIL)	4.81	4.81	-1.00	0.2
0	OLIGOCHAETA (TOTAL)	927.88	927.88	-1.00	46.5
0	NAIDIDAE				
1	NAIDIDAE (LPIL)	576.92	576.92	-1.00	28.9
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	350.96	350.96	-1.00	17.6
0	BIVALVIA (TOTAL)	57.69	57.69	-1.00	2.9
0	SPHAERIIDAE				
1	SPHAERIUM (LPIL)	9.62	9.62	-1.00	0.5
5	SPHAERIUM (LPIL)	33.65	33.65	-1.00	1.7
2	SPHAERIUM (LPIL)	4.81	4.81	-1.00	0.2
5	PISIDIUM (LPIL)	4.81	4.81	-1.00	0.2
5	SPHAERIIDAE (LPIL)	4.81	4.81	-1.00	0.2
0	EPHEMEROPERA (TOTAL)	4.81	4.81	-1.00	0.2
0	CAENIDAE				
10	CAENIS (LPIL)	4.81	4.81	-1.00	0.2
0	ODONATA (TOTAL)	4.81	4.81	-1.00	0.2
10	ODONATA (LPIL)	4.81	4.81	-1.00	0.2
0	COLEOPTERA ADEPHAGA (TOTAL)	4.81	4.81	-1.00	0.2
0	HALIPLIDAE				
2	HALIPLUS (LPIL)	4.81	4.81	-1.00	0.2
0	DIPTERA NEMATOCERA (TOTAL)	975.96	975.96	-1.00	48.9
0	CERATOPOGONIDAE				
2	CERATOPOGON (LPIL)	19.23	19.23	-1.00	1.0
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIL)	24.04	24.04	-1.00	1.2
2	TANYTARSUS (LPIL)	461.54	461.54	-1.00	23.1
2	DICROTENDIPES (LPIL)	211.54	211.54	-1.00	10.6
2	ABLAESMYIA (LPIL)	52.88	52.88	-1.00	2.7
2	PROCLADUS (LPIL)	28.85	28.85	-1.00	1.4
2	PARACHIRONOMUS (LPIL)	52.88	52.88	-1.00	2.7
2	TANYPUS (LPIL)	38.46	38.46	-1.00	1.9
2	PSECTROCLADUS (LPIL)	4.81	4.81	-1.00	0.2
2	ENDOCHIRONOMUS (LPIL)	24.04	24.04	-1.00	1.2
3	CHIRONOMIDAE (LPIL)	38.46	38.46	-1.00	1.9
2	CHIRONOMIDAE (LPIL)	19.23	19.23	-1.00	1.0
0	DIPTERA BRACHYCERA (TOTAL)	4.81	4.81	-1.00	0.2
0	TABANIDAE				
2	CHRYSOPS (LPIL)	4.81	4.81	-1.00	0.2
0	DIPTERA (TOTAL)	9.62	9.62	-1.00	0.5
2	DIPTERA (LPIL)	9.62	9.62	-1.00	0.5
	TOTAL	1995.19	1995.19	-1.00	100.0
	-DIVERSITY (H PRIME)	2.33	2.38	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA			-		REL
				X	S.E.	ABZ
DIVERSITY (J PRIME)		20				
NUMBER OF TAXA		0.69		0.69		-1.00
BOTTOM TYPE	0	22		22		

ABOVE COMPUTED USING SAMPLE IDS:

191	192	201	202
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 1 3 00

				DURATION			TOW		SAMP VOL			WIND		CURR HT			TEMP										
SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	L'	AIR	WAT	BT	TURB	COND	DO	PH	SALN P	
211	6/14/80	1345	0	0.0	0	0.5	0.5	0.0	0	0.1	6	0.5	0 0	1	6	0	0.0	0	35.0	0.0	0	0.0	0	0.0	0.0	0.0 0	
212	6/14/80	1345	0	0.0	0	0.5	0.5	0.0	0	0.1	6	0.5	0 0	1	6	0	0.0	0	35.0	0.0	0	0.0	0	0.0	0.0	0.0 0	
																							X			S.E.	REL
LS	TAXA																						ABX				
								1	2																		
0	NEMATODA (TOTAL)							0.6		19.23										9.62		9.62		0.1			
1	NEMATODA (LPIL)							0.0		19.23										9.62		9.62		0.1			
0	OLIGOCHAETA (TOTAL)							3557.69		13403.83										8480.76		4923.07		95.8			
0	NAIDIDAE																										
1	NAIDIDAE (LPIL)							403.85		711.54										557.69		153.85		6.3			
0	TUBIFICIDAE																										
1	TUBIFICIDAE (LPIL)							3153.84		12692.30										7923.07		4769.22		89.5			
0	BIVALVIA (TOTAL)							230.77		211.54										221.15		9.62		2.5			
0	SPHAERIIDAE																										
1	SPHAERIUM (LPIL)							134.62		0.0										67.31		67.31		0.8			
5	SPHAERIUM (LPIL)							19.23		115.38										67.31		48.08		0.8			
1	PISIDIUM (LPIL)							19.23		0.0										9.62		9.62		0.1			
5	PISIDIUM (LPIL)							38.46		57.69										48.08		9.62		0.5			
5	SPHAERIIDAE (LPIL)							0.0		19.23										9.62		9.62		0.1			
1	BIVALVIA (LPIL)							19.23		19.23										19.23		0.0		0.2			
0	ISOPODA (TOTAL)							38.46		115.38										76.92		38.46		0.9			
0	ASELLIDAE																										
5	ASELLUS (LPIL)							38.46		115.38										76.92		38.46		0.9			
0	DIPTERA NEMATOCERA (TOTAL)							96.15		38.46										67.31		28.85		0.8			
0	CERATOPOGONIDAE																										
2	CERATOPOGONIDAE (LPIL)							19.23		0.0										9.62		9.62		0.1			
0	CHIRONOMIDAE																										
2	CHIRONOMUS (LPIL)							19.23		19.23										19.23		0.0		0.2			
2	ABLABESHYIA (LPIL)							19.23		0.0										9.62		9.62		0.1			
2	PROCLADIUS (LPIL)							38.46		19.23										28.85		9.62		0.3			
TOTAL								3923.07		13788.44										8855.75		4932.68		100.0			
DIVERSITY (H PRINE)								1.14		0.55										0.85		0.30					
DIVERSITY (J PRINE)								0.34		0.16										0.25		0.09					
NUMBER OF TAXA								10		10																	
BOTTOM TYPE								0																			

ABOVE COMPUTED USING SAMPLE IDS

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BARTLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE MORPHOLOGICAL ABUNDANCE (IND/SQ M)

STATION REPORT

15	TAXA	21	\bar{X}	S.E.	REL ABZ
0	HEMATODA (TOTAL)	9.62	9.62	-1.00	0.1
1	HEMATODA (LPIL)	9.62	9.62	-1.00	0.1
0	OLIGOCHAETA (TOTAL)	8480.76	8480.76	-1.00	95.6
0	HAUDIDAE				
1	HAUDIDAE (LPIL)	557.69	557.69	-1.00	6.3
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	7923.07	7923.07	-1.00	69.5
0	BIVALVIA (TOTAL)	221.15	221.15	-1.00	2.5
0	SPHAERIUM				
1	SPHAERIUM (LPIL)	67.31	67.31	-1.00	0.6
5	SPHAERIUM (LPIL)	67.31	67.31	-1.00	0.6
1	PISIDIUM (LPIL)	9.62	9.62	-1.00	0.1
5	PISIDIUM (LPIL)	43.03	43.03	-1.00	0.5
5	SPHAERIUM (LPIL)	9.62	9.62	-1.00	0.1
1	BIVALVIA (LPIL)	19.23	19.23	-1.00	0.2
0	ISOPODA (TOTAL)	76.92	76.92	-1.00	0.9
0	ASELLIDAE				
5	ASELLUS (LPIL)	76.92	76.92	-1.00	0.9
0	DIPTERA HEMICERA (TOTAL)	67.31	67.31	-1.00	0.6
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIL)	9.62	9.62	-1.00	0.1
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIL)	19.23	19.23	-1.00	0.2
2	ADABESHTIA (LPIL)	9.62	9.62	-1.00	0.1
2	PROCLADUS (LPIL)	28.85	28.85	-1.00	0.3
	TOTAL	8855.75	8855.75	-1.00	100.0
	DIVERSITY (H PRIN)	0.85	0.85	-1.00	
	DIVERSITY (J PRIN)	0.25	0.25	-1.00	
	NUMBER OF TAXA	12	12		
	BOTTOM TYPE	0			

ABOVE COMPUTED USING SAMPLE 105
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA		- X	S.E.	REL AB%
		21			
0	NEMATODA (TOTAL)	9.62	9.62	-1.00	0.1
1	NEMATODA (LPIL)	9.62	9.62	-1.00	0.1
0	OLIGOCHAETA (TOTAL)	8480.76	8480.76	-1.00	95.8
0	HAIDIDAE				
1	HAIDIDAE (LPIL)	557.69	557.69	-1.00	6.3
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	7923.07	7923.07	-1.00	89.5
0	BIVALVIA (TOTAL)	221.15	221.15	-1.00	2.5
0	SPHAERIIDAE				
1	SPHAERIUM (LPIL)	67.31	67.31	-1.00	0.8
5	SPHAERIUM (LPIL)	67.31	67.31	-1.00	0.8
1	PISIDIUM (LPIL)	9.62	9.62	-1.00	0.1
5	PISIDIUM (LPIL)	48.08	48.08	-1.00	0.5
5	SPHAERIIDAE (LPIL)	9.62	9.62	-1.00	0.1
1	BIVALVIA (LPIL)	19.23	19.23	-1.00	0.2
0	ISOPODA (TOTAL)	76.92	76.92	-1.00	0.9
0	ASELLIDAE				
5	ASELLUS (LPIL)	76.92	76.92	-1.00	0.9
0	DIPTERA NEMATOCERA (TOTAL)	67.31	67.31	-1.00	0.8
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIL)	9.62	9.62	-1.00	0.1
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIL)	19.23	19.23	-1.00	0.2
2	ABLABESHTIA (LPIL)	9.62	9.62	-1.00	0.1
2	PROCLADUS (LPIL)	28.85	28.85	-1.00	0.3
	TOTAL	8855.75	8855.75	-1.00	100.0
	DIVERSITY (H PRIME)	0.85	0.85	-1.00	
	DIVERSITY (J PRIME)	0.25	0.25	-1.00	
	NUMBER OF TAXA	12	12		
	BOTTOM TYPE	0			

ABOVE COMPUTED USING SAMPLE IDS

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 T600AQUA 9/28/77

BATTERY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ. M)

