2.0 RESOURCE DESCRIPTION AND ASSESSMENT

2.1 DESCRIPTION OF THE RIVER AREA

The Myakka River originates in marshes near Myakka Head and flows approximately 66 miles in a southerly direction through Manatee, Sarasota, and Charlotte Counties. The river discharges into Charlotte Harbor, which empties into the Gulf of Mexico. The wild and scenic river segment encompasses 34 miles entirely within Sarasota County (see Figure 2-1), from County Road 780 to the Sarasota/Charlotte County line.

In the upper reaches of the river near Myakka Head in Manatee County, the river consists of a very narrow channel. Mesic flatwoods is the dominant habitat type, and ranching is the principal land use. The wetlands adjacent to the river are mixed hardwoods, dominated by bays, oaks, and pop ash with a fern understory.

Wingate Creek joins the Myakka River at river mile 60 (see Figure 2-1), and Flatford's Swamp is located below river mile 59 (see Figure 2-6). The first of four large subbasins within the Myakka River watershed, Flatford's Swamp is formed from the confluence of seven different tributaries, which are Myakka River, Wingate Creek, Ogleby Creek, Long Creek, Maple Creek, Youngs Creek, and Taylor Creek. Immediately below Flatford's Swamp, the river runs through popash swamp and marsh habitats.

At Myakka City, some channelization and alteration of the river has occurred. Below Myakka City, at river mile 52, there is a transition from marsh and hardwood swamp to cabbage palm, live oak, and laurel oak hammock. This vegetation remains the dominant association for the remainder of the designated segment of the river, except for the salt marsh habitat at the extreme southern end near Charlotte Harbor. Adjacent land use is primarily agricultural and rural residential.

At river mile 43, just above Myakka River State Park, the river channel splits into Clay Gully and the Myakka River. Both watercourses run into Upper Myakka Lake. Before entering the state park, about 0.5 mile of the Myakka River flows through the southeastern part of Tatum Sawgrass marsh (see Figure 2-6). This 4,300-acre marsh is the second of the four natural depressions within the

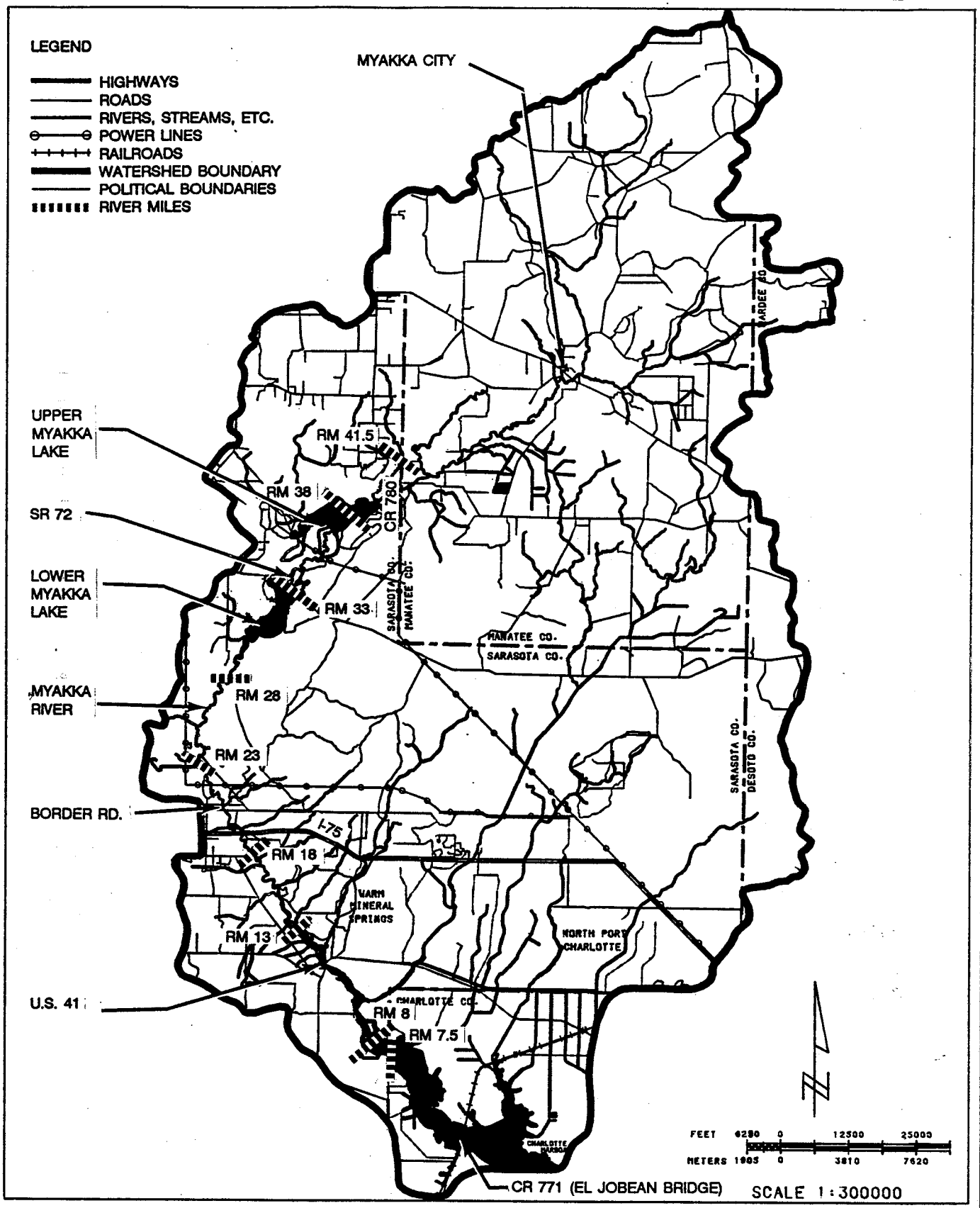

Figure 2-1
THE MYAKKA RIVER

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

Myakka watershed. A series of dikes to divert water away from the marsh and to allow conversion to agricultural land was constructed in Tatum Sawgrass in 1974. These dikes reduced the water storage capacity of the marsh.

Twelve miles of the Myakka River are within the boundaries of the state park. The dominant water features of the river in the park are Upper Myakka and Lower Myakka Lakes, the remaining two of the four topographic depressions along the river. Upper Myakka Lake experiences water quality problems, primarily from high nutrient levels and seasonally low dissolved oxygen levels, and a seasonal infestation of exotic aquatic vegetation. Downriver from Upper Myakka Lake, the Myakka River flows through a large marsh area known as Big Flats. Originally, a secondary water course from the Upper Myakka Lake passed through Vanderipe Slough, but this was severed by a dike constructed near the lake in the 1930's and 1940's. Below State Road 72, the Myakka River enters the Myakka River State Park wilderness preserve. At this point the hammock closes in on the river channel for a short reach before again opening into marshes at the northern end of Lower Myakka Lake. Downriver from Lower Myakka Lake, the hammock again closes in on the river channel. Approximately 0.5 mile below the state park boundary, at river mile 28, a private dam, locally known as Downs' Dam (see Figure 2-7), has been constructed across the river. Downs' Dam is capable of retaining approximately 4 feet of water behind the structure. The river channel is undisturbed from this point to approximately river mile 23.

Downriver of Downs' Dam, the river channel is deeply incised, meandering, and bordered by hardwood hammock. At several locations, the river flows through higher and drier land, with pine-palmetto flatwoods extending to the river's edge, creating a number of bluffs along this river segment. The outside edge of many meanders displays evidence of erosion, with sand bars accreting on the inner edge of the meanders. Much of the river bottom below Downs' Dam consists of hard limestone, and limestone outcrops along the river banks occur in many places. The bottom and banks in many places are also covered by relic marine shells.

The first residential development along the river is located at river mile 23. From this point to Interstate 75, at river mile 19.5, there are a number of

small homes along the banks. Downriver from Interstate 75 there are only a few homes, Snook Haven fishcamp, and Ramblers Rest Resort (see Figure 2-7). Downriver from Ramblers Rest Resort, no development occurs directly along the river until U.S. Highway 41, where several residences, Becky's Bait and Tackle store and a boat ramp are located.

Beginning just downstream from Snook Haven, the brackish water influence on the river bank vegetation is evidenced by the growth of leatherfern and other halophytic plants. Mangroves are found growing as far upstream as the mouth of Deer Prairie Creek (see Figure 2-2). Tidal marshes and mangroves gradually become more extensive from this point downriver towards Charlotte Harbor.

Downstream of U.S. Highway 41, both shorelines of the river have been partially developed. In this river area to the Sarasota/Charlotte County line, the river widens and is relatively shallow with a sandy bottom. Two small mangrove islands in this area are the site of bird rookeries. Limited development exists along the western bank of the river down to the Sarasota/Charlotte County line, in contrast to the eastern bank which contains several large, fully developed subdivisions. Between the Sarasota/Charlotte County line and the El Jobean Bridge (County Road 771), most of the native vegetation has been replaced with bulkheads and finger canals associated with residential development. Downriver from El Jobean, the river banks are relatively natural as they widen into Charlotte Harbor.

2.1.1 Visual Corridor Determination

To properly plan for the preservation, enhancement, and management of certain resource values of the Myakka River, several studies were conducted, including a study to determine the visual corridor or viewshed along the designated river area. The methodology generally consisted of field trips by boat or canoe, where the general extent of view was mapped on 1986 blueline aerial photographs at a scale of 1 inch = 200 feet. During the field trips, an observer determined the extent of view from the river by counting the number of trees and shrubs visible from river bank (or contiguous marsh) landward. This number was then used to identify the tree canopies apparent on the aerial photographs.

The field trips were conducted by canoe from Upper Myakka Lake to Snook Haven, and from a 20-foot Aquasport from Snook Haven to the Sarasota/Charlotte County line. Observations were made by an environmental planner from a boat, and views were made in both upstream and downstream traveling directions.

The field trips were conducted in March 1989, a period of relatively low water elevation. Shrubs and tree foliage was less than full due to the time of year of the survey. These factors as well as the height, size, and density of vegetation and structures played a role in determining the precise extent of the limits of the viewshed.

Viewshed limits were determined by identifying from the river channel the extent the observer could see into the plant communities along the river. Observations were made at a near horizontal alignment, with observation adjustments made for river shore obstructions such as bluffs or dense palmetto thicket. In these instances, the observer adjusted his line of sight upward or to the side to circumvent a nearby obstruction. Observations were, however, limited to general horizontal directions. A distant transmission line or radio tower extending well above the horizon, for example, was not used to determine the viewshed distance. Cultural features were recorded on the aerial photographs only to determine man-induced impacts to the viewshed.

The results of the viewshed mapping study are depicted in Figure 2-2. Three factors contributed to the width of the viewshed: the width of the waterbody; the width of adjacent marshes, which generally do not limit the extent of view; and the type and density of vegetation along and adjacent to the river bank. Each of these factors is included in determining the width of the viewshed throughout the Wild and Scenic River segment.

The viewshed is greatest at Upper Myakka Lake, where the treeline generally limits the view while on the lake. Maximum viewing distance is approximately 2.5 miles between lake shores. A significant viewing distance is maintained downstream to the outfall of Lower Myakka Lake, with the exception of a small area south of State Road 72 when visual observations are limited to several hundred feet by hammocks on each side of the river. The extent of the viewshed in these areas is due to the extensive open waters in each lake, as

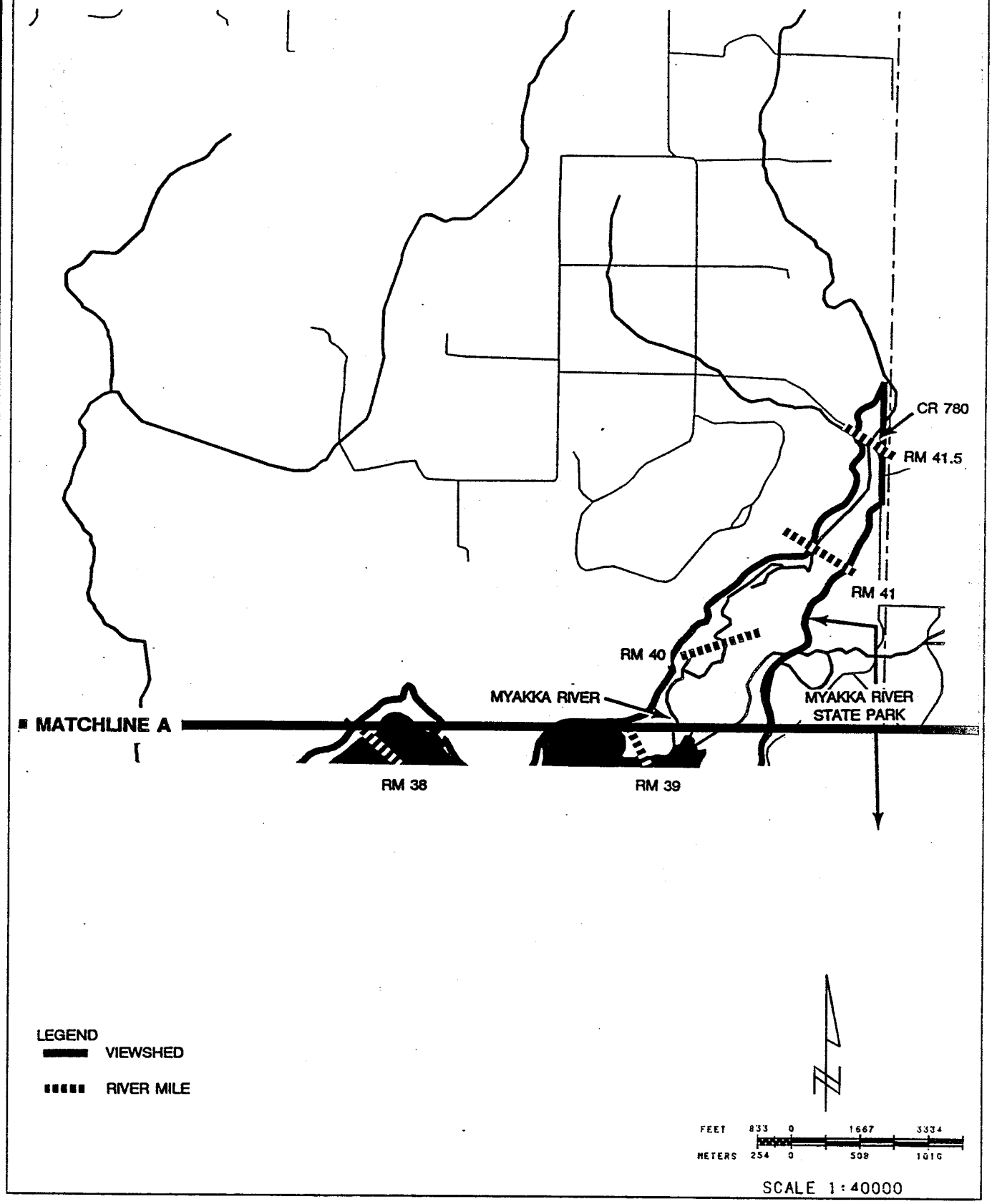

Figure 2-2
DESIGNATED AREA VIEWSHED (1 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

