PROGRESS REPORT

FOR THE THIRTY- FIRST QUARTER

on

STUDY OF WOODBORER POPULATIONS IN RELATION TO THE OYSTER CREEK GENERATING STATION

to

GPU NUCLEAR CORPORATION

February 28, 1983

by

R.E. Hillman and C.I. Belmore

REPORT NO. 15173

November 21, 1982 to January 20, 1983

BATTELLE
New England Marine Research Laboratory
Duxbury, Massachusetts 02332

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Executive Summary

This progress report presents data from field and laboratory work during the period November 21, 1982 to January 20, 1983.

All field work during this quarter was carried out by GPU personnel. Temperature, salinity, dissolved oxygen and pH were measured and recorded at each of the 20 stations during the two periods of exposure panel exchange except in December, 1982 when there was an equipment malfunction at some of the stations (see Table 5).

The laboratory analysis of the exposure panels shows the species Teredo bartschi to be absent from any of the exposure panels in Barnegat Bay, New Jersey during the 1982 settling season.

Teredinidae were breeding and settling during the month of November this year at Station 1, which is a month later in the year than usual at this location.

Limnoria were present at Station 1 through 4A as in previous years. Juveniles were observed in panels removed from two stations in December, 1982 and from three stations in January, 1983. Last year juveniles were only recorded from one station in December and none in January.

The gonads of most specimens were found to be in the partially spawned to spent stage during November and December, which is typical for this time of year.

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INTRODUCTION

Battelle's New England Marine Research Laboratory is conducting an investigation to determine whether the generating station is affecting the resident marine borer population in Oyster Creek to the extent that that population is contributing significantly to marine borer-caused damage in Barnegat Bay.

A description of the program and procedures used may be found in the sixth annual report titled, "Study of Woodborer Populations in Relation to the Oyster Creek Generating Station," dated March 15, 1982.

This report presents data for the thirty-first quarterly period from November 21, 1982 to January 20, 1983.

PROCEDURES AND INTERIM DATA

Exposure Panels

The long-term and short-term exposure panels were retrieved and replaced with new untreated pre-soaked (for two weeks) panels at the 20 exposure sites in Barnegat Bay and adjacent waters (Figure 1) during the periods December 6-7, 1982 and January 3-4, 1983. Long-term and short-term panels at all stations were retrieved and replaced by personnel from GPU's Oyster Creek Nuclear Generating Station.

Table 1 describes the geographical locations of the exposure sites. The data for the laboratory examination of the panels are presented in Tables 2 through 4.

Water Quality

Salinity, water temperature, dissolved oxygen and pH were taken at each site by the GPU field team. The results for December, 1982 and January, 1983 are presented in Tables 5 and 6.

Teredinid Gonadal Development Studies

Table 7 shows the gonad condition of the teredinid borers collected in November and December, 1982. Included are results from panels exposed for periods ranging from 6 to 12 months.