SITE SUMMARY

Nearshore Ponds

		Pond B	Pond C	Cowles Bog		S.E.	PEL
	T.A.C.A.	1	1	1	X	ABZ	
15							
0	CHIRONOMIA (TOTAL)	254.81	0.0	0.0	84.94	84.94	2.1
0	HYDROZOA						
1	HYDRA (LPIL)	254.81	0.0	0.0	84.94	84.94	2.1
0	REHATODA (TOTAL)	4.81	4.81	9.62	6.41	1.60	0.2
1	REHATODA (LPIL)	4.81	4.81	9.62	6.41	1.60	0.2
0	OLIGOCHAETA (TOTAL)	168.27	927.88	8480.76	3192.30	2653.30	80.6
0	HAIRIDAE						
1	CHAETOGASTER (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
1	HAIRIDAE (LPIL)	158.65	576.92	557.69	431.09	136.33	10.9
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	4.81	350.96	7923.07	2759.61	2583.66	69.7
0	GASTROPODA (TOTAL)	4.81	0.0	0.0	1.60	1.60	0.0
0	ANCYLIDAE						
1	ANCYLIDAE (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
0	BIVALVIA (TOTAL)	19.23	57.69	221.15	99.36	61.90	2.5
0	SPHAERIIDAE						
1	SPHAERIUM (LPIL)	0.0	9.62	67.31	25.64	21.02	0.6
5	SPHAERIUM (LPIL)	0.0	33.65	67.31	33.65	19.43	0.8
2	SPHAERIUM (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
1	PISIDIUM (LPIL)	9.62	0.0	9.62	6.41	3.21	0.2
5	PISIDIUM (LPIL)	9.62	4.81	48.13	20.83	13.69	0.5
5	SPHAERIIDAE (LPIL)	0.0	4.81	9.62	4.81	2.78	0.1
1	BIVALVIA (LPIL)	0.0	0.0	19.23	6.41	6.41	0.2
0	ISOPODA (TOTAL)	0.0	0.0	76.92	25.64	25.64	0.6
0	ASELLIDAE						
5	ASELLUS (LPIL)	0.0	0.0	76.92	25.64	25.64	0.6
0	AMPHIPODA (TOTAL)	48.08	0.0	0.0	16.03	16.03	0.4
0	HYALELLIDAE						
1	HYALELLA AZTECA	38.46	0.0	0.0	12.82	12.82	0.3
5	HYALELLA AZTECA	9.62	0.0	0.0	3.21	3.21	0.1
0	EPHEMEROPIDEA (TOTAL)	43.27	4.81	0.0	16.03	13.69	0.4
0	BATEIIDAE						
10	BATEIODE (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
0	CAENIDAE						
10	CAENIS (LPIL)	38.46	4.81	0.0	14.42	12.10	0.4
0	ODONATA (TOTAL)	0.0	4.81	0.0	1.60	1.60	0.0
10	ODONATA (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
0	COLEOPTERA ADEPHAGA (TOTAL)	0.0	4.81	0.0	1.60	1.60	0.0
0	HALIPLIDAE						
2	HALIPLUS (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
0	DIPTERA RHATOCLEPA (TOTAL)	485.58	975.96	67.31	509.61	262.58	12.9
0	CERATOPOGONIDAE						
2	CERATOPOGONIDAE (LPIL)	0.0	19.23	9.62	9.62	5.55	0.2
0	CHIRONOMIDAE						

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B 1	Pond C 1	Cowles Bog 1	X	S.E.	REL AB%
2	CHIRONOMUS (LPIL)	9.62	24.04	19.23	17.63	4.29	0.4
2	TANTAROSUS (LPIL)	331.73	461.54	0.0	264.42	127.42	6.7
2	DICROTENDIPES (LPIL)	24.04	211.54	0.0	78.53	66.67	2.0
2	ASIALABESHTIA (LPIL)	38.46	52.88	9.62	33.65	12.72	0.8
2	PROCLADUS (LPIL)	28.85	28.85	28.85	28.85	0.0	0.7
2	PARACHEIRONOMUS (LPIL)	0.0	52.88	0.0	17.63	17.63	0.4
2	HARNISCHIA (LPIL)	9.62	0.0	0.0	3.21	3.21	0.1
2	TANPUS (LPIL)	0.0	38.46	0.0	12.82	12.82	0.3
2	PSLEICROCLADUS (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
2	ENDOCHIRONOMUS (LPIL)	0.0	24.04	0.0	8.01	8.01	0.2
2	HELOTANYPUS (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
3	CHIRONOMIDAE (LPIL)	19.23	38.46	0.0	19.23	11.10	0.5
2	CHIRONOMIDAE (LPIL)	19.23	19.23	0.0	12.82	6.41	0.3
0	DIPTERA ERACHYCEA (TOTAL)	0.0	4.81	0.0	1.60	1.60	0.0
0	TENDIDAE						
2	CHRISO'S (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
0	DIPTERA (TOTAL)	0.0	9.62	0.0	3.21	3.21	0.1
2	DIPTERA (LPIL)	0.0	9.62	0.0	3.21	3.21	0.1
TOTAL		1028.84	1995.19	8855.75	3959.93	2463.76	100.0
DIVERSITY (H PRIME)		2.46	2.39	0.85	1.90	0.53	
DIVERSITY (J PRIME)		0.78	0.69	0.25	0.57	0.16	
NUMBER OF TAXA		18	22	12	31		
EDITION TYPE	0						

ABOVE COMPUTED USING SAMPLE IDS

171	172
191	192
211	212

161
201102
272

DATE 03/09/81
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Corrections to:

APPENDIX F

BENTHIC MACROINVERTEBRATE REPLICATE REPORTS,
BAILLY STUDY AREA, APRIL 1980

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

CENTRIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC CC LOC

5 71 71 0 0 0

STO	DATE	TIME	D/N	UNITS	C	SD	WD	SP	0	TOH	SAMP	VOL	SC	DI	WIND	CURRENT	TEMP	WAT	B	TURED	COND	DO	PH	SALN	P
11	4/17/60	1143	0	0.0	0	4.6	4.6	0.0	0	0.1	6	0.5	8	0	3	2	6	0.0	0	0.0	0	0.0	0.0	0.0	0.0
12	4/17/60	1143	0	0.0	0	4.6	4.6	0.0	0	0.1	6	0.5	8	0	3	2	6	0.0	0	0.0	0	0.0	0.0	0.0	0.0
LS	TAXA																								
0	OLIGOCHAETA (TOTAL)								1																
0	TUBIFICIDAE								0.0																
1	TUBIFICIDAE (LPIL)								0.0																
0	HIRUDINEA (TOTAL)								0.0																
1	HIRUDINEA (LPIL)								0.0																
0	ADPHIENEA (TOTAL)								0.0																
0	HAUSTORIIDAE								0.0																
1	FORHUSOREIA AFFINIS								19.23																
0	DIPTERA NEUTOCERA (TOTAL)								0.0																
0	CHIRONOMIDAE								0.0																
2	PARACLAUSPELINA (LPIL)								19.23																
TOTAL									19.23																
DIVERSITY (H PRIME)									57.69																
DIVERSITY (J PRIME)									1.58																
NUMBER OF TAXA									1.00																
BOTTOM TYPE									3																

ABOVE COMPUTED USING SAMPLE IDS

11

12

DATE 05/04/61

PAGE NO 1

1600AQUA 9/20/77



DATE 05/04/81
PAGE NO 2
T600AQUA 9/28/77

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC
5 71 71 0 0 00

		DURATION				TOW		SAMP VOL				WIND		CURRENT		TEMP													
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURB	COND	DO	PH	SALT	P		
31	4/17/80	1005	0	0.0	0	15.2	15.2	0.0	0	0.1	6	1.0	8.0	3	6	6	0.0	0	12.8	8.0	0	0.0	0	0.0	7.0	0.0	0		
32	4/17/80	1005	0	0.0	0	15.2	15.2	0.0	0	0.1	6	1.0	8.0	3	6	6	0.0	0	12.8	8.0	0	0.0	0	0.0	0.0	0.0	0		
																							-					REL	
																							X					S.E.	ABZ
1 TAXA								1		2																			
0	OLIGOCHAETIA (TOTAL)							942.31		519.23														730.77		211.54		52.4	
0	TUBIFICIDAE																												
1	TUBIFICIDAE (LPIL)							942.31		519.23														730.77		211.54		52.4	
0	HIRUDINEA (TOTAL)							0.0		19.23														9.62		9.62		0.7	
1	HIRUDINEA (LPIL)							0.0		19.23														9.62		9.62		0.7	
0	BIVALVIA (TOTAL)							19.23		19.23														19.23		0.0		1.4	
0	SPHAERIIDAE																												
1	PISIDIUM (LPIL)							19.23		0.0														9.62		9.62		0.7	
5	PISIDIUM (LPIL)							0.0		19.23														9.62		9.62		0.7	
0	AMPHIPODA (TOTAL)							192.31		153.85														173.08		19.23		12.4	
0	HAUSTORIIDAE																												
1	PONTOPOREIA AFFINIS							192.31		0.0														96.15		96.15		6.9	
1	PONTOPOREIA (LPIL)							0.0		153.85														76.92		76.92		5.5	
0	TRICHOPTERA (TOTAL)							0.0		19.23														9.62		9.62		0.7	
2	TRICHOPTERA (LPIL)							0.0		19.23														9.62		9.62		0.7	
0	DIPTERA NEMATOCERA (TOTAL)							673.08		230.77														451.92		221.15		32.4	
0	CHIRONOMIDAE																												
2	CHIRONOMUS (LPIL)							38.46		19.23														28.85		9.62		2.1	
2	CRYPTOCHIRONOMUS (LPIL)							519.23		192.31														355.77		163.46		25.5	
2	PROCLADIUS (LPIL)							19.23		19.23														19.23		0.0		1.4	
2	PARACLADOPELMA (LPIL)							76.92		0.0														38.46		38.46		2.8	
2	TRICHOCLADIUS (LPIL)							19.23		0.0														9.62		9.62		0.7	
TOTAL								1826.92		961.54														1394.23		432.69		100.0	
DIVERSITY (H PRINE)								1.87		1.93														1.90		0.03			
DIVERSITY (J PRINE)								0.62		0.64														0.63		0.01			
NUMBER OF TAXA								8		8																			
BOTTOM TYPE								0																					

ABOVE COMPUTED USING SAMPLE IDS
31 32

DATE 05/04/81
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T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	1	2	3	X	S.E.	REL AB%
0	NEMATODA (TOTAL)	0.0	9.62	0.0	3.21	3.21	0.5
1	NEMATODA (LPIL)	0.0	9.62	0.0	3.21	3.21	0.5
0	OLIGOCHAETA (TOTAL)	9.62	57.69	730.77	266.03	232.79	40.1
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	9.62	57.69	730.77	266.03	232.79	40.1
0	HIRUDINEA (TOTAL)	9.62	0.0	9.62	6.41	3.21	1.0
1	HIRUDINEA (LPIL)	9.62	0.0	9.62	6.41	3.21	1.0
0	BIVALVIA (TOTAL)	0.0	9.62	19.23	9.62	5.55	1.4
0	SPHAERIIDAE						
1	PISIDIUM (LPIL)	0.0	0.0	9.62	3.21	3.21	0.5
5	PISIDIUM (LPIL)	0.0	0.0	9.62	3.21	3.21	0.5
5	SPHAERIIDAE (LPIL)	0.0	9.62	0.0	3.21	3.21	0.5
0	AMPHIPODA (TOTAL)	9.62	125.00	173.08	102.56	48.50	15.5
0	HAUSTORIIDAE						
1	PONTOPOREIA AFFINIS	9.62	125.00	96.15	76.92	34.67	11.6
1	PONTOPOREIA (LPIL)	0.0	0.0	76.92	25.64	25.64	3.9
0	TRICHOPTERA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.5
2	TRICHOPTERA (LPIL)	0.0	0.0	9.62	3.21	3.21	0.5
0	DIPTERA NEMATOCERA (TOTAL)	9.62	355.77	451.92	272.44	134.31	41.1
0	CHIRONOMIDAE						
2	CHIRONOMUS (LPIL)	0.0	38.46	28.85	22.44	11.56	3.4
2	CRYPTOCHIRONOMUS (LPIL)	0.0	250.00	355.77	201.92	105.48	30.4
2	PROCLADUS (LPIL)	0.0	19.23	19.23	12.82	6.41	1.9
2	PAPILLADOPELMA (LPIL)	9.62	28.85	38.46	25.64	8.48	3.9
2	MICRODIAPYSA (LPIL)	0.0	19.23	0.0	6.41	6.41	1.0
2	TRICHOCLADUS (LPIL)	0.0	0.0	9.62	3.21	3.21	0.5
TOTAL		38.46	557.69	1394.23	663.46	394.93	100.0
DIVERSITY (H PRIME)		0.79	2.16	1.90	1.62	0.42	
DIVERSITY (J PRIME)		0.50	0.80	0.63	0.64	0.09	
NUMBER OF TAXA		4	9	11	14		
BOTTOM TYPE		0					

ABOVE COMPUTED USING SAMPLE IDS

11 12 21 22
31 32

DATE 05/04/81
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TE00AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

