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2.4 HYDROLOGIC ENGINEERING

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

Subsection 2.4.1 of the DCD is renumbered as Section 2.4.15. This is being done to accommodate the incorporation of Regulatory Guide 1.206 numbering conventions for Section 2.4.

STD DEP 1.1-1

2.4.1 HYDROLOGIC DESCRIPTION

PTN COL 2.4-1

This subsection describes the hydrological setting at the Units 6 & 7 site and presents the plant's interface with the hydrosphere. The subsection also provides a list of surface water users whose intakes could be affected by Units 6 & 7. Groundwater hydrology and groundwater use are described in Subsection 2.4.12.

2.4.1.1 Site and Facilities

The Units 6 & 7 plant area is part of the larger Turkey Point plant property located approximately 25 miles south of Miami in unincorporated Miami-Dade County, Florida. The approximate 9400-acre Turkey Point plant property includes two gas/oil-fired steam electric generating units, Units 1 & 2, one natural gas combined cycle plant, Unit 5, and four nuclear powered steam electric generating units, Units 3 & 4 (Reference 201) and Units 6 & 7. Figure 2.4.1-201 shows the Turkey Point site and the surrounding area. Major hydrologic features near the plant property are also identified on the figure. The topography of the area in the immediate vicinity of the plant is shown on Figure 2.4.1-202.

Units 6 & 7 are located immediately south of the Units 3 & 4 on a plant area of approximately 218 acres. Most of the Units 6 & 7 plant features are located on an area bounded on all four sides by the permitted industrial wastewater facility/ cooling canals. The cooling canals serve as part of the closed-loop cooling water supply for Units 1 through 4 (Figure 2.4.1-203). For Unit 5, cooling tower makeup water is supplied from the Upper Floridan aquifer and the blowdown is routed to the cooling canals (Reference 201).

The Units 6 & 7 plant area within the bounds of cooling canals is raised to a higher elevation above surrounding grade. The grade elevations in the plant area vary

from 19 feet to 25.5 feet in North American Vertical Datum of 1988 (NAVD 88). The area is surrounded by a retaining wall structure with the top of wall elevation varying from 20 feet to 21.5 feet NAVD 88. The NAVD 88 is the plant reference elevation datum for Units 6 & 7 and is used in this and subsequent subsections. Conversions to NAVD 88 are provided when elevations referencing to other vertical datum are cited. The general arrangement of Units 6 & 7 are shown on Figure 2.4.1-204.

FPL selected the Westinghouse AP1000 certified plant design for Units 6 & 7. The design plant grade for all safety-related facilities is at 26.0 feet NAVD 88 (which is equivalent to the design plant grade elevation of 100 feet or 30.48 meters in the DCD reference datum as defined in the DCD). The safety-related structures for the AP1000 design include the containment/shield building and the auxiliary building. Finished grade elevations at the plant area are shown in Figure 2.4.2-202 Before construction, the area where the plant is located was occupied by sparsely vegetated, low-lying mudflats and was isolated by the surrounding cooling canals. The preconstruction elevations ranged from approximately –2.4 feet to 0.8 foot NAVD 88.

The AP1000 reactor design employs a safety-related passive containment cooling system that serves as the ultimate heat sink for design basis accident events. As indicated in the DCD, the passive containment cooling system does not require offsite water sources to perform its safety functions. Units 6 & 7 use mechanical draft cooling towers for nonsafety-related circulating water system cooling, with makeup water from two independent water sources, each capable of supplying 100 percent of the makeup water demand, as addressed in Subsection 2.4.11. The units also use mechanical draft cooling towers for nonsafety-related service water system cooling, with makeup water supplied from the Miami-Dade Water and Sewer District potable water system.

The two makeup water sources for the plant’s nonsafety-related circulating water system are reclaimed water and saltwater. Reclaimed water is supplied by the Miami-Dade Water and Sewer Department from its wastewater treatment facilities via a pipeline system to the FPL reclaimed water treatment facility. The treated reclaimed water from the facility is stored in the makeup water reservoir, which is shown on Figure 2.4.1-204. Details of the makeup water reservoir are described in Subsection 2.4.8. The maximum makeup water requirement, when the circulating water system is operating with reclaimed water, is approximately 38,400 gallons per minute for both Units 6 & 7. Saltwater is supplied from radial collector wells to the cooling tower basins and is used to supplement reclaimed water as needed to meet the makeup water demand. The maximum makeup

water rate when the circulating water system is operating with saltwater is approximately 86,400 gallons per minute for both units. The circulating water system is also capable of operating on any combination of the two types of makeup water. Locations of the water supply sources are shown on Figures 2.4.11-201 and 2.4.11-202. The cooling tower blowdown and other plant wastewater streams are collected in a common collection sump for injection into a deep injection well, as described in Subsection 2.4.12. Consequently, none of the surrounding surface water bodies are used as a water supply source, waste effluent discharge point, or heat sink for Units 6 & 7.

The Units 6 & 7 plant property is surrounded by the low-lying areas of the Everglades drainage basin (Figure 2.4.1-205). There are no major rivers, lakes, or dams located nearby, as shown in Figures 2.4.1-202 and 2.4.1-203. However, a network of drainage canals, which includes canals from the Everglades National Park-South Dade Conveyance System (ENP-SDCS) and local project (drainage) canals, provides freshwater supply to the Everglades and controlled drainage from southeast Florida to Biscayne Bay. Consequently, the hydrology near Units 6 & 7 is mainly governed by the Biscayne Bay. In addition to Biscayne Bay, other major hydrologic features near Units 6 & 7 include the Everglades and the drainage canal system of southeast Florida, as described in Subsection 2.4.1.2.

Potential flooding events and the determination of the design basis flood elevation that may affect the Units 6 & 7 safety-related facilities are described in Subsection 2.4.2. Because the design plant grade, including the elevation of the openings and entrances to the Units 6 & 7 safety-related buildings, is located above the design basis flood elevation, as described in Subsection 2.4.2, the safety-related functions of the plant will not be adversely impacted by flooding events. Subsection 2.4.10 describes the flooding protection requirements for Units 6 & 7.

2.4.1.2 Hydrosphere

Units 6 & 7 are located adjacent to the Biscayne Bay within the Everglades drainage basin of the south Florida watershed subregion, as shown on Figure 2.4.1-205. As described in Subsection 2.5.1.1, the plant property is located in the Southern Slope subprovince of the Southern Zone subregion of the Florida Platform within the Atlantic Coastal Plain physiographic province (see Figure 2.5.1-202). The physiographic features in the Southern Zone subregion that govern surface water flows southward from Lake Okeechobee include the Immokalee Rise, Big Cypress Spur, Atlantic Coastal Ridge, and the Everglades physiographic sub-provinces (Figure 2.5.1-202). Higher topographic relief of the

Immokalee Rise and Big Cypress Spur in the west and the Atlantic Coastal Ridge in the east of the Everglades historically guided the stormwater runoff and freshwater flows from Lake Okeechobee to drain south and southeast into the Everglades. However, flood control structures and an elaborate drainage canal system constructed in the past century has since modified the natural drainage pattern, its freshwater discharge, and its interaction with the coastal bays in the Atlantic Ocean and Gulf of Mexico. The interaction of surface water and groundwater within the area further complicates the hydrology of the area (References 202, 203, and 204).

2.4.1.2.1 The Everglades

The Everglades is the largest wetland in the continental United States and was part of the larger, natural Kissimmee-Okeechobee-Everglades watershed that once extended south from Lake Okeechobee to the southernmost extremity of peninsular Florida. Elevations within the Everglades, which were formed on limestone bedrock, are lower than the elevations in the Flatwoods or Atlantic Coastal Ridge physiographic provinces and slope toward the south with an average gradient less than 2 inches per mile (References 204 and 205). The freshwater flow from Lake Okeechobee and the flat terrain of the basin supported the accumulation of layers of peat and mud that formed the historical Everglades wetlands over an area of approximately 4500 square miles (References 202 and 205).

Before the beginning of drainage development in the late 1800s, overflows from Lake Okeechobee slowly moved through the Everglades as sheet flows. The overflow also provided the freshwater supply that sustained the ecosystem functions within the wetlands that were dominated by sawgrass and tree islands, the small, forested islands that are a prominent feature of the Everglades (Reference 204). From the Everglades, water drained south to the Gulf of Mexico through a series of open-water sloughs. Hydrological features and natural direction of historical surface water flows are shown in Figure 2.4.1-206.

The Atlantic Coastal ridge that separates the Everglades from the Atlantic coastline has a maximum elevation of approximately 20 feet above MSL datum (Reference 205), which is equivalent to the National Geodetic Vertical Datum of 1929 (NGVD 29). At the National Oceanic and Atmospheric Administration (NOAA) tide gage station located at Virginia Key, Florida, the NGVD 29 is located approximately 1.6 feet below the NAVD 88. This datum relationship is also considered applicable to Units 6 & 7. Applying the datum conversion, the maximum elevation of the Atlantic Coastal Ridge is approximately 18.4 feet NAVD

88. Historically, nearly all of southeast Florida, except for the Atlantic Coastal ridge, was flooded annually (Reference 205). The floodwater discharged to Biscayne Bay through the Miami, New, and Hillsborough rivers and other sloughs that formed the transverse glades in the Atlantic Coastal ridge, as shown in Figure 2.4.1-206.

Since the late nineteenth century, the south Florida watershed subregion has been affected by anthropogenic alterations (Reference 202). Land reclamation for agriculture, construction of flood control levees and drainage canals, and urbanization irreversibly modified the hydrology of the region. Canals were first dug through the Everglades to drain water from the area south of Lake Okeechobee, thus enabling agriculture to develop during the late nineteenth and early twentieth centuries (Reference 202). By the late 1920s, major canals were constructed and rivers in the transverse glades were modified to connect Lake Okeechobee with the Gulf of Mexico and Atlantic Ocean (Figure 2.4.1-207). In the west, the Caloosahatchee Canal connected Lake Okeechobee with the Gulf of Mexico. St. Lucie Canal in the east connected Lake Okeechobee with the St. Lucie River and estuary. In the southeast, the West Palm Beach, Hillsborough, North New River, South New River, and Miami (River) Canals connected Lake Okeechobee with the Biscayne Bay and Atlantic Ocean (References 202 and 204). Government-initiated flood control measures, including levee construction and drainage channel modification, began in the 1930s (Reference 204).

U.S. Congress authorized the Central and Southern Florida Flood Control Project (C&SF project) in 1948 with a mandate to provide flood protection, water supply, prevention of saltwater intrusion, and protection of fish and wildlife resources (References 202 and 204). The state of Florida formed the Central and Southern Florida Flood Control District in 1949, which later became the South Florida Water Management District (SFWMD), to work with the C&SF project. The C&SF project adopted a water management plan for Lake Okeechobee and three water conservation areas (WCAs) to provide flood protection and water supply. As part of the water management plan, the Everglades Agricultural Area (EAA) was also drained for agricultural development. The locations of the EAA and the WCAs are shown in Figure 2.4.1-207.

The construction of these flood control canals, levees, and structures by the C&SF project has caused a large portion of runoff that originally flowed from the Kissimmee River and Lake Okeechobee into the Everglades to be diverted directly to the Gulf of Mexico by the Caloosahatchee Canal and to the Atlantic Ocean by the St. Lucie Canal. Before flood control, agriculture, and urbanization

development, which began in the late nineteenth century, the natural water level in Lake Okeechobee overflowed its southern bank at elevations 20 to 21 feet NGVD 29 (18.4 to 19.4 feet NAVD 88). Currently, the lake water level is maintained at approximately 13 to 16 feet NGVD 29 (11.4 to 14.4 feet NAVD 88) (Reference 205). Surface water flows from the EAA into the WCAs are maintained by pumping, resulting in alterations in the timing and spatial distribution of historical (prior to the construction of the canals) flows as well as a reduction in the volume of water discharged. As a result, water levels in the Everglades generally are shallower and have shorter hydroperiods than water levels prior to late-nineteenth century development (References 202 and 205). Post-development drainage patterns in the Everglades are shown in Figure 2.4.1-207.

By 2000, approximately 50 percent of the historic Everglades basin in Florida remained undeveloped. The rest of the area has been altered for agriculture or urban growth (Reference 204). Most of the undeveloped portions of the Everglades at present are protected by public parks including the Everglades National Park, Big Cypress National Preserve, Loxahatchee National Wildlife Refuge, the WCAs, Fakahatchee Strand State Preserve, and other state lands (Reference 202). The Everglades National Park was established in 1947 on marshland south of the WCAs and now covers approximately 1.4 million acres (Reference 202). The park is approximately 15 miles west of the plant property and is adjacent to the southeast Florida drainage canal system.

In 2000, the federal Water Resources Development Act authorized a Comprehensive Everglades Restoration Plan (CERP) to provide a framework and guide the restoration, protection, and preservation of the water resources of central and southern Florida, including the Everglades (Reference 206). The plan has more than 60 elements, covers 16 counties over an area of 18,000 square miles and focuses on updating the C&SF project (Reference 206). The CERP projects intend to restore water flows that have changed over the past century, and plan on capturing and storing freshwater flows in surface and subsurface reservoirs, which are currently released to the Atlantic Ocean and Gulf of Mexico.

The freshwater would be directed to the wetlands, lakes, rivers, and estuaries of southern Florida while also ensuring future urban and agricultural water supplies (Reference 206). The surface and subsurface reservoirs would mainly be located within the low-lying areas of the EAA and WCAs. Failure of these reservoirs would not adversely affect the functioning of the Units 6 & 7 safety-related structures that are located at an elevation of 26 feet NAVD 88.

2.4.1.2.2 Everglades National Park-South Dade Conveyance System

The systematic and elaborate construction of drainage canals in southern Miami-Dade County was initiated in the 1960s. The Federal Flood Control Act (FCA) of 1962 authorized the C&SF project for southern Miami-Dade County. The C&SF project implemented a system of canals and structures to provide drainage for urban development, prevent over-drainage of agricultural lands, and prevent contamination of groundwater by saltwater intrusion (Reference 207). The conveyance system relies on gravity drainage through a primary network of 12 canals with outlets to serve a system of secondary canals (Reference 207). The stages of development of the canals during the 1950s and 1960s are shown on Figure 2.4.1-208.

The canal system was modified in the 1970s to meet the hydrologic needs of the Everglades National Park, as authorized by the updated FCA of 1968, by implementing the ENP-SDCS (Reference 207). ENP-SDCS interconnected several drainage basins of the C&SF drainage project (Reference 208). Gated control structures were first installed at the eastern (coastal) end of the primary canals to release excess stormwater runoff to the coastal water bodies during the wet seasons and to manage saltwater intrusion during the dry seasons. Secondary controls on the inland reaches of the canals were then installed to regulate flow eastward, control inland and agricultural flooding, and maintain higher water levels in the surficial aquifer system where appropriate (Reference 209). The surface water canal system was fully developed in the 1980s when the ENP-SDCS was completed. Figure 2.4.1-209 shows the partially completed canal system in the 1970s, and the fully developed system in the 1990s. The conveyance system met its objectives by providing agricultural water supply, control flooding, and mitigating saltwater intrusion (Reference 209).