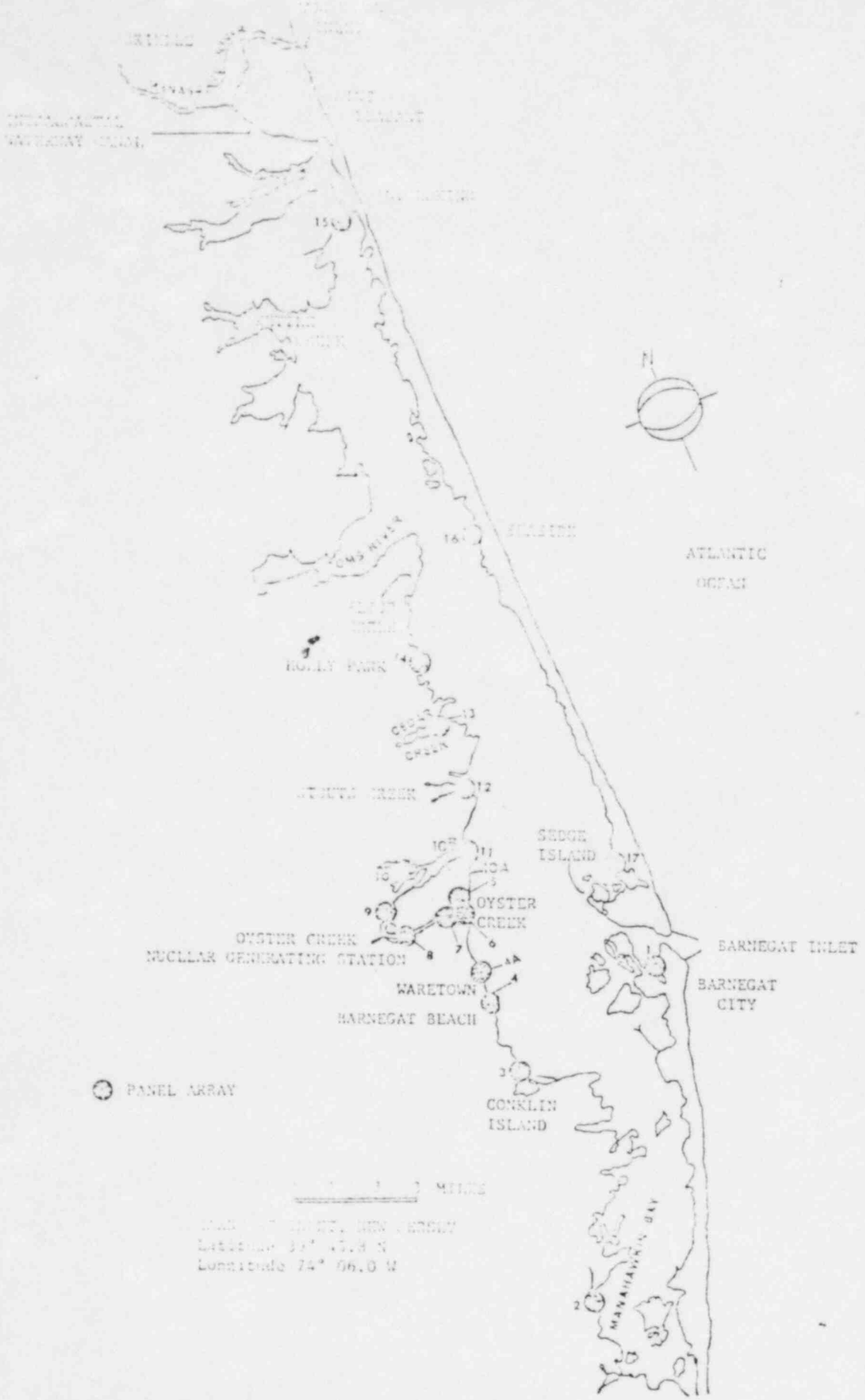

FIGURE 1. OUTLINE OF BARNEGAT BAY SHOWING GEOGRAPHICAL LOCATION OF EXPOSURE PANELS

TABLE 1. GEOGRAPHICAL LOCATIONS OF BATTELLE NEW ENGLAND MARINE RESEARCH LABORATORY'S EXPOSURE PANEL ARRAYS IN BARNEGAT BAY, NEW JERSEY

Site No.	Site	Structure to be used for Suspension of Rack	Nearest Previous Data Stations	Approximate Latitude and Longitude
1.	Barnegat Coast Guard Station, Barnegat Inlet	Finger Pier Bulkhead	WC 1 WFCL 1948-1967	Lat. 39° 45.8'N Long. 74° 06.5'W
2.	Ashton Marina 1450 Bay Ave. Manahawkin	Bulkhead	WC 13, 14	Lat. 39° 40'N Long. 74° 13'W
3.	Iggie's Marina East Bay Ave. Barnegat (Conklin Island)	Bulkhead	WC 16, 17, 18, 19	Lat. 39° 45'N Lonog. 74° 12.5'W
4.	Liberty Harbor Marina Washington Ave. Waretown	Bulkhead	WC 21 R. Turner Rutgers U.	Lat. 39° 47'N Long. 74° 11'W
4-A*.	Holiday Harbor Marina Lighthouse Drive Waretown	Bulkhead R. Turner Rutgers U.	WC 21 Long. 74° 11'N	Lat. 39° 48'N
5.	Mouth of Oyster Creek, Lot 4, Compass Road Offshore End	Dock	WC 29, 30 Rutgers U.	Lat. 39° 43.5'N Long. 74° 10.3'W
6.	Oyster Creek #1 Lagoon, Inshore End 37 Capstan Drive	Dock		Lat. 39° 43.5'N Long. 74° 10.35'W

TABLE 1. (Continued)