LENNIC MACROINVERTEBRATE HABITAT ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC IC GC LOC
5 71 71 0 0 10

SID	DATE	TIME	D/R	UNITS	C	SD	WB	SP	D	TOM	SAMP VOL		WIND	CURRENT		TEMP		BT	TURBO	COND	DO	PH	SALIN	P
											UNITS	C		CL	SP	DI	AIR							
41	4/17/80	1218	0	0.0	0	4.6	4.6	0.0	0	230.77	0.16	0.58	3	2	6	0.0	0	16.7	11.0	0	0.0	0.0	0.0	0.0
42	4/17/80	1218	0	0.0	0	4.6	4.6	0.0	0	19.23	0.16	0.58	3	2	6	0.0	0	16.7	11.0	0	0.0	0.0	0.0	0.0
LS	TAXA																							
0	OLIGOCHAETA (TOTAL)																							
0	TUBIFICIDAE																							
1	TUBIFICIDAE (LPII)																							
0	AMPHIRODA (TOTAL)																							
0	HAUSTORIIDAE																							
1	FORIPOREIA (LPII)																							
0	DIPTERA REMIGERA (TOTAL)																							
0	CHIRONOMIDAE																							
2	CRYPTOCHIRONOMUS (LPII)																							
2	PARACADOPHELA (LPII)																							
TOTAL																								
DIVERSITY (H PRIME)																								
DIVERSITY (J PRIME)																								
NUMBER OF TAXA																								
BOTCH TYPE																								

ABOVE COMPUTED USING SAMPLE IDS

DATE 05/04/81
PAGE NO 5
1600AQUA 9/28/77

DATE 05/04/01
PAGE NO 6
T600AQUA 9/28/77

DATE 05/04/81
PAGE NO 7
T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	4	5	6	X	S.E.	REL AB%
0	NEMATODA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.2
1	NEMATODA (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
0	OLIGOCHAETA (TOTAL)	115.38	38.46	2153.84	769.23	692.66	57.4
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	115.38	38.46	2153.84	769.23	692.66	57.4
0	GASTROPODA (TOTAL)	0.0	9.62	0.0	3.21	3.21	0.2
5	GASTROPODA (LPIL)	0.0	9.62	0.0	3.21	3.21	0.2
0	BIVALVIA (TOTAL)	0.0	19.23	125.00	48.08	38.86	3.6
0	SPHAERIIDAE						
5	SPHAERIUM (LPIL)	0.0	9.62	0.0	3.21	3.21	0.2
1	PISIDIUM (LPIL)	0.0	0.0	76.92	25.64	25.64	1.9
5	PISIDIUM (LPIL)	0.0	9.62	48.08	19.23	14.69	1.4
0	AMPHIPODA (TOTAL)	9.62	355.77	442.31	269.23	132.19	20.1
0	HAUSTORIIDAE						
1	PONTOPOREIA (LPIL)	9.62	355.77	442.31	269.23	132.19	20.1
0	EPHEMEROPTERA (TOTAL)	0.0	9.62	0.0	3.21	3.21	0.2
0	EPHEMERIDAE						
10	HEXAGENIA LIMBATA	0.0	9.62	0.0	3.21	3.21	0.2
0	DIPTERA NEMATOCERA (TOTAL)	96.15	115.38	519.23	243.59	137.93	18.2
0	CHIRONOMIDAE						
2	CHIRONOMUS (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
2	CRYPTOCHIRONOMUS (LPIL)	67.31	105.77	461.54	211.54	125.49	15.8
2	PROCLADUS (LPIL)	0.0	0.0	9.62	3.21	3.21	0.2
2	PARACLADELLA (LPIL)	28.85	0.0	38.46	22.44	11.56	1.7
2	CHIRONOMIDAE (LPIL)	0.0	9.62	0.0	3.21	3.21	0.2
	TOTAL	221.15	548.08	3249.99	1339.74	959.78	100.0
	DIVERSITY (H PRIME)	0.80	1.52	1.46	1.26	0.23	
	DIVERSITY (J PRIME)	0.40	0.59	0.64	0.54	0.07	
	NUMBER OF TAXA	4	8	8	12		
	BOTTOM TYPE	0					

ABOVE COMPUTED USING SAMPLE IDS

41	42	51	52
61	62		

DATE 05/04/81
PAGE NO 8
T600AQUA 9/28/77

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND/SQ M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 0 0 20

SID		DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TOM	SAMP	VOL	SEC	H	T	SC	DI	WIND	CURRENT	TEMP	WAT	BT	TUBED	COND	DO	PH	SALT	P	REL			
101	4/17/80	1932	0	0.0	0	3.5	3.5	3.5	0.0	0	0.1	6	1.5	8.0	3	2	6	0.0	0	8.9	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0		
102	4/17/80	1932	0	0.0	0	3.5	3.5	3.5	0.0	0	0.1	6	1.5	8.0	3	2	6	0.0	0	8.9	0.0	0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	0.0		
LS TAXA																																	
0	CHIDARIA (TOTAL)										0.0	2	19.23																		9.62	2.9	
0	HYDROZOA										0.0	0.0	19.23																		9.62	2.9	
11	CORDYLOPODA LACUSIRIS										0.0	0.0	19.23																		9.62	2.9	
0	REHATODA (TOTAL)										0.0	0.0	38.46																		19.23	5.7	
1	REHATODA (LPIU)										0.0	0.0	38.46																		19.23	5.7	
0	OLIGOCHAETA (TOTAL)										57.69	519.23																		288.46	230.77	85.7	
0	TUDIFICIDAE										0.0	0.0	19.23																		288.46	230.77	85.7
1	TUDIFICIDAE (LPIU)										57.69	519.23																		9.62	2.9		
0	BIVALVIA (TOTAL)										0.0	0.0	19.23																		9.62	2.9	
0	SPHAERIIDAE										0.0	0.0	19.23																		9.62	2.9	
5	PISIDIUM (LPIU)										0.0	0.0	19.23																		9.62	2.9	
0	DIPTERA REHATOCERA (TOTAL)										0.0	0.0	19.23																		9.62	2.9	
0	CHIRONOMIDAE										0.0	0.0	19.23																		9.62	2.9	
2	CRYPTOCHIRONOMUS (LPIU)										0.0	0.0	19.23																		9.62	2.9	
TOTAL											57.69	615.38																		336.54	278.85	100.0	
DIVERSITY (H PRIME)											0.0	0.93																		0.46			
DIVERSITY (J PRIME)											0.0	0.40																		0.20			
NUMBER OF TAXA											1	5																		5			
LOTION TYPE											0	5																					

ABOVE COMPUTED USING SAMPLE 105

101 102

DATE 05/04/81
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 T600AQUA 9/28/77

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS TAXA		-		REL
		X	S.E.	AB%
	10			
0	CHITIDARIA (TOTAL)	9.62	-1.00	2.9
0	HYDROZOA			
11	CORYLOPHORA LACUSTRIS	9.62	-1.00	2.9
0	NEMATODA (TOTAL)	19.23	-1.00	7
1	NEMATODA (LPIL)	19.23	-1.00	5.7
0	OLIGOCHAETA (TOTAL)	288.46	-1.00	85.7
0	TUBIFICIDAE			
1	TUBIFICIDAE (LPIL)	288.46	-1.00	85.7
0	BIVALVIA (TOTAL)	9.62	-1.00	2.9
0	SPHALRIIDAE			
5	PISIDIUM (LPIL)	9.62	-1.00	2.9
0	DIPTERA NEMATOCERA (TOTAL)	9.62	-1.00	2.9
0	CHIRONOMIDAE			
2	CRYPTOCHIRONOMUS (LPIL)	9.62	-1.00	2.9
TOTAL		336.54	-1.00	100.0
DIVERSITY (H PRIME)		0.46	-1.00	
DIVERSITY (J PRIME)		0.20	-1.00	
NUMBER OF TAXA		5		
BOTTOM TYPE		0		

ABOVE COMPUTED USING SAMPLE IDS
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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND/SQ M)

STATION REPORT

LS	TAXA	3	6	10	X	S.E.	REL AEZ
0	CHIDARIA (TOTAL)	0.0	0.0	9.62	3.21	3.21	0.4
0	HYDROZOA						
11	CORDILOPHORA LACUSIRIS	0.0	0.0	9.62	3.21	3.21	0.4
0	HEMATODA (TOTAL)	3.21	3.21	19.23	8.55	5.34	1.1
1	HEMATODA (LPII)	3.21	3.21	19.23	8.55	5.34	1.1
0	OLIGOCHAETA (TOTAL)	266.03	769.23	288.46	441.24	164.12	56.6
0	TUOIFICIDAE						
1	TUOIFICIDAE (LPII)	266.03	769.23	288.46	441.24	164.12	56.6
0	HIRUDINEA (TOTAL)	6.41	0.0	0.0	2.14	2.14	0.3
1	HIRUDINEA (LPII)	6.41	0.0	0.0	2.14	2.14	0.3
0	GASTROPODA (TOTAL)	0.0	3.21	0.0	1.07	1.07	0.1
5	GASTROPODA (LPII)	0.0	3.21	0.0	1.07	1.07	0.1
0	BIVALVIA (TOTAL)	9.62	48.03	9.62	22.44	12.82	2.9
0	SPHAERIIDAE						
5	SPHAERIIDAE (LPII)	0.0	3.21	0.0	1.07	1.07	0.1
1	PISIDIUM (LPII)	3.21	25.64	0.0	9.62	8.07	1.2
5	PISIDIUM (LPII)	3.21	19.23	9.62	10.68	4.66	1.4
5	SPHAERIIDAE (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
0	AMPHIPODA (TOTAL)	102.56	269.23	0.0	123.93	78.45	15.9
0	HAUSTORIIDAE						
1	FOROFOREIA AFFINIS	76.92	0.0	0.0	25.64	25.64	3.3
1	FOROFOREIA (LPII)	25.64	269.23	0.0	98.29	85.79	12.6
0	EPHEMEROPTERA (TOTAL)	0.0	3.21	0.0	1.07	1.07	0.1
0	EPHEMEROPTERA						
10	HEXAGHERIA LIMBATA	0.0	3.21	0.0	1.07	1.07	0.1
0	TRICHOPTERA (TOTAL)	3.21	0.0	0.0	1.07	1.07	0.1
2	TRICHOPTERA (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
0	DIPTERA REMATOCERA (TOTAL)	272.44	243.59	9.62	175.21	83.22	22.5
0	CHIRONOMIDAE						
2	CHIRONOMUS (LPII)	22.44	3.21	0.0	8.55	7.01	1.1
2	CRIPICHTHURUS (LPII)	201.92	211.54	9.62	141.03	65.76	18.1
2	PROCLADUS (LPII)	12.82	3.21	0.0	5.34	3.85	0.7
2	PAPACIACOPHIA (LPII)	25.64	22.44	0.0	16.03	8.07	2.1
2	PARAGNIESA (LPII)	6.41	0.0	0.0	2.14	2.14	0.3
2	TRICHOCLADUS (LPII)	3.21	0.0	0.0	1.07	1.07	0.1
2	CHIRONOMIDAE (LPII)	0.0	3.21	0.0	1.07	1.07	0.1
TOTAL		663.46	1339.74	336.54	779.91	295.40	100.0
DIVERSITY (H PRIME)		1.62	1.26	0.46	1.11	0.34	
DIVERSITY (J PRIME)		0.64	0.54	0.20	0.46	0.13	
NUMBER OF TAXA		14	12	5	19		
EDITION TYPE	0						

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

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31	32	41	42
51	52	61	62
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC
5 71 71 0 1 00

				DURATION				TOW				SAMP VOL				WIND				CURRENT				TEMP											
STD	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALIN	P								
71	4/17/80	1544	0	0.0	0	4.6	4.6	0.0	0	0.1	6	0.5	8.0	3	2	6	0.0	0	0.0	5.5	0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0				
72	4/17/80	1544	0	0.0	0	4.6	4.6	0.0	0	0.1	6	0.5	8.0	3	2	6	0.0	0	0.0	5.5	0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0				
																						-				REL									
LS	TAXA																					X				S.E.				AB%					
								1				2																							
0	OLIGOCHAETA (TOTAL)							76.92				57.69												67.31				9.62				53.8			
0	TUBIFICIDAE																																		
1	TUBIFICIDAE (LPIL)							76.92				57.69												67.31				9.62				53.8			
0	BIVALVIA (TOTAL)							19.23				19.23												19.23				0.0				15.4			
0	SPHAERIIDAE																																		
1	PISIDIUM (LPIL)							19.23				0.0												9.62				9.62				7.7			
5	PISIDIUM (LPIL)							0.0				19.23												9.62				9.62				7.7			
0	DIPTERA NEMATOCERA (TOTAL)							57.69				19.23												38.46				19.23				30.8			
0	CHIRONOMIDAE																																		
2	CHIRONOMUS (LPIL)							38.46				0.0												19.23				19.23				15.4			
2	CRYPTOCHIRONOMUS (LPIL)							19.23				19.23												19.23				0.0				15.4			
TOTAL								153.85				96.15												125.00				28.85				100.0			
DIVERSITY (H PRIME)								1.75				1.37												1.56				0.19							
DIVERSITY (J PRIME)								0.87				0.86												0.87				0.01							
NUMBER OF TAXA								4				3												4											
BOTTOM TYPE								0																											