The ENP-SDCS was mandated to supply 55,000 acre-feet of water per year to the Everglades National Park. It made use of the existing canals from the C&SF project (Reference 208). The existing north-south directed borrow canals L-30 and L-31N/L-31W were enlarged to convey water from the Miami Canal (C-6) to the Everglades. The west-east running canals provide drainage from the southern Dade development corridor to the Biscayne Bay by control structures at the mouth of the canals (Reference 209). The locations of present-day ENP-SDCS and C&SF project drainage canals are shown in Figure 2.4.1-210. The western borrow canal of the L-31E Levee (L-31E Canal) runs parallel to the coastline of Biscayne Bay in southern Miami-Dade County, separating the coastal wetlands along the

bay from the mainland. Starting north of Black Creek Canal (C-1) and extending to Card Sound Road in the south, the L-31E Levee has a crest elevation of approximately 7 feet NAVD 88. The levee and canal are located immediately west of the Turkey Point cooling canals (Reference 210).

Based on hydrology of the area, the U.S. Army Corps of Engineers (USACE) delineated water management subbasins in southern Miami-Dade County (Reference 208). The water management area includes 17 subbasins that contribute flow to the Biscayne Bay and Everglades, as shown on Figure 2.4.1-211. Surface water flows from the drainage subbasins to the Biscayne Bay or the Everglades are controlled by numerous flow control structures. Flow control structures also regulate flow between the subbasin areas. The subbasins' names are based on the major canal in the subbasin. A summary of the subbasins (with names corresponding to the primary canal servicing each of the areas), drainage areas, and the control structures at basin outlets that regulate flow to the Biscayne Bay is provided in Table 2.4.1-201. The locations of the control structures are shown on Figure 2.4.1-210.

Detailed flow and water level monitoring and measurements are performed as part of the operation of the structures in the ENP-SDCS. A search in the SFWMD database (DBHYDRO) for flow and water level monitoring data within the subbasins listed in Table 2.4.1-201 returned approximately 700 records (Reference 211). The DBHYDRO database includes data from stations maintained by various agencies including U.S. Geological Survey (USGS), SFWMD, and the Everglades National Park. Monthly mean flow rates and water levels at four stations near Units 6 & 7, S-197, S-20, S-21A, and S-21, are obtained from the SFWMD database. Details of the station locations and available data records are presented in Table 2.4.1-202. Monthly mean flow rates and water levels at the selected locations are presented in Tables 2.4.1-203 through 2.4.1-210.

2.4.1.2.3 Biscayne Bay

Biscayne Bay is a shallow coastal lagoon located on the lower southeast coast of Florida (Reference 212). The bay is approximately 38 miles long, approximately 11.2 miles wide on average, and has an area of approximately 428 square miles (References 213 and 214). The bay began forming between 5000 and 3000 years ago as sea level rose and filled a limestone depression (Reference 203). The eastern boundary of the Biscayne Bay is composed of barrier islands that form a part of the Florida Keys and separates the bay from the Atlantic Ocean

(Reference 215). Coral reefs east of the barrier islands make up the northern extent of the Florida reef tract (Reference 213). Several canals on the western shore discharge surface water into the bay, as described in Subsection 2.4.1.2.2. The Biscayne Bay is connected to the Atlantic Ocean by a wide and shallow opening of coral shoal near the middle of the bay that is known as the Safety Valve, and by several channels and cuts (Reference 215).

Because the Biscayne Bay is not a drowned river valley, unlike most estuaries, sediment inflow to the bay from rivers/canals is insignificant. Near the plant property, part of the Biscayne Bay is within the designated boundaries of the Biscayne National Park that contains a narrow fringe of mangrove forest along the mainland. Similar mangrove zones are present along the southern expanse of the Biscayne Bay, and in the northernmost islands of the Florida Keys including Elliott Key (Reference 216).

For basin-wide planning purposes, the Biscayne Bay is divided into three subregions: North Bay, Central Bay, and South Bay (Reference 213). North Bay extends from approximately 5 miles north of the Miami-Dade/Broward County boundary to the shoreline near Miami, Florida; Central Bay extends from the shoreline near Miami, Florida to the Featherbed Banks east of Black Creek Canal; and South Bay extends from the Featherbed Banks east of Black Creek Canal to Barnes Sound (Figure 2.4.1-210). The Turkey Point plant property is located adjacent to South Bay, which is generally undeveloped and fringed by mangrove wetlands. South Bay (also identified as the Lower Biscayne Bay) is approximately 100 square miles in area (Reference 201).

The average depth of the Biscayne Bay is approximately 6 feet with a maximum depth of approximately 13 feet (Reference 217). The volume at mean low water is approximately 1.5E10 cubic feet (Reference 201). The mean low water datum at the NOAA Virginia Key, Florida, station is located at –1.9 feet NAVD 88 (Reference 218). NOAA maintains tidal stations in the Biscayne Bay and surrounding areas (Reference 219). A list of selected stations near Units 6 & 7 and their estimated tidal ranges is presented in Table 2.4.1-211. The stations currently in operation with more than 10 years of record include Virginia Key, Florida (NOAA station 8723214); Vaca Key, Florida (8723970); and Key West, Florida (8724580) (References 220, 221, and 222). The Virginia Key, Florida, station is located approximately 25 miles north-northeast of Units 6 & 7. The Vaca Key, Florida, and Key West, Florida, stations are located approximately 70 miles and 110 miles southwest of Units 6 & 7, respectively. Other stations, as listed in Table 2.4.1-211, are located within the Biscayne Bay and Card Sound with only

short periods of tidal data and are no longer active. The locations of the tidal stations are shown on Figure 2.4.1-212.

Within the Biscayne Bay, the great diurnal tide range, which is the difference between the mean higher high and mean lower low tide levels, is higher near the entrance of the bay, as shown in Table 2.4.1-211. At Cutler station in the Biscayne Bay, the great diurnal range is 2.13 feet; near Turkey Point, the range is 1.78 feet; and in the southern Biscayne Bay at the Card Sound Bridge station, the range is reduced to 0.63 foot.

Studies of the Biscayne Bay show the principal circulation forces to be tidal, although winds that persist for longer than a complete tidal cycle of 12 to 13 hours cause relatively large water movements (Reference 201). Measurements of tidal flow past discrete points such as Cutter Bank (east of the cooling canals) average approximately 50,000 acre-feet per day, or a continuous flow of 60,000 acre-feet per half of a tidal cycle. Tidal exchange between the Biscayne Bay and the ocean is estimated to be less than 10,000 acre-feet per day (Reference 201).

The South Bay also includes Card Sound and Barnes Sound south of Biscayne Bay. Card Sound is part of the Biscayne Bay Aquatic Preserve of the Upper Florida Keys. Freshwater input to Card Sound is primarily surficial sheet flow with additional flow from groundwater upwelling (Reference 223). Circulation within Card Sound and Barnes Sound is restricted because of the enclosed configuration of the sounds by barrier islands that increases residence times of its waters (Reference 223). The tidal range within Card Sound is presented in Table 2.4.1-211.

2.4.1.2.4 Units 6 & 7 Plant Area

The Units 1 though 7 plant area is bounded by the Biscayne Bay and L-31E Canal to the east and west, respectively, by the Florida City Canal to the north and by Card Sound Road and Card Sound to the south. The L-31E Levee intercepts the freshwater flows that historically discharged as sheet flow to the coastal wetlands and the Biscayne Bay east of the canal. Outflow from the canals north and west of Units 6 & 7 (Mowry Canal, North Canal, Florida City Canal, and Model Land Canal) is controlled by two flow control structures, S-20 and S-20F. Public works projects in this area for mosquito control and land reclamation in the early 1900s resulted in the construction of shallow ditches approximately 6 to 10 feet wide. The shallow ‘mosquito ditches’ run north-south, and the drainage ditches run east-west to provide quick drainage of the wetlands. Remnants of the ditches can still be identified in the area (Reference 224). The SFWMD has undertaken an

elaborate plan (Biscayne Bay Coastal Wetlands Project) to restore the Biscayne Bay ecosystem in the areas surrounding the Turkey Point plant property (Reference 225). FPL is maintaining a wetland area in the northern area of the Turkey Point plant property shown as TP-5 Mitigation Area in Figure 2.4.1-203. In addition, FPL is implementing a wetland mitigation project southwest of Units 6 & 7 (shown as Everglades Mitigation Bank on Figure 2.4.1-203). Future hydrologic changes in the Biscayne Bay Coastal Wetlands project are not expected to have adverse flooding and water use impact on the safety-related functions of Units 6 & 7.

The Federal Emergency Management Agency (FEMA) flood insurance study for Miami-Dade County indicates that the most severe flooding in the county would result from hurricane storm surges (Reference 226). The flood insurance study estimated the surge elevations (still water level) at transect locations along the shoreline of Biscayne Bay for different return periods. Units 6 & 7 lie between Transect 30 in the north to Transect 31 in the south. The maximum still water levels in the transects range between elevation 8.5 feet NGVD 29 (6.9 feet NAVD 88) for a 10-year return period to 12.4 feet NGVD 29 (10.8 feet NAVD 88) for a 500-year return period (Reference 226).

2.4.1.2.5 Dams and Reservoirs

There are no dams or reservoirs near Units 6 & 7. The only flow regulation and control near Units 6 & 7 is for the ENP-SDCS that regulates drainage from the Everglades and saltwater intrusion from Biscayne Bay. An assessment of dam failure potential is provided in Subsection 2.4.4.

2.4.1.2.6 Surface Water Users

Approximately 90 percent of all consumptive water use in southern Florida comes from groundwater sources, while the remaining 10 percent is supplied from surface water sources (Reference 227). SFWMD administers water use permits for the south Florida region. As of October 13, 2008, 139 permits were in use within Miami-Dade County. Permitted surface water uses within 10 miles of Units 6 & 7 are tabulated in Table 2.4.1-212 (Reference 228). Approximately 83 percent of the permitted surface water use is for landscape irrigation. The remaining use is for irrigation of golf courses, agriculture, aquaculture, nursery irrigation, industrial uses, and dewatering. There are no surface water withdrawals permitted for potable water supply. The nearest surface water user is approximately 6 miles west-northwest of Units 6 & 7.

The major non-consumptive surface water uses near Units 6 & 7 includes recreation, fishing, and navigation. The Biscayne National Park and Homestead Bayfront Park support nearly all of non-consumptive water use near Units 6 & 7.

2.4.1.2.7 Groundwater Characteristics

The local and regional hydrogeology characterization is addressed in Subsection 2.4.12. A detailed list of current nondomestic groundwater users, groundwater well locations, and the withdrawal rates in the vicinity of Units 6 & 7 is presented in Subsection 2.4.12.2.

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PTN COL 2.4-1

Table 2.4.1-201
East Miami-Dade County Drainage Subbasin Areas and Outfall Structures

Subbasin Name	Major Canal	Drainage Area Square Miles	Outfall Structure	Structure Type	Design Headwater Stage Feet NGVD 29	Structure Design Discharge Cubic Feet per Second
C-9[(a)]	Snake Creek Canal (C-9)	98	S-29	Spillway, 4 gates	3.0	4780
C-8	Biscayne Bay Canal (C-8)	31.5	S-28	Spillway, 2 gates	2.3	3220
C-7	Little River Canal (C-7)	35	S-27	Spillway, 2 gates	3.2	2800
C-6	Miami Canal (C-6)	69	S-26 S-25B	Spillway, 2 gates Spillway, 2 gates	4.4 4.4	3400 2000
C-5	Comfort Canal (C-5)	2.3	S-25	Culvert	2.5	260
C-4	Tamiami Canal (C-4)[(b)]	60.9	S-25A	Gated Culvert	N/A[(c)]	N/A
C-3	Coral Gables Canal (C-3)	18	G-97	Weir	4.5	640
C-2	Snapper Creek Canal (C-2)	53	S-22	Spillway, 2 gates	3.5	1950
C-100	C-100 Canal	40.6	S-123	Spillway, 2 gates	2.0	2300
C-1	Black Creek Canal (C-1)	56.9	S-21	Spillway, 3 gates	1.9	2560
C-102	C-102 Canal	25.4	S-21A	Spillway, 2 gates	1.9	1330
C-103	Mowry Canal (C-103)	40.6	S-20F	Spillway, 3 gates	1.9	2900
Homestead	Military Canal	4.7	S-20G	Spillway, 1 gate	2.0	900
North Canal	North Canal[(d)]	7.8	S-20F	Spillway, 3 gates	1.9	2900
Florida City	Florida City Canal[(e)]	12.5	—	—	—	—
Model Land	Model Land Canal	28.1	S-20	Spillway, 1 gate	1.5	450
C-111	C-111 Canal	100	S-197	Gated Culvert	1.4	550

(a) Subbasin C-9 combines areas C-9 West and C-9 East, as shown in Figure 2.4.1-211
(b) Joins with Subbasins C-5 and C-6 and outflows through S-25 and S-25B
(c) N/A indicates data not available
(d) Outflows through S-20F
(e) No outflow structure; joins with L-31E Canal
Source: Reference 210

PTN COL 2.4-1

Table 2.4.1-202
Summary of Data Records for Gage Stations at S-197, S-20, S-21A, and S-21 Flow Control Structures

Structure	Database Key[(a)]	Station[(b)]	Latitude[(c)]	Subbasin	Subbasin[(d)]	Data Type[(e)]	Frequency	Statistics	Agency	Start Date	End Date
S-197	04994	S197_C	251713.4	802629.2	MODEL	FLOW	Daily	Mean	SFWMD	6/23/1969	3/30/2000
	HA458	S197_C	251713.4	802629.2	MODEL	FLOW	Daily	Mean	SFWMD	12/31/1997	Ongoing
	15763	S197_C	251713.4	802629.2	MODEL	FLOW	Daily	Mean	SFWMD	1/1/1970	Ongoing
	04990	S197_H	251713.4	802629.2	MODEL	STG	Daily	Mean	SFWMD	6/23/1969	4/28/1993
	13093	S197_H	251713.4	802629.2	MODEL	STG	Daily	Mean	SFWMD	9/21/1990	6/29/1999
	HA459	S197_H	251713.4	802629.2	MODEL	STG	Daily	Mean	SFWMD	1/29/1998	Ongoing
S-20	13037	S20_H	252201.4	802235.2	FLA CITY	STG	Daily	Mean	SFWMD	5/30/1990	Ongoing
	03846	S20_H	252201.4	802235.2	FLA CITY	STG	Daily	Mean	SFWMD	12/28/1967	5/26/1992
	13036	S20_S	252201.4	802235.2	FLA CITY	FLOW	Daily	Mean	SFWMD	5/30/1990	Ongoing
	03850	S20_S	252201.4	802235.2	FLA CITY	FLOW	Daily	Mean	SFWMD	2/29/1968	8/26/1991
S-21A	04708	S21A_H	253109.4	802046.2	C1	STG	Daily	Mean	SFWMD	8/18/1972	1/30/1990
	06601	S21A_H	253109.4	802046.2	C1	STG	Daily	Mean	SFWMD	8/31/1985	Ongoing
	04712	S21A_S	253109.4	802046.2	C1	FLOW	Daily	Mean	SFWMD	1/16/1974	1/30/1990
	06777	S21A_S	253109.4	802046.2	C1	FLOW	Daily	Mean	SFWMD	8/31/1985	Ongoing
S-21	06597	S21_H	253235.5	801951.4	DA-4	STG	Daily	Mean	SFWMD	1/17/1984	Ongoing
	00677	S21_H	253235.5	801951.4	DA-4	STG	Daily	Mean	USGS	10/1/1967	10/20/2004
	06776	S21_S	253235.5	801951.4	DA-4	FLOW	Daily	Mean	SFWMD	1/17/1984	Ongoing
	00679	S21_S	253235.5	801951.4	DA-4	FLOW	Daily	Mean	USGS	11/1/1969	9/30/2004