Site No.	Site	Structure to be used for Suspension of Rack	Nearest Previous Data Stations	Approximate Latitude and Longitude
7.	Private Dock Dock Ave. Oyster Creek Sands Pt. Harbor Waretown	End of Dock	WC 27,28 R. Turner Rutgers U.	Lat. 39° 48.5'N Long. 74° 11.1'W
8.	Oyster Creek-R.R. Bridge Discharge Canal	Cross Member Bridge	WC 26 Rutgers U.	Lat. 39° 48.7'N Long. 74° 12'W
9.	Forked River South Branch Intake Canal	Cross Member R.R. Bridge	WC 31	Lat. 39° 49.2'N
10.	Teds Marina Bay Ave. Forked River	Pier	WC 33, 34	Lat. 39° 50.1'N Long. 74° 11.6'W
10A*.	Private Dock 1217 Aquarius Ct. Forked River	Under Dock		Lat. 39° 49'N Long. 74° 10'W
10B*.	Private Dock 1307 Beach Blvd. Forked River	Under Dock		Lat. 39° 49.4'N Long. 74° 10.1'W
11.	Forked River (near mouth) 1413 River View Drive	Bulkhead	Wc 35 Rutgers U.	Lat. 39° 49.7'N Long. 74° 10'W

TABLE 1. (Continued)

Site No.	Site	Structure to be used for Suspension of Rack	Nearest Previous Data Stations	Approximate Latitude and Longitude
12.	Stouts Creek 1273 Capstan Drive	Bulkhead	WC 38, 40, 41 R. Turner Wurtz Rutgers U.	Lat. 39° 50.5'N Long. 74° 08.8'W
13.	Rocknak's Yacht Basin Seaview Ave. Lanoka Harbor Cedar Creek	End of Pier	WC 46	Lat. 39° 52'N Long. 74° 09'W
14.	Dicks Landing Island Drive Bayville (Holly Park)	Pier	WC 49 R. Turner Nelson	Lat. 39° 54'W Long. 74° 08.1'W
15.	Winter Yacht Basin Inc. Rt. 528 Mantoloking Bridge	Pier	WC 57	Lat. 40° 02.5'N Long. 74° 04.9'W
16.	Berkely Yacht Basin J. Street Seaside	Pier	WC 60, 61	Lat. 39° 55.9'N Long. 74° 04.9'W
16A*.	Municipal Dock Seaside Heights	Pier	WC 60, 61	Lat. 39° 56.6'N Long. 74° 04.9'W
16B*.	Bayside Boats State Highway #35 and Bay Boulevard Seaside Heights, NJ	Pier	WC 60, 61	Lat. 39° 56.6'N Long. 74° 04.9'W

TABLE 1. (Continued)

Site No.	Site	Structure to be used for Suspension of Rack	Nearest Previous Data Stations	Approximate Latitude and Longitude
17	Island Beach State Park (Sedge Island)	Pier	WC 68	Lat. 39° 47.1'N Long. 74° 05.9'W

All exposure panel racks suspended in a minimum water depth at mean low water of at least three feet. Racks hung with nylon line from existing structures so the bottom panels are close to, but not touching the bottom. Racks at Forked River railroad bridge and Oyster Creek railroad bridge suspended with wire rope.

WC = Woodward-Clyde
WFCL = William F. Clapp Laboratories

* Site 4-A installed April, 1977.
Sites 10A, 10B installed April, 1978.
Site 16 discontinued November, 1981.
Site 16A installed December, 1981 - discontinued June, 1982.
Site 16B installed June, 1982.

TABLE 2. INCIDENCE OF TEREDINIDAE IN PANELS REMOVED DECEMBER 6-7, 1982

Station	Panel	No. of Specimens	Percent Filled	Size Range in mm	Species Identification	Remarks
1	P	650	99	<1-70	150 T. navalis, 500 Teredinidae*	75% of specimens dead
	C	90	<1	<1	90 Teredinidae*	
5	P	1	2	125	1 T. navalis	
	C	0				
7	P	6	9	14-200	5 T. navalis, 1 Teredinidae*	4 live, 2 dead
	C	0				
9	P	3	10	170-200	1 B. gouldi, 2 T. navalis	
	C	0				
10A	P	4	14	85-290	2 B. gouldi, 2 T. navalis	
	C	0				
10B	P	1	4	250	1 B. gouldi	
	C	0				
11	P	77	90	30-205	2 B. gouldi, 60 T. navalis, 15 Teredinidae*	15 specimens dead
	C	0				
13	P	3	13	210-235	3 B. gouldi	
	C	0				
15	P	2	<1	10-48	2 T. navalis	1 specimen dead
	C	0				
16B	P	1	3	190	1 B. gouldi	
	C	0				
17	P	9	10	9-130	6 T. navalis	
	C	0				

Stations 2-4A, 6, 8, 10, 12, and 14 - No Teredinidae present

P = Long-term panel submerged June 1-2, 1982.
C = Short-term panel submerged November 1-2, 1982.
* = Not speciated due to size or condition.