ABOVE COMPUTED USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILLY GENERATING PLANT

DETHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

REPLICATE REPORT

FC TC GC	LOC										
5	71	71	0	1	00						
SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C
81	4/17/80	1515	0	0.0	0	9.1	9.1	0.0	0	0.1	6
82	4/17/80	1515	0	0.0	0	9.1	9.1	0.0	0	0.1	6
LS	TAXA	1	2	3	4	5	6	7	8	9	10
0	OLIGONECTA (TOTAL)	96.15	76.92								
0	TUBIFICIDAE										
1	TUBIFICIDAE (LPIL)	96.15	76.92								
0	BIVALVIA (TOTAL)	0.0	19.23								
0	SPHARIIDAE										
5	SPHARIIDAE (LPIL)	0.0	19.23								
0	AMPHIPODA (TOTAL)	76.92	96.15								
0	HAUSTORIIDAE										
1	HAUSTORIIDAE (LPIL)	76.92	96.15								
0	DIPLEURA RHINOCEPHALA (TOTAL)	33.46	0.0								
0	CHIRONOMIDAE										
1	CHIRONOMIDAE (LPIL)	33.46	0.0								
TOTAL		211.54	192.31								
DIVERSITY (H PRIME)		1.49	1.36								
DIVERSITY (J PRIME)		0.94	0.86								
NUMBER OF TAXA		3	3								
LOTION TYPE		0									

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TIME

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

DAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PC TC GC LOC
5 71 71 0 1 00

		DURATION				TOW		SAMP VOL				WIND		CURRENT		TEMP													
SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P		
91	4/17/80	1433	0	0.0	0	15.2	15.2	0.0	0	0.1	6	1.5	8.0	3	2	6	0.0	0	8.9	5.5	0	0.0	0	0.0	0.0	0.0	0		
92	4/17/80	1433	0	0.0	0	15.2	15.2	0.0	0	0.1	6	1.5	8.0	3	2	6	0.0	0	8.9	5.5	0	0.0	0	0.0	0.0	0.0	0		
																					-				REL				
LS	TAXA																				X		S.E.		ABZ				
								1		2																			
0	OLIGOCHAETA (TOTAL)							0.0		19.23												9.62				9.62		33.3	
0	TUBIFICIDAE																												
1	TUBIFICIDAE (LPIL)							0.0		19.23												9.62				9.62		33.3	
0	BIVALVIA (TOTAL)							38.46		0.0												19.23				19.23		66.7	
0	SPHAERIIDAE																												
1	SPHAERIUM (LPIL)							19.23		0.0												9.62				9.62		33.3	
5	PISIDIUM (LPIL)							19.23		0.0												9.62				9.62		33.3	
TOTAL								38.46		19.23												28.85				9.62		100.0	
DIVERSITY (H PRIME)								1.00		0.0												0.50				0.50			
DIVERSITY (J PRIME)								1.00		0.0												0.50				0.50			
NUMBER OF TAXA								2		1												3							
BOTTOM TYPE								0																					

ABOVE COMPUTED USING SAMPLE IDS
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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (HP/50 M)

STATION REPORT

LS	TAXA	7	8	9	X	S.E.	REL ABZ
0	OLIGOCHAETA (TOTAL)	67.31	86.54	9.62	54.49	23.11	45.9
0	TUBIFICIDAE						
1	TUBIFICIDAE (LPIL)	67.31	86.54	9.62	54.49	23.11	45.9
0	BIVALVIA (TOTAL)	19.23	9.62	19.23	16.03	3.21	13.5
0	SPHAERIIDAE						
1	SPHAERIUM (LPIL)	0.0	0.0	9.62	3.21	3.21	2.7
1	PISIDIUM (LPIL)	9.62	0.0	0.0	3.21	3.21	2.7
5	PISIDIUM (LPIL)	9.62	0.0	9.62	6.41	3.21	5.4
5	SPHAERIIDAE (LPIL)	0.0	9.62	0.0	3.21	3.21	2.7
0	AMPHIPODA (TOTAL)	0.0	86.54	0.0	28.85	28.85	24.3
0	HAUSTORIIDAE						
1	PONTOPOREIA (LPIL)	0.0	86.54	0.0	28.85	28.85	24.3
0	DIPTER/ NEMATOCERA (TOTAL)	38.46	19.23	0.0	19.23	11.10	16.2
0	CHIRONOMIDAE						
2	CHIRONOMUS (LPIL)	19.23	0.0	0.0	6.41	6.41	5.4
2	CRYPTOCHIRONOMUS (LPIL)	19.23	0.0	0.0	6.41	6.41	5.4
1	CRYPTOCHIRONOMUS (LPIL)	0.0	19.23	0.0	6.41	6.41	5.4
TOTAL		125.00	201.92	28.85	118.59	50.07	100.0
DIVERSITY (H PRIME)		1.56	1.43	0.50	1.16	0.33	
DIVERSITY (J PRIME)		0.87	0.90	0.50	0.76	0.13	
NUMBER OF TAXA		4	4	3	7		
BOTTOM TYPE		0					

ABOVE COMPUTED USING SAMPLE 105

71	72	81	82
91	92		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

IS	TAXA		- X	S.E.	REL ABZ
		9			
0	OLIGOCHAETA (TOTAL)	54.49	54.49	-1.00	45.9
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	54.49	54.49	-1.00	45.9
0	BIVALVIA (TOTAL)	16.03	16.03	-1.00	13.5
0	SPHAERIIDAE				
1	SPHAERIUM (LPIL)	3.21	3.21	-1.00	2.7
1	PISIDIUM (LPIL)	3.21	3.21	-1.00	2.7
5	PISIDIUM (LPIL)	6.41	6.41	-1.00	5.4
5	SPHAERIIDAE (LPIL)	3.21	3.21	-1.00	2.7
0	AMPHIPODA (TOTAL)	28.85	28.85	-1.00	24.3
0	HAUSTORIIDAE				
1	FORIOPORETA (LPIL)	28.85	28.85	-1.00	24.3
0	DIPTERA NEMATOCERA (TOTAL)	19.23	19.23	-1.00	16.2
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIL)	6.41	6.41	-1.00	5.4
2	CRYPTOCHIRONOMUS (LPIL)	6.41	6.41	-1.00	5.4
1	CRYPTOCHIRONOMUS (LPIL)	6.41	6.41	-1.00	5.4
	TOTAL	118.59	118.59	-1.00	100.0
	DIVERSITY (H PRIME)	1.16	1.16	-1.00	
	DIVERSITY (J PRIME)	0.76	0.76	-1.00	
	NUMBER OF TAXA	7	7		
	BOTTOM TYPE	0			

ABOVE COMPUTED USING SAMPLE 105

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9172
92

81

82

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DAILY GENERATING PLANT

BEHIND HPCOINVERTERBATE NUMERICAL ABUNDANCE (NO/SQ M)

SITE SUMMARY

15	TAXA	Nearfield (1-6, 10)	Farfield (7-9)	\bar{X}	S.E.	REL ABZ
0	CHITARIA (TOTAL)	0	0	1.60	1.60	0.4
0	HYDROZOA	3.21	0.0			
11	CORDILOPHORA LACUSTRIS	3.21	0.0	1.60	1.60	0.4
0	HEMATODA (TOTAL)	8.55	0.0	4.27	4.27	1.0
1	HEMATODA (LPII)	8.55	0.0	4.27	4.27	1.0
0	OLIGOCHEATA (TOTAL)	441.24	54.49	247.06	193.38	55.2
0	TUSIFICIDAE					
1	TUBIFICIDAE (LPII)	441.24	54.49	247.06	193.38	55.2
0	HIRUDINIA (TOTAL)	2.14	0.0	1.07	1.07	0.2
1	HIRUDINIA (LPII)	2.14	0.0	1.07	1.07	0.2
0	GASTROPODA (TOTAL)	1.07	0.0	0.53	0.53	0.1
5	GASTROPODA (LPII)	1.07	0.0	0.53	0.53	0.1
0	BIVALVIA (TOTAL)	22.44	16.03	19.23	3.21	4.3
0	SPHAERIIDAE					
5	SPHAERIUM (LPII)	1.07	0.0	0.53	0.53	0.1
1	SPHAERIUM (LPII)	0.0	3.21	1.60	1.60	0.4
1	PISIDIUM (LPII)	9.62	3.21	6.41	3.21	1.4
5	PISIDIUM (LPII)	10.68	6.41	8.55	2.14	1.9
5	SPHAERIIDAE (LPII)	1.07	3.21	2.14	1.07	0.5
0	ACERATODA (TOTAL)	123.93	28.85	76.39	47.54	17.0
0	HALSOTIIDAE					
1	FORHOPEIA AFFINIS	25.64	0.0	12.62	12.62	2.9
1	FORHOPEIA (LPII)	98.29	28.85	63.57	34.72	14.1
0	EPHEMEROPTERA (TOTAL)	1.07	0.0	0.53	0.53	0.1
0	EPHEMERIDAE					
10	HEXAGENIA LIMBATA	1.07	0.0	0.53	0.53	0.1
0	TRICHOPTERA (TOTAL)	1.07	0.0	0.53	0.53	0.1
2	TRICHOPTERA (LPII)	1.07	0.0	0.53	0.53	0.1
0	DIPLEPA HEMATOCLERA (TOTAL)	175.21	19.23	97.22	77.99	21.6
0	CHIRONOMIDAE					
2	CHIRONOMUS (LPII)	8.55	6.41	7.48	1.07	1.7
2	CRYPTOCHIRONOMUS (LPII)	141.03	6.41	73.72	67.31	16.4
1	CRYPTOCHIRONOMUS (LPII)	0.0	6.41	3.21	3.21	0.7
2	PROCLADUS (LPII)	5.34	0.0	2.67	2.67	0.6
2	PAPACLADEPHERA (LPII)	16.03	0.0	8.01	8.01	1.8
2	HEMIDIAESEA (LPII)	2.14	0.0	1.07	1.07	0.2
2	TRICHOCLADUS (LPII)	1.07	0.0	0.53	0.53	0.1
2	CHIRONOMIDAE (LPII)	1.07	0.0	0.53	0.53	0.1
TOTAL		779.91	118.59	449.25	330.66	100.0
DIVERSITY (H PRIME)		1.11	1.16	1.14	0.03	
DIVERSITY (J PRIME)		0.46	0.76	0.61	0.15	
RARE OF TAXA		19	7	19		
DOTTYPE		0				

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

SITE SUMMARY

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11	12	21	22
31	32	41	42
51	52	61	62
101	102	71	72
81	82	91	92

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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