(a) Record identification number for SFWMD DBHYDRO database
(b) Suffix designation: C – Culvert, H – Headwaters, S – Spillway
(c) Latitude/longitude format: ddmmss.s, dd – Degrees, mm – Minutes, ss.s – Seconds, latitudes in degrees North, longitudes in degrees West
(d) MODEL - Model Land subbasin, FLA CITY – Florida City subbasin, C1 – C1 subbasin, DA-4 – Dade subbasin 4
(e) Flow – flow discharge, STG – stage
Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-203 (Sheet 1 of 2)
Monthly Mean Flows at the Canal C-111 Structure S-197

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	19.278	96.74	45	15.411	8.538	4.083	0	0
1973	0	0	0	0	0	0	3.64	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	4.905	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	79.304	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	26.519	17.269	0	0
1979	0	0	0	0	65.356	0	0	0	47.398	49.93	0	0
1980	0	0	0	0	0	0	76.507	78.337	240.179	29.640	112.646	0
1981	0	52.891	0	0	0	0	0	239.978	536.729	105.378	0	0
1982	0	0	0	0	0	170.247	28.94	0	63.522	129.102	144.590	0
1983	96.527	373.798	452.039	79.333	0	334.074	100.896	157.914	328.885	12.586	0	0
1984	0	0	51.403	0	82.276	0	116.553	43.698	14.174	0	0	0
1985	0	0	0	0	0	0	60.308	0	134.999	0	0	0
1986	0	0	0	0	0	60.811	0	290.441	110.000	0	8.963	6.990
1987	58.032	0	0	0	0	0	0	0	41.852	250.42	92.859	0
1988	0	0	0	0	0	342.095	0	916.717	39.972	92.99	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	46.051	0	0
1992	0	0	0	0	0	459.429	94.048	115.695	82.059	0	0	0
1993	0	0	0	0	0	0	0	0	0	41.968	0	0
1994	0	0	0	0	0	0	0	0	74.269	95.552	332.916	0
1995	0	0	0	0	0	341.752	125.366	269.349	122.944	690.039	8.278	0

PTN COL 2.4-1

Table 2.4.1-203 (Sheet 2 of 2)
Monthly Mean Flows at the Canal C-111 Structure S-197

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	0	0	0	0	0	257.087	8.231	0	0	178.448	0	0
1997	0	0	0	0	0	505.727	0	0	82.344	0	0	16.801
1998	0	0	0	0	0	0	0	0	472.435	0	27.967	0
1999	0	0	0	0	0	0	0	0	74.81	608.412	0	0
2000	0	0	0	0	0	0	0	0	21.391	393.893	0	0
2001	0	0	0	0	0	0	0	80.273	40.494	219.259	0	0
2002	0	0	0	0	0	134.37	132.425	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	30.410	26.294	0	0
2004	0	0	0	0	0	0	0	0	0	38.366	0	0
2005	0	0	0	0	0	113.481	0	444.112	349.756	167.782	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	24.685	0	0	0	113.736	0	0
2008	0	0	0	0	0	0	0	70.182	—[(a)]	—	—	—
Mean	3.963	10.941	12.909	2.034	4.280	74.867	20.303	69.923	77.465	87.137	19.164	0.626

(a) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-204 (Sheet 1 of 2)
Monthly Mean Water Level at the Canal C-111 Structure S-197 (Headwater)

Year	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1970	1.518	1.506	1.290	0.732	0.232	1.346	1.513	1.316	1.350	1.519	1.464	1.207
1971	0.851	0.619	0.136	–0.467	–0.535	0.461	1.224	1.278	1.451	1.519	1.529	1.407
1972	1.348	1.315	1.148	1.284	1.364	1.717	1.660	1.490	1.675	1.667	1.654	1.512
1973	1.465	1.407	1.188	0.790	0.376	0.760	1.477	1.676	1.721	1.690	1.538	1.375
1974	1.389	1.027	0.348	–0.239	–0.072	1.076	1.347	1.444	1.477	1.580	1.387	1.395
1975	1.197	0.856	0.231	–0.468	0.375	1.179	1.628	1.574	1.497	1.516	1.513	1.289
1976	1.011	0.905	0.733	0.594	1.041	1.697	1.485	1.706	1.778	1.617	1.499	1.389
1977	1.414	1.328	1.114	0.521	1.267	1.593	1.388	1.483	1.866	1.679	1.565	1.608
1978	1.556	1.611	1.590	1.334	1.505	1.629	1.749	1.728	1.999	1.995	1.832	1.608
1979	1.579	1.415	1.009	0.503	1.697	1.625	1.581	1.603	1.820	1.934	1.682	1.723
1980	1.594	1.620	1.476	1.359	1.328	1.736	1.749	1.778	1.865	1.893	1.838	1.797
1981	1.617	1.592	1.565	0.976	0.536	1.133	1.317	1.536	1.929	1.791	1.774	1.558
1982	1.366	1.168	0.940	1.038	1.477	1.741	1.593	1.686	1.796	2.079	2.014	1.805
1983	1.848	2.122	2.107	2.161	1.549	1.955	1.807	2.030	2.272	2.161	2.004	1.698
1984	1.576	1.372	1.289	1.248	0.922	1.773	1.912	2.099	2.150	2.094	1.759	1.612
1985	1.472	1.354	1.226	1.336	1.257	1.346	2.023	2.215	2.358	2.522	2.310	1.900
1986	1.862	1.548	1.552	1.664	1.245	1.847	2.315	2.353	2.405	1.914	1.818	1.854
1987	1.952	1.607	1.782	1.466	1.482	1.414	1.713	1.841	2.091	2.633	2.621	2.381
1988	1.953	1.623	1.357	0.927	1.564	2.350	2.629	2.309	2.627	2.455	1.883	1.664
1989	1.488	1.205	1.028	1.279	1.155	1.025	1.792	1.983	2.032	1.801	1.661	1.560
1990	1.334	1.014	0.972	1.034	0.859	1.492	1.548	2.160	2.095	2.147	1.707	1.614
1991	1.529	1.345	1.350	1.172	1.335	2.170	1.965	2.021	2.493	2.594	2.114	1.715
1992	1.617	1.583	1.396	1.305	0.857	1.848	2.145	1.982	2.428	2.068	2.120	1.830
1993	2.138	1.821	1.667	1.555	1.290	2.121	2.018	2.014	2.316	2.472	2.224	1.722
1994	1.721	1.937	1.852	1.537	1.785	1.992	1.595	2.078	2.569	2.531	2.414	2.500
1995	2.445	2.122	1.899	1.685	1.962	2.194	2.427	2.549	2.656	2.603	2.392	1.931

PTN COL 2.4-1

Table 2.4.1-204 (Sheet 2 of 2)
Monthly Mean Water Level at the Canal C-111 Structure S-197 (Headwater)

Year	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	1.894	1.602	1.421	1.093	1.339	2.271	2.043	1.811	2.167	2.400	1.929	1.687
1997	1.684	1.654	1.382	1.144	1.354	2.385	2.258	2.356	2.574	2.275	1.760	2.185
1998	1.928	2.180	2.268	2.016	1.962	1.743	1.719	2.103	2.195	2.373	2.281	1.937
1999	1.926	1.718	1.441	0.877	1.035	1.957	2.152	2.217	2.521	2.549	2.379	2.172
2000	2.190	2.125	1.878	1.796	1.319	1.801	2.117	2.431	2.519	2.514	1.996	1.949
2001	1.648	1.314	1.116	0.832	1.212	1.253	1.994	2.368	2.433	2.560	2.446	2.229
2002	2.078	1.777	1.586	1.110	0.709	2.231	2.507	2.369	2.368	2.023	1.710	1.905
2003	1.605	1.326	1.423	1.763	1.953	2.376	2.073	2.396	2.583	2.411	2.419	2.266
2004	1.856	1.941	1.560	1.140	0.976	0.827	1.239	2.257	2.349	2.269	2.253	1.939
2005	1.640	1.503	1.439	1.450	1.399	2.321	2.422	2.445	2.732	2.645	2.354	2.230
2006	1.797	1.584	1.360	1.337	1.208	1.551	2.340	2.308	2.540	2.233	1.906	1.711
2007	1.666	1.595	1.531	1.596	1.715	2.311	2.547	2.291	2.169	2.519	2.189	1.765
2008	1.600	1.528	1.343	1.597	1.255	1.593	2.152	2.345	2.456	—[(a)]	—	—
Mean	1.650	1.509	1.333	1.130	1.161	1.688	1.876	1.990	2.162	2.138	1.946	1.780

(a) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-205 (Sheet 1 of 2)
Monthly Mean Flows in the Canal L-31E at Structure S-20

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	N/A[(a)]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.2	0
1969	1.507	0	25.242	4.747	0	42.24	32.724	0	106.301	80.99	284.187	
1970	0	0	0	0	0	4.567	–0.173	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0.289	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0.777	0.052	1.165	0.085
1975	0	0	0	0	0	0	0.078	0	0.17	0	0	0
1976	0	0	0	0	0	0	0	3.701	75.683	0.243	0	0
1977	0	0	0	0	30.657	59.678	0	0	116.304	9.482	0	0
1978	0	0	0	0	0	4.948	1.159	16.284	21.56	45.93	24.549	0
1979	0	0	0	0	0	0	0	8.022	57.789	80.121	0	0
1980	23.595	0	0	0	0	59.211	35.737	26.648	45.653	40.799	26.491	0
1981	0	0	0	0	0	0	0	105.314	128.263	83.247	0	0
1982	0	0	0	0	0	40.808	0	0	0	11.921	0	0
1983	40.372	0	0	0	2.832	0	0	0	106.754	0	0.219	0
1984	0	0	0	0	0	0	0	0	0.582	38.388	0	0
1985	0	0	0	0	0	0	57.109	58.302	22.063	38.642	0	0
1986	0	0	0	0	0	15.749	41.475	0.087	0	15.926	1.833	0
1987	43.152	0	23.583	0.016	0	0	0	0	22.114	106.246	46.753	0
1988	0	0	0	0	0	161.759	149.41	179.534	38.577	0	0	0
1989	0	0	0	0	0	0	0	38.758	0.219	0	0	0
1990	0	0	0	0	0	0	0	106.017	45.836	10.81	0	0
1991	0	0.095	0.159	2.227	0.251	0	0	0	0	149.682	49.295	
1992	N/A	0	2.307	0	0	81.074	149.633	62.117	86.822	0	0	0
1993	0	0	0	0	0	0	0	25.621	57.057	N/A	N/A	N/A

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Table 2.4.1-205 (Sheet 2 of 2)
Monthly Mean Flows in the Canal L-31E at Structure S-20

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994	N/A	N/A	0	0	0	0	0	0.115	63.734	108.26	103.73	70.832
1995	0	0	0.868	0	0	95.945	57.231	90.961	109.186	201.169	28.057	0
1996	0	0	0	0	0	187.071	114.843	0.298	0	49.303	0	0.033
1997	0	0.078	0	0	0	603.788	0	143.963	399.966	7.812	0	63.708
1998	0	17.561	0	0	0	N/A	N/A	N/A	N/A	0	0.027	0.038
1999	N/A	N/A	N/A	0	0	59.886	22.741	52.061	52.330	119.456	42.276	0.188
2000	1.274		0	0	0	0	0	0	51.708	76.003	–4.708	0
2001	0	0	0	0	0	20.359	21.717	51.343	76.752	31.414	19.377	0
2002	–4.001	0	0	0	0	102.642	129.294	0.003	0	0	0.000	0.042
2003	0.003	0.010	0	0	0	0	0.001	0	39.591	60.012	51.666	0.023
2004	0.066	0	0.052	0	0	0	0.001	0	0	0	N/A	N/A
2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2006	0	0	0	0	0	0	108.994	0.008	0.000	0.035	0.001	0
2007	0	0	0	0	0	88.319	76.108	0	35.958	–19.527	N/A	N/A
2008	0	0	0	0	0	0	0	102.019	0	—[(b)]	—	—
Mean	3.117	0.522	1.450	0.189	0.912	45.230	27.733	29.755	48.937	38.469	19.945	4.217

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-206 (Sheet 1 of 2)
Monthly Mean Water Levels in the Canal L-31E at Structure S-20 (Headwaters)

YEAR	Monthly Mean in feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	0.924	0.785	0.574	0.216	1.697	2.092	2.096	1.763	1.877	2.454	1.469	1.016
1969	1.272	1.089	1.232	1.121	1.277	2.006	1.744	1.557	1.846	2.004	1.873	1.404
1970	1.228	1.210	0.867	0.496	0.435	1.566	1.622	1.205	1.485	1.783	1.473	1.067
1971	0.790	0.761	0.401	–0.040	–0.102	0.793	1.295	1.465	1.617	1.755	1.901	1.550
1972	1.379	1.320	1.003	1.333	1.480	1.832	1.678	1.532	1.958	1.894	1.855	1.473
1973	1.496	1.496	1.356	1.258	0.826	1.004	1.853	1.788	2.091	2.175	1.875	1.600
1974	1.382	1.014	0.706	0.594	0.902	1.428	1.811	1.869	1.800	2.299	1.823	1.702
1975	1.364	1.234	0.968	0.551	1.082	1.601	2.265	1.977	1.827	1.801	1.800	1.451
1976	1.132	0.984	0.956	0.982	1.230	2.230	1.964	1.948	2.087	1.954	1.655	1.424
1977	1.318	1.230	1.209	0.982	1.754	1.844	1.506	1.762	2.071	1.994	1.806	1.732
1978	1.491	1.566	1.535	1.344	1.592	1.949	1.846	1.889	2.110	2.259	2.179	1.731
1979	1.645	1.234	1.015	0.803	1.762	1.883	1.592	1.642	2.054	2.153	1.947	1.807
1980	1.523	1.617	1.312	1.412	1.285	1.925	2.036	2.018	2.132	2.045	2.067	1.830
1981	1.432	1.505	1.342	0.956	1.030	1.318	1.367	2.010	2.354	2.408	2.348	1.683
1982	1.140	1.194	1.092	1.459	1.854	2.192	2.039	2.079	1.894	2.336	2.350	1.927
1983	1.814	2.101	1.809	1.422	0.902	1.729	1.870	2.041	2.170	2.278	2.064	1.592
1984	1.587	1.321	1.318	1.186	1.066	2.177	2.191	2.125	2.202	2.273	1.980	1.639
1985	1.429	1.378	1.390	1.300	1.488	1.685	2.212	2.184	2.378	2.334	2.058	1.895
1986	1.731	1.390	1.356	1.486	1.432	1.967	1.944	1.978	2.137	2.029	1.830	1.944
1987	1.901	1.539	1.831	1.441	1.618	1.632	1.886	2.063	2.108	2.384	2.301	1.946
1988	1.748	1.564	1.362	1.228	1.825	2.289	2.256	2.335	2.123	2.237	1.933	1.590
1989	1.406	1.339	1.355	1.504	1.548	1.548	2.073	2.198	2.224	2.154	1.886	1.722
1990	1.513	1.338	1.433	1.508	1.414	1.900	2.035	2.149	2.023	2.083	1.918	1.564
1991	1.355	1.242	1.358	1.233	1.380	2.260	2.004	1.730	2.260	2.529	2.207	1.636
1992	1.507	1.495	1.303	1.436	1.104	2.018	2.228	1.847	1.808	2.090	1.872	1.592
1993	1.951	1.789	1.450	1.459	1.253	2.179	1.892	2.072	2.057	2.197	1.728	1.624