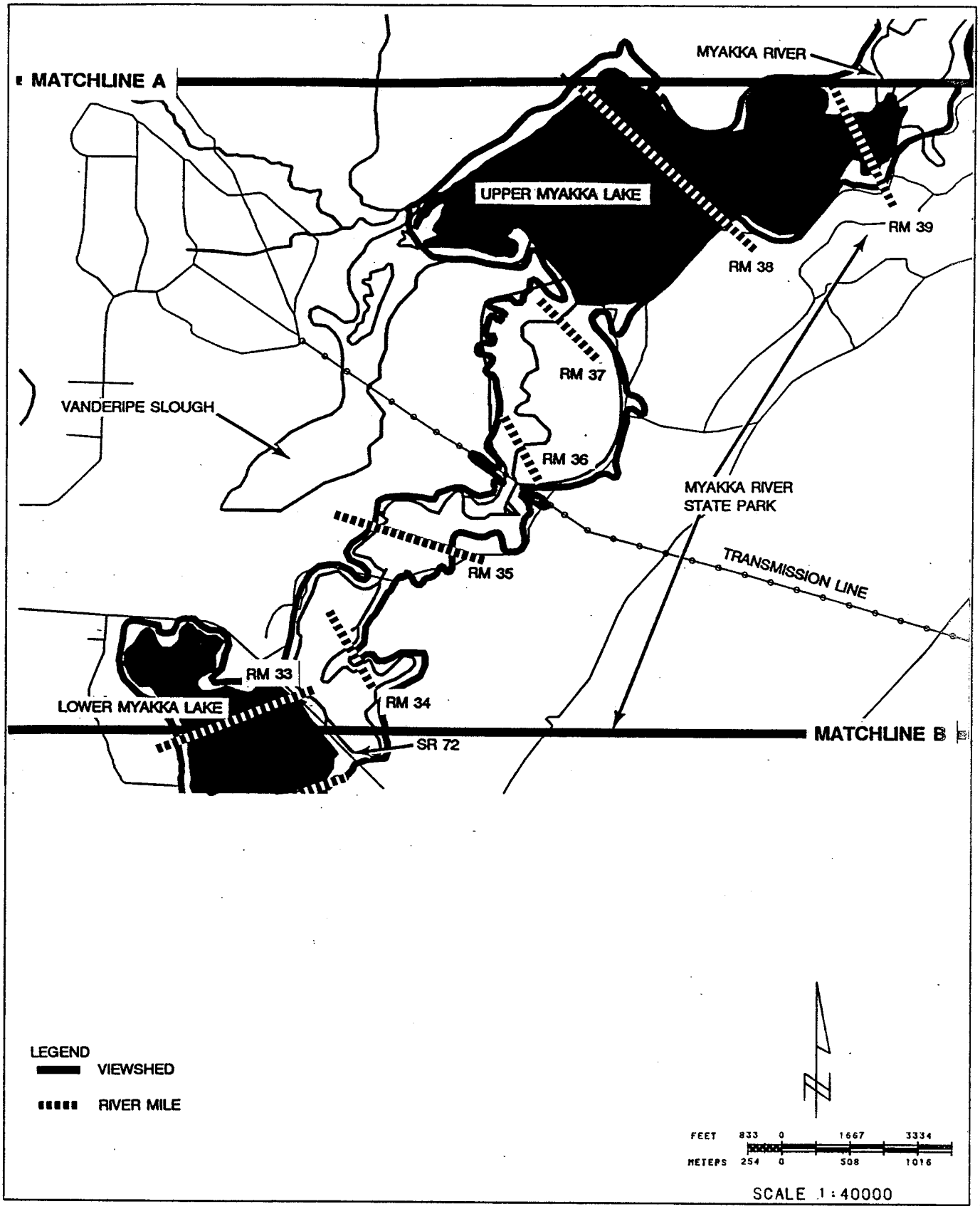

Figure 2-2
DESIGNATED AREA VIEWSHED (2 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

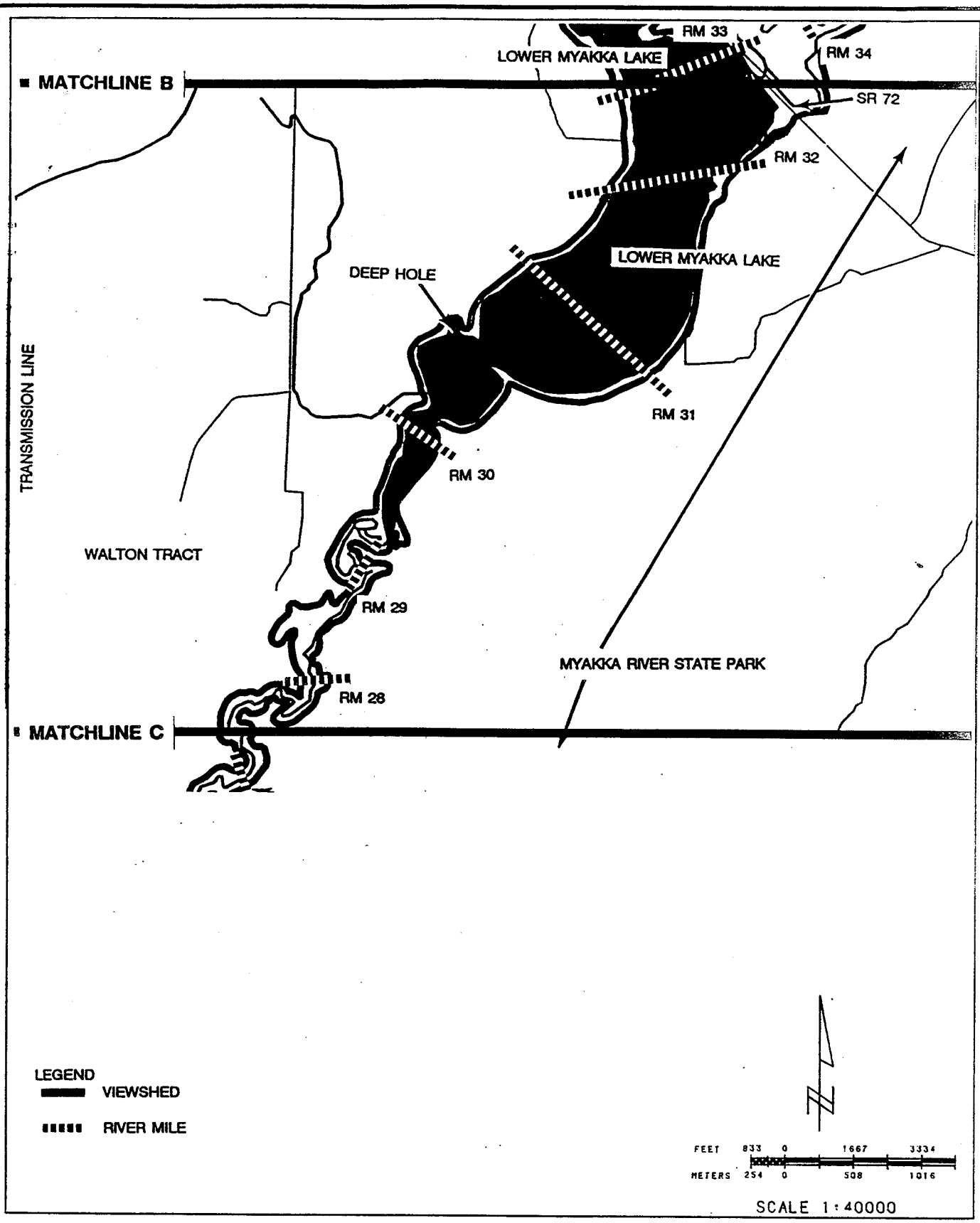

Figure 2-2
DESIGNATED AREA VIEWSHED (3 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

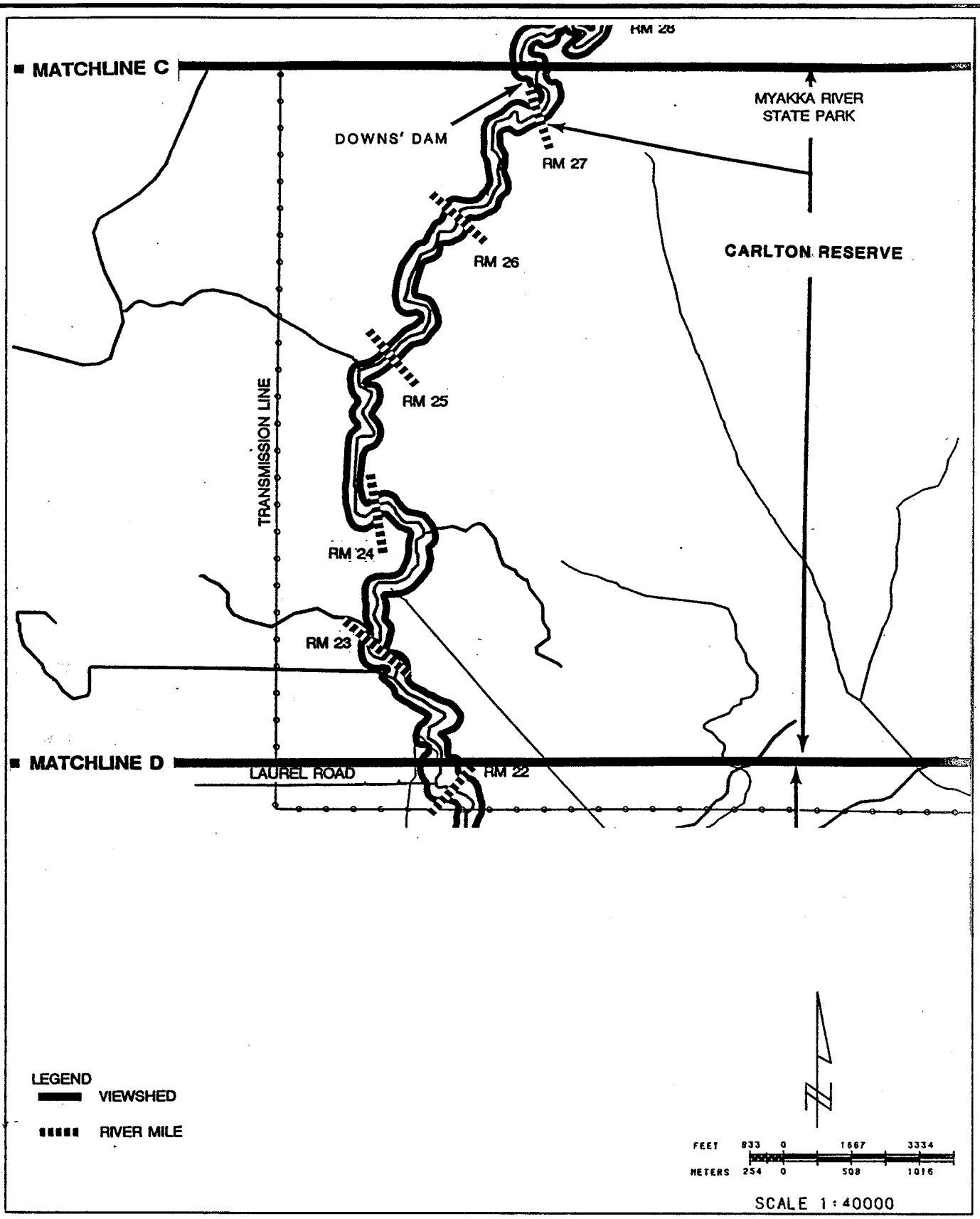

Figure 2-2
DESIGNATED AREA VIEWSHED (4 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

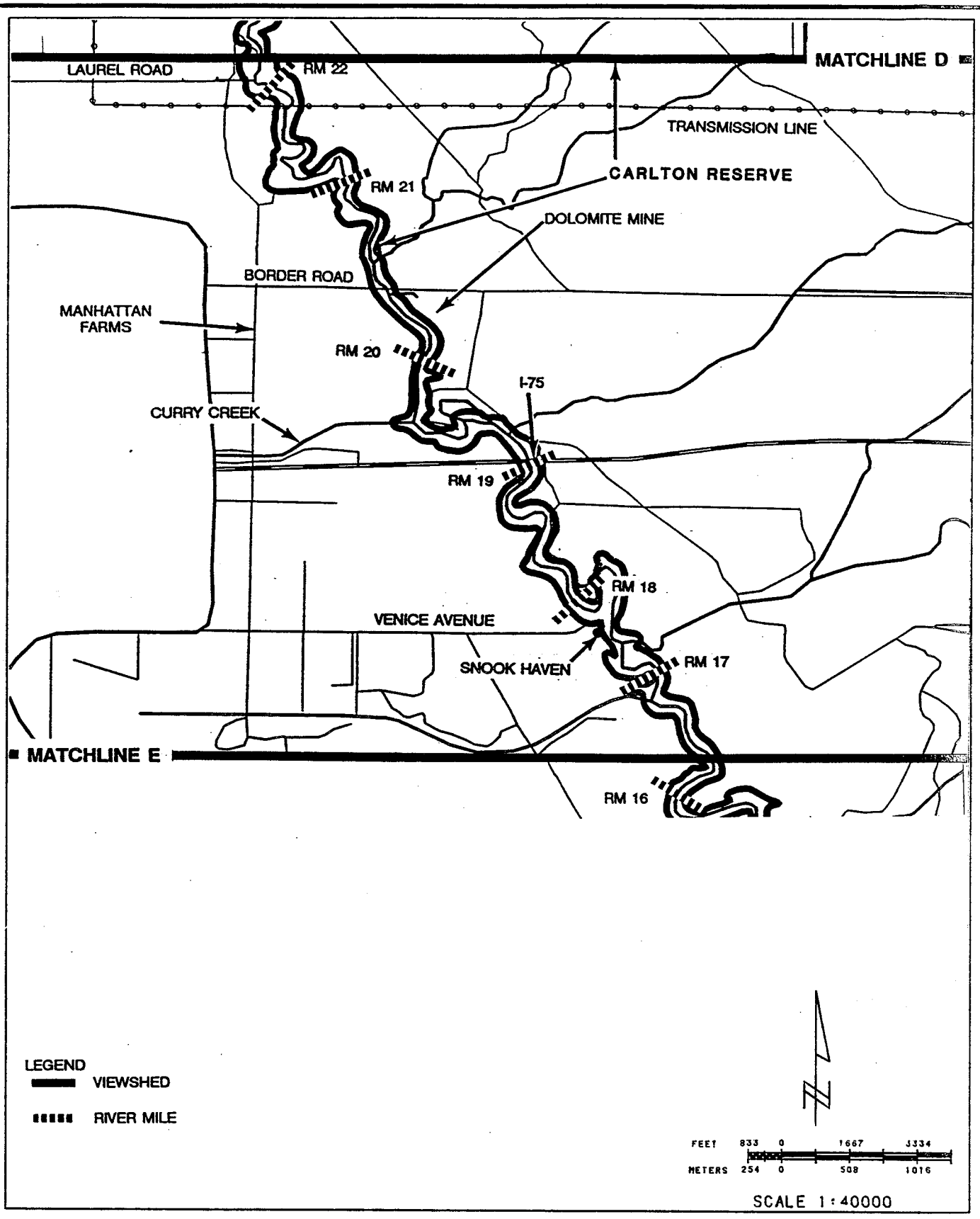

Figure 2-2
DESIGNATED AREA VIEWSHED (5 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

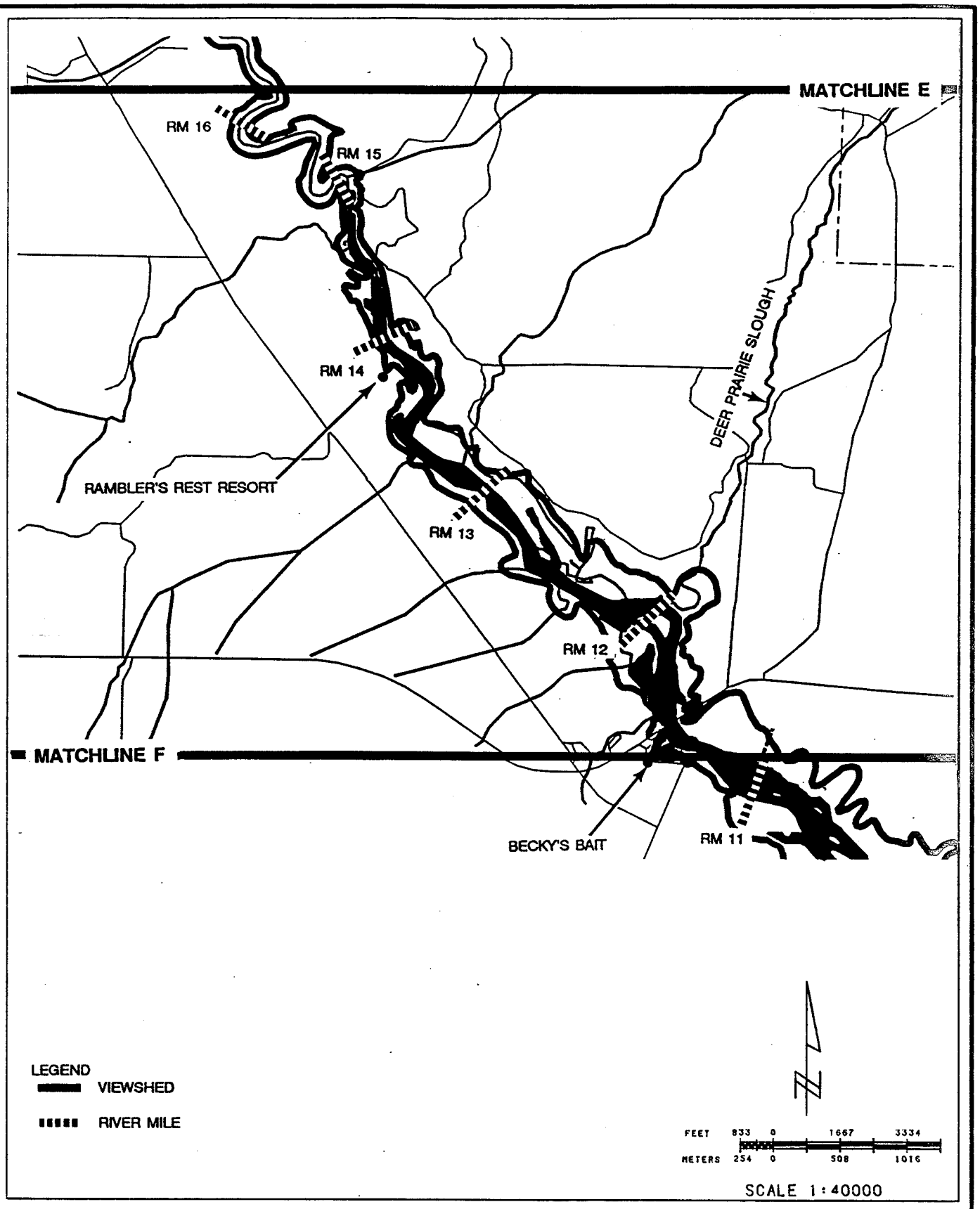

Figure 2-2
DESIGNATED AREA VIEWSHED (6 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