PG 1C GC LOC

5 71 71 1 1 00

STD	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	TOH	SAHP	VOL	WIDD	CL	SP	DI	CUREHT	TEMP	BT	TURBD	COND	DO	PH	SAHP	P
171	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	0.0	0	0.0	0	8.9	0.0	0.0
172	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	0.0	0	0.0	0	8.9	0.0	0.0
15	TAXA																								
0	CHIDARIA (TOTAL)									1		2													
0	HYDROZOA									33.46		0.0													
1	HYDRA (LPL)									33.46		0.0													
0	PLATYHELMINTHES (TOTAL)									0.0		38.46													
1	TUBELLARIA (LPL)									0.0		38.46													
0	NEMATODA (TOTAL)									211.54		57.69													
1	NEMATODA (LPL)									211.54		57.69													
0	OLIGOCHAETA (TOTAL)									3423.07		22730.75													
0	NALIDIAE									3423.07		22730.75													
1	NALIDIAE (LPL)									19.23		0.0													
0	GASTROPODA (TOTAL)									19.23		0.0													
5	GASTROPODA (LPL)									19.23		0.0													
0	BIVALVIA (TOTAL)									76.92		19.23													
0	SERAPIDIAE									38.46		0.0													
1	FUSIDIA (LPL)									0.0		19.23													
5	PISIDIA (LPL)									38.46		0.0													
5	SPHAERIIDAE (LPL)									134.62		115.38													
0	AMPHIPODA (TOTAL)									134.62		115.38													
0	HYALINIDAE									134.62		115.38													
1	HYALINIDAE AZTECA									38.46		19.23													
0	EPHEMEROPTERA (TOTAL)									38.46		19.23													
10	CAENIDAE									38.46		19.23													
0	CADIDS (LPL)									19.23		0.0													
0	COCHATA (TOTAL)									19.23		0.0													
0	CUENAGRIDIAE									19.23		0.0													
10	COENAGRIDIAE (LPL)									19.23		0.0													
0	TRICHOPTERA (TOTAL)									19.23		0.0													
0	HYDROPTILIDAE									19.23		0.0													
2	ORHOIRICHTIA (LPL)									19.23		0.0													
0	DIPTERA HEDALOCERA (TOTAL)									769.46		2192.31													
0	CEPATOPOGONIDAE									0.0		57.69													
2	CHIRONOMIDAE									0.0		461.54													
2	CHIRONOMUS (LPL)									0.0		19.23													
2	TARAPIDUS (LPL)									461.54		750.00													
2	DICROTETIDIFES (LPL)									96.15		0.0													
2	AGLAESHTIA (LPL)									57.69		211.54													

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS	TAXA	1	2	X	S.E.	REL ABZ
2	PSECTROCLADIUS (LPIL)	153.05	673.08	413.46	259.61	2.8
2	ENDOCHIRONOMUS (LPIL)	19.23	0.0	9.62	9.62	0.1
3	CHIRONOMIDAE (LPIL)	0.0	19.23	9.62	9.62	0.1
0	DIPTERA BRACHYCERA (TOTAL)	38.46	0.0	19.23	19.23	0.1
0	STRATIOMYIDAE					
2	HEMILETUS	19.23	0.0	9.62	9.62	0.1
0	TABANIDAE					
2	CHRISTOPHER (LPIL)	19.23	0.0	9.62	9.62	0.1
	TOTAL	4807.68	25173.04	14990.36	10182.68	100.0
	DIVERSITY (H PRIME)	1.78	0.71	1.24	0.53	
	DIVERSITY (J PRIME)	0.44	0.19	0.31	0.12	
	NUMBER OF TAXA	17	13	22		
	BOTTOM TYPE	0				

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/5Q M)

REPLICATE REPORT

PC TC GC LOC

5 71 71 1 1 00

		DURATION				TOW				SAMP VOL				WIND				CURRENT				TEMP											
SID	DATE	TIME	D/N	UNITS	C	SD	NO	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	ATP	WAT	BT	TURBD	COND	DO	PH	SALN	P						
181	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	15.5	0	0.0	0	9.1	0.0	0.0	0						
182	4/20/80	1025	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	15.5	0	0.0	0	9.1	0.0	0.0	0						
																							REL										
																							S.E.		ABX								
L5		TAXA												1		2												X		S.E.		ABX	
0	CHIDARIA (TOTAL)												57.69		96.15												76.92		19.23		4.2		
0	HYDROZOA																																
1	HYDRA (LPIL)												57.69		96.15												76.92		19.23		4.2		
0	NEMATODA (TOTAL)												19.23		0.0												9.62		9.62		0.5		
1	NEMATODA (LPIL)												19.23		0.0												9.62		9.62		0.5		
0	OLIGOCHAETA (TOTAL)												288.46		538.46												413.46		125.00		22.4		
0	HAIDIDAE																																
1	HAIDIDAE (LPIL)												38.46		115.38												76.92		38.46		4.2		
0	TUBIFICIDAE																																
1	TUBIFICIDAE (LPIL)												250.00		423.08												336.54		86.54		18.2		
0	BIVALVIA (TOTAL)												0.0		115.38												57.69		57.69		3.1		
0	SPHAERIIDAE																																
5	SPHAERIUM (LPIL)												0.0		115.38												57.69		57.69		3.1		
0	OSTRACODA (TOTAL)												76.92		0.0												38.46		38.46		2.1		
1	OSTRACODA (LPIL)												76.92		0.0												38.46		38.46		2.1		
0	LOPEPODA (TOTAL)												19.23		0.0												9.62		9.62		0.5		
0	CALANOIDA (TOTAL)																																
1	CALANOIDA (LPIL)												19.23		0.0												9.62		9.62		0.5		
0	AMPHIPODA (TOTAL)												76.92		96.15												86.54		9.62		4.7		
0	HYALELLIDAE																																
1	HYALELLA AZTECA												76.92		96.15												86.54		9.62		4.7		
0	EPHEMEROPTERA (TOTAL)												153.85		38.46												96.15		57.69		5.2		
0	CAENIDAE																																
10	CAENIS (LPIL)												153.85		38.46												96.15		57.69		5.2		
0	TRICHOPTERA (TOTAL)												38.46		0.0												19.23		19.23		1.0		
0	LEPTOCERIDAE																																
2	OECETIS (LPIL)												38.46		0.0												19.23		19.23		1.0		
0	DIPTERA HEMATOCERA (TOTAL)												1057.69		1019.23												1038.46		19.23		56.3		
0	CERATOPOGONIDAE																																
2	CERATOPOGONIDAE (LPIL)												57.69		38.46												48.08		9.62		2.6		
0	CHIRONOMIDAE																																
2	CRYPTOCHIRONOMUS (LPIL)												19.23		0.0												9.62		9.62		0.5		
2	TANYTARSUS (LPIL)												230.77		173.08												201.92		28.85		10.9		
2	DICROTENDIPES (LPIL)												76.92		38.46												57.69		19.23		3.1		
2	POLYPEDIUM (LPIL)												38.46		0.0												19.23		19.23		1.0		
2	ABLABESHYIA (LPIL)												0.0		38.46												19.23		19.23		1.0		
2	PROCLADUS (LPIL)												519.23		673.08												596.15		76.92		32.3		
2	TETHEMENABRIELLA (LPIL)												38.46		0.0												19.23		19.23		1.0		

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS	TAXA	1	2	- X	S.E.	REL ABZ
2	PSECTROCLADIUS (LPIL)	19.23	38.46	28.85	9.62	1.6
2	TRICHOCLADIUS (LPIL)	0.0	19.23	9.62	9.62	0.5
2	CHIRONOMIDAE (LPIL)	57.69	0.0	28.85	28.85	1.6
TOTAL		1788.46	1903.84	1846.15	57.69	100.0
DIVERSITY (H PRIME)		3.42	2.89	3.16	0.27	
DIVERSITY (J PRIME)		0.82	0.78	0.80	0.02	
NUMBER OF TAXA		18	13	21		
BOTTOM TYPE		0				

ABOVE COMPUTED USING SAMPLE IDS
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T600AQUA 9/28/77

FAMILY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (100/SQ M)

STATION REPORT

LS	TAXA	17	18	X	S.E.	REL ABZ
0	CHIDARIA (TOTAL)	17.23	76.92	48.08	28.85	0.6
0	HYDROZOA					
1	HYDRA (LPTL)	19.23	76.92	48.08	28.85	0.6
0	PLATYHELMINTHES (TOTAL)	19.23	0.0	9.62	9.62	0.1
1	TURBELLARIA (LPTL)	19.23	0.0	9.62	9.62	0.1
0	RENAICCA (TOTAL)	134.62	9.62	72.12	62.50	0.9
1	RENAICCA (LPTL)	134.62	9.62	72.12	62.50	0.9
0	OLIGOCHAETA (TOTAL)	13076.91	413.46	6745.19	6331.72	80.1
0	NAYIDAE					
1	NAYIDAE (LPTL)	13076.91	76.92	5576.92	6499.99	78.1
0	TUSIFICIDAE					
1	TUSIFICIDAE (LPTL)	0.0	336.54	166.27	166.27	2.0
0	GASTROPODA (TOTAL)	9.62	0.0	4.81	4.81	0.1
5	GASTROPODA (LPTL)	9.62	0.0	4.81	4.81	0.1
0	BIVALVIA (TOTAL)	48.08	57.69	52.89	4.81	0.6
0	SNAILIIDAE					
5	SPERMION (LPTL)	0.0	57.69	28.85	28.85	0.3
1	PISIDIUM (LPTL)	19.23	0.0	9.62	9.62	0.1
5	PISIDIUM (LPTL)	9.62	0.0	4.81	4.81	0.1
5	SPHAERIIDAE (LPTL)	19.23	0.0	9.62	9.62	0.1
0	OSTRACODA (TOTAL)	0.0	38.46	19.23	19.23	0.2
1	OSTRACODA (LPTL)	0.0	38.46	19.23	19.23	0.2
0	COPEPODA (TOTAL)	0.0	9.62	4.81	4.81	0.1
0	CLARIDIA (TOTAL)					
1	CLARIDIA (LPTL)	0.0	9.62	4.81	4.81	0.1
0	AMPHIPODA (TOTAL)	125.00	86.54	105.77	19.23	1.3
0	HYALELLIDAE					
1	HYALELLA AZTECA	125.00	86.54	105.77	19.23	1.3
0	EPHEMEROPTERA (TOTAL)	23.85	96.15	62.50	33.65	0.7
0	CAENIDAE					
10	CAENIS (LPTL)	28.85	96.15	62.50	33.65	0.7
0	ODONATA (TOTAL)	9.62	0.0	4.81	4.81	0.1
0	COLEOPTERIDAE					
10	COLEOPTERIDAE (LPTL)	9.62	0.0	4.81	4.81	0.1
0	TRICHOPTERA (TOTAL)	9.62	19.23	14.42	4.81	0.2
0	HYDROPTILIDAE					
2	ORTHOTRICHIA (LPTL)	9.62	0.0	4.81	4.81	0.1
0	LEPTOCEPIDAE					
2	OECETIS (LPTL)	0.0	19.23	9.62	9.62	0.1
0	DIPTERA BEBACERA (TOTAL)	1490.38	1038.46	1264.42	225.96	15.0
0	CERATOPHYGIDAE					
2	CERATOPHYGIDAE (LPTL)	28.85	48.08	38.46	9.62	0.5
0	CHIRONOMIDAE					
2	CHIRONOMUS (LPTL)	230.77	0.0	115.38	115.38	1.4

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BATLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND./SQ. M.)

STATION REPORT

LS	TAXA	15	17	18	- X	S.E.	REL AB%
2	CRYPTOCHIRODUS (LPIL)	0.0	9.62	4.81	4.81	4.81	0.1
2	CRICOTOPUS (LPIL)	9.62	0.0	4.81	4.81	4.81	0.1
2	TANYTARSUS (LPIL)	605.77	201.92	403.05	201.92	201.92	4.8
2	DICRODENDIPES (LPIL)	48.08	57.69	52.88	52.88	4.81	0.6
2	POLYPELIDUM (LPIL)	0.0	19.23	9.62	9.62	9.62	0.1
2	ABALUSHTIA (LPIL)	134.62	19.23	76.92	76.92	57.69	0.9
2	PROCLADUS (LPIL)	0.0	596.15	298.08	298.08	298.08	3.5
2	THIENHAIHELLA (LPIL)	0.0	19.23	9.62	9.62	9.62	0.1
2	PECTINOCLADUS (LPIL)	413.46	28.65	221.15	221.15	192.31	2.6
2	ENDOCHEIRODUS (LPIL)	9.62	0.0	4.81	4.81	4.81	0.1
2	TRICHOCLADUS (LPIL)	0.0	9.62	4.81	4.81	4.81	0.1
2	CHIRONOMIDAE (LPIL)	0.0	28.65	14.42	14.42	14.42	0.2
3	CHIRONOMIDAE (LPIL)	9.62	0.0	4.81	4.81	4.81	0.1
0	DIPTERA BRACHYCERA (TOTAL)	19.23	0.0	9.62	9.62	9.62	0.1
0	SIRATIONIIDAE						
2	NEPHETUS	9.62	0.0	4.81	4.81	4.81	0.1
0	TADRIDAE						
2	CHRYSOPE (LPIL)	9.62	0.0	4.81	4.81	4.81	0.1
TOTAL		14990.36	1846.15	8418.25	8418.25	6572.10	100.0
DIVERSITY (H PRIME)		1.24	3.16	2.20	2.20	0.96	
DIVERSITY (J PRIME)		0.31	0.60	0.56	0.56	0.24	
NUMBER OF TAXA		22	21	32	32		
EDITION TYPE	0						