PTN COL 2.4-1

Table 2.4.1-206 (Sheet 2 of 2)
Monthly Mean Water Levels in the Canal L-31E at Structure S-20 (Headwaters)

YEAR	Monthly Mean in feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994	1.688	1.784	1.782	1.351	1.674	2.031	1.670	1.961	2.201	2.295	2.391	2.083
1995	1.814	1.467	1.495	1.399	1.708	2.150	2.140	2.141	2.267	2.332	1.985	1.598
1996	1.640	1.378	1.242	1.137	1.428	2.039	1.901	1.730	2.156	2.235	1.985	1.655
1997	1.760	1.782	1.342	1.364	1.720	2.291	2.159	2.082	2.158	2.124	1.775	1.963
1998	1.739	2.067	1.955	1.412	1.359	1.658	1.684	1.952	2.069	1.966	2.063	1.724
1999	1.716	1.443	1.213	0.969	1.433	2.181	2.010	2.159	2.282	2.679	2.085	1.758
2000	1.380	1.230	1.347	1.211	1.782	2.063	2.022	2.096	2.435	1.771	1.964	0.000
2001	1.615	1.158	1.233	1.099	1.599	1.631	2.125	1.997	2.073	2.216	2.179	1.737
2002	1.411	1.417	1.475	1.162	1.167	2.172	2.055	2.047	2.101	1.802	1.787	1.724
2003	1.356	1.232	1.365	1.653	1.789	1.948	1.698	1.924	2.118	1.937	2.050	1.729
2004	1.458	1.626	1.305	1.188	1.170	0.980	1.296	1.846	1.958	2.034	1.932	1.446
2005	1.275	1.303	1.211	1.240	1.302	2.127	2.025	2.180	2.300	2.035	1.533	1.371
2006	1.227	1.321	1.086	1.355	1.413	1.980	1.880	1.914	1.989	2.051	1.804	1.659
2007	1.553	1.491	1.266	1.682	1.914	2.205	2.066	2.049	2.083	2.375	N/A[(a)]	N/A
2008	1.437	1.409	1.378	1.437	1.263	1.658	1.921	1.988	2.108	—[(b)]	—	—
Mean	1.476	1.386	1.274	1.179	1.362	1.858	1.901	1.934	2.073	2.144	1.942	1.605

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-207 (Sheet 1 of 2)
Monthly Mean Flows in the Princeton Canal at Structure S-21A

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	9.435	0	0	0	0	0	32.84	55.339	54.278	49.674	75.27	82.035
1975	4.747	0	0	0	0	3.025	95.608	35.223	30.335	33.959	20.947	1.215
1976	0	7.712	0	0	18.548	117.709	44.113	73.103	83.76	38.139	35.222	32.355
1977	2.655	4.198	0	0	64.372	112.828	64.626	83.935	176.795	65.827	45.415	19.826
1978	20.417	38.995	37.522	43.604	38.447	102.558	84.474	59.364	N/A[(a)]	N/A	N/A	N/A
1979	N/A	N/A	13.417	68.191	1051.47	307.851	375.055	372.993	98.64	376.168	320.883	294.474
1980	67.74	21.967	56.912	57.65	13.838	210.051	179.707	187.95	114.565	153.029	195.734	102.176
1981	44.347	51.843	37.898	10.1	0	0	0	383.346	285.008	73.878	119.334	23.698
1982	0.007	11.398	0.647	125.831	83.497	313.143	153.097	154.617	100.653	215.819	250.798	102.82
1983	189.691	469.708	1333.76	334.007	57.05	99.966	60.42	160.741	274.665	139.755	111.76	93.85
1984	70.448	74.615	81.103	63.543	27.797	94.174	142.746	41.639	69.896	73.726	79.649	66.527
1985	27.484	3.726	21.169	4.88	6.728	8.845	62.25	22.043	31.973	25.926	14.955	45.541
1986	78.845	27.175	61.792	31.395	1.78	57.659	33.898	58.089	107.032	52.864	69.996	60.653
1987	50.722	24	59.869	8.248	8.674	15.223	92.143	57.107	126.581	189.892	164.684	94.396
1988	47.966	33.688	31.374	0.239	40.66	258.467	68.005	212.75	34.153	55.578	32.958	11.474
1989	21.769	12.651	9.38	33.061	17.165	2.189	33.193	84.996	39.75	47.731	28.744	9.885
1990	0	0	8.298	29.27	34.061	36.054	88.441	137.671	87.143	123.553	53.003	4.9
1991	0	0.76	7.084	1.446	86.171	172.545	100.563	63.064	121.688	253.953	107.368	75.455
1992	64.85	52.447	54.478	54.825	1.999	382.2	96.134	243.132	127.167	122.511	221.32	86.207
1993	171.185	68.823	78.011	69.455	55.609	143.798	73.026	43.203	105.048	182.708	135.688	91.928
1994	85.937	152.05	83.005	99.623	56.702	73.905	46.621	122.298	196.47	137.074	381.629	128.094
1995	117.867	44.154	39.982	51.118	79.55	238.251	124.943	179.08	151.179	346.364	120.264	52.75
1996	66.487	35.889	30.943	18.43	63.053	269.232	83.949	99.303	115.444	185.69	66.505	30.116
1997	107.126	33.513	23.898	28.421	10.995	350.415	61.169	118.172	232.901	92.902	68.711	132.915
1998	67.46	118.244	130.06	43.857	7.093	9.721	31.652	138.74	275.595	98.768	186.898	49.636
1999	96.239	55.918	28.174	0.003	6.797	183.58	105.567	152.807	247.516	507.426	136.659	128.483

PTN COL 2.4-1

Table 2.4.1-207 (Sheet 2 of 2)
Monthly Mean Flows in the Princeton Canal at Structure S-21A

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	97.294	80.866	56.941	63.135	17.474	67.439	108.355	131.344	138.044	474.344	79.037	223.266
2001	55.809	16.575	34.604	25.216	38.249	82.513	157.76	169.212	321.322	382.933	201.383	110.312
2002	75.508	74.604	102.733	30.66	5.745	280.486	364.62	80.11	369.277	123.284	147.597	107.289
2003	34.029	7.663	65.534	90.772	164.064	226.718	70.154	240.216	237.285	162.985	231.379	112.74
2004	114.212	121.945	54.576	14.329	1.654	0.009	44.222	183.182	225.799	285.275	147.807	103.87
2005	55.799	33.831	52.935	17.276	19.514	365.851	145.679	423.939	408.996	253.485	161.395	56.957
2006	67.375	94.428	66.376	42.824	44.279	46.991	180.394	117.288	185.094	102.259	108.915	93.871
2007	68.548	67.974	17.493	40.3	45.059	186.579	176.821	78.382	141.404	203.069	135.269	26.473
2008	8.28	5.932	19.43	72.587	11.467	110.57	103.732	217.908	122.309	—(b)	—	—
Mean	58.538	54.332	77.126	44.980	62.273	140.873	105.314	142.351	159.934	170.623	129.005	80.491

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-208 (Sheet 1 of 2)
Monthly Mean Water Levels in the Princeton Canal at Structure S-21A (Headwaters)

YEAR	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	1.332	1.129	1.138	0.815	0.959	1.213	1.383	1.555	1.725	1.901	2.253	0.76
1975	1.475	1.187	0.842	0.42	0.528	N/A[(a)]	N/A	N/A	N/A	N/A	N/A	N/A
1976	N/A	1.731	1.827	1.914	2.001	2.088	2.168	2.158	2.137	2.116	2.096	2.022
1977	1.579	1.6	1.174	1.016	1.433	1.496	1.628	1.763	2.147	2.218	2.095	1.846
1978	1.694	1.558	1.754	1.783	1.895	1.975	1.989	1.992	1.968	1.947	1.742	1.721
1979	1.683	1.463	1.345	0.744	1.157	1.369	1.689	2.014	2.245	2.086	1.609	2.028
1980	1.761	1.765	1.683	1.666	1.922	1.801	1.819	1.97	1.945	1.819	1.665	1.566
1981	1.4	1.453	1.454	1.538	1.262	1.44	2.134	2.087	1.684	1.665	2.071	1.903
1982	2.068	1.969	1.73	1.786	1.762	1.576	1.732	1.953	2.169	2.073	1.928	1.579
1983	1.659	1.106	1.466	1.458	1.512	1.603	1.504	1.695	1.498	1.878	N/A	N/A
1984	N/A	N/A	N/A	1.369	1.314	1.208	1.398	2.145	2.113	1.998	1.931	1.73
1985	1.553	1.556	1.501	1.722	1.623	1.738	1.69	1.501	1.832	1.931	1.815	1.803
1986	1.584	1.391	1.591	1.543	1.84	1.912	1.985	2.058	2.13	2.151	1.909	1.629
1987	1.535	1.941	1.629	1.724	1.839	1.905	1.97	2.037	2.103	2.023	1.727	1.522
1988	1.611	1.66	1.709	1.834	2.025	1.798	1.714	1.692	2.036	2.098	1.443	1.598
1989	1.759	1.689	1.598	1.557	1.736	1.759	1.793	1.828	1.863	1.868	1.818	1.536
1990	1.746	1.595	1.773	1.694	1.636	2.098	2.051	1.999	2.056	1.847	1.891	1.89
1991	1.722	1.719	1.866	1.714	1.616	2.056	2.07	2.09	2.061	1.864	1.613	1.373
1992	1.534	1.619	1.668	1.684	1.609	1.682	2.038	1.885	1.913	1.782	1.449	1.284
1993	1.318	1.57	1.493	1.655	1.818	1.941	2.077	2.106	2.046	1.753	1.376	1.356
1994	1.284	1.444	1.497	1.55	2.039	2.078	2.089	2.046	1.682	1.484	1.528	1.433
1995	1.254	1.437	1.685	1.675	1.77	1.787	1.864	1.582	1.659	1.571	1.206	1.619
1996	1.677	1.705	1.608	1.705	2.041	1.736	1.818	2.047	1.94	1.548	1.459	1.64
1997	1.416	1.719	1.728	1.723	2.086	1.801	2.037	2.03	1.843	1.701	1.433	1.439
1998	1.66	1.373	1.486	1.537	2.002	2.045	2.113	1.668	1.802	1.7	1.35	1.726
1999	1.615	1.663	1.717	1.734	1.969	1.727	1.957	1.955	1.934	1.869	1.409	1.303

PTN COL 2.4-1

Table 2.4.1-208 (Sheet 2 of 2)
Monthly Mean Water Levels in the Princeton Canal at Structure S-21A (Headwaters)

YEAR	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	1.434	1.654	1.68	1.728	1.923	1.968	2.043	1.997	2.017	1.711	1.45	1.597
2001	1.681	1.733	1.71	1.717	2.064	2.062	1.999	1.555	1.608	1.693	1.515	1.309
2002	1.457	1.634	1.616	1.698	1.614	1.599	1.646	2.074	1.624	1.393	1.303	1.277
2003	1.622	1.949	1.834	1.666	1.63	1.514	1.663	1.526	1.621	1.524	1.495	1.311
2004	1.275	1.348	1.682	1.733	1.941	1.463	1.73	1.476	1.394	1.523	1.384	1.261
2005	1.502	1.724	1.695	1.726	1.997	1.518	1.885	1.908	1.607	1.646	1.46	1.967
2006	1.66	1.654	1.665	1.815	1.875	2.094	1.732	1.862	2.018	1.731	1.364	1.425
2007	1.668	1.67	1.812	2.039	2.114	1.998	2.002	2.068	2.003	1.78	1.451	1.846
2008	1.816	1.721	1.911	1.894	2.003	1.998	2.04	1.791	1.867	—[b]	—	—
Mean	1.577	1.592	1.605	1.588	1.730	1.766	1.866	1.886	1.891	1.815	1.632	1.572

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-209 (Sheet 1 of 2)
Monthly Mean Flows in the Black Creek Canal at Structure S-21

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1969	N/A[(a)]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	363.533	203.935
1970	113.071	86.357	87.516	3.667	32.742	223.973	405.839	136.645	144.733	199.161	113.723	5.71
1971	0	0	0	0	0	11.4	38.977	206.452	433.767	141.00	161.8	56.194
1972	23.742	17.586	31.645	26.88	152.213	392.303	206.742	170.774	249.433	173.613	150.133	71.348
1973	49.839	54.571	9.935	3.523	0	10.5	94.742	299.419	334.667	159.29	43.053	10.806
1974	64.00	0	0	0	0	0	152.871	123.103	135.767	189.419	76.113	71.452
1975	1.677	0	0	0	4.323	62.08	195.323	132.29	126.833	212.452	184.2	45.71
1976	0	19.041	3.774	0	72.548	403.567	146.774	322.29	373.1	133.355	156.533	81.00
1977	82.871	39.336	3.548	0	337.871	256.533	212.935	208.806	714.2	227.71	169.133	149.706
1978	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	286.452	266.867	53.077
1979	39.742	2.118	0.742	147.133	376.935	121.4	168.226	126.129	342.033	348.968	87.667	115.574
1980	83.00	81.807	55.581	70.833	102.323	263.8	206.968	268.516	320.7	165.226	193.333	60.00
1981	28.419	80.036	26.903	0	0	0	0	551.645	791.133	303.129	142.473	66.839
1982	81.161	146.786	81.174	236.367	187.329	417.567	153.903	231.968	496.067	318.935	367.033	144.194
1983	109.871	325.332	387.806	190.7	42.774	1151.23	184.968	433.868	459.6	316.29	126.667	86.29
1984	46.903	31.966	127.577	31.583	136.739	355.8	463.613	516.097	558.567	595.677	26.067	0
1985	0	0.304	0.003	0	0	11.647	245.968	135.132	195.9	143.968	139.593	135.384
1986	89.077	9.621	89.677	20.667	25.842	146.213	95.161	130.929	108.333	73.032	50.967	77.935
1987	85.839	44.893	47.226	28.467	53.29	7.467	42.161	10.226	83.133	219.226	69.138	46.903
1988	25.774	14.759	8.871	4.333	59.8	531.967	153.323	422.467	46.367	70.867	24.207	3.567
1989	4.1	4.607	3.733	2.933	57.259	15.133	63.00	52.129	33.2	38.097	30.233	13.355
1990	34.52	149.292	256.088	160.496	33.442	317.631	131.319	198.869	94.819	146.608	35.793	7.291
1991	0.484	0.357	0.286	14.881	48.113	207.505	179.625	284.815	375.555	528.618	116.626	4.474
1992	0.381	1.42	15.937	13.568	7.465	347.896	171.25	192.409	474.359	89.909	226.841	29.021
1993	222.444	47.409	44.073	110.976	85.589	354.5	119.3	90.136	152.886	342.589	109.203	9.018
1994	43.762	174.738	71.703	60.836	110.167	167.21	89.916	271.454	594.523	575.636	662.847	268.017