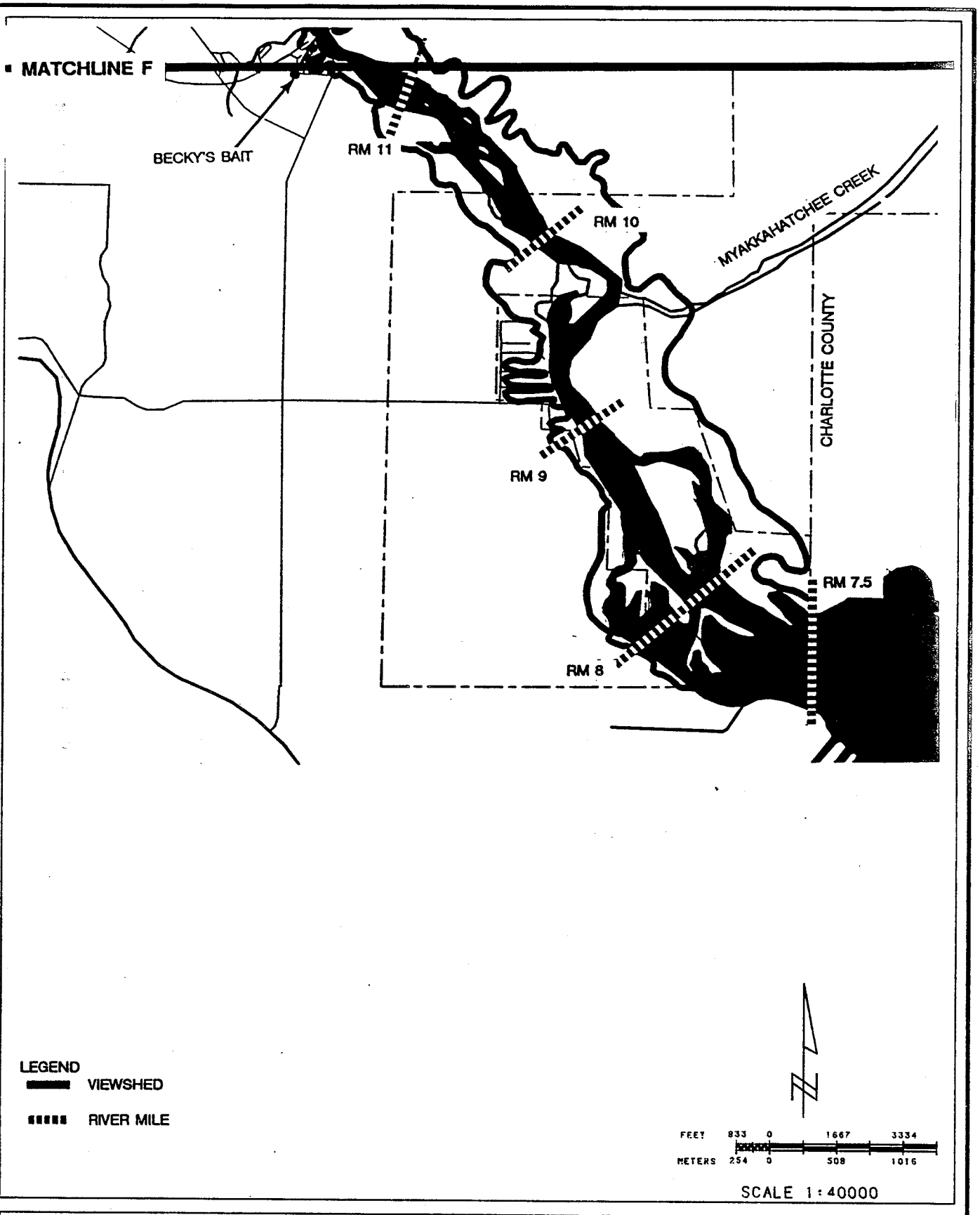

Figure 2-2
DESIGNATED AREA VIEWSHED (7 OF 7)

SOURCE: HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

well as the extensive marsh communities between the lakes. From the outfall of Lower Myakka Lake to the vicinity of Ramblers Rest Resort, the viewshed is limited to an average of 300 to 600 feet by hammock vegetation and/or understory vegetation within the hammocks. Open water and marshes are narrow or nonexistent and play a small role in determining the viewshed width. Exceptions to the viewshed width occur at a transmission line crossing and the crossing of Interstate 75, where vegetation has been cleared.

South of Ramblers Rest Resort, the viewshed widens and includes extensive riverine brackish marshes. The limits of the viewshed increase south of the resort and are limited by hardwood hammocks, pine flatwoods, or mangrove forest tree lines. Due primarily to the width of the river and associated marshes, the maximum extent of the viewshed at the county line is approximately 1.3 miles.

The viewshed was determined in early spring, and changes to vegetation (dense vegetation in the summer months and senescence in the fall-winter) will serve to either limit or increase the width of the viewshed. In addition, higher water elevations will result in an expanded viewshed in areas where the river is incised, primarily from the outfall of Lower Myakka Lake to the vicinity of Ramblers Rest Resort.

2.2 GEOLOGY

2.2.1 Soils

The dominant soils types in that portion of the Myakka watershed lying within the DeSoto Plain in Manatee County are the Myakka-Immokalee-Basinger Association and the Immokalee-Pomello Association (Figure 2-2a). The former soils association, which includes the Myakka fine sand, the state soil, is characterized as nearly level, poorly drained, sandy soils, with weakly cemented sandy subsoil and poorly drained sandy soils throughout. The latter association is characterized as nearly level to gently sloping, poorly and moderately drained sandy soils with weakly cemented sandy subsoil. Along the Myakka River mainstem from Upper Myakka Lake, and including Tatum Sawgrass, up to Long and Ogleby Creeks, the dominant soils are freshwater swamp and marsh soils. These are nearly level, very poorly drained soils subject to flooding. The soils in the vicinity of the two lakes are the Pompano-Delray Association.

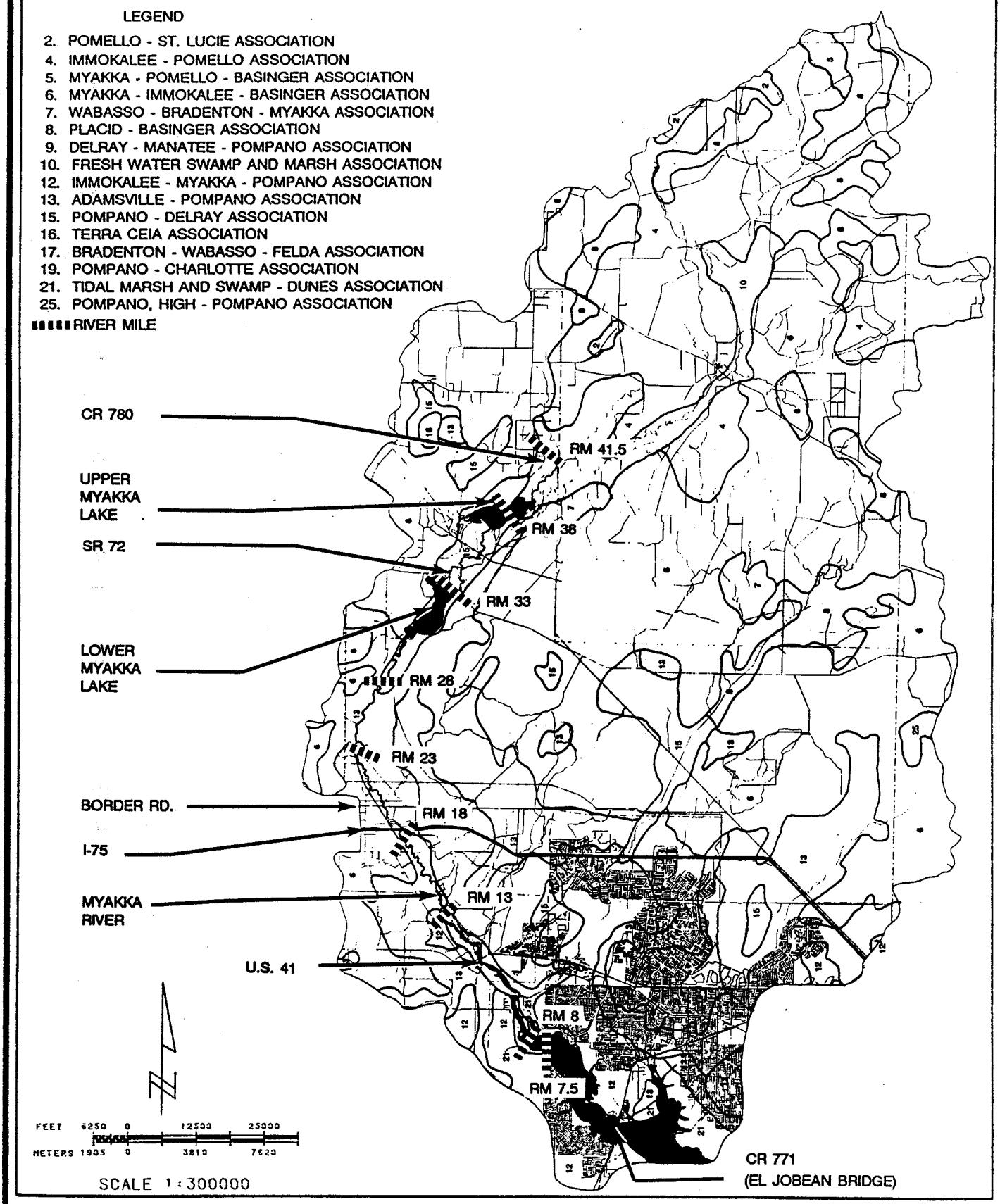

Figure 2-2a
SOILS ASSOCIATIONS MAP

SOURCES: GENERAL SOILS ATLAS, 1975; HUNTER, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

This soils association contains nearly level poorly drained soils which are sandy throughout, and very poorly drained soils with sandy layers over loamy subsoil. From south of Lower Myakka Lake to just north of Deer Prairie Creek, the dominant soils on either side of the Myakka River are the Adamsville-Pompano Association. This soil association is characterized as nearly level, somewhat poorly and poorly drained soils which are sandy throughout. From this point to the Myakka River mouth, soils consist of a tidal marsh and swamp-dunes association, which contain nearly level very poorly drained soils subject to frequent flooding by tidal waters, and deep droughty soils.

APOXSEE categorizes the soils of the Myakka River watershed within Sarasota County as consisting basically of three soils categories. Along the river mainstem the soils are considered floodplain soils, which are nearly level and poor to very poorly drained. Bordering either side of the river are the hammock soils, which are nearly level and poor to very poorly drained. Flatwoods soils comprise the majority of the Myakka watershed and account for approximately 83 percent of Sarasota County. Flatwoods soils associations are nearly level and moderately to very poorly drained.

2.2.2 Subsurface Geology

Stratigraphy/Lithology--The surface and subsurface geology of the Myakka watershed are directly related to fluctuations in sea level. The rise and fall of sea level through geologic time resulted in the deposition of limestone and other sedimentary rocks.

The uppermost stratigraphic unit consists of undifferentiated deposits, up to 60 feet thick, of the Holocene and Pleistocene eras. These are mostly fine to medium grained quartz sand underlain by marine terrace deposits of sand and marl, including clay, shell and peat deposits. The top unit is underlain by the Caloosahatchee Marl, with a thickness of 0 to 20 feet, which consists of shallow marine deposits; marl and shell beds, limestone and some phosphate. Next is the Bone Valley Formation, 0 to 20 feet thick, which is primarily a non-marine deposit consisting of clay with lenses of quartz sand and terrestrial vertebrate fossils. It also includes some marine fossil fragments, phosphate nodules and quartz pebbles. Below the Bone Valley Formation is the Tamiami Formation, 0 to 50 feet thick, which is a shallow

marine deposit consisting of sandy calcareous clay, sandstone, limestone and some phosphate. Deeper are the Hawthorn Formation (200 to 400 feet thick) and the Tampa Limestone Formation (150 to 300 feet thick). Both are marine deposits. Below the Tampa Limestone are the Suwanee Limestone (120 to 420 feet thick), Ocala Limestone (300 to 400 feet thick), Avon Park Limestone (600 to 700 feet thick) and the Lake City Limestone Formations (950 feet thick).

Hydrogeology--The hydrogeologic units in central Sarasota County and the political-based boundaries of the Manasota Basin, in general, consist of the surficial aquifer, two intermediate aquifers and confining units, and the Floridan Aquifer. The surficial aquifer is contained within the surface undifferentiated deposits, the Caloosahatchee Marl and the Bone Valley formation. The intermediate aquifers are contained in the Tamiami and Hawthorn Formations and parts of the Tampa Limestone. The Floridan Aquifer includes part or all of the Tampa Limestone, Suwanne Limestone, Ocala Limestone, and the Avon Park Limestone Formations.

2.3 WATERSHED

The Myakka watershed is part of the Manasota Basin and dominates the eastern and central portions of Manatee and Sarasota Counties, respectively. The topography of the Myakka River watershed is largely controlled by a series of relict marine terraces and is characterized as low flatland, with moderate to gentle slopes limited to the peripheral areas in the northern half of the watershed. The watershed lies primarily within the Gulf Coastal Lowlands (in Sarasota County) and the DeSoto Plain subdivisions of the midpenisular physiographic zone. The Gulf Coastal Lowlands is generally below 30 feet mean sea level (msl) and is a broad, gently sloping marine plain characterized by broad flatlands with numerous sloughs and swampy areas. The DeSoto Plain is a slightly elevated, gently sloping plain that generally lies between 30 and 100 feet above msl.

The Myakka River headwaters are located in the area of Myakka Head. The river drains an area of approximately 550 square miles. At its source the river is about 115 feet above msl. Except for a limited portion of the watershed headwaters, the land surface is quite flat. In the upper reaches of the river, the channel gradient is approximately 5 feet per mile (ft/mi), in comparison

to the lower reaches where the channel gradient is generally less than 1 ft/mi. Slopes within the Myakka River watershed rarely exceed 2 percent, which is considered flat.

Throughout its course, the Myakka River channel is the only well defined and naturally entrenched drainage within the watershed. The river itself is characterized by a wide floodplain which may be up to 1 mile or greater in width (see Figure 2-3). The extent of both the 100- and 500-year flood boundaries for the Myakka River depicted in Figure 2-3 were derived from current Flood Insurance Rate Maps (FIRM) of the Federal Emergency Management Agency (FEMA, 1989). The Upper Myakka Lake-Lower Myakka Lake system, with its associated sloughs and depressions, has a large wide floodplain that is frequently inundated for long periods of time. The downstream area of the river below Myakka River State Park has a riverine floodplain, without the large depressions and natural impoundments characteristic of the river area within the state park. The upstream floodplain is in an important area for detention storage for seasonal flooding events to larger infrequent events, and has a major governing effect on discharge rates during high discharge periods.