ABOVE COMPUTED USING SAMPLE IDS

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DALEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

15	TAXA	16	- X	S.E.	REL ADZ
0	CHITIDARIA (TOTAL)	40.08	40.08	-1.00	0.6
0	HYDROZOA				
1	HYDRA (LPIU)	40.08	40.08	-1.00	0.6
0	PLATYHELMINTHUS (TOTAL)	9.62	9.62	-1.00	0.1
1	TURDELLARIA (LPIU)	9.62	9.62	-1.00	0.1
0	HEMATODA (TOTAL)	72.12	72.12	-1.00	0.9
1	HEMATODA (LPIU)	72.12	72.12	-1.00	0.9
0	OLIGOCHAETA (TOTAL)	6745.19	6745.19	-1.00	80.1
0	HAIRIDAE				
1	HAIRIDAE (LPIU)	6576.92	6576.92	-1.00	78.1
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIU)	168.27	168.27	-1.00	2.0
0	GASTROPODA (TOTAL)	4.81	4.81	-1.00	0.1
5	GASTROPODA (LPIU)	4.81	4.81	-1.00	0.1
0	BIVALVIA (TOTAL)	52.88	52.88	-1.00	0.6
0	SPHARIIDAE				
5	SPHARIIDAE (LPIU)	28.85	28.85	-1.00	0.3
1	PISIDIUM (LPIU)	9.62	9.62	-1.00	0.1
5	PISIDIUM (LPIU)	4.81	4.81	-1.00	0.1
5	SPHARIIDAE (LPIU)	9.62	9.62	-1.00	0.1
0	OSTRACODA (TOTAL)	19.23	19.23	-1.00	0.2
1	OSTRACODA (LPIU)	19.23	19.23	-1.00	0.2
0	COPEPODA (TOTAL)	4.81	4.81	-1.00	0.1
0	CALANOIDA (TOTAL)				
1	CALANOIDA (LPIU)	4.81	4.81	-1.00	0.1
0	AMPHIPODA (TOTAL)	105.77	105.77	-1.00	1.3
0	HYALELLIDAE				
1	HYALELLA AZTECA	105.77	105.77	-1.00	1.3
0	EPHEMEROPTERA (TOTAL)	62.50	62.50	-1.00	0.7
0	CAENIDAE				
10	CAENUS (LPIU)	62.50	62.50	-1.00	0.7
0	OBOLATA (TOTAL)	4.81	4.81	-1.00	0.1
0	COLEMBOLIGRIDA				
10	COLEMBOLIGRIDA (LPIU)	4.81	4.81	-1.00	0.1
0	TRICHOPTERA (TOTAL)	14.42	14.42	-1.00	0.2
0	HYDROPTERIDAE				
2	ORTHOTRICHIA (LPIU)	4.81	4.81	-1.00	0.1
0	LEPTOCERIDAE				
2	CECTIS (LPIU)	9.62	9.62	-1.00	0.1
0	DIPTERA HEMITOCERA (TOTAL)	1264.42	1264.42	-1.00	15.0
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIU)	38.46	38.46	-1.00	0.5
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIU)	115.38	115.38	-1.00	1.4

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DAYLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA	18	101	172	171	0	REL AB%	S.E.	X
2	CRYPTOCHIRONOMUS (LPIL)	4.81					0.1	-1.00	4.81
2	CRICOTOPUS (LPIL)	4.81					0.1	-1.00	4.81
2	TARANTULUS (LPIL)	403.05					4.8	-1.00	403.05
2	DICROTENDIPES (LPIL)	52.08					0.6	-1.00	52.08
2	POLYPLETHUM (LPIL)	9.62					0.1	-1.00	9.62
2	ADLAESHTIA (LPIL)	76.92					0.9	-1.00	76.92
2	PROCLADUS (LPIL)	298.08					3.5	-1.00	298.08
2	THIENHARTIELLA (LPIL)	9.62					0.1	-1.00	9.62
2	PSEROCLODIUS (LPIL)	221.15					2.6	-1.00	221.15
2	ENDOCHIRONOMUS (LPIL)	4.81					0.1	-1.00	4.81
2	TRICHOCLADUS (LPIL)	4.81					0.1	-1.00	4.81
2	CHIRONOMIDAE (LPIL)	14.42					0.2	-1.00	14.42
3	CHIRONOMIDAE (LPIL)	4.81					0.1	-1.00	4.81
0	DIPURA BRACHYCEPHALA (TOTAL)	9.62					0.1	-1.00	9.62
0	STRATIOTIDAE								
2	DESOLEIUS	4.81					0.1	-1.00	4.81
0	TABANIDAE								
2	CHRYSOPS (LPIL)	4.81					0.1	-1.00	4.81
TOTAL		8418.25					100.0	-1.00	8418.25
DIVERSITY (H PRIME)		2.20						-1.00	2.20
DIVERSITY (J PRIME)		0.56						-1.00	0.56
NUMBER OF TAXA		32							32
EDITION TYPE		0							

ABOVE COMPUTED USING SAMPLE IDS

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

FC TC GC LOC

5 71 71 1 2 00

		DURATION			TOW			SAMP VOL			WIND			CURRENT			TEMP										
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURB	COND	DO	PH	SALN	P
191	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	19.5	0	0.0	0	8.5	0.0	0.0	0
192	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	19.5	0	0.0	0	8.5	0.0	0.0	0
LS TAXA																											

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS	TAXA	1	2	-	S.E.	REL
				X		ABZ
NUMBER OF TAXA		13	13			
BOTTOM TYPE	0				17	

ADOVE COMPUTED USING SAMPLE IDS
191 192

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T600AQUA 9/28/77

BAYLEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/5Q H)

DUPLICATE REPORT

C IC CC LOC

5 71 71 1 2 00

SID	DATE	TIME	D/H	UNITS	C	SD	WD	SP	D	TON	SAMP	VOI	WTRD	CL	SP	DI	CURRNT	TEMP	BT	TURBD	COND	DO	PH	SALN	P
201	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.6	19.5	0	0.0	0	8.7	0.0	0.0
202	4/20/80	1055	0	0.0	0	1.0	1.0	0.0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.6	19.5	0	0.0	0	8.7	0.0	0.0
15	TAXA																						S.E.	ABZ	
0	REHATODA (TOTAL)							1	2											28.85			9.62	0.7	
1	REHATODA (IPIL)							38.46	19.23											28.05			9.62	0.7	
0	OLIGOCHAETA (TOTAL)							1692.31	5134.61											3413.46			1721.15	85.5	
0	HAIRIDAE (IPIL)							461.54	4538.46											2500.00			2038.46	62.7	
0	TUBIFICIDAE																			913.46			317.31	22.9	
1	TUBIFICIDAE (IPIL)							1252.77	596.15											9.62			9.62	0.2	
0	HIRUDINEA (TOTAL)							0.0	19.23																
0	GLOSSIPHONIDAE								19.23											9.62			9.62	0.2	
1	GLOSSIPHONIDAE (IPIL)							0.0	230.77											134.62			96.15	3.4	
0	BIVALVIA (TOTAL)							38.46	230.77											134.62			96.15	3.4	
0	SPHAERIIDAE																			9.62			9.62	0.2	
5	SPHAERIUM (IPIL)							38.46	0.0											9.62			9.62	0.2	
0	OSTRACODA (TOTAL)							19.23	0.0											9.62			9.62	0.2	
1	OSTRACODA (IPIL)							19.23	0.0											9.62			9.62	0.2	
0	COPPEODA (TOTAL)							0.0	19.23											9.62			9.62	0.2	
0	HAPPACTICOIDA (TOTAL)																								
1	HAPPACTICOIDA (IPIL)							0.0	19.23											9.62			9.62	0.2	
0	ISOPODA (TOTAL)							38.46	6.0											19.23			19.23	0.5	
0	ASELLIDAE																								
1	ASELLUS (IPIL)							38.46	0.0											19.23			19.23	0.5	
0	ETHEROPODEA (TOTAL)							0.0	19.23											9.62			9.62	0.2	
0	CAERIDAE																								
10	CAERUS (IPIL)							0.0	19.23											9.62			9.62	0.2	
0	TRICHOPTERA (TOTAL)							0.0	19.23											9.62			9.62	0.2	
0	LEPTOCLEIDAE																								
2	OLETTIS (IPIL)							0.0	19.23											9.62			9.62	0.2	
0	DIPTERA HEMATOCEPA (TOTAL)							192.31	500.60											346.15			153.05	8.7	
0	CERATOPOGONIDAE																								
2	CERATOPOGONIDAE (IPIL)							76.92	76.92											76.92			0.0	1.9	
0	CHIRONOMIDAE																								
2	CHIRONOMUS (IPIL)							0.0	38.46											19.23			19.23	0.5	
2	TANITARNUS (IPIL)							19.23	96.15											57.69			30.46	1.4	
2	DICP-HERIPES (IPIL)							0.0	211.54											105.77			105.77	2.7	
2	ADAEESINIA (IPIL)							38.46	38.46											38.46			0.0	1.0	
2	PROCLADUS (IPIL)							0.0	19.23											9.62			9.62	0.2	
2	PHANOPUSCIRA (IPIL)							19.23	0.0											9.62			9.62	0.2	
2	PSECHROCLADUS (IPIL)							38.46	19.23											2085			9.62	0.7	

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

IS	TAXA	1	2	- X	S.E.	REL AB%
TOTAL		2019.23	5961.52	3990.37	1971.15	100.0
DIVERSITY (H PRIME)		1.84	1.44	1.64	0.29	
DIVERSITY (J PRIME)		0.53	0.37	0.45	0.08	
NUMBER OF TAXA		11	15	18		
BOTTOM TYPE	0					

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/2 M)

STATION REPORT

LS	TAXA	19	20	X	S.E.	REL AB%
0	NEMATODA (TOTAL)	153.85	28.85	91.35	62.50	1.9
1	NEMATODA (LPIL)	153.85	28.85	91.35	62.50	1.9
0	OLIGOCHAETA (TOTAL)	4134.61	3413.46	3774.03	360.58	76.6
0	HAIDIDAE					
1	HAIDIDAE (LPIL)	2375.00	2500.00	2437.50	62.50	49.5
0	TUBIFICIDAE					
1	TUBIFICIDAE (LPIL)	1759.61	913.46	1336.54	423.08	27.1
0	HIRUDINEA (TOTAL)	0.0	9.62	4.81	4.81	0.1
0	GLOSSIPHONIIDAE					
1	GLOSSIPHONIIDAE (LPIL)	0.0	9.62	4.81	4.81	0.1
0	BIVALVIA (TOTAL)	1134.61	134.62	634.61	500.00	12.9
0	SNIAERIIDAE					
5	SNIAERIUM (LPIL)	1134.61	134.62	634.61	500.00	12.9
0	OSTRACODA (TOTAL)	0.0	9.62	4.81	4.81	0.1
1	OSTRACODA (LPIL)	0.0	9.62	4.81	4.81	0.1
0	COPEPODA (TOTAL)	0.0	9.62	4.81	4.81	0.1
0	HARPACTICOIDA (TOTAL)					
1	HARPACTICOIDA (LPIL)	0.0	9.62	4.81	4.81	0.1
0	ISOPODA (TOTAL)	0.0	19.23	9.62	9.62	0.2
0	ASELLIDAE					
1	ASELLUS (LPIL)	0.0	19.23	9.62	9.62	0.2
0	AMPHIPODA (TOTAL)	28.85	0.0	14.42	14.42	0.3
0	HYALELLIDAE					
1	HYALELLA AZTECA	28.85	0.0	14.42	14.42	0.3
0	EPHEMEROPTERA (TOTAL)	19.23	9.62	14.42	4.81	0.3
0	CAENIDAE					
10	CAENIS (LPIL)	19.23	9.62	14.42	4.81	0.3
0	TRICHOPTERA (TOTAL)	9.62	9.62	9.62	0.0	0.2
0	LEPTOCERIDAE					
2	DECEIS (LPIL)	9.62	9.62	9.62	0.0	0.2
0	DIPTERA NEMATOCERA (TOTAL)	365.38	346.15	355.77	9.62	7.2
0	CERATOPOGONIDAE					
2	CERATOPOGONIDAE (LPIL)	76.92	76.92	76.92	0.0	1.6
0	CHIRONOMIDAE					
2	CHIRONOMUS (LPIL)	9.62	19.23	14.42	4.81	0.3
2	TANYTARSUS (LPIL)	144.23	57.69	100.96	43.27	2.0
2	DICROTENIDIPES (LPIL)	86.54	105.77	96.15	9.62	2.0
2	POLYPEDILUM (LPIL)	9.62	0.0	4.81	4.81	0.1
2	ABLADESMYIA (LPIL)	0.0	38.46	19.23	19.23	0.4
2	PROCLADIUS (LPIL)	19.23	9.62	14.42	4.81	0.3
2	PHAENOPSECTRA (LPIL)	0.0	9.62	4.81	4.81	0.1
2	PSECTROCLADIUS (LPIL)	0.0	28.85	14.42	14.42	0.3
2	PARATENDIPES (LPIL)	9.62	0.0	4.81	4.81	0.1
2	CHIRONOMIDAE (LPIL)	9.62	0.0	4.81	4.81	0.1