PTN COL 2.4-1

Table 2.4.1-209 (Sheet 2 of 2)
Monthly Mean Flows in the Black Creek Canal at Structure S-21

YEAR	Monthly Mean in Cubic Feet per Second											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995	367.651	226.985	80.073	65.508	106.159	450.776	403.799	619.149	566.021	832.155	396.028	81.116
1996	94.213	56.224	32.052	0	84.74	588.074	207.946	126.247	266.319	176.66	169.56	10.228
1997	28.792	11.903	0	16.576	73.356	24.883	186.66	252.386	464.535	166.624	24.263	239.284
1998	208.252	351.905	334.38	133.637	129.326	31.362	128.917	109.435	152.856	408.19	451.057	94.114
1999	228.022	91.506	23.212	6.516	51.438	306.899	273.907	341.364	249.443	–199.16	184.773	36.565
2000	22.748	37.451	24.186	71.223	18.967	60.176	195.201	283.803	194.159	323.833	49.375	190.364
2001	21.085	0	2.363	12.046	85.385	80.084	290.448	528.428	312.307	332.213	118.061	116.599
2002	157.957	69.728	212.451	13.274	6.501	321.608	655.617	475.612	429.076	150.229	349.113	285.442
2003	118.357	50.457	89.819	80.03	421.771	648.237	298.798	488.602	586.424	384.12	430.864	51.456
2004	15.993	234.295	20.356	4.065	33.779	0.119	15.127	551.962	468.00	461.935	424.301	229.754
2005	3.429	0	6.63	1.704	33.513	576.389	566.696	248.34	430.815	343.049	65.844	157.406
2006	72.209	53.517	26.728	15.268	24.845	25.007	473.775	339.882	546.94	263.886	149.359	65.278
2007	15.796	12.107	0.003	54.565	18.664	398.945	192.742	83.746	172.323	470.974	287.835	9.794
2008	6.197	21.613	6.103	62.842	16.64	231.963	372.791	593.504	367.183	—[b]	—	—
Mean	68.194	67.106	58.215	43.818	79.785	250.575	215.403	277.869	338.055	266.156	184.467	86.774

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-210 (Sheet 1 of 2)
Monthly Mean Water Levels in the Black Creek Canal at Structure S-21

YEAR	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1969	1.784	1.799	1.747	1.867	1.792	1.798	1.972	2.015	2.062	2.064	2.043	1.796
1970	2.043	2.052	2.064	2.182	1.794	1.995	2.026	2.144	2.154	2.153	2.196	2.192
1971	1.905	1.659	1.279	0.768	0.564	1.41	2.192	2.162	2.042	2.082	2.111	2.177
1972	2.198	2.157	2.042	1.887	1.961	1.942	1.909	1.973	2.013	2.002	1.971	2.033
1973	2.06	2.041	2.107	1.611	1.075	1.176	1.99	1.931	1.946	1.995	2.046	2.024
1974	2.012	2.042	1.42	0.858	0.793	1.643	2.006	2.025	2.028	2.073	2.11	2.072
1975	2.257	1.944	1.467	0.752	1.193	2.092	1.928	2.059	2.008	2.015	2.029	2.133
1976	2.144	2.017	2.059	1.565	1.93	1.933	2.088	1.959	1.927	2.008	2.076	2.162
1977	2.197	2.26	2.207	1.669	1.795	1.901	1.994	1.948	1.928	1.949	1.969	1.909
1978	N/A[(a)]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.157	2.13	2.197
1979	2.244	2.203	1.934	1.476	2.066	2.175	2.105	2.148	2.079	2.135	2.274	2.213
1980	2.26	2.276	2.282	2.304	2.319	2.194	2.135	2.136	2.118	2.175	2.159	2.238
1981	2.349	2.239	2.32	1.932	1.695	1.965	2.197	2.005	1.95	2.202	2.459	2.116
1982	1.903	1.925	1.946	1.916	2.079	2.109	2.12	1.94	2.221	2.07	2.089	2.237
1983	2.07	1.886	1.843	1.668	1.863	1.842	2.221	2.166	1.876	2.029	1.833	1.818
1984	1.891	1.917	1.905	1.986	1.736	2.119	2.021	2.103	2.145	2.152	2.253	2.23
1985	2.03	2.071	2.05	2.079	1.898	2.122	2.142	2.235	2.211	2.208	2.274	2.256
1986	2.04	2.356	1.982	2.207	2.247	2.178	2.223	2.214	1.973	2.248	2.328	2.105
1987	1.838	1.888	2.172	2.048	2.128	2.281	2.263	2.356	2.268	2.133	2.225	2.245
1988	2.273	2.332	2.304	2.154	2.287	2.032	2.197	1.647	2.353	2.207	2.317	2.206
1989	2.196	2.142	1.983	2.021	1.974	1.924	2.225	2.264	2.298	2.293	2.269	2.229
1990	2.072	1.891	1.999	2.298	2.084	2.32	2.243	2.223	2.232	2.21	2.303	2.233
1991	1.959	1.904	2.034	1.952	1.925	2.229	2.181	2.097	2.098	2.095	2.256	2.251
1992	2.276	2.351	2.126	2.346	1.955	1.814	2.104	2.08	N/A	2.115	1.795	2.214
1993	2.044	2.185	2.116	2.138	2.234	1.653	1.926	2.123	2.059	2.07	2.132	2.28
1994	2.209	1.969	2.164	2.18	2.13	2.037	2.156	2.054	1.657	1.838	1.853	1.655

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Table 2.4.1-210 (Sheet 2 of 2)
Monthly Mean Water Levels in the Black Creek Canal at Structure S-21

YEAR	Monthly Mean in Feet NGVD 29											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995	1.536	1.497	1.681	1.938	2.106	1.854	1.978	1.636	1.656	1.561	1.507	1.743
1996	1.713	1.764	1.831	2.137	2.195	1.781	1.866	2.182	2.001	1.884	1.808	2.113
1997	2.165	2.264	2.243	2.223	2.098	1.863	2.065	2.03	1.817	2.078	2.255	1.939
1998	2.008	1.695	1.846	2.08	2.132	2.21	2.078	1.97	1.838	1.64	1.581	2.035
1999	1.985	2.173	2.265	2.241	2.211	1.951	1.98	1.964	1.997	1.72	1.947	2.214
2000	2.259	2.227	2.251	2.117	2.206	2.146	2.074	1.957	2.059	1.849	1.863	2.039
2001	2.259	2.138	2.074	2.193	2.174	2.162	1.971	1.968	1.81	1.924	1.794	1.692
2002	1.563	1.958	1.977	2.199	1.9	1.841	1.818	2.201	1.859	1.782	1.679	1.54
2003	1.691	1.774	1.685	1.729	1.969	2.023	1.919	1.929	2.017	2.096	2.076	2.206
2004	2.221	1.948	2.249	2.216	2.188	1.873	1.958	1.859	1.74	1.838	1.751	1.771
2005	2.037	2.179	2.227	2.147	2.188	1.701	2.014	1.86	1.798	1.814	1.829	2.036
2006	2.209	2.203	2.238	2.244	2.121	2.262	2.054	1.961	2.032	2.122	1.713	1.814
2007	2.29	2.263	2.224	2.152	2.246	1.887	2.048	2.128	2.106	2.102	2.093	2.302
2008	2.269	2.196	2.154	2.135	2.237	2.171	1.881	1.673	1.876	—[b]	—	—
Mean	2.057	2.039	2.006	1.931	1.928	1.957	2.050	2.023	1.996	2.022	2.030	2.062

(a) N/A indicates data not available
(b) — Indicates data not available when retrieved from SFWMD database (Reference 212)

Source: Reference 212

PTN COL 2.4-1

Table 2.4.1-211
NOAA Tide Gages near Units 6 & 7 and Corresponding Tidal Range

Site Number	Site Name	Latitude	Longitude	Start Date	End Date	Great Diurnal Tide Range[(a)] Feet
8723289	Cutler, Biscayne Bay, FL	25° 36.9'	80° 18.3'	5/1/1970	3/31/1972	2.13
8723355	Ragged Key No. 5, Biscayne Bay, FL	25° 31.4'	80° 10.5'	8/1/1987	9/30/1987	1.68
8723393	Elliott Key (Outside), FL	25° 28.6'	80° 10.8'	7/1/1974	7/31/1974	2.53
8723409	Elliott Key Harbor, Elliott Key, FL	25° 27.2'	80° 11.8'	7/1/1974	8/31/1987	1.66
8723423	Turkey Point, Biscayne Bay, FL	25° 26.2'	80° 19.8'	5/1/1970	8/31/1993	1.78
8723465	East Arsenicker, Card Sound, FL	25° 22.4'	80° 17.4'	12/1/1971	2/29/1972	1.02
8723439	Billys Point, Elliott Key, FL	25° 24.9'	80° 12.6'	7/1/1974	7/31/1974	1.64
8723506	Pumpkin Key, Card Sound, FL	25° 19.5'	80° 17.6'	8/1/1987	9/30/1987	0.75
8723534	Card Sound Bridge, FL	25° 17.3'	80° 22.2'	5/1/1970	7/31/1971	0.63
8723214[(b)]	Virginia Key, FL	25° 43.9'	80° 9.7'	1/1/1996	9/30/2008	2.24
8723970[(b)]	Vaca Key, FL	24° 42.7'	81° 6.3'	12/1/1995	9/30/2008	0.97
8724580[(b)]	Key West, FL	24° 33.2'	81° 48.5'	11/27/1973	9/30/2008	1.81

(a) Great diurnal tide range is the difference between the mean higher high and mean lower low tide levels
(b) Active stations
Source: References 219, 220, 221, and 222

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Table 2.4.1-212 (Sheet 1 of 3)
SFWMD Water Use Permits Within a 10-Mile Radius

Permit No.	Expiration Date	Permit Type	Land Use	Acres	Water Source	Permitted Allocation (million gallons)			Location from the Site	
						Annual	Max. Monthly	Max. Daily	Direction	Distance (miles)
13-00168-W	2/28/2013	General (>3, <=15 MGM)	Golf Course	100	Onsite Lake(s)	115.8	14.7		WNW	7
13-00221-W	9/26/2009	General	Landscape	4.02	SFWMD Canal(C-1)	—	—	18,300 gal	NNW	9
13-02079-W	9/16/2023	General (<3 MGM)	Landscape	15.64	Onsite Lake(s)	17.383	2.1178		NW	7
13-02354-W	10/6/2024	General (minor)	Landscape	26.41	Onsite Lake(s)	20.73	2.8		WNW	7.5
13-02429-W	11/16/2024	General (<3 MGM)	Landscape	8.09	Onsite Lake(s)/Pond(s)	6.3503	0.868		NW	6.5
13-02461-W	12/15/2024	General (<3 MGM)	Landscape	15	Onsite Lake(s)	11.7744	1.6095		N	9
13-02518-W	3/8/2025	General (<3 MGM)	Landscape	6.64	Onsite Lake(s)/Pond(s)	5.2121	0.7125		NW	6.5
13-02571-W	7/17/2025	General (minor)	Landscape	10.75	Onsite Lake(s)/Pond(s)	8.4383	1.1534		NW	7.2
13-02578-W	1/9/2026	General (<3 MGM)	Landscape	4.24	Onsite Lake(s)	3.3282	0.4549		N	9
13-02613-W	9/16/2025	General (<3 MGM)	Landscape	6.1	Biscayne Aquifer/ Onsite Canal(s)	7.0618	0.8956		NW	8
13-02624-W	1/30/2027	General (<3 MGM)	Landscape	21.3	Onsite Lake(s)/Pond(s)	21.2379	2.6613		N	9
13-02633-W	6/30/2026	General (<3 MGM)	Agricultural	27.5	Onsite Lake(s)	21.5864	2.9507		NNW	6.6
13-02643-W	10/17/2025	General (<3 MGM)	Landscape	3.82	Onsite Lake(s)/Pond(s)	2.9986	0.4099		NW	6.5

PTN COL 2.4-1

Table 2.4.1-212 (Sheet 2 of 3)
SFWMD Water Use Permits Within a 10-Mile Radius

Permit No.	Expiration Date	Permit Type	Land Use	Acres	Water Source	Permitted Allocation (million gallons)			Location from the Site	
						Annual	Max. Monthly	Max. Daily	Direction	Distance (miles)
13-02723-W	5/1/2026	General (<3 MGM)	Landscape	10.37	Onsite Lake(s)/Pond(s)	8.14	1.1127		WNW	8
13-02754-W	4/9/2026	General (<3 MGM)	Landscape	7.93	Onsite Lake(s)/Pond(s)	6.2247	0.8509		WNW	6
13-02778-W	5/27/2026	General (<3 MGM)	Landscape	6.32	Onsite Lake(s)	6.199	0.9793		N	9
13-02823-W	1/14/2027	General (<3 MGM)	Landscape	9.64	Onsite Lake(s)	—	—		N	9
13-02844-W	10/26/2026	General (<3 MGM)	Landscape	7.22	Biscayne Aquifer/ Onsite Lake(s)	5.6517	0.7725		N	9
13-02858-W	8/13/2026	General (<3 MGM)	Landscape	9.5	Onsite Lake(s)/Pond(s)	7.4571	1.0193		NW	7.2
13-02864-W	8/13/2026	General (<3 MGM)	Landscape	6.67	Onsite Lake(s)/Pond(s)	5.2357	0.7157		NW	7.2
13-02886-W	9/23/2026	General (<3 MGM)	Landscape	0.82	SFWMD Canal (C-103)	0.9493	0.1204		NW	8
13-02911-W	8/22/2026	General (<3 MGM)	Landscape	5.25	Onsite Canal(s)	6.0778	0.7708		NW	8
13-02915-W	1/12/2027	General (<3 MGM)	Landscape	1.5	SFWMD Canal(C-1)	1.1774	0.1609		NNW	9
13-03023-W	12/18/2026	General (<3 MGM)	Landscape	8	Onsite Lake(s)/Pond(s)	9.2614	1.1746		NW	7.5
13-03046-W	12/22/2026	General (<3 MGM)	Landscape	8.32	Onsite Lake(s)	8.2957	1.0395		N	9
13-03105-W	2/16/2027	General (<3 MGM)	Landscape	2.2	Onsite Lake(s)	2.5469	0.323		WNW	8
13-03201-W	4/3/2027	General (<3 MGM)	Landscape	1	SFWMD Canal (C-1)	—	—	5,000 gal	NNW	10