TABLE 3. INCIDENCE OF TEREDINIDAE IN PANELS REMOVED JANUARY 3-4, 1983

Station	Panel	No. of Specimens	Percent Filled	Size Range in mm	Species Identification	Remarks
1	P	700	99	4-60	100 T. navalis 600 Teredinidae*	85% of specimens dead
	C	0				
3	P	2	5	145-200	2 B. gouldi	
	C	0				
7	P	4	2	<1-155	1 T. navalis, 3 Teredinidae*	
	C	0				
10	P	1	4	240	1 T. navalis	
	C	0				
10A	P	2	5	140-160	2 T. navalis	
	C	0				
10B	P	2	8	210-215	2 B. gouldi	1 dead
	C	0				
11	P	62	95	25-190	1 B. gouldi, 57 T. navalis, 4 Teredinidae*	4 Teredinidae dead
	C	0				
12	P	1	2	155	1 B. gouldi	
	C	0				
13	P	1	2	150	1 B. gouldi	
	C	0				
15	P	7	15	40-190	4 B. gouldi, 2 T. navalis, 1 Teredinidae*	1 T. navalis and 1 Teredinidae dead
	C	0				
17	P	20	20	2-120	19 T. navalis, 1 Teredinidae*	
	C	0				

Stations 2, 4-6, 8, 9, 14 and 16B - No Teredinidae present.

P = Long-term panel submerged July 6-7, 1982.
C = Short-term panel submerged December 6-7, 1982.
* = Not speciated due to size or condition.

TABLE 4. INCIDENCE OF LIMNORIA IN PANELS REMOVED DECEMBER, 1982, AND JANUARY, 1983

Station	Panel	December		January	
		No. of Tunnels	No. of Specimens	No. of Tunnels	No. of Specimens
1	P	4	0	7	0
	C	0	0	0	0
2	P	360	390*	345	300*
	C	0		0	
3	P	1	1	0	
	C	0		0	
4	P	425	390	132	110*
	C	0		0	
4A	P	6800	5000*	500	450*
	C	1	1	0	

Stations 5 through 17, no Limnoria present

P = Long-term panel, submerged 6 months.
C = Short-term panel, submerged 1 month.
* = Juveniles present.

TABLE 5. WATER QUALITY AT EXPOSURE PANEL STATIONS DECEMBER, 1982

Station	Date	Time	Depth in Feet	Salinity o/oo	Temperature (oC)	O_2** (mg/l)	pH*
1	12/6/82	0950	3.0	23.5	13.8	8.0	8.0
2	12/6/82	1045	2.5	20.4	14.1	7.5	7.9
3	12/6/82	1125	0.5	20.6	14.8	8.2	8.2
4	12/6/82	1150	2.5	21.9	14.6	8.9	-
4A	12/6/82	1220	0.5	19.8	14.2	8.9	-
5	12/6/82	1340	0.8	20.5	16.8	8.5	-
6	12/6/82	1355	1.0	20.5	16.6	8.5	-
7	12/6/82	1410	0.8	20.5	17.5	8.1	-
8	12/6/82	1430	3.0	20.7	18.0	8.2	-
9	12/6/82	1505	3.0	20.9	15.7	9.5	-
10	12/7/82	1430	2.5	19.8	13.3	9.9	-
10A	12/6/82	1530	0.8	21.0	15.4	9.3	-
10B	12/6/82	1550	2.0	21.0	16.0	-	-
11	12/6/82	1605	0.8	22.3	14.5	-	-
12	12/7/82	1350	1.0	16.7	12.0	9.5	-
13	12/7/82	1330	1.2	15.0	12.2	9.2	-
14	12/7/82	1300	1.5	15.2	12.9	9.1	-
15	12/7/82	0940	1.0	16.8	12.1	8.9	-
16B	12/7/82	1030	2.0	14.6	11.9	9.5	-
17	12/7/82	1120	0.2	22.2	11.8	10.4	-

\- No reading taken.
* pH meter not working properly after Station 3.
** DO readings questionable, meter erratic at Stations 4 through 7.
YSI DO meter temperature reading incorrect at Stations 8, 9 and 10A, therefore DO reading may be invalid at these stations.