The natural drainages within the Myakka River watershed are primarily sloughs and form a poorly developed drainage system. Most have small drainage basins, short channel lengths, and do not yield high volumes of flow. Many of the sloughs and swamps have been ditched and channelized to facilitate their drainage efficiency and reduce flooding of upland areas.

Drummond (1978) describes the characteristics of the Myakka River watershed. The watershed is divided into nine tributary subbasins and two subbasins centered on sections of the river's main stem. The subbasins are Myakka Head/Wingate Creek, Ogleby Creek, Owen Creek, Tatum Sawgrass, Howard Creek, Clay Gully, Mossy Island Slough, Deer Prairie Slough, Myakkahatchee Creek, middle river, and lower river. The four major tributaries of the Myakka River within the borders of Sarasota County are Howard Creek, Deer Prairie Creek, Myakkahatchee Creek, and Warm Mineral Springs Creek.

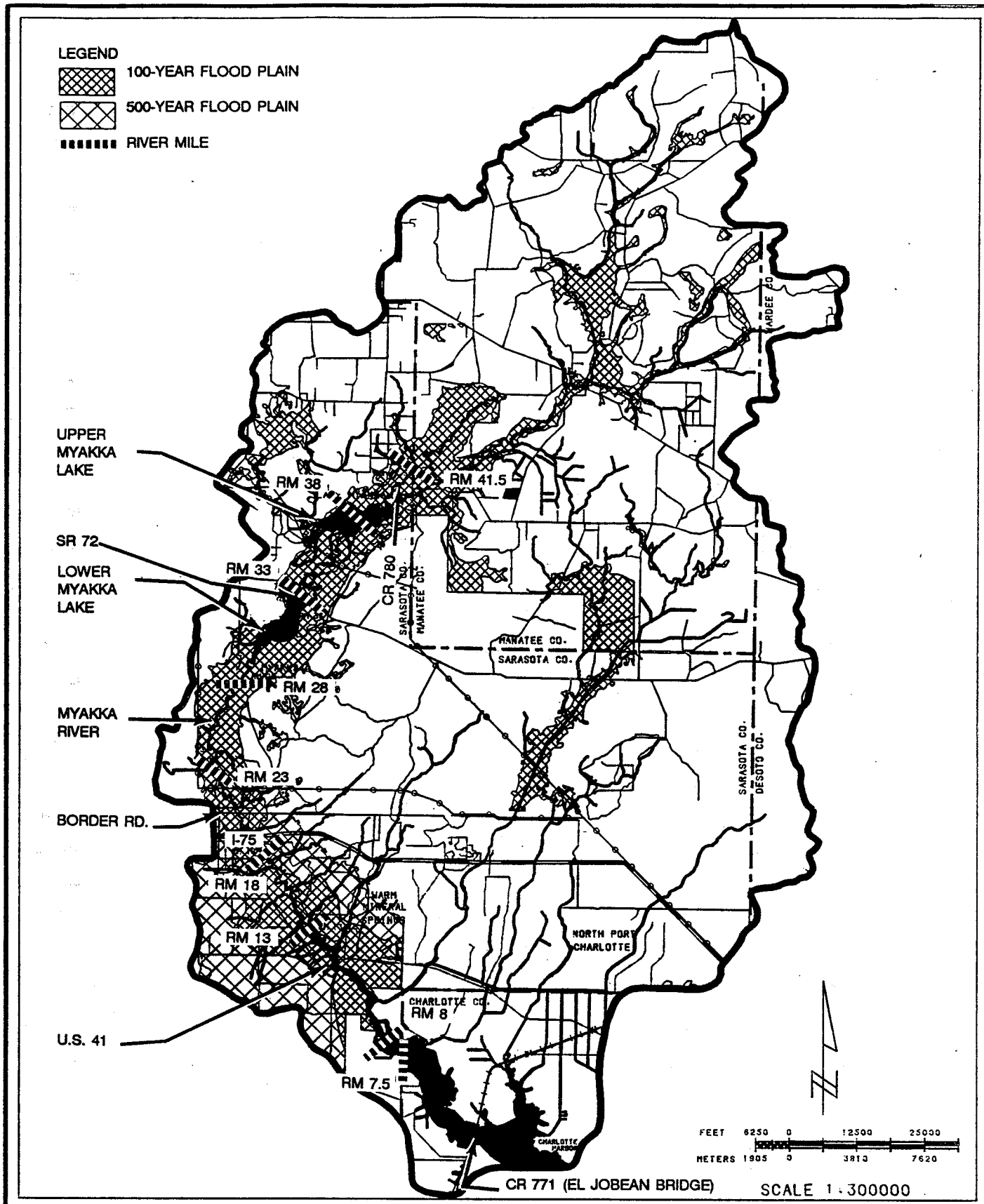

Figure 2-3
100-YEAR AND 500-YEAR FLOODPLAINS

SOURCE: FEMA, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

The Myakka Head/Wingate Creek subbasin covers approximately 54 square miles (mi^2), is an amalgamation of several smaller hydrologic units, and contains the headwaters of the Myakka River. This watershed also contains considerable recent phosphate mining activity which has disturbed the watershed's hydrologic character. The Ogleby Creek subbasin covers approximately 42 mi^2 and contains the longest single tributary upstream of the Upper and Lower Myakka Lakes. Most land within this subbasin remains in a natural state. Owen Creek is a subbasin which covers approximately 39 mi^2 and originates in a swamp just below Myakka Head. The land surface is predominantly undisturbed pine flatwoods and palmetto prairies. The Tatum Sawgrass subbasin is approximately 19 mi^2 in area. The dominant feature of this subbasin is the 4,300-acre marsh, Tatum Sawgrass, just north of the Myakka River State Park. The Howard Creek subbasin occupies approximately 31 mi^2 in area. Howard Creek discharges into the western tip of Upper Myakka Lake. More than 90 percent of this subbasin has been drained and cleared. Clay Gully is the smallest of the subbasins, covering about 6 mi^2. The Mossy Island Slough subbasin has an area of approximately 12 mi^2. This subbasin has a low wet topography and about 70 percent has remained in its natural state. Both Mossy Island Slough and neighboring Deer Prairie Slough have been channelized to achieve drainage. Deer Prairie Slough has a drainage area of approximately 27 mi^2. The subbasin is characterized by a linear arrangement of intermittently flowing prairie depressions and swamps. The lower half of the subbasin has experienced drainage modifications that connects marsh areas into a drainage network. The Myakkahatchee Creek subbasin is the largest within the Myakka watershed, covering an area of approximately 168 mi^2. The Myakkahatchee Creek subbasin drains the southeastern portion of the Myakka watershed. The drainage area is generally flat and swampy, and less than 50 feet msl. Myakkahatchee Creek serves as a potable water supply for the City of North Port. Discharge of Myakkahatchee Creek is controlled by a dam near the U.S. Highway 41 bridge in the City of North Port.

The middle river subbasin includes Upper Myakka Lake. This subbasin covers approximately 27 mi^2. The lower river subbasin is a relatively homogeneous, low, flat region dominated by pine flatwoods, palmetto rangeland, and wet prairie depressions. This subbasin is approximately 125 mi^2, and the drainage

consists primarily of small unbraided tributaries and drainage canals, and there is no apparent drainage pattern above the 20-foot contour.

Numerous drainage modifications within the Myakka watershed have been instituted for the conversion of lands to agricultural uses and for the control of flooding. The Tatum Sawgrass marsh was diked in 1974. Tatum Sawgrass is extremely important as a holding basin during periods of heavy rainfall. It has the capacity to store an equivalent of 1.8 inches of rainfall, four times that of the Upper and Lower Myakka Lakes combined. The results of the Tatum Sawgrass diking have been to reduce the storage capacity of the marsh and to increase the potential of downstream flooding by diverting water away from the marsh. As a result of the dike system, flood-peak discharges and flood heights having recurrence intervals of up to 25 years are increased, approximately 1,200 additional acres along the Myakka River may be flooded during 2-year flood conditions, a 19-percent increase in flood-peak discharge at the County Road 780 bridge may occur, and a 0.8 foot increase in flood height can result (Hammett, Turner, and Murphy, 1978).

Drainage modifications made to Clay Gully divert water from the Myakka River. During low flow, most of the surface water goes directly to Upper Myakka Lake bypassing Tatum Sawgrass. This diversion of water has accelerated vegetation changes in the bypassed section of the river which may stay dry for nearly half the year.

In the 1930's and 1940's, an earthen dike was constructed to separate Upper Myakka Lake from Vanderipe Slough and to divert the flow of Howard Creek into Upper Myakka Lake. These modifications were for the purpose of converting land near Vanderipe Slough into pasture land.

A privately constructed dam, Downs' Dam, approximately 0.5 mile below the Myakka River State Park's south boundary can retain up to 4 feet of water behind the structure during the dry season. As a result, the dam alters water levels upstream from their natural levels. The dam may also acts as an obstacle to upstream movement of fish such as mullet, tarpon, and snook. These species may be found in Lower Myakka Lake following prolonged periods of

high water. The degree of impact of the dam is relatively unknown, but may be a negative influence on the Myakka River system (FDNR, 1986).

South of the Myakka River State Park, Deer Prairie Slough has been subjected to channelization to increase upland drainage. At the southern border of the park, a dike has been constructed in the slough to compensate for the effects of channelization. A weir also exists towards the downstream end of Deer Prairie Slough.

Myakkahatchee Creek drains flat, swampy lowlands generally less than 50 feet above msl in the southeastern portion of the Myakka River watershed, and serves as a primary source of drinking water for residents of North Port and a large portion of Port Charlotte. It has experienced channelization within the main stem, and extensive stormwater/flood control canals have been excavated within the City of North Port. A large east-west canal, R-36, along the northern boundary of North Port, intercepts the natural drainage flow towards the south, and also has some cross connections to Deer Prairie Slough and the Carlton Reserve.

Within the lower watershed, a diversion channel (Curry Creek) connects the Myakka River with Roberts Bay on the Gulf of Mexico. It was created to relieve flooding on the Myakka River by diverting water to the Curry Creek system. The canal may be tidally affected for more than 5 miles upstream from the Venice by-way, may flow in either a westerly or easterly direction, and may divert up to 10 percent of the Myakka River water into Roberts Bay at high flow (Hammett, et al., 1978; Myakka River Management Coordinating Council, 1987).

The Southwest Florida Water Management District (SWFWMD) (1989) summarized the watershed as follows. "The Myakka River drainage basin is characterized by sandy soils with many natural storage areas, such as lakes, swamps, ponds and sloughs. These characteristics have the tendency to reduce runoff potential of the watershed when storage is available on the surface and in the soil. During wet conditions, the high water table and inundated surface storage have a tendency to provide high runoff rates and volumes."

2.4 WATER RESOURCES

2.4.1 Surface Water

The surface waters of the Myakka River watershed include the Myakka River and its tributaries, Upper Myakka Lake and Lower Myakka Lake, Little Salt and Warm Mineral Springs, and numerous small depressional wetlands (see Figure 2-4). The Myakka River is a southern blackwater stream. Three critical aspects of the water resource value of the Myakka River are the water quality, the quantity of discharge, and the timing of the discharge. These three variables are not only important to the continued health of the Myakka River, they are also important to the health of downstream estuarine areas of Charlotte Harbor.

The Myakka River is designated as Class I waters (potable water supplies) from the Manatee County line through Upper Myakka Lake and Lower Myakka Lake to Manhattan Farms at river mile 20 (see Figure 2-10). The Florida Wild and Scenic River segment is an Outstanding Florida Water, and the area from the western line of Section 35, Township 39S, Range 20E in Sarasota County at approximately river mile 11 to Charlotte Harbor is designated as a Class II water (shellfish propagation or harvesting). From the Charlotte-Sarasota County line to State Road 771 (El Jobean Bridge), the lower Myakka River is an Outstanding Florida Water by virtue of the fact this area is a designated Special Water. Charlotte Harbor and associated aquatic preserve are Outstanding Florida Waters. Myakkahatchee Creek is Class I waters down to the dam at U.S. Highway 41. All other surface waters in the watershed are designated Class III (recreation; propagation and management of fish and wildlife).

The Myakka River watershed generally has very good water quality and meets the designated uses under its water classification. A small portion of the river above Myakka City is considered to have fair water quality, partially meeting the designated use under Class II waters. Two major tributaries of the Myakka River, Deer Prairie Creek and Myakkahatchee Creek, are considered to have fair water quality partially meeting the designated uses. The lower river just upstream of Charlotte Harbor is considered to have fair water quality, partially meeting its designated use [Department of Environmental Regulation

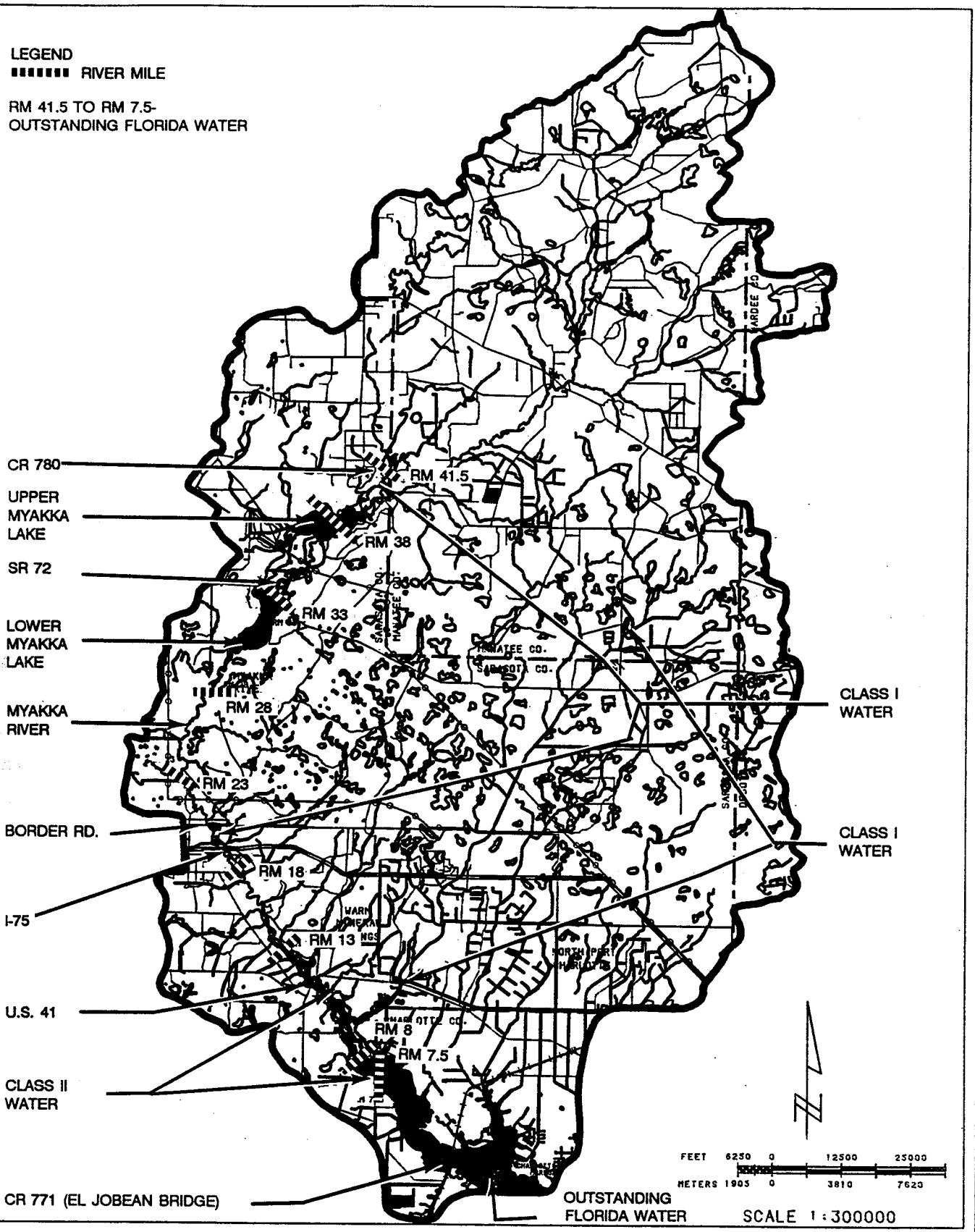

Figure 2-4
SURFACE WATER FEATURES

SOURCE: USGS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

(DER), 1988]. Water quality data for the Myakka River are contained in Table 2-1 and Figure 2-5.