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA			-	REL	
		19	20	X	S.E.	ABZ
0	DIPTERA BRACHYCERA (TOTAL)	9.62	0.0	4.81	4.81	0.1
0	TAEANIDAE					
2	CHRYSOPS (LPIL)	9.62	0.0	4.81	4.81	0.1
0	DIPTERA (TOTAL)	9.62	0.0	4.81	4.81	0.1
2	DIPTERA (LPIL)	9.62	0.0	4.81	4.81	0.1
TOTAL		5865.37	3990.37	4927.87	937.50	100.0
DIVERSITY (H PRIME)		2.01	1.64	1.82	0.18	
DIVERSITY (J PRIME)		0.54	0.45	0.50	0.05	
NUMBER OF TAXA		17	18	24		
BOTTOM TYPE		0				

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DAILY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

STATION REPORT

LS	TAXA	20	X	S.E.	REL ABZ
0	REHATODA (TOTAL)	91.35	91.35	-1.00	1.9
1	REHATODA (LPII)	91.35	91.35	-1.00	1.9
0	ORTOGHAEIA (TOTAL)	3774.03	3774.03	-1.00	76.6
0	HAIDIDAE				
1	HAIDIDAE (LPII)	2437.50	2437.50	-1.00	49.5
0	IRISIFICIDAE				
1	IRISIFICIDAE (LPII)	1336.54	1336.54	-1.00	27.1
0	HIRUDINEA (TOTAL)	4.81	4.81	-1.00	0.1
0	GLOSSIPHORIIDAE				
1	GLOSSIPHORIIDAE (LPII)	4.81	4.81	-1.00	0.1
0	BIVALVIA (TOTAL)	634.61	634.61	-1.00	12.9
0	SPHAERIIDAE				
5	SPHAERIUM (LPII)	634.61	634.61	-1.00	12.9
0	OSIRACODA (TOTAL)	4.81	4.81	-1.00	0.1
1	OSIRACODA (LPII)	4.81	4.81	-1.00	0.1
0	COPEPUDA (TOTAL)	4.81	4.81	-1.00	0.1
0	HARPACTICOIDA (TOTAL)				
1	HARPACTICOIDA (LPII)	4.81	4.81	-1.00	0.1
0	ISOPODA (TOTAL)	9.62	9.62	-1.00	0.2
0	ASELLIDAE				
1	ASELLUS (LPII)	9.62	9.62	-1.00	0.2
0	AMPHIPODA (TOTAL)	14.42	14.42	-1.00	0.3
0	HYALELLIDAE				
1	HYALELLA AZTECA	14.42	14.42	-1.00	0.3
0	EPHEMEROPTERA (TOTAL)	14.42	14.42	-1.00	0.3
0	CAENIDAE				
10	CAENIS (LPII)	14.42	14.42	-1.00	0.3
0	TRICHOPTERA (TOTAL)	9.62	9.62	-1.00	0.2
0	LEPTOCERIDAE				
2	OECETIS (LPII)	9.62	9.62	-1.00	0.2
0	DIPTERA REMAFCERA (TOTAL)	355.77	355.77	-1.00	7.2
0	CERATOPOGONIDAE (LPII)				
2	CERATOPOGONIDAE	76.92	76.92	-1.00	1.6
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPII)	14.42	14.42	-1.00	0.3
2	TABUTARSUS (LPII)	100.96	100.96	-1.00	2.0
2	DICROGOMIDAE (LPII)	96.15	96.15	-1.00	2.0
2	POLYPTERIDAE (LPII)	4.81	4.81	-1.00	0.1
2	ADOLEPHIDAE (LPII)	19.23	19.23	-1.00	0.4
2	PHOCILABUS (LPII)	14.42	14.42	-1.00	0.3
2	PHALLOPOGONIDAE (LPII)	4.81	4.81	-1.00	0.1
2	PHOCILABUS (LPII)	14.42	14.42	-1.00	0.3
2	PHOCILABUS (LPII)	4.81	4.81	-1.00	0.1
2	PHOCILABUS (LPII)	4.81	4.81	-1.00	0.1
2	CHIRONOMIDAE (LPII)	4.81	4.81	-1.00	0.1

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA		-		REL
			X	S.E.	AB%
		20			
0	DIPTERA BRACHYCERA (TOTAL)	4.81	4.81	-1.00	0.1
0	TABANIDAE				
2	CHRYSOPS (LPIL)	4.81	4.81	-1.00	0.1
0	DIPTERA (TOTAL)	4.81	4.81	-1.00	0.1
2	DIPTERA (LPIL)	4.81	4.81	-1.00	0.1
TOTAL		4927.87	4927.87	-1.00	100.0
DIVERSITY (H PRIME)		1.82	1.82	-1.00	
DIVERSITY (J PRIME)		0.50	0.50	-1.00	
NUMBER OF TAXA		24	24		
BOTTOM TYPE	0				

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NORTHERN INDIAN PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

FC TC GC LOC

5 71 71 1 3 00

		DURATION					TOW		SAMP VOL		WIND		CURRENT		TEMP													
SID	DATE	TIME	D/N	UNITS	C	SD	WD	SP	D	UNITS	C	SECH	WT	SC	DI	CL	SP	DI	AIR	WAT	BT	TURBD	COND	DO	PH	SALN	P	
211	4/20/80	1327	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	19.0	0	0.0	0	12.0	0.0	0.0	0	
212	4/20/80	1327	0	0.0	0	1.0	1.0	0.0	0	0.1	6	1.0	8.0	4	1	5	0.0	0	17.8	19.0	0	0.0	0	12.0	0.0	0.0	0	
																						REL						
LS	TAXA																				X		S.E.		ABZ			
								1		2																		
0	PLATHELMINTHES (TOTAL)							0.0		19.23																	9.62	0.2
1	TUNICELLARIA (LPIL)							0.0		19.23																	9.62	0.2
0	NEMATODA (TOTAL)							96.15		76.92																	86.54	1.4
1	NEMATODA (LPIL)							96.15		76.92																	86.54	1.4
0	OLIGOCHAETA (TOTAL)							1500.00		7865.38																	4682.69	75.2
0	HAIDIDAE																											
1	HAIDIDAE (LPIL)							846.15		4153.84																	2500.00	1653.85
0	TUBIFICIDAE																											
1	TUBIFICIDAE (LPIL)							653.85		3711.54																	2182.69	1528.85
0	HIRUDINEA (TOTAL)							19.23		0.0																	9.62	0.2
0	HIRUDINIDAE																											
1	HAEMOPIS							19.23		0.0																	9.62	0.2
0	BIVALVIA (TOTAL)							480.77		288.46																	384.61	96.15
0	SPHAERIIDAE																											
5	SPHAERIUM (LPIL)							307.69		211.54																	259.62	48.08
1	SPHAERIUM (LPIL)							115.38		19.23																	67.31	48.08
1	PISIDIUM (LPIL)							57.69		0.0																	28.85	0.5
5	PISIDIUM (LPIL)							0.0		57.69																	28.85	0.5
0	OSTRACODA (TOTAL)							19.23		57.69																	38.46	19.23
1	OSTRACODA (LPIL)							19.23		57.69																	38.46	19.23
0	ISOPODA (TOTAL)							269.23		76.92																	173.08	96.15
0	ASELLIDAE																											
1	ASELLUS (LPIL)							269.23		76.92																	173.08	96.15
0	EPHEMEROPTERA (TOTAL)							0.0		19.23																	9.62	0.2
0	CAENIDAE																											
10	CAENIS (LPIL)							0.0		19.23																	9.62	0.2
0	DIPTERA HEMATOCERA (TOTAL)							961.54		692.31																	826.92	134.62
0	CERATOPOGONIDAE																											
2	CERATOPOGONIDAE (LPIL)							942.31		192.31																	567.31	375.00
0	CHIRONOMIDAE																											
2	CHIRONOMUS (LPIL)							0.0		19.23																	9.62	0.2
2	TANYTARSUS (LPIL)							0.0		115.38																	57.69	0.9
2	DICROSTELTIPES (LPIL)							0.0		173.08																	86.54	1.4
2	POLYPELIDUM (LPIL)							0.0		38.46																	19.23	0.3
2	ABLAESNYIA (LPIL)							19.23		38.46																	28.85	9.62
2	PROCLADUS (LPIL)							0.0		19.23																	9.62	0.2
2	PECTROCLADUS (LPIL)							0.0		57.69																	28.85	0.5
2	CHIRONOMIDAE (LPIL)							0.0		38.46																	19.23	0.3

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NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

REPLICATE REPORT

LS	TAXA	1	2	- X	S.E.	REL AB%
0	DIPTERA BRACHICERA (TOTAL)	0.0	19.23	9.62	9.62	0.2
0	STRATIOMYIDAE					
2	EUPATYPHUS	0.0	19.23	9.62	9.62	0.2
TOTAL		3346.15	9115.36	6230.75	2884.60	100.0
DIVERSITY (H PRIME)		2.52	1.93	2.23	0.29	
DIVERSITY (J PRIME)		0.76	0.46	0.61	0.15	
NUMBER OF TAXA		10	19	20		
BOTTOM TYPE	0					

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BAILEY GENERATING PLANT

DEBILIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO./SQ M)