TABLE 6. WATER QUALITY AT EXPOSURE PANEL STATIONS JANUARY, 1983

Station	Date	Time	Depth in Feet	Salinity o/oo	Temperature (°C)	O_2 (mg/l)	pH
1	1/3/83	1020	3.5	28.5	4.9	12.6	8.3
2	1/3/83	1110	0.7	23.4	3.9	12.6	8.2
3	1/3/83	1150	1.0	25.9	4.2	12.0	8.3
4	1/3/83	1215	1.0	26.1	4.5	12.1	8.3
4A	1/3/83	1230	1.0	26.7	4.7	11.6	8.3
5	1/3/83	1400	0.7	23.9	6.7	10.4	8.2
6	1/3/83	1415	1.0	23.1	5.9	10.7	8.1
7	1/3/82	1435	0.7	23.8	6.7	11.1	8.2
8	1/3/83	1505	3.5	22.7	6.4	11.6	8.3
9	1/3/83	1540	3.0	23.8	4.6	11.7	8.3
10	1/4/83	1412	2.5	21.5	5.5	11.2	8.1
10A	1/3/83	1608	1.0	24.0	4.6	11.9	8.2
10B	1/3/83	1622	2.5	24.4	4.5	12.0	8.3
11	1/4/83	1440	0.8	24.1	3.1	11.8	8.3
12	1/4/83	1308	1.5	23.7	4.3	11.7	8.2
13	1/4/83	1235	1.5	21.0	3.9	12.1	8.2
14	1/4/83	1208	2.0	22.1	3.3	12.4	8.3
15	1/4/83	1040	2.0	22.8	3.1	13.2	8.2
16B	1/4/83	1110	2.5	18.6	2.0	13.1	8.1
17	1/4/83	1145	0.5	27.1	1.6	13.9	8.2

TABLE 7. CONDITION OF GONADS OF TEREDINID BORERS REMOVED FROM EXPOSURE PANELS IN BARNEGAT BAY FROM NOVEMBER AND DECEMBER, 1982

EA = Early active; LA = Late active; R = Ripe; PS = Partially spawned; S = Spent; M = Male; F = Female; H = Hermaphrodite

Specimen No.	Station	Month Removed	No. Months Exposed	Species	Sex	Gonad Condition	Comments
1160a	14	Nov 82	6	Bankia gouldi	M	S	
b				Bankia gouldi	M	S	
1161a	10A	Nov 82	6	Teredo navalis	F	S	
b				Teredo navalis	M	S	
c				Teredo navalis	F	PS	
d				Teredo navalis	M	S	
1162a	15	Nov 82	6	Teredo navalis	H	PS	
b				Teredo navalis	H	EA	
c				Teredo navalis	M	S	
d				Teredo navalis			No discernable gonad
1163	15	Nov 82	6	Bankia gouldi			No discernable gonad
1164a	11	Nov 82	6	Teredo navalis	M	PS	
b				Teredo navalis	H	S	
c				Teredo navalis	H	PS	
d				Teredo navalis	F	PS	
e				Teredo navalis	M	S	
f				Teredo navalis	H	S	
g				Teredo navalis	M	PS	
h				Teredo navalis	F	S	
i				Teredo navalis	M	S	
j				Teredo navalis	F	S	
k				Teredo navalis	M	S	
l				Teredo navalis	M	S	
m				Teredo navalis	M	S	

Table 7. (continued)

Specimen No.	Station	Month Removed	No. Months Exposed	Species	Sex	Gonad Condition	Comments
n				Teredo navalis	M	S	
o				Teredo navalis	H	S	
p				Teredo navalis	M	S	
q				Teredo navalis	M	S	
1165a	13	Nov 82	6	Bankia gouldi	M	S	
b				Bankia gouldi	M	S	
c				Bankia gouldi	M	S	
d				Bankia gouldi			No discernable gonad
e				Bankia gouldi	M	S	
1166	8	Nov 82	6	Teredo navalis	F	R	Dead when fixed
1167a	16B	Nov 82	5	Bankia gouldi	M	S	
b				Bankia gouldi	M	S	
1168	5	Nov 82	6	Teredo navalis	F	S	
1169a	17	Nov 82	6	Terdeo navalis			No discernable gonad
b				Teredo navalis	H	S	
c				Teredo navalis	M	S	
d				Teredo navalis	M	S	
e				Teredo navalis	M	LA	
1170	9	Nov 82	6	Teredo navalis	H	S	
1171a	17	Nov 82	12	Teredo navalis	M	S	Special panel
b				Teredo navalis	M	S	
c				Teredo navalis			No discernable gonad
d				Teredo navalis			No discernable gonad
e				Teredo navalis	H	S	
f				Teredo navalis	H	S	
g				Teredo navalis	F	S	
h				Teredo navalis	H	S	
i				Teredo navalis	F	S	