Monitoring stations at the Upper Myakka Lake (Reach #5.50), Clay Gulley (Reach #5.30), and Wingate Creek (Reach #8.30) had averaged concentrations of Dissolved Oxygen (3.0 mg/l, 4.5 mg/l and 4.9 mg/l, respectively) that are below the state standard (5 mg/l) for Class I Waters (see Table 2-1, Figure 2-5).

The bacteriological quality at a few of the monitoring stations along the Myakka River can be considered to be somewhat poor based on Total Coliform averages for the period from 1970-1987 (see Table 2-1, Figure 2-5). In particular, one station at Clay Gulley (Reach #5.30) had an averaged Total Coliform level of 3,550 per 100 milliliters which exceeds the state standard for Class I Waters (2,400 per 100 milliliters at any one time).
The monitoring station at Johnson Creek (Reach #8.31) exhibited a depressed alkalinity level (8 mg/l) below the state standard for Class I Waters (20 mg/l).

Sarasota County's Comprehensive Plan, APOXSEE, assigned a "threatened" rating to the Myakka River based on the fact there is no known impairment of its designated use, despite shellfish bed closures due to coliform counts. Further, based on the poor water quality in Upper Myakka Lake and potential future development in the watershed, the river's designated use could become impaired. Sarasota County has recently instituted a water quality monitoring program which includes the Myakka River.

Water quality within the Myakka River varies seasonally. During the wet season when streamflow is mainly surface runoff, specific conductance is lowest and color is highest. The brown water color of the river is the result of humic, fulvic, and tannic acids from drainage of floodplain swamps. Nutrient concentrations and coliform concentrations tend to increase with increased surface runoff. Dissolved oxygen concentrations are generally higher during the low flow period. During high flow periods, dissolved oxygen concentrations are lower due to the input of oxygen demanding organics included in runoff. Following extremely heavy rain events, including tropical

Table 2-1

WATER QUALITY DATA FOR 1970-1987

(MOST UNITS IN MG/L -1 INDICATES MISSING DATA)

+ Reach No.	REACH NAME	SAMPLE RECORD			WATER CLARITY				DISSOLVED OXYGEN		OXYGEN DEMAND			PH	ALKALINITY	TROPHIC STATUS			COLIFORM		SPECIES DIVERSITY			COND	FLOW	WQI
		MAX #OBS	BEG YR	END YR	TURB	SD	COLOR	TSS	DO	%SAT	BOD	COD	TOC	PH	ALK	NITRO	PHOS	CHLA	TOTAL	FECL	NAT	ART	BECK	COND	FLOW	
** USGS HYDROLOGIC UNIT: 03100102 MYAKKA RIVER																										
* WATER BODY TYPE: ESTUARY																										
11.00	MYAKKA RIVER AB CHARLOTTE HARB	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
12.00	MYAKKA RIVER AB CHARLOTTE HARB	100	65	85	2.0	0.9	40	-1	7.0	84	1.5	-1	9	7.6	-1	0.90	0.24	14	65	96	-1.0	-1.0	-1	28450	-1	58
15.00	MYAKKA RIVER AB *A	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
16.00	MYAKKA RIVER AB CHARLOTTE HARB	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
* WATER BODY TYPE: LAKE																										
5.40	LOWER MYAKKA LAKE AB MYAKKA RI	14	65	83	-1.0	-1.0	150	-1	5.6	72	-1.0	-1	-1	7.2	26	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	155	-1	-1
5.50	UPPER MYAKKA LAKE AB MYAKKA RI	10	75	80	1.9	1.2	158	-1	3.0	37	-1.0	-1	23	7.2	38	1.29	0.28	8	-1	-1	1.2	-1.0	3	128	-1	52
* WATER BODY TYPE: STREAM																										
2.00	UNNAMED CREEK AB MYAKKA RIVER	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
3.00	MYAKKA RIVER AB CHARLOTTE HARB	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
4.00	BIG SLOUGH CANAL AB MYAKKA RIV	151	62	87	2.8	-1.0	170	10	6.2	72	1.1	84	22	7.2	41	1.25	0.29	5	1000	218	-1.0	-1.0	-1	423	26	45
4.10	MUD LAKE SLOUGH AB BIG SLOUGH	22	81	85	1.0	-1.0	200	-1	6.3	80	2.0	-1	24	6.5	-1	1.47	0.29	-1	1534	-1	-1.0	-1.0	-1	99	6	50
5.00	MYAKKA RIVER AB BIG SLOUGH CAN	1219	62	87	1.5	1.0	140	3	5.7	65	1.5	68	20	6.9	26	1.25	0.33	8	650	65	3.5	2.7	12	237	73	41
5.10	WARM SALT SPRING AB BIG SLOUGH	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
5.20	DEER PRAIRIE CREEK AB MYAKKA R	42	82	85	0.8	-1.0	175	8	5.7	68	1.8	-1	22	6.2	-1	1.52	0.07	-1	1455	-1	-1.0	-1.0	-1	80	18	51
5.30	CLAY GULLEY AB MYAKKA RIVER	9	74	79	2.5	-1.0	100	-1	4.5	47	1.1	-1	-1	6.7	44	0.87	0.20	-1	3550	335	-1.0	-1.0	-1	160	-1	50
6.00	OWEN CREEK AB MYAKKA RIVER	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
6.01	OWEN BRANCH AB OWEN CREEK	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
6.02	OWEN CREEK AB OWEN BRANCH	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
7.00	MYAKKA RIVER AB OWEN CREEK	111	66	87	1.0	0.5	185	-1	5.4	67	1.4	-1	23	6.5	-1	2.92	0.39	0	1950	150	-1.0	-1.0	-1	175	-1	63
8.00	MYAKKA RIVER AB OGLEBY CREEK	13	63	83	2.0	-1.0	160	-1	6.1	69	1.4	87	34	6.4	58	1.54	0.41	0	580	146	-1.0	-1.0	-1	273	-1	52
8.10	LONG CREEK AB MYAKKA RIVER	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
8.20	MYAKKA RIVER AB LONG CREEK	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
8.30	WINGATE CREEK AB MYAKKA RIVER	4	63	76	-1.0	-1.0	-1	-1	4.9	62	1.0	48	30	6.5	-1	1.13	0.19	-1	-1	-1	-1.0	-1.0	-1	76	-1	53
8.31	JOHNSON CREEK AB WINGATE CREEK	34	71	81	2.0	-1.0	40	-1	6.4	74	2.3	86	24	6.5	8	0.98	0.13	-1	-1	-1	-1.0	-1.0	-1	102	12	22
8.32	WINGATE CREEK AB JOHNSON CREEK	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
8.40	MYAKKA RIVER AB WINGATE CREEK	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
9.00	OGLEBY CREEK AB LONG CREEK	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
20.00	SAM KNIGHT CREEK AB TIPPECANOE	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
21.00	HUCKABY CREEK AB TIPPECANOE BA	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1
22.00	FLOPBUCK CREEK AB TIPPECANOE B	0	0	0	-1.0	-1.0	-1	-1	-1.0	-1	-1.0	-1	-1	-1.0	-1	-1.00	-1.00	-1	-1	-1	-1.0	-1.0	-1	-1	-1	-1

+ Reach Nos. refer to Figure 2-5.

Source: FDER, 1988.

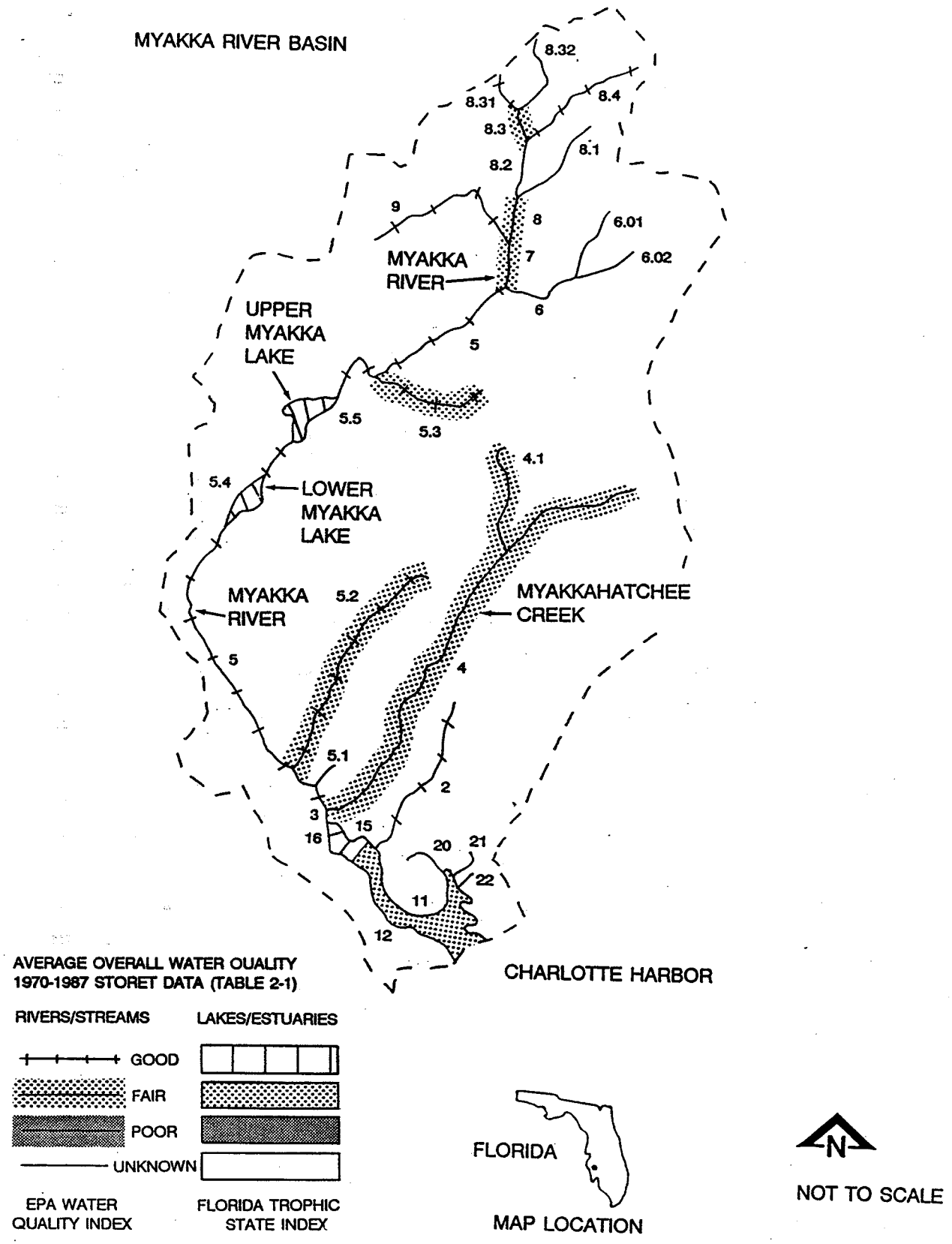

Figure 2-5
WATER QUALITY DATA

SOURCE: DER, 1988.

MYAKKA WILD AND SCENIC RIVER
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disturbances, the entire river may be in violation of the state dissolved oxygen standards. Water quality during the dry season may be measurably affected by limited ground water contributions to base flow and the runoff of ground water utilized for agricultural irrigation.

Potential sources of nutrient and pollution loads in the Myakka River watershed are generally nonpoint sources. These sources of high nutrients and pollution include agricultural and rangeland runoff, phosphate mining in the upper watershed, residential areas and related septic tank drain fields, landfills, golf courses, and other sources of stormwater runoff.

For the years 1963 through 1985, the Myakka River near Sarasota showed statistically significant trends of increasing dissolved solids, dissolved sulfate, dissolved chloride, total phosphorus, and specific conductance. There was a statistically significant decrease in total nitrate from 1963 to 1985, but the magnitude of the decrease was small. The increases in specific conductance, chloride, sulfate, and dissolved solids probably resulted from the increased runoff associated with irrigation. The primary source of irrigation water in the watershed is ground water, which has higher concentrations of chloride, sulfate, and dissolved solids than does surface water. Irrigation water effects are primarily seasonal, with the greatest quantities of water utilized during the dry season (Hammett, 1988).

In general, Upper Myakka Lake has been characterized as a highly disturbed ecological system with excessive nutrient concentration and extensive aquatic weed problems. Upper Myakka Lake is considered to be eutrophic to hypereutrophic. The lake has experienced numerous dissolved oxygen concentrations below the DER state standards, Chapter 17-3, FAC, primarily during warmer months, and there is a general lack of dissolved oxygen just above the organic bottoms of the lake. Total nitrogen in the lake has been found to peak following periods of high inflow from tributaries and following the application of herbicides for the control of aquatic weeds. There is also an increase in total phosphorus following herbicide applications. Lake water quality is influenced primarily from nonpoint source loads contributed by tributary loadings (Priede-Sedgewick, Inc., 1983). Chapter 17-3, FAC, non-numerical nutrient criteria state, "In no case shall nutrient concentrations

of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." Upper Myakka Lake would appear to be in violation of this water quality criterion. Lower Myakka Lake and the river below the lakes also have extensive hydrilla growth.

Myakkahatchee Creek is a main tributary of the Myakka River. It is a Class I water and supplies potable water to North Port and part of Port Charlotte. The lower few miles are designated Class II waters. Historically, the lower creek received discharge from a sewage treatment plant and had experienced coliform and nutrient contamination. The sewage plant has recently ceased discharge to Myakkahatchee Creek. The water quality of Myakkahatchee Creek is still threatened by the discharge of stormwater from North Port and nutrient loading from agricultural runoff. DER has rated Myakkahatchee Creek as partially meeting its designated use.

Two major springs exist within the Myakka River watershed, Little Salt Springs and Warm Mineral Springs. Warm Mineral Springs discharges directly to the Myakka River through Warm Mineral Springs Creek. The water quality characteristics of Warm Mineral Springs suggests that the water from the spring is the result of upward migration of highly mineralized water from deep aquifer zones.

The base flow of streams in the Myakka watershed is principally controlled by the permeability and porosity of the surficial deposits, the interrelations among these deposits and older underlying beds, the relative elevations of the water table and the water surface elevation in streams, soil moisture conditions and evapotranspiration rates, man-induced alterations to drainage systems and water use, and the time distribution of precipitation. The streamflow of the Myakka River is highly variable and mostly dependent on surface runoff during the rainy season.

During the dry season, streamflow is maintained by ground water discharge. Low flow data indicate that ground water contributions to streamflow are small. (Hutchinson, 1984). Ground water discharge from the surficial aquifer is insufficient to provide base flow to the Myakka River during the dry period (SWFWMD, 1989). Streamflow and water quality characteristics indicate that

there are negligible ground water contributions to the Myakka River between Myakka City and the outlet to Lower Myakka Lake. The lakes and the Myakka River channel are underlain by relatively impermeable clays (Flippo and Joyner, 1968).

About 2.0 miles southwest of Myakka City, a seepage zone occurs along the Myakka River. The seeps issue from the top of a hardpan outcrop in the surficial aquifer. The flow of the individual seeps, one of which may be perennial, is probably less than 0.004 cubic feet per second.

All nontidal reaches of streams cease natural flows during droughts, and many go dry during most years. During the dry season, drainage from agricultural lands may contribute between 10 and 60 percent of stream discharge. Near zero flow has occurred in the Myakka River for periods of up to 6 months, and during normal water years the river will experience near zero flow for approximately 2 months.

Minimum discharges generally occur in April, May, or early June. The Myakka River at Myakka City drains an area of approximately 125 square miles. During the period 1978 to 1981, incidents of zero cubic feet per second discharge were recorded. At the Myakka River near Sarasota, with a drainage area of 229 square miles, incidents of zero discharge have been recorded during the 28 years between 1937 to 1981 (Hammett, 1985).