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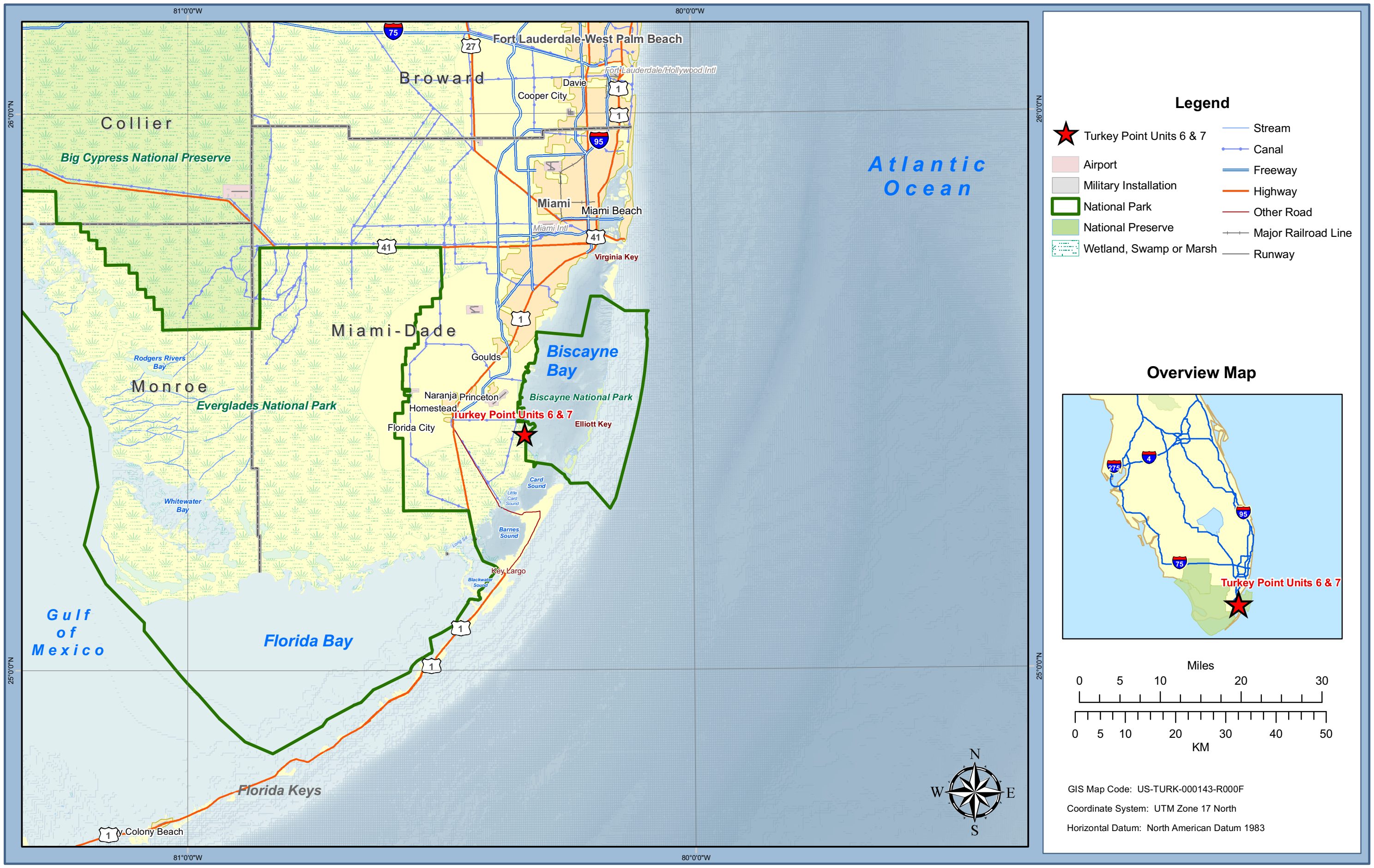
Table 2.4.1-212 (Sheet 3 of 3)
SFWMD Water Use Permits Within a 10-Mile Radius

Permit No.	Expiration Date	Permit Type	Land Use	Acres	Water Source	Permitted Allocation (million gallons)			Location from the Site	
						Annual	Max. Monthly	Max. Daily	Direction	Distance (miles)
13-03469-W	5/18/2027	General (<3 MGM)	Landscape	10.91	Onsite Lake(s)/Pond(s)	12.6302	1.6019		NW	8.2
13-03492-W	7/12/2012	General (minor)	Landscape	62.17	Onsite Lake(s)	71.9727	9.1282		NNW	8.5
13-03586-W	5/20/2027	General (<3 MGM)	Landscape	18	Onsite Lake(s)/Pond(s)	14.1293	1.9313		WNW	6.3
13-03796-W	7/13/2009	Individual	Industrial	320	Onsite Borrow Pit(s)	504	42		WNW	7
13-03960-W	11/4/2028	General (<3 MGM)	Landscape	6.6	Biscayne Aquifer/ Onsite Lake(s)	7.6407	0.9691		WNW	7.5
13-04010-W	1/8/2028	General (<3 MGM)	Landscape	5	Onsite Lake(s)/Pond(s)	3.9248	0.5365		WNW	9
13-04043-W	3/14/2028	General (<3 MGM)	Landscape	15	Biscayne Aquifer/ Onsite Lake(s)	11.7744	1.6095		NNW	9