Table 7. (continued)

Specimen No.	Station	Month Removed	No. Months Exposed	Species	Sex	Gonad Condition	Comments
1172a	12	Nov 82	12	Bankia gouldi			Special panel; no discernable gonad
b				Bankia gouldi	M	S	
1173a	11	Nov 82	12	Teredo navalis	M	S	Special panel
b				Teredo navalis	F	S	
c				Teredo navalis	F	S	
1174a	11	Nov 82	12	Bankia gouldi	M	S	Special panel
b				Bankia gouldi	M	S	
c				Bankia gouldi			No discernable gonad
d				Bankia gouldi			No discernable gonad
1175	16B	Dec 82	6	Bankia gouldi			No discernable gonad
1176a	13	Dec 82	6	Bankia gouldi			No discernable gonad
b				Bankia gouldi			No discernable gonad
c				Bankia gouldi			No discernable gonad
1177	10B	Dec 82	6	Bankia gouldi	M	S	
1178a	10A	Dec 82	6	Teredo navalis	F	S	
b				Teredo navalis	F	S	
1179	5	Dec 82	6	Teredo navalis	F	S	
1180a	10A	Dec 82	6	Bankia gouldi	M	S	
b				Bankia gouldi	M	S	
1181a	7	Dec 82	6	Teredo navalis	F	S	
b				Teredo navalis	F	S	
c				Teredo navalis	F	S	
d				Teredo navalis			No discernable gonad

Table 7. (continued)

Specimen No.	Station	Month Removed	No. Months Exposed	Species	Sex	Gonad Condition	Comments
1182	15	Dec 82	15	Teredo navalis	M	S	
1183a	9	Dec 82	6	Teredo navalis	H	S	
b				Teredo navalis	F	S	
1184	9	Dec 82	6	Bankia gouldi	M	S	
1185a	11	Dec 82	6	Bankia gouldi			No discernable gonad
b				Bankia gouldi	M	S	
1186a	11	Dec 82	6	Teredo navalis	M	S	
b				Teredo navalis	M	PS	
c				Teredo navalis	M	S	
d				Teredo navalis	F	PS	
e				Teredo navalis	F	PS	
f				Teredo navalis	M	PS	
g				Teredo navalis	F	S	
h				Teredo navalis	F	S	
i				Teredo navalis	H	S	
j				Teredo navalis	F	S	
k				Teredo navalis	M	S	
l				Teredo navalis	M	PS	
1187a	17	Dec 82	6	Teredo navalis	H	S	
b				Teredo navalis	F	S	
c				Teredo navalis	H	S	
d				Teredo navalis	M	S	
e				Teredo navalis	H	S	
f				Teredo navalis	M	S	

Table 7. (continued)

Specimen No.	Station	Month Removed	No. Months Exposed	Species	Sex	Gonad Condition	Comments
1188a	1	Dec 82	6	Teredo navalis	F	PS	
b				Teredo navalis	H	S	
c				Teredo navalis	F	PS	
d				Teredo navalis	M	PS	
e				Teredo navalis	F	PS	
f				Teredo navalis	F	S	
g				Teredo navalis	M	S	
h				Teredo navalis	F	PS	
i				Teredo navalis	M	S	
j				Teredo navalis	F	PS	
k				Teredo navalis	H	S	
l				Teredo navalis	F	S	
m				Teredo navalis	M	S	
n				Teredo navalis	H	S	
o				Teredo navalis	H	PS	
1189	17	Dec 82	12	Teredo navalis	H	S	Special panel
1190	7	Dec 82	12	Bankia gouldi	M	S	Special panel
1191	12	Dec 82	12	Bankia gouldi	M	S	Special panel
1192a	11	Dec 82	12	Teredo navalis	M	S	Special panel
b				Teredo navalis	H	S	
c				Teredo navalis	H	S	
d				Teredo navalis	F	PS	
e				Teredo navalis	F	S	

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