The average annual rainfall in the Myakka watershed is 56 inches, approximately 60 percent of which occurs from June to September. Because there is a lag time of river discharge following rains, the maximum river discharge generally occurs from July to October. The discharge of the Myakka River, as measured at the U.S. Geological Survey (USGS) gauging station between the lakes, averaged 254 cubic feet per second annually for the period 1937 to 1984. Inflow of freshwater to Charlotte Harbor from the Myakka River averages 630 cubic feet per second annually.

Several factors may act to either increase or decrease the freshwater discharge of the Myakka River. Factors which may increase the discharge are the diking of wetlands and the resultant loss of storage capacity, drainage

canals which increase the efficiency with which water runs off the surrounding land, and agricultural pumpage from ground water supplies for irrigation during the dry season. Factors which may serve to decrease the discharge of fresh water are diversion channels (i.e., Blackburn Canal), withdrawal for public water supply, salinity barriers in Deer Prairie Creek and Myakkahatchee Creek, and water control structures at the outlet of Upper Myakka Lake and below Lower Myakka Lake.

The quality, quantity, and timing of freshwater input is critical to downstream estuarine areas. However, what is relatively unknown is the critical amount of fresh water necessary to maintain the proper functioning of estuarine areas.

2.4.2 Ground Water

SWFWMD (1988a, 1988b) has conducted a Ground Watershed Resource Availability Inventory for Sarasota and Manatee Counties. The following discussion of ground water is taken largely from these reports. Ground water within the Myakka River watershed consists of the surficial aquifer, two intermediate aquifers, and the Floridan Aquifer. The surficial aquifer is suitable unconfined with a saturated thickness of about 40 to 75 feet. The water table is generally within 5 feet of land surface. In upland areas where drainage channels are well defined, the water table may be more than 10 feet below land surface. Fluctuations in the water table are seasonal and vary within about a 5-foot range. Lowest water table levels generally occur during May or June, and the highest water table levels generally occur in September or October. Water from the surficial aquifer is generally suitable for potable use, except near the coast and along stream and canals which allow saltwater intrusion or where poorer water quality from flowing wells has contaminated the aquifer. Iron and color often affect the potability of water from the surficial aquifer, but can be removed through treatment. In Sarasota County, many hundreds of wells tap the surficial aquifer, and are used to obtain water for domestic supply, lawn irrigation and watering livestock. In Manatee County the surficial aquifer is generally undeveloped as a water source and is used only in small volumes for domestic supply, lawn irrigation, and watering livestock. The surficial aquifer has the potential as a dependable water

supply because it is readily recharged by rainfall. It also has the greatest potential for contamination from surface sources.

The water of the intermediate aquifer is generally within DER primary and secondary drinking water standards. Water quality is best in eastern Sarasota County and degrades towards the southwest and water depth. The intermediate aquifer is the most highly developed aquifer and supplies most of the water used for domestic supply and home irrigation. For potable usage the intermediate aquifer water frequently requires extensive treatment to reduce mineralization.

The Floridan Aquifer is the principal source of ground water. Use of this water is generally restricted because of poor water quality. Large withdrawals of water are made from the Floridan Aquifer and used primarily for agricultural irrigation. Recharge rates of the Upper Floridan Aquifer are low, and no recharge occurs along the Myakka River.

In Sarasota County the loss of potable and agricultural water is a problem due to improperly constructed or deteriorated artesian wells. These wells are partially responsible for degradation of water quality in the artesian system through inter-aquifer connections. Uncontrolled wells discharge highly mineralized water at land surface resulting in artificial recharge of the surficial aquifer with poor quality water. Artesian wells are inventoried and some are being plugged by the SWFWMD through the Quality of Water Improvement Program (QWIP).

2.5 PLANT COMMUNITIES

The interaction of topography, climate, soils, and hydrology determines the character of the plant and animal communities within a particular region. Due to the southerly location of Sarasota County within the State of Florida, the Myakka River area experiences a near-subtropical to temperate climate with an associated high annual rainfall. This regional climate, together with other specific topographic and edaphic conditions, as well as surface water drainage features, contribute to a rich and varied flora. Due to the constant changes occurring to vegetation since presettlement times, as a result of natural and/or man-induced perturbations, the separation of these floral species

associations into distinct plant community types is an arduous task. Several distinct plant community and/or subplant community types have been described for the immediate region [Florida Game and Freshwater Fish Commission (FGFWFC), 1980; NPS, 1984; DNR, 1986; Sarasota County, 1986; Southwest Florida Regional Planning Council (SWFRPC), 1987]. However, for the purposes of this planning document, the emphasis on plant communities will be confined to those associations only found along the Myakka River Wild and Scenic designated portion of the river corridor within Sarasota County. Smaller plant community types or subtypes have been condensed into the major plant community categories, which are further separated by the major headings of uplands, wetlands, and submerged aquatic vegetation.

Plant species composition characterizes the specific type of plant community or association within a particular region. When a plant species within a community or association becomes regionally important due to an unnatural overabundance or diminished population status, that plant species is typically protected and/or managed through local, regional, state, or federal agencies. The Myakka River contains some important plant species that may be considered to be either exotic, nuisance, or officially listed species. Exotic or nuisance species include any plant species either naturalized or exotic within the State of Florida that outcompetes with native flora for growth space and nutrients. It is a commonly accepted practice that these plant species, where practicable, are controlled through the use of approved herbicides and/or mechanical methods. Listed species are plant species that have been officially listed by the state or federal government or conservation organizations as threatened with extinction or extirpation. State and federal laws protect these listed species from collection and/or eradication.

2.5.1 Uplands, Wetlands, and Submerged Aquatic Vegetation

Uplands along the Myakka River consist of pine flatwoods/pine prairie, scrubby flatwoods/oak scrub, xeric hammock, mesic-hydric hammock, coastal hammock, dry prairie, and agricultural areas/developed lands. Wetlands include mixed-hardwood swamp, swamp thickets, bay swamp, freshwater marsh, wet prairie, brackish-saltwater marsh, and mangrove swamp (see Figure 2-6 for geographic extent of wetlands). Submerged aquatic vegetation (SAV) typically consists of monotypic populations that persist underwater within the Myakka River and its

associated tributaries. Detailed descriptions of the plant communities distributed along the Myakka River are provided in Appendix B. The distribution of plant communities along the Myakka River are indicated on Figure 2-7. The land use and cover classification (see Figure 2-7) are defined by the Florida Land Use and Cover Classification System (FLUCCS, 1976).

The limits of land cover and land use depicted in Figure 2-7 are approximately one mile on each side of the river. The boundary does fluctuate in size to accommodate the width of the river and to depict important land cover and ownership classifications. The limits are not a definitive measure and are only used to provide enough area on both sides of the river to depict the appropriate land cover and ownership patterns.

2.5.2 Exotic and Nuisance Plants

Although there are no distinct plant communities of exotic vegetation (unless one includes the infestations of the submergent hydrilla within the Lower Myakka Lake and the Upper Myakka Lake as a SAV plant community), exotic and nuisance species have threatened the longevity of natural communities along the Myakka River. There are 21 species of exotic or nuisance plant species that occur along the Myakka River (DNR, 1986). Some species such as mango, guava, and citrus are not as noxious as the more insidious, aggressive forms of aquatic, wetland and upland weed plants including water hyacinth, parrot feather, paragrass, alligator weed, hydrilla, cattail, Melaleuca (punk tree), Australian pine, and Brazilian pepper. These exotic and nuisance plants outcompete the native flora for growth space and, thus, threaten plant species diversity. Exotic and nuisance plants should be controlled at every opportunity to preserve natural systems integrity. Although some of these exotic/nuisance plants are not at significant population levels currently, such as Australian pine and cattail, the opportunity for future encroachment should be restricted while conditions remain manageable. Currently, the most threatening exotic or nuisance species to the integrity of the Myakka River system are hydrilla, water hyacinth, cattail, Melaleuca and Brazilian pepper. The only ongoing exotic plant removal along the Myakka River through mechanical and/or chemical means is being conducted by the SWFWMD and DNR. SWFWMD has an aquatic weed control program that includes the Myakka River

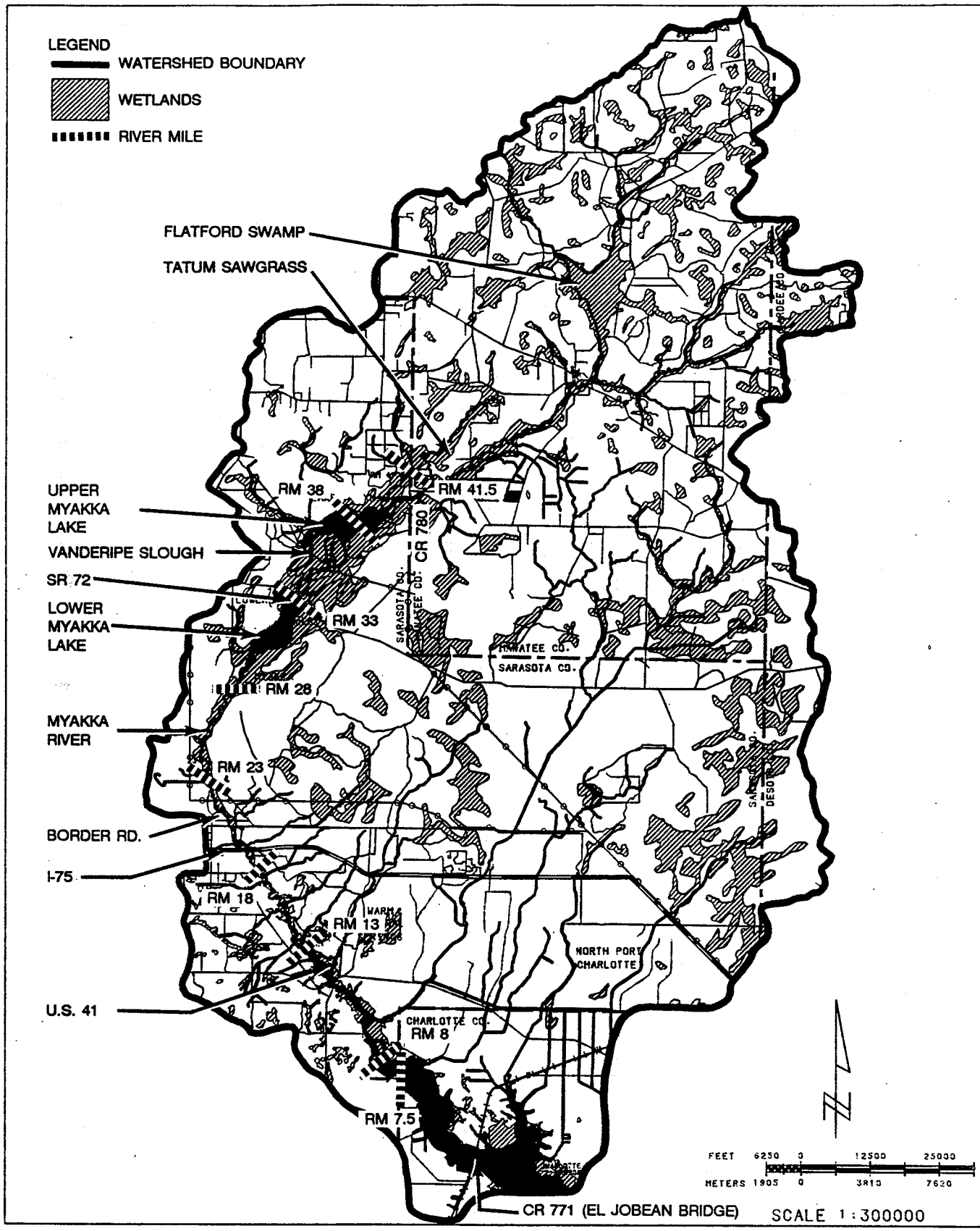

Figure 2-6
WETLANDS-MYAKKA RIVER WATERSHED

SOURCE: SARASOTA COUNTY, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

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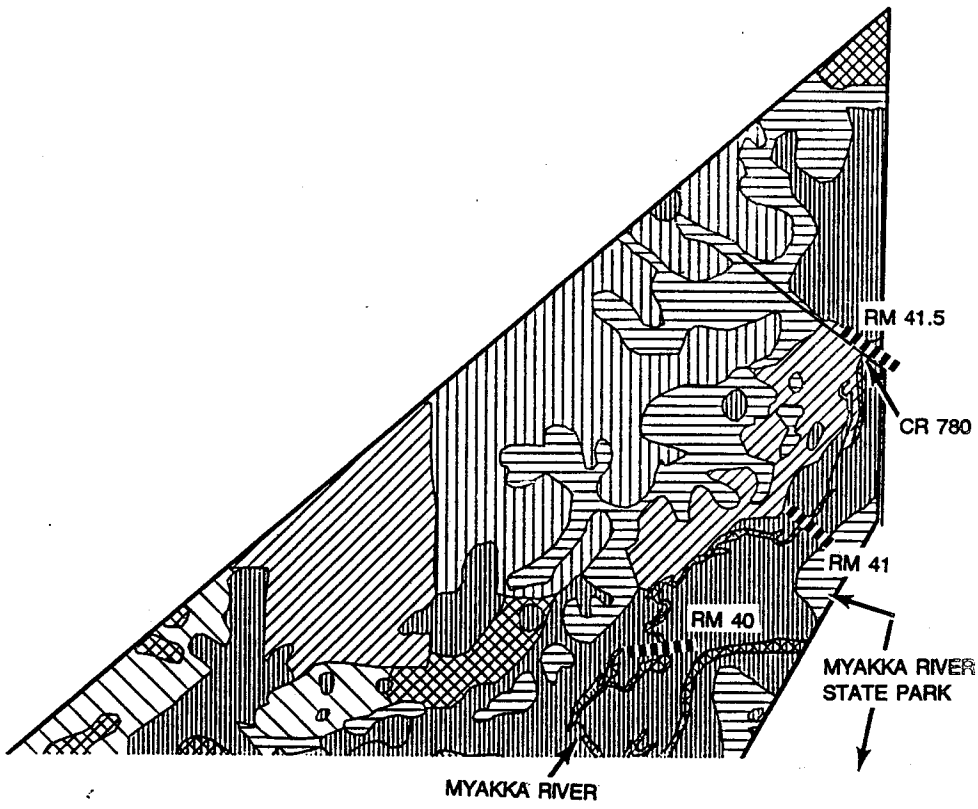
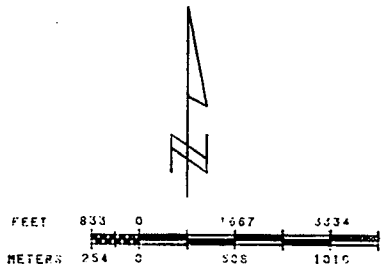


LEGEND

411		PINE FLATWOODS
213		IMPROVED PASTURE
422		OTHER HARDWOODS
512		STREAMS WITH GRASS BEDS
642		SALT WATER MARSH
144		MAJOR ROADS AND HIGHWAYS
621		FRESHWATER SWAMP
522		LAKES WITH GRASS BEDS
190		OPEN LAND AND OTHER
191		UNDEVELOPED LAND WITH URBAN AREAS
111		SINGLE UNIT, LOW DENSITY RESIDENTIAL
115		MOBILE HOMES, HIGH DENSITY
121		RETAIL SALES AND SERVICE
127		MIXED COMMERCIAL AND SERVICES
421		XERIC OAK
179		OTHER RECREATIONAL
		RIVER MILE



SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (1 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