Note: MGM = millions of gallons per month
Source: Reference 228

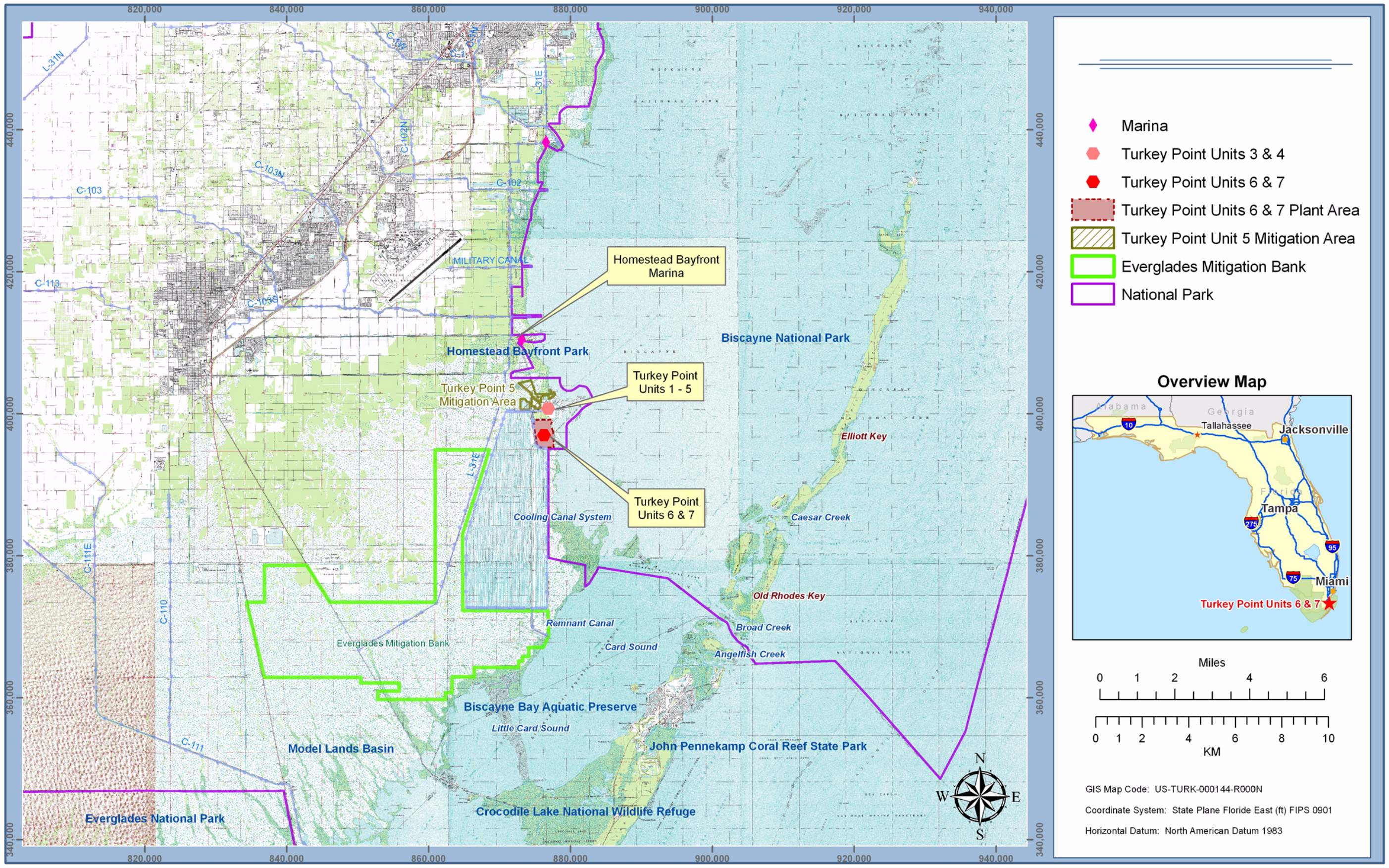
PTN COL 2.4-1

Figure 2.4.1-201 Major Hydrological Features near Units 6 & 7



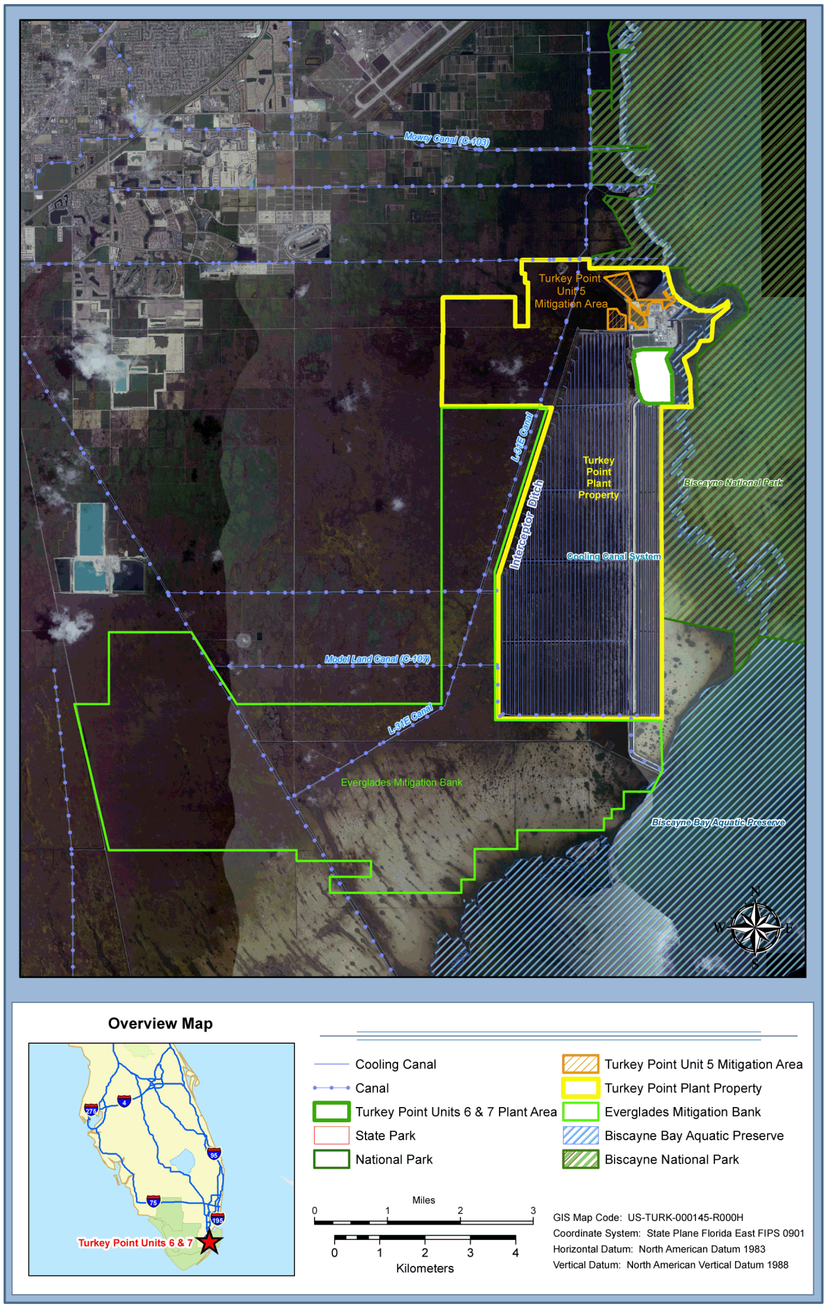
PTN COL 2.4-1

Figure 2.4.1-202 Areas Surrounding Units 6 & 7



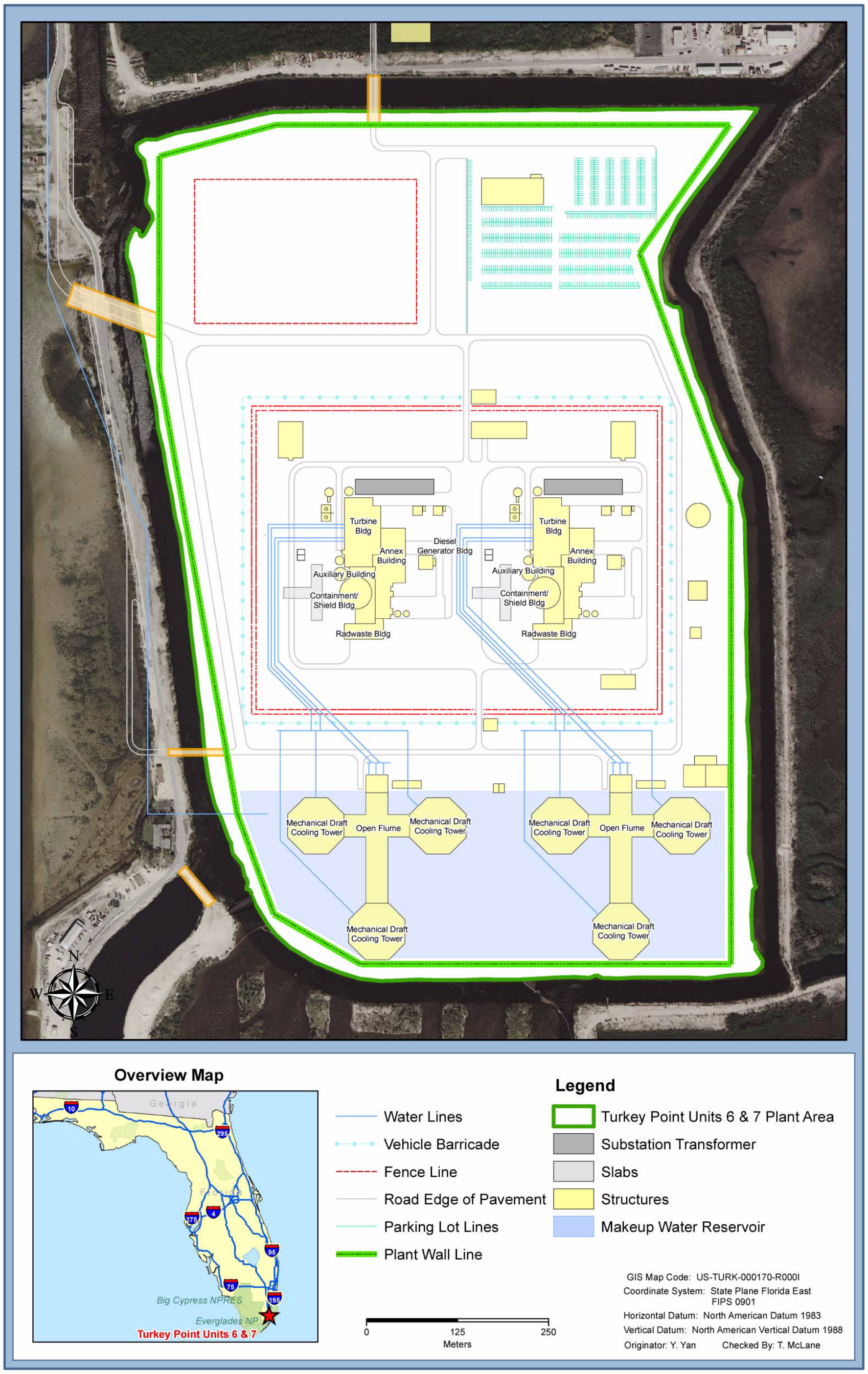
PTN COL 2.4-1

Figure 2.4.1-203 Units 6 & 7 and the Cooling Canals for Units 1 through 4



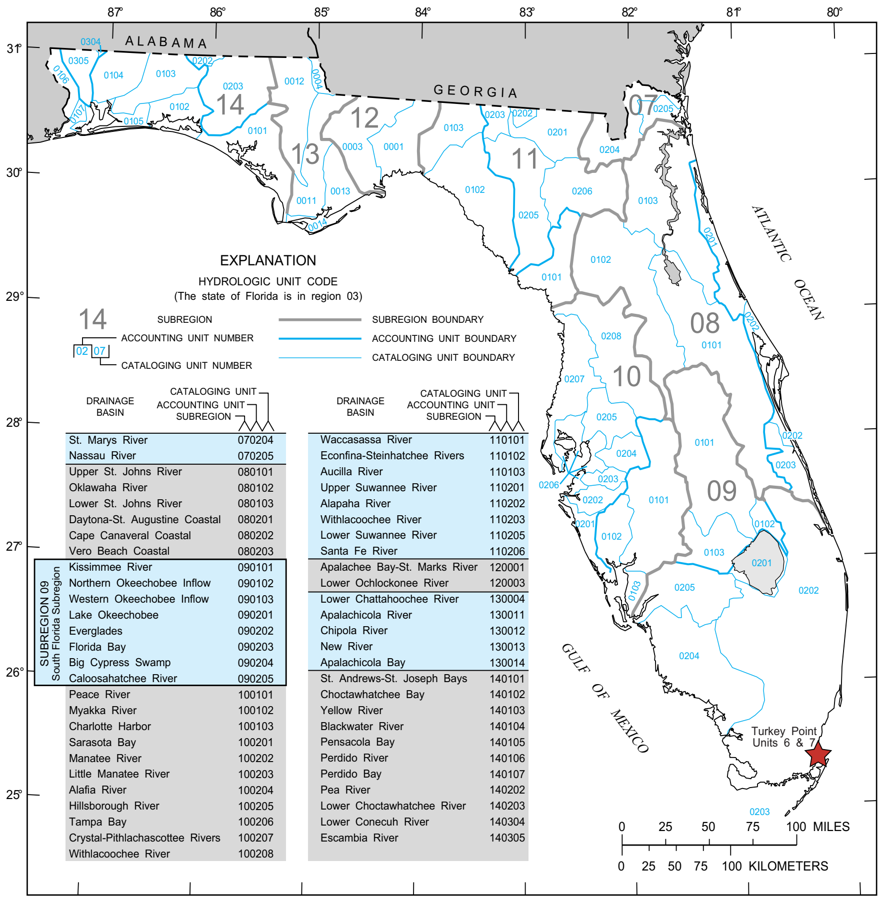
PTN COL 2.4-1

Figure 2.4.1-204 General Arrangement of Units 6 & 7



PTN COL 2.4-1

Figure 2.4.1-205 Map of South Florida Watershed Subregions

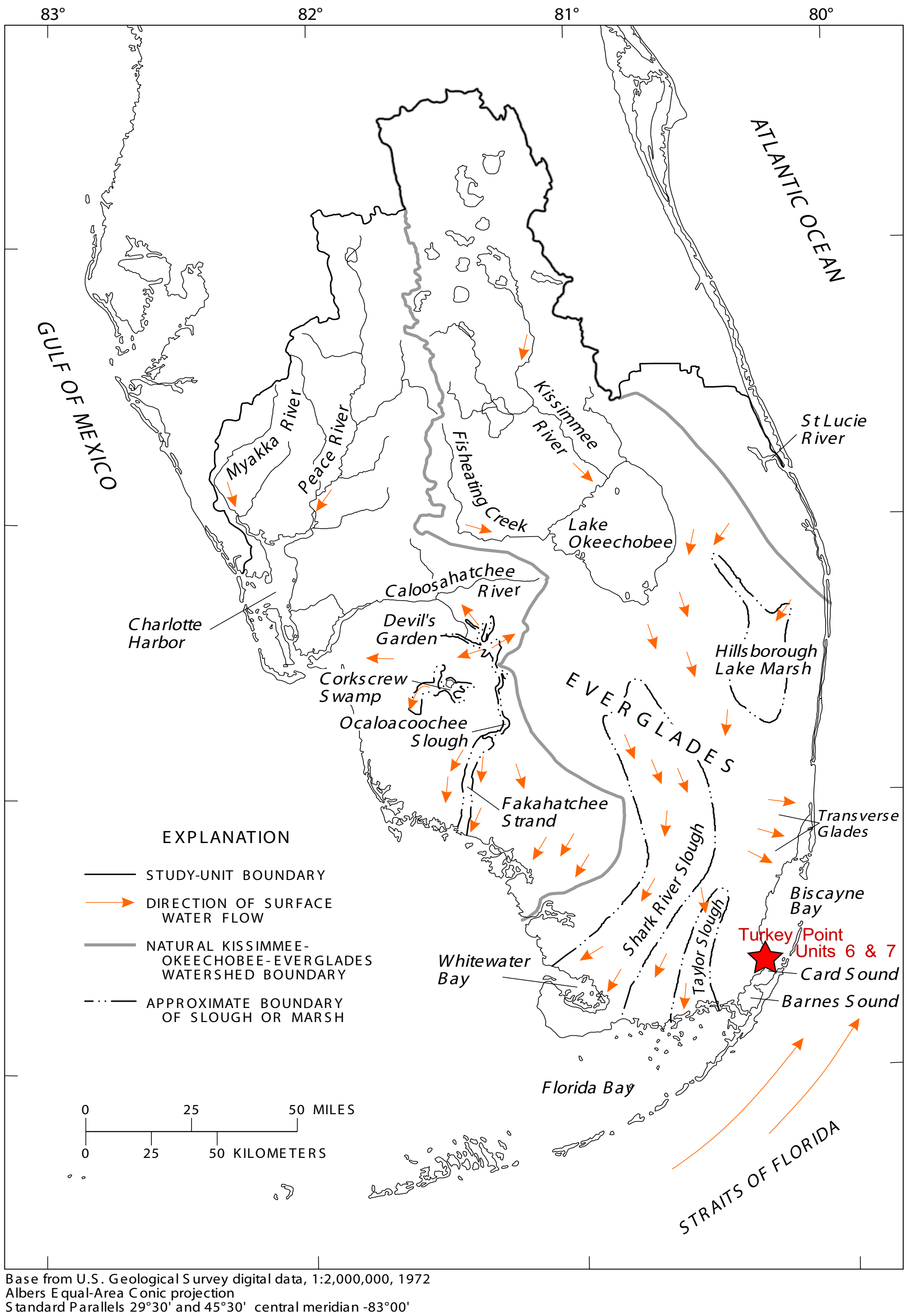


Drainage Basin	Subregion / Accounting Unit / Cataloging Unit
St. Marys River	070204
Nassau River	070205
Upper St. Johns River	080101
Oklawaha River	080102
Lower St. Johns River	080103
Daytona-St. Augustine Coastal	080201
Cape Canaveral Coastal	080202
Vero Beach Coastal	080203
Kissimmee River	090101
Northern Okeechobee Inflow	090102
Western Okeechobee Inflow	090103
Lake Okeechobee	090201
Everglades	090202
Florida Bay	090203
Big Cypress Swamp	090204
Caloosahatchee River	090205
Peace River	100101
Myakka River	100102
Charlotte Harbor	100103
Sarasota Bay	100201
Manatee River	100202
Little Manatee River	100203
Alafia River	100204
Hillsborough River	100205
Tampa Bay	100206
Crystal-Pithlachascottee Rivers	100207
Withlacoochee River	100208

Drainage Basin	Subregion / Accounting Unit / Cataloging Unit
Waccasassa River	110101
Econfina-Steinhatchee Rivers	110102
Aucilla River	110103
Upper Suwannee River	110201
Alapaha River	110202
Withlacoochee River	110203
Lower Suwannee River	110205
Santa Fe River	110206
Apalachee Bay-St. Marks River	120001
Lower Ochlockonee River	120003
Lower Chattahoochee River	130004
Apalachicola River	130011
Chipola River	130012
New River	130013
Apalachicola Bay	130014
St. Andrews-St. Joseph Bays	140101
Choctawhatchee Bay	140102
Yellow River	140103
Blackwater River	140104
Pensacola Bay	140105
Perdido River	140106
Perdido Bay	140107
Pea River	140202
Lower Choctawhatchee River	140203
Lower Conecuh River	140304
Escambia River	140305

Modified from Reference 229

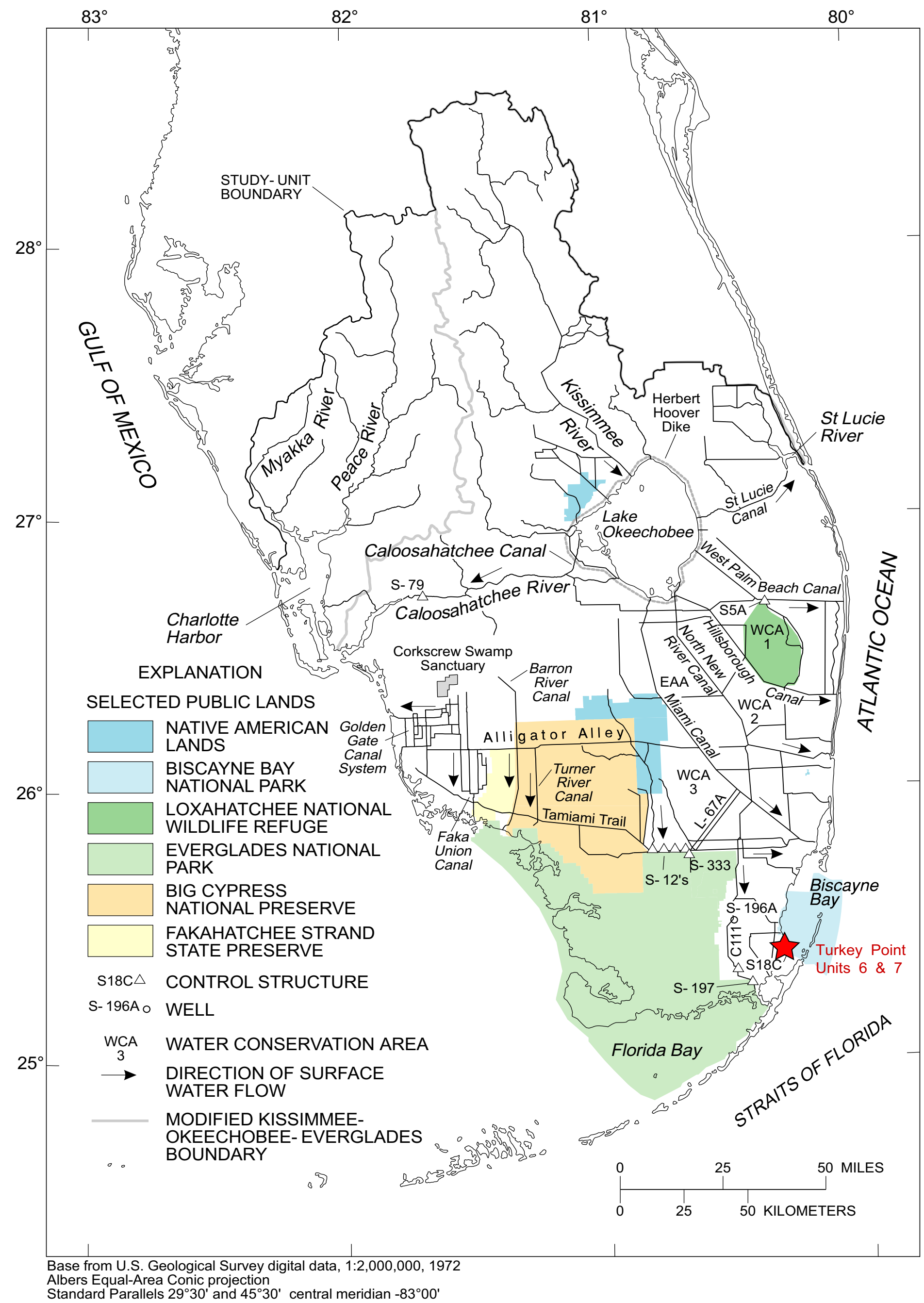
PTN COL 2.4-1 **Figure 2.4.1-206 Hydrologic Features and Flow Patterns Within the South Florida Watershed Before the Construction of Drainage Canals**