STATION REPORT

IS	TAXA	21	X	S.E.	REL AD%
0	PLATYHELMINTHES (TOTAL)	9.62	9.62	-1.00	0.2
1	TURBELLARIA (LPII)	9.62	9.62	-1.00	0.2
0	REMAEDA (TOTAL)	86.54	86.54	-1.00	1.4
1	REMAEDA (LPII)	86.54	86.54	-1.00	1.4
0	OLIGOCHAETA (TOTAL)	4682.69	4682.69	-1.00	75.2
0	NAIDIDAE				
1	NAIDIDAE (LPII)	2500.00	2500.00	-1.00	40.1
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPII)	2182.69	2182.69	-1.00	35.0
0	HIRUDINEA (TOTAL)	9.62	9.62	-1.00	0.2
0	HIRUDINIDAE				
1	HAEMIPIS	9.62	9.62	-1.00	0.2
0	BIVALVIA (TOTAL)	384.61	384.61	-1.00	6.2
0	SPHACRIIDAE				
5	SPHACRIUM (LPII)	259.62	259.62	-1.00	4.2
1	SPHACRIUM (LPII)	67.31	67.31	-1.00	1.1
1	PISIDIUM (LPII)	28.85	28.85	-1.00	0.5
5	PISIDIUM (LPII)	28.85	28.85	-1.00	0.5
0	OSTRACODA (TOTAL)	38.46	38.46	-1.00	0.6
1	OSTRACODA (LPII)	38.46	38.46	-1.00	0.6
0	ISOPODA (TOTAL)	173.08	173.08	-1.00	2.8
0	ASELLIDAE				
1	ASELLUS (LPII)	173.08	173.08	-1.00	2.8
0	EPHEMEROPTERA (TOTAL)	9.62	9.62	-1.00	0.2
0	CALIIDAE				
10	CALIS (LPII)	9.62	9.62	-1.00	0.2
0	DIPTERA NEMATOCERA (TOTAL)	826.92	826.92	-1.00	13.3
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPII)	567.31	567.31	-1.00	9.1
0	CHIRONIDAE				
2	CHIRONIDUS (LPII)	9.62	9.62	-1.00	0.2
2	TABTARGUS (LPII)	57.69	57.69	-1.00	0.9
2	DICHOEIDIFES (LPII)	86.54	86.54	-1.00	1.4
2	FOLEYIDUM (LPII)	19.23	19.23	-1.00	0.3
2	ASABESCHIA (LPII)	28.85	28.85	-1.00	0.5
2	PROCLADUS (LPII)	9.62	9.62	-1.00	0.2
2	PSYCHOCADUS (LPII)	28.85	28.85	-1.00	0.5
2	CHIRONIDAE (LPII)	19.23	19.23	-1.00	0.3
0	DIPTERA BRACHYCERA (TOTAL)	9.62	9.62	-1.00	0.2
0	STIPATIONIIDAE				
2	EUPARTIDUS	9.62	9.62	-1.00	0.2
TOTAL		6230.75	6230.75	-1.00	100.0
DIVERSITY (H PRIN)		2.23	2.23	-1.00	
DIVERSITY (J PRIN)		0.61	0.61	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS	TAXA		- X	S.E.	REL AB%
		21			
0	PLATYHELMINTHES (TOTAL)	9.62	9.62	-1.00	0.2
1	TURBELLARIA (LPIL)	9.62	9.62	-1.00	0.2
0	NEMATODA (TOTAL)	86.54	86.54	-1.00	1.4
1	NEMATODA (LPIL)	86.54	86.54	-1.00	1.4
0	OLIGOCHAETA (TOTAL)	4682.69	4682.69	-1.00	75.2
0	NAIDIDAE				
1	NAIDIDAE (LPIL)	2500.00	2500.00	-1.00	40.1
0	TUBIFICIDAE				
1	TUBIFICIDAE (LPIL)	2182.69	2182.69	-1.00	35.0
0	HIRUDINEA (TOTAL)	9.62	9.62	-1.00	0.2
0	HIRUDINIDAE				
1	HAENOPSIS	9.62	9.62	-1.00	0.2
0	BIVALVIA (TOTAL)	384.61	384.61	-1.00	6.2
0	SPHAERIIDAE				
5	SPHAERIUM (LPIL)	259.62	259.62	-1.00	4.2
1	SPHAERIUM (LPIL)	67.31	67.31	-1.00	1.1
1	PISIDIUM (LPIL)	28.85	28.85	-1.00	0.5
5	PISIDIUM (LPIL)	28.85	28.85	-1.00	0.5
0	OSTRACODA (TOTAL)	38.46	38.46	-1.00	0.6
1	OSTRACODA (LPIL)	38.46	38.46	-1.00	0.6
0	ISOPODA (TOTAL)	173.08	173.08	-1.00	2.8
0	ASELLIDAE				
1	ASELLUS (LPIL)	173.08	173.08	-1.00	2.8
0	EPHEMEROPTERA (TOTAL)	9.62	9.62	-1.00	0.2
0	CAENIDAE				
10	CAENIS (LPIL)	9.62	9.62	-1.00	0.2
0	DIPTERA NEMATOCERA (TOTAL)	826.92	826.92	-1.00	13.3
0	CERATOPOGONIDAE				
2	CERATOPOGONIDAE (LPIL)	567.31	567.31	-1.00	9.1
0	CHIRONOMIDAE				
2	CHIRONOMUS (LPIL)	9.62	9.62	-1.00	0.2
2	TANYTARSUS (LPIL)	57.69	57.69	-1.00	0.9
2	DICROTENDIPES (LPIL)	86.54	86.54	-1.00	1.4
2	POLYPEDILUM (LPIL)	19.23	19.23	-1.00	0.3
2	ABLADESMYIA (LPIL)	28.85	28.85	-1.00	0.5
2	PROCLADIUS (LPIL)	9.62	9.62	-1.00	0.2
2	PSECTROCLADIUS (LPIL)	28.85	28.85	-1.00	0.5
2	CHIRONOMIDAE (LPIL)	19.23	19.23	-1.00	0.3
0	DIPTERA BRACHYCERA (TOTAL)	9.62	9.62	-1.00	0.2
0	STRATIOMYIDAE				
2	EUPATYRUS	9.62	9.62	-1.00	0.2
	TOTAL	6230.75	6230.75	-1.00	100.0
	DIVERSITY (H PRIME)	2.23	2.23	-1.00	
	DIVERSITY (J PRIME)	0.61	0.61	-1.00	

NORTHERN INDIANA PUBLIC SERVICE COMPANY (49720)

BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

STATION REPORT

LS TAXA

21

-
X

REL
S.E. ABZ

NUMBER OF TAXA

20

20

EDITION TYPE

0

ABOVE COMPUTED USING SAMPLE IDS

211

212

DATE 05/04/81
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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (IND/SQ M)

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B 1	Pond C 1	Cowles Bog 1	- X	S.E.	REL ABX
0	CHIRONOMIDAE (TOTAL)	48.08	0.0	0.0	16.03	16.03	0.2
0	HYDROPHILIDAE	48.08	0.0	0.0	16.03	16.03	0.2
1	HYDRA (EPI)	9.62	0.0	9.62	6.41	3.21	0.1
0	PLATYHELMINTHES (TOTAL)	9.62	0.0	9.62	6.41	3.21	0.1
1	TURBELLARIA (EPI)	72.12	91.35	86.54	83.33	5.78	1.3
0	NEMATODA (TOTAL)	72.12	91.35	86.54	83.33	5.78	1.3
1	NEMATODA (EPI)	6745.19	3774.03	4682.69	5067.30	878.99	77.7
0	OLIGOCHEATA (TOTAL)	6576.92	2437.50	2500.00	3838.14	1369.51	58.8
0	HAIRIDAE	168.27	1336.54	2182.69	1229.17	583.99	18.6
1	TURBIDICIDAE (EPI)	0.0	4.81	9.62	4.81	2.78	0.1
0	HIRUDINEA (TOTAL)	0.0	4.81	0.0	1.60	1.60	0.0
0	GLOSSIPHORIIDAE	0.0	4.81	0.0	1.60	1.60	0.0
1	GLOSSIPHORIIDAE (EPI)	0.0	4.81	0.0	1.60	1.60	0.0
0	HYDROPHILIDAE	0.0	0.0	9.62	3.21	3.21	0.0
1	HAIRIDAE	4.81	0.0	0.0	1.60	1.60	0.0
0	GASTROPODA (TOTAL)	4.81	0.0	0.0	1.60	1.60	0.0
5	GASTROPODA (EPI)	4.81	0.0	0.0	1.60	1.60	0.0
0	BIVALVIA (TOTAL)	52.88	634.61	384.61	357.37	168.48	5.5
0	SPHAERIUM (EPI)	28.85	634.61	259.62	307.69	176.51	4.7
1	SPHAERIUM (EPI)	0.0	0.0	6.31	22.44	22.44	0.3
1	PISIDIUM (EPI)	9.62	0.0	28.85	12.82	8.48	0.2
5	PISIDIUM (EPI)	4.81	0.0	28.85	11.22	8.92	0.2
5	SPHAERIUM (EPI)	9.62	0.0	0.0	3.21	3.21	0.0
0	OSTRACODA (TOTAL)	19.23	4.81	38.46	20.83	9.75	0.3
1	OSTRACODA (EPI)	19.23	4.81	38.46	20.83	9.75	0.3
0	CORFODA (TOTAL)	4.81	4.81	0.0	3.21	1.60	0.0
0	CALANDRIA (TOTAL)	4.81	0.0	0.0	1.60	1.60	0.0
1	CALANDRIA (EPI)	0.0	4.81	0.0	1.60	1.60	0.0
0	HAPPACTICODA (TOTAL)	0.0	9.62	173.03	60.90	56.16	0.9
1	HAPPACTICODA (EPI)	0.0	9.62	173.03	60.90	56.16	0.9
0	ISOPODA (TOTAL)	0.0	14.42	0.0	40.06	33.12	0.6
0	ASCELLIDAE	105.77	14.42	0.0	40.06	33.12	0.6
1	ASCELLUS (EPI)	105.77	14.42	0.0	40.06	33.12	0.6
0	AMPHIRODA (TOTAL)	62.50	14.42	9.62	28.85	16.88	0.4
1	HYALINIDAE	62.50	14.42	9.62	28.85	16.88	0.4
0	EPHEMEROPTERA (TOTAL)	62.50	14.42	9.62	28.85	16.88	0.4
0	CAIRIDAE	4.81	0.0	0.0	1.60	1.60	0.0
10	CAIRUS (EPI)	4.81	0.0	0.0	1.60	1.60	0.0
0	ODONATA (TOTAL)	4.81	0.0	0.0	1.60	1.60	0.0
0	COLEOPTERA (TOTAL)	4.81	0.0	0.0	1.60	1.60	0.0

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BAILEY GENERATING PLANT

BENTHIC MACROINVERTEBRATE NUMERICAL ABUNDANCE (NO/SQ M)

SITE SUMMARY

Nearshore Ponds

LS	TAXA	Pond B	Pond C	Cowles Bog	X	S.E.	REL ABZ
		1	1	1			
10	COENAGRIONIDAE (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
0	TRICHOPTERA (TOTAL)	14.42	9.62	0.0	8.01	4.24	0.1
0	HYDROPTILIDAE						
2	ORTHOTRICHIA (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
0	LEPTOCERIDAE						
2	CECIDS (LPIL)	9.62	9.62	0.0	6.41	3.21	0.1
0	DIPTERA NEMATOCERA (TOTAL)	1264.42	355.77	826.92	815.70	262.37	12.5
0	CERATOPOGONIDAE						
2	CERATOPOGONIDAE (LPIL)	38.46	76.92	567.31	227.56	170.23	3.5
0	CHIRONOMIDAE						
2	CHIRONOMUS (LPIL)	115.38	14.42	9.62	46.47	34.48	0.7
2	CRYPTOCHIRONOMUS (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
2	CRICOTOPUS (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
2	TANYTARSUS (LPIL)	403.85	100.96	57.69	187.50	108.69	2.9
2	BICROTENDIPES (LPIL)	52.88	96.15	86.54	78.53	13.12	1.2
2	POLYPEDILUM (LPIL)	9.62	4.81	19.23	11.22	4.24	0.2
2	ABIABESMYIA (LPIL)	76.92	19.23	28.85	41.67	17.85	0.6
2	PROCLADIUS (LPIL)	298.08	14.42	9.62	107.37	95.36	1.6
2	PIAENOPSECTRA (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
2	THIENEMANNIELLA (LPIL)	9.62	0.0	0.0	3.21	3.21	0.0
2	PSECTROCLADIUS (LPIL)	221.15	14.42	28.85	88.14	66.64	1.4
2	PARATENDIPES (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
2	ENDOCHIRONOMUS (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
2	TRICHOCLADIUS (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
2	CHIRONOMIDAE (LPIL)	14.42	4.81	19.23	12.82	4.24	0.2
3	CHIRONOMIDAE (LPIL)	4.81	0.0	0.0	1.60	1.60	0.0
0	DIPTERA BRACHYCERA (TOTAL)	9.62	4.81	9.62	8.01	1.60	0.1
0	STRATIOMIDAE						
2	MEGALOTUS	4.81	0.0	0.0	1.60	1.60	0.0
2	EUPATYPUS	0.0	0.0	9.62	3.21	3.21	0.0
0	TABANIDAE						
2	CHRYSOPS (LPIL)	4.81	4.81	0.0	3.21	1.60	0.0
0	DIPTERA (TOTAL)	0.0	4.81	0.0	1.60	1.60	0.0
2	DIPTERA (LPIL)	0.0	4.81	0.0	1.60	1.60	0.0
	TOTAL	8418.25	4927.87	6230.75	6525.62	1018.32	100.0
	DIVERSITY (H PRIME)	2.20	1.82	2.23	2.08	0.13	
	DIVERSITY (J PRIME)	0.56	0.50	0.61	0.55	0.03	
	NUMBER OF TAXA	32	24	20	40		
	BOTOM TYPE	0					

ABOVE COMPUTED USING SAMPLE IDS

171	172	181	182
191	192	201	202
211	212		