Modified from Reference 202

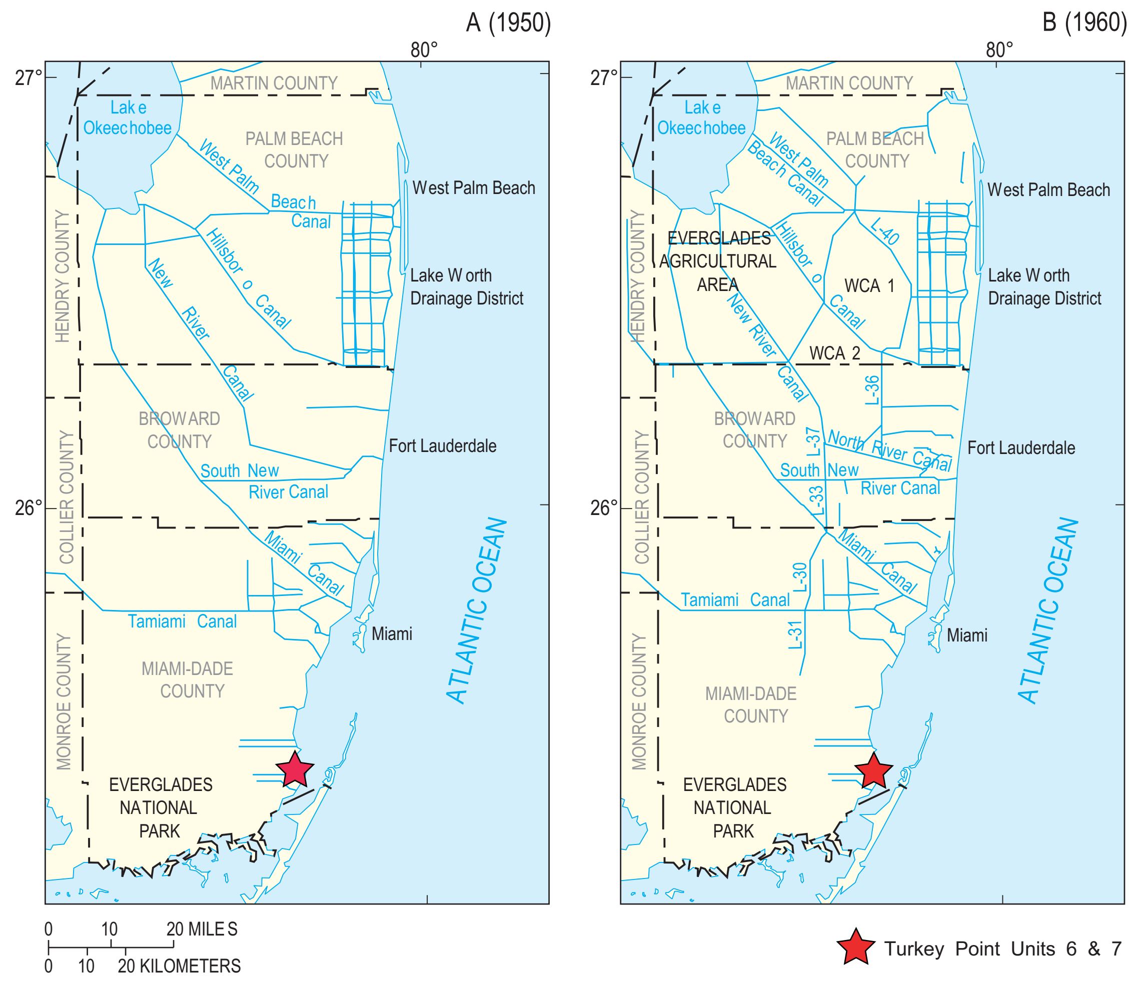
PTN COL 2.4-1

Figure 2.4.1-207 Selected Public Lands and Flow Alteration Within the South Florida Watershed after the Construction of the Drainage Canals



Modified from Reference 202

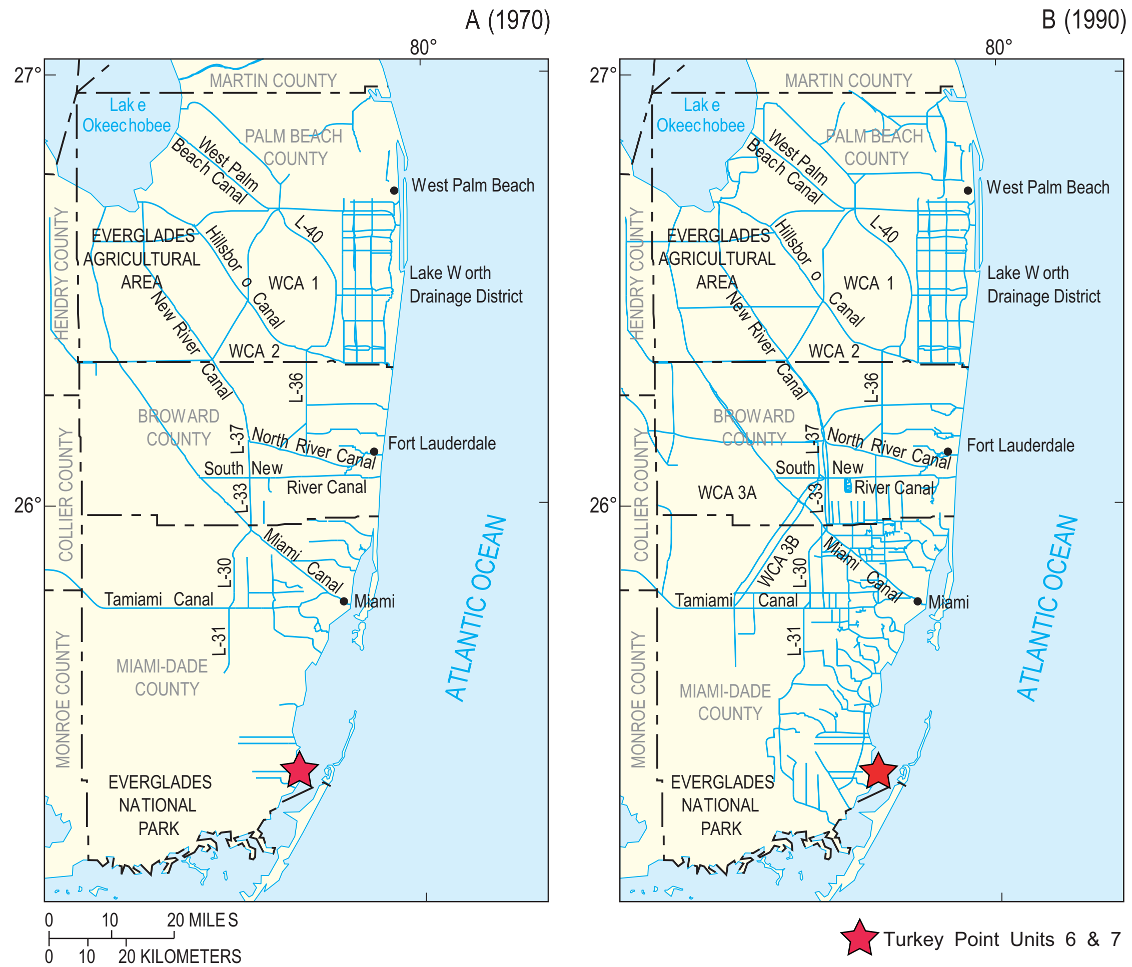
PTN COL 2.4-1 **Figure 2.4.1-208 Surface Water Conveyance System in the South Florida Region in (A) 1950 and (B) 1960**



Modified from Reference 207

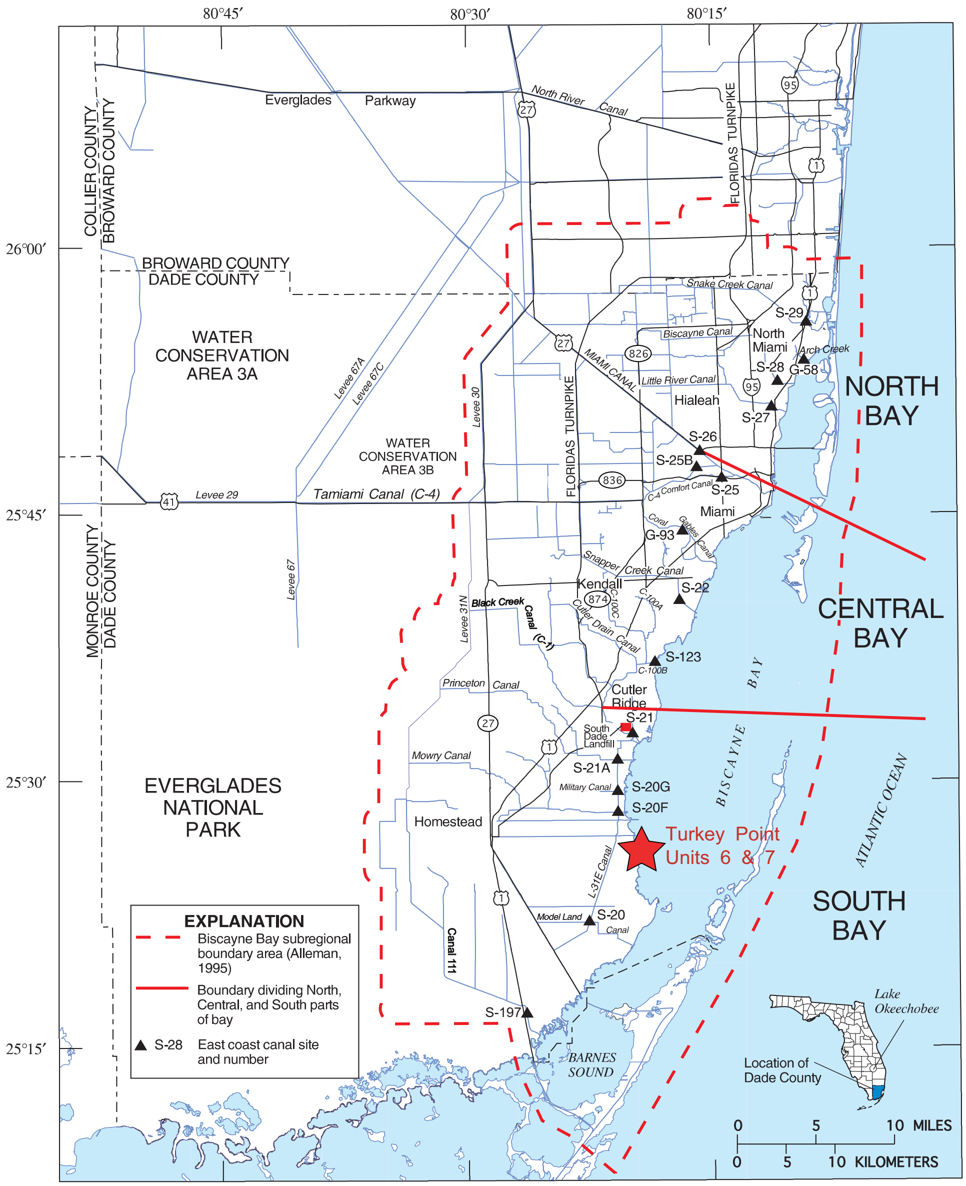
PTN COL 2.4-1

Figure 2.4.1-209 Surface Water Conveyances System in the South Florida Region in (A) 1970 and (B) 1990



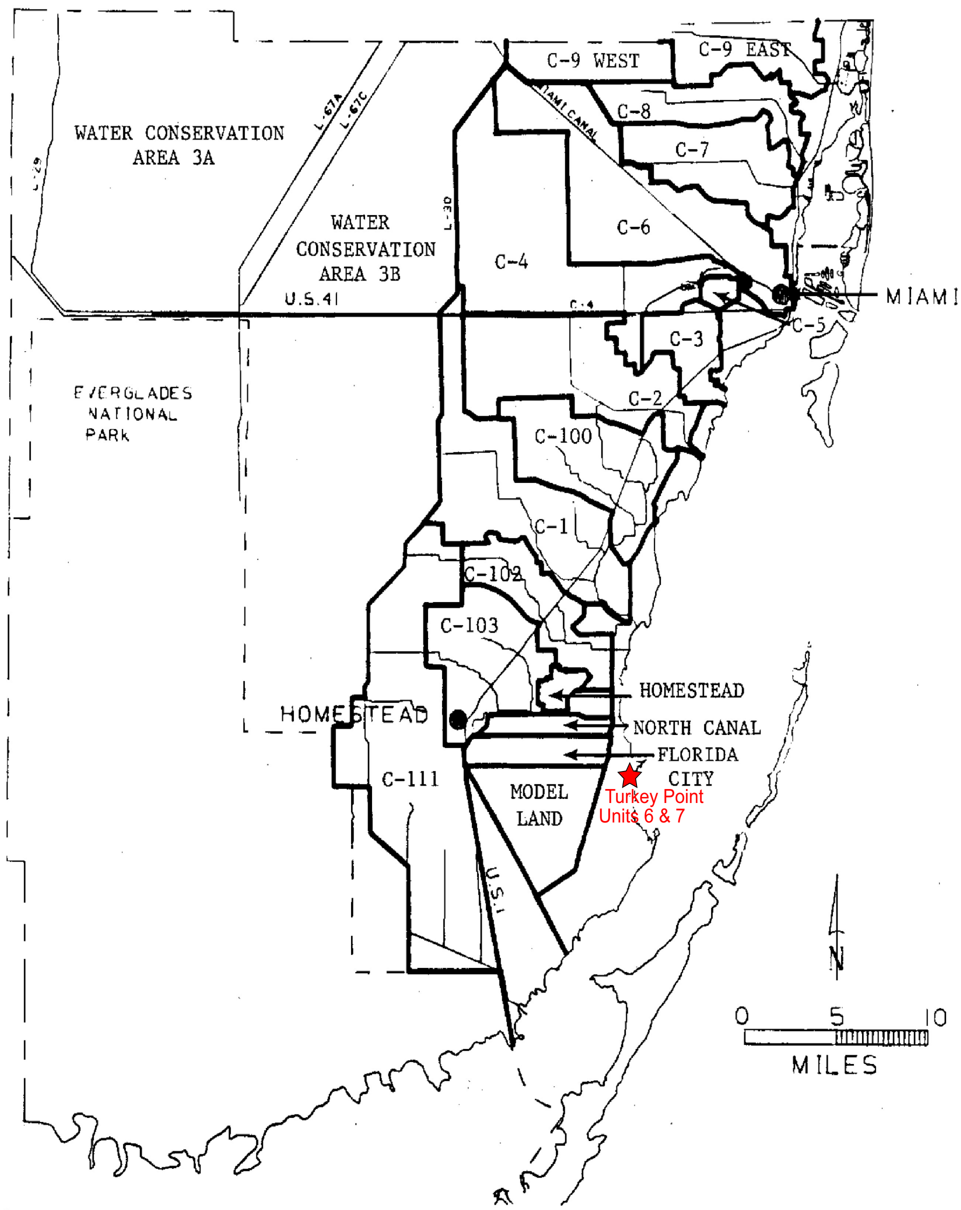
Modified from Reference 207

PTN COL 2.4-1 **Figure 2.4.1-210 Locations of ENP-SDCS Canals, Flow Control Structures on Canal Outlets, and Biscayne Bay Planning Regions**



Modified from Reference 230

PTN COL 2.4-1 **Figure 2.4.1-211 Locations of Eastern Miami-Dade County Surface Water Management Basins**



Modified from Reference 210

PTN COL 2.4-1

Figure 2.4.1-212 Locations of NOAA Tide and USGS Streamflow Gages Near Units 6 & 7