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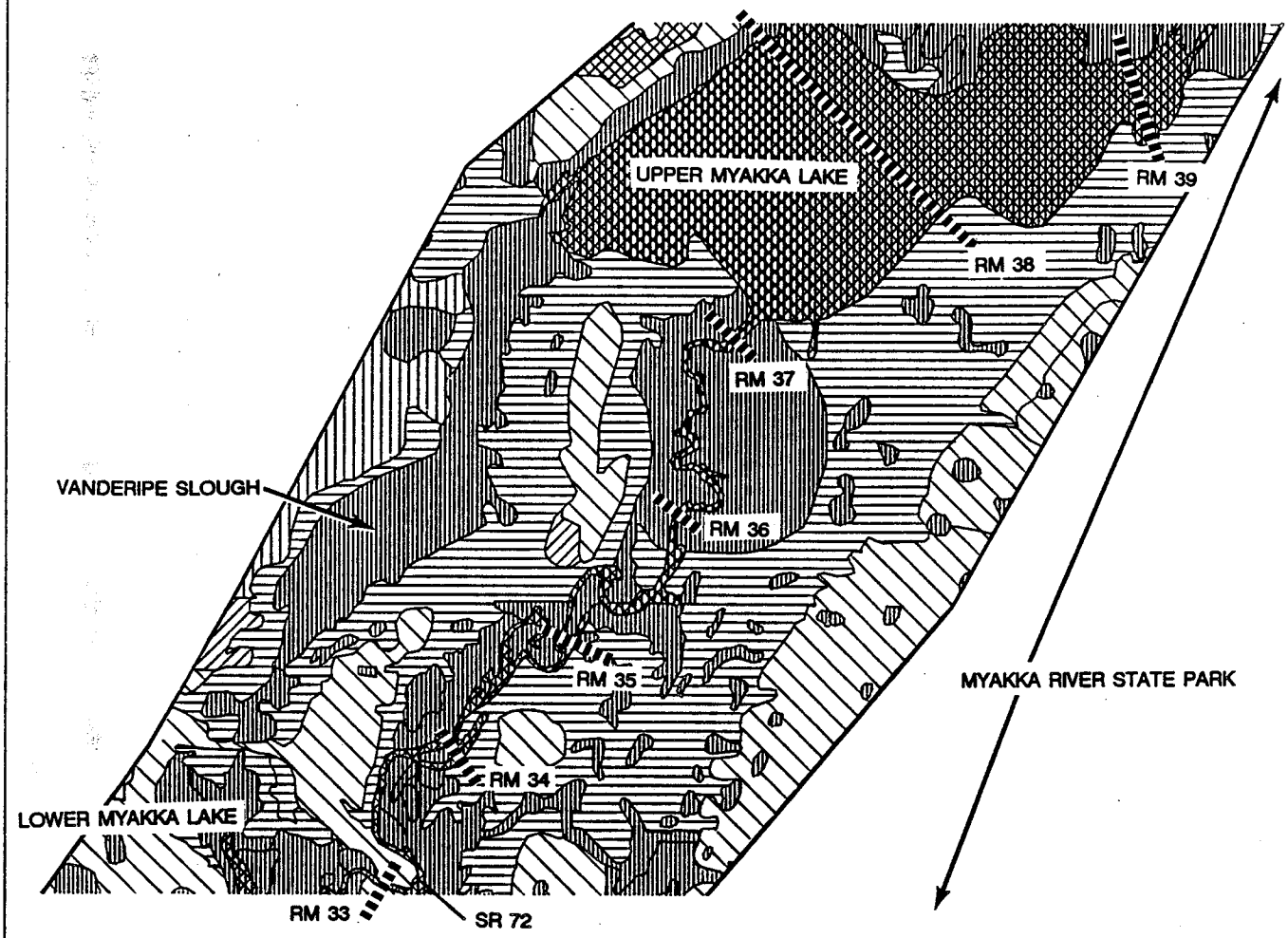
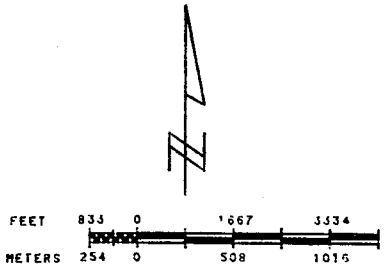


LEGEND

411	PINE FLATWOODS	191	UNDEVELOPED LAND WITH URBAN AREAS
213	IMPROVED PASTURE	111	SINGLE UNIT, LOW DENSITY RESIDENTIAL
422	OTHER HARDWOODS	115	MOBILE HOMES, HIGH DENSITY
512	STREAMS WITH GRASS BEDS	121	RETAIL SALES AND SERVICE
642	SALT WATER MARSH	127	MIXED COMMERCIAL AND SERVICES
144	MAJOR ROADS AND HIGHWAYS	421	XERIC OAK
621	FRESHWATER SWAMP	179	OTHER RECREATIONAL
522	LAKES WITH GRASS BEDS		RIVER MILE
190	OPEN LAND AND OTHER		



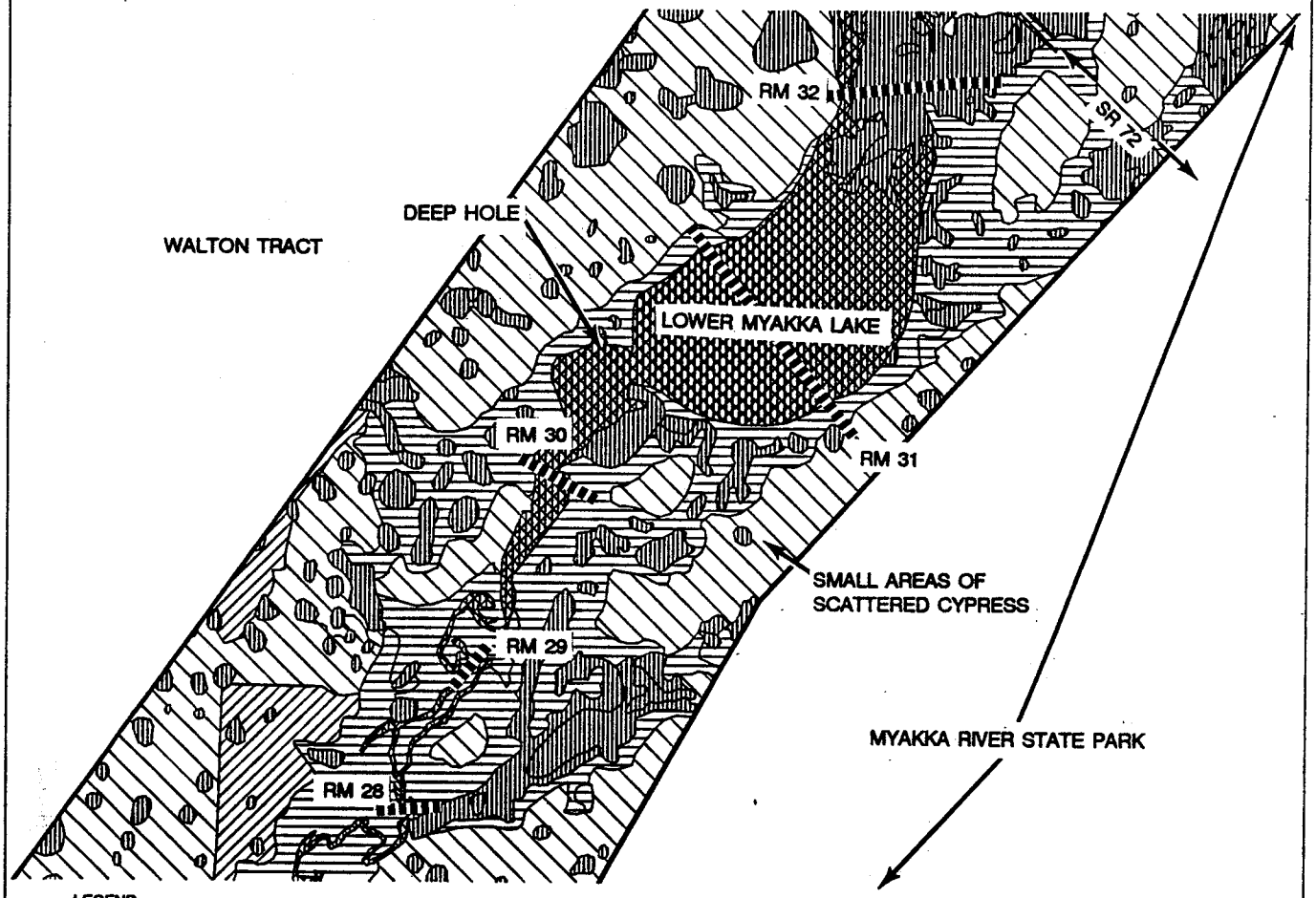
SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (2 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

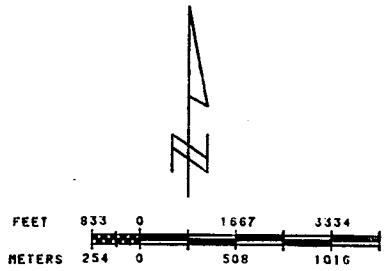
MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND

411		PINE FLATWOODS
213		IMPROVED PASTURE
422		OTHER HARDWOODS
512		STREAMS WITH GRASS BEDS
642		SALT WATER MARSH
144		MAJOR ROADS AND HIGHWAYS
621		FRESHWATER SWAMP
522		LAKES WITH GRASS BEDS
190		OPEN LAND AND OTHER
191		UNDEVELOPED LAND WITH URBAN AREAS
111		SINGLE UNIT, LOW DENSITY RESIDENTIAL
115		MOBILE HOMES, HIGH DENSITY
121		RETAIL SALES AND SERVICE
127		MIXED COMMERCIAL AND SERVICES
421		XERIC OAK
179		OTHER RECREATIONAL
		RIVER MILE



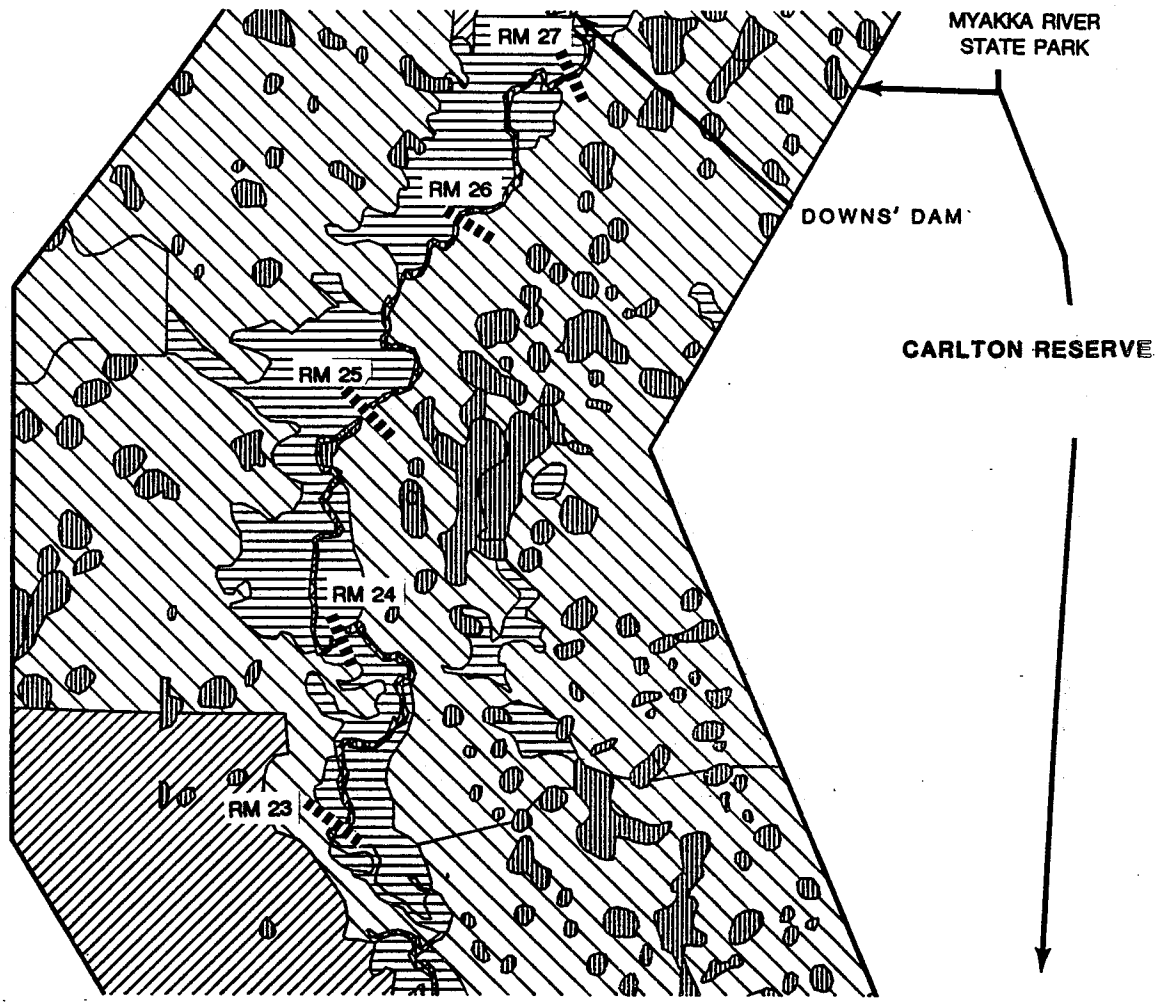
SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (3 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND

411	PINE FLATWOODS	191	UNDEVELOPED LAND WITH URBAN AREAS
213	IMPROVED PASTURE	111	SINGLE UNIT, LOW DENSITY RESIDENTIAL
422	OTHER HARDWOODS	115	MOBILE HOMES, HIGH DENSITY
512	STREAMS WITH GRASS BEDS	121	RETAIL SALES AND SERVICE
642	SALT WATER MARSH	127	MIXED COMMERCIAL AND SERVICES
144	MAJOR ROADS AND HIGHWAYS	421	XERIC OAK
621	FRESHWATER SWAMP	179	OTHER RECREATIONAL
522	LAKES WITH GRASS BEDS		RIVER MILE
190	OPEN LAND AND OTHER		

FEET 833 0 1667 3334
METERS 254 0 508 1016

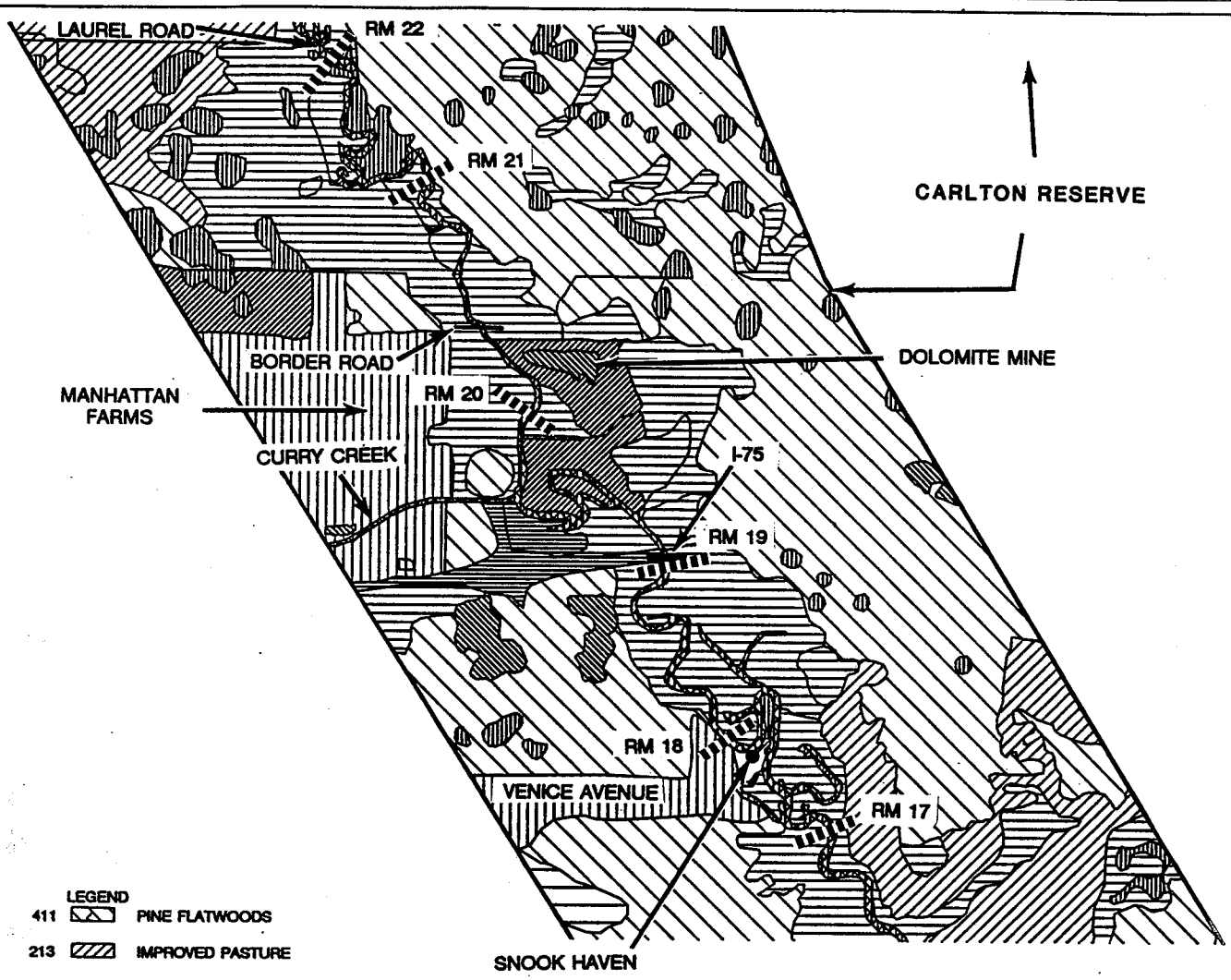
SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (4 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND

411		PINE FLATWOODS
213		IMPROVED PASTURE
422		OTHER HARDWOODS
512		STREAMS WITH GRASS BEDS
642		SALT WATER MARSH
144		MAJOR ROADS AND HIGHWAYS
621		FRESHWATER SWAMP
522		LAKES WITH GRASS BEDS
190		OPEN LAND AND OTHER
191		UNDEVELOPED LAND WITH URBAN AREAS
111		SINGLE UNIT, LOW DENSITY RESIDENTIAL
115		MOBILE HOMES, HIGH DENSITY
121		RETAIL SALES AND SERVICE
127		MIXED COMMERCIAL AND SERVICES
421		XERIC OAK
179		OTHER RECREATIONAL
		RIVER MILE

FEET	833	0	1667	3334
METERS	254	0	508	1016

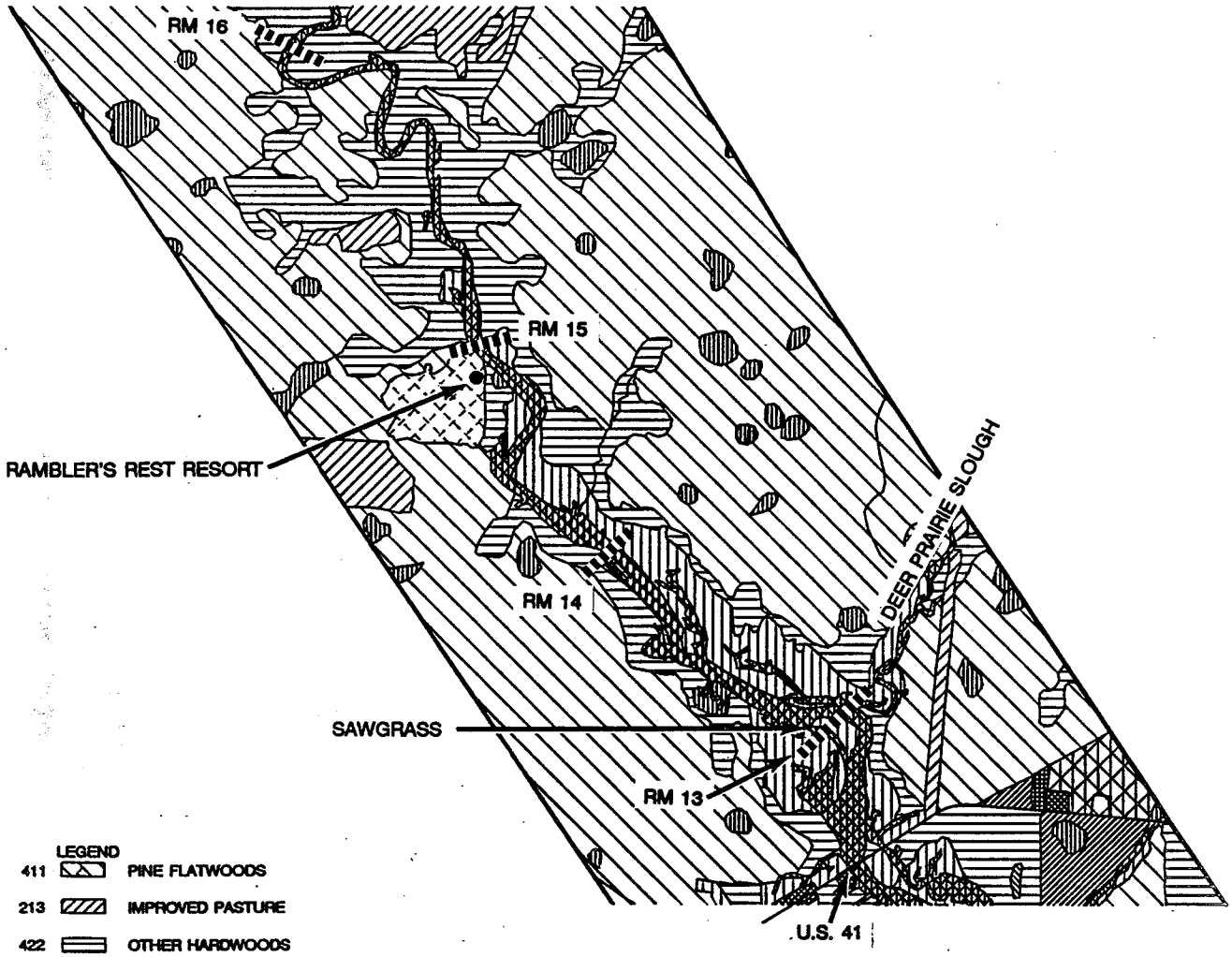
SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (5 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

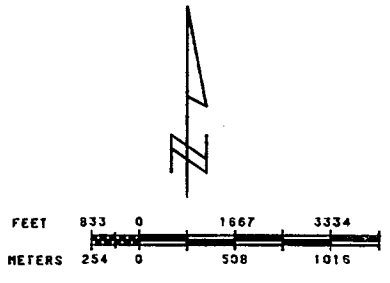
MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND

411		PINE FLATWOODS
213		IMPROVED PASTURE
422		OTHER HARDWOODS
512		STREAMS WITH GRASS BEDS
642		SALT WATER MARSH
144		MAJOR ROADS AND HIGHWAYS
621		FRESHWATER SWAMP
522		LAKES WITH GRASS BEDS
190		OPEN LAND AND OTHER
191		UNDEVELOPED LAND WITH URBAN AREAS
111		SINGLE UNIT, LOW DENSITY RESIDENTIAL
115		MOBILE HOMES, HIGH DENSITY
121		RETAIL SALES AND SERVICE
127		MIXED COMMERCIAL AND SERVICES
421		XERIC OAK
179		OTHER RECREATIONAL
		RIVER MILE



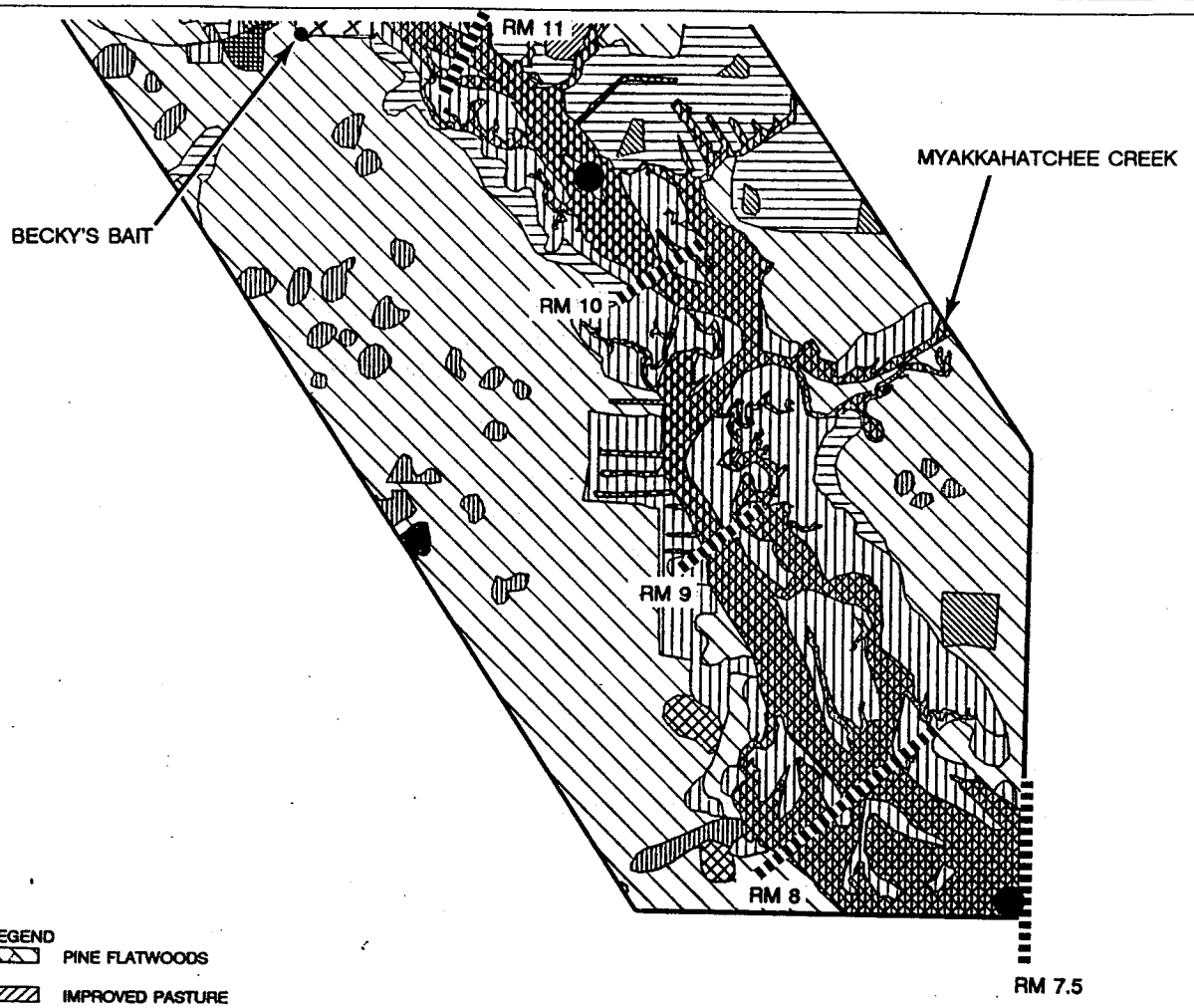
SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (6 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND

411		PINE FLATWOODS
213		IMPROVED PASTURE
422		OTHER HARDWOODS
512		STREAMS WITH GRASS BEDS
642		SALT WATER MARSH
144		MAJOR ROADS AND HIGHWAYS
621		FRESHWATER SWAMP
522		LAKES WITH GRASS BEDS
190		OPEN LAND AND OTHER
191		UNDEVELOPED LAND WITH URBAN AREAS
111		SINGLE UNIT, LOW DENSITY RESIDENTIAL
115		MOBILE HOMES, HIGH DENSITY
121		RETAIL SALES AND SERVICE
127		MIXED COMMERCIAL AND SERVICES
421		XERIC OAK
179		OTHER RECREATIONAL
		WADING BIRD ROOKERY
		RIVER MILE

FEET 833 0 1667 3334
METERS 254 0 508 1016

SCALE 1:40000

Figure 2-7
EXISTING LAND COVER (7 OF 7)

SOURCE: SARASOTA COUNTY, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

State Park. The program is administered through an interagency agreement between SWFWMD and DNR. DNR also has a separate program for the removal of exotic plant species within Myakka River State Park.

2.5.3 Listed Plant Species

The Endangered Species Act of 1973, as amended by Public law 97-304 in February 1983, provides for the protection and conservation of endangered and threatened species of plants and animals. Other federal and state laws also provide governmental agencies with the power to regulate endangered and threatened species and their habitats. Approximately 25 listed plant species occur, or have the potential to occur, along the Myakka River (Mote Marine Laboratory, 1985 and 1986; Huffman, 1989; Florida State University, 1989). None of the plant species which occur along the Myakka River are currently listed as federally threatened or endangered by the U.S. Fish and Wildlife Service (FWS) for the State of Florida. However, two of these listed plant species, Curtiss milkweed and Florida coontie are listed as threatened by the Florida Committee on Rare and Endangered Plants and Animals (FCREPA). The FCREPA list was created as a planning tool to protect endangered/threatened species and their habitats from being destroyed in Florida. However, there is no legal protection of these species unless they are listed on the state or federal lists. Florida coontie and Curtiss milkweed are rare species that grow within longleaf pine flatwoods/shell mounds or scrubby flatwoods, respectively.

The remainder of the listed plant species are orchids, lilies, bromeliads, and ferns. These species are listed by the Florida Department of Agriculture and Consumer Services (DACS) as threatened or commercially exploited. DACS has the authority through Chapter 581, Florida Statutes, to regulate the species on this list (regulated plant index). However, the chapter pertains to the plant industry and protects native flora from unlawful harvesting. It is unlawful to harvest or destroy an endangered plant on the regulated plant index without permission from the landowner and a DACS permit. If a plant is threatened or commercially exploited, then only permission from the landowner is needed. Exemptions to this regulation include:

1. The clearing or other disturbance of land for agricultural or silvicultural purposes, fire control measures, or required mining assessment work;
2. The clearing or removal of regulated plants from a canal, ditch, survey line, building site, or road or other right-of-way by the landowner or his or her agent; and
3. The clearing of land by a public agency or a publicly or privately owned utility when acting in the performance of its obligation to provide service to the public.

The most conspicuous of these listed species exists as epiphytes that festoon the oak branches and cabbage palm trunks which reach out over the water's surface along the Myakka River. Unfortunately, these epiphytes have been collected over the years by man for personal and/or commercial exploitation.

2.6 FISH AND WILDLIFE

Florida leads the continental United States in having the greatest number of endangered or threatened fish and wildlife species and the greatest number of described sub-species. The state extends from the temperate zone to the sub-tropics, and as a result supports species populations of both climatic zones, many of which are near the northern or southern limits of their ranges. A number of factors have led to the isolation and differentiation of Florida's biota including: fluctuations in sea level over geologic time; the long coastline coupled with conditions favoring the formation of barrier islands; the diversity of vegetation and soils, which has provided a broad variety of potential habitats, and the widespread destruction of habitat by man. More than 40 percent of the 104 species listed as endangered, threatened, or special concern are found in the Charlotte Harbor area (FGFWFC, 1980). Rules of the Florida Wildlife Code, Chapter 39-27.02, state, "No person shall hunt, shoot, wound, kill, capture, pursue, harass....any endangered species...." Similar language is included for threatened and special concern species.

2.6.1 Wildlife

The mosaic of habitat types situated throughout the Myakka River corridor assures the availability of food and cover for the life stages of numerous terrestrial and aquatic wildlife species. In addition, the size of the

corridor, including the river, provides access to various habitats and adjacent properties which is vital to those species with large home ranges or which require a variety of habitat types. Vegetative communities identified for the Myakka River corridor include mesic-hydric hammock, coastal hammock, xeric hammock, pine flatwoods/pine prairie, dry prairie, scrubby flatwoods/oak scrub, freshwater wetlands/aquatic habitat, mangrove swamp, brackish-saltwater marsh, and agricultural areas/developed lands. Aquatic habitats would include all of the contiguous open surface waters of the Myakka River. A list of vertebrate wildlife species expected to occur in each of these broad community types is included in Appendix C, Table C-1.

Mesic-hydric Hammock--Mesic-hydric hammock occurs along both sides of the Myakka River, providing a forested buffer or transitional zone between aquatic/wetland and upland habitats. The high diversity of these transitional zones is typical of edge habitats. These hammocks also provide access to water for terrestrial species inhabiting the uplands. Due to the rather pristine and uninterrupted condition of mesic-hydric hammock along the Myakka River, this system functions as a travel corridor for a diverse array of wildlife.

Hardwoods in these hammocks provide cover and/or mast for numerous mammal and bird species such as the gray squirrel, fox squirrel, cotton mouse, wood duck, eastern mole, raccoon, green treefrog, and red-eyed vireo. A myriad of warblers and songbirds are also dependent on hammocks during migration. Mesic-hydric hammocks also are utilized by domesticated or feral animals such as cattle and hogs.

Coastal Hammock--The moist-to-dry conditions and isolated nature of coastal hammocks restrict the diversity of fauna within these systems. Species occurring mainly in the river or on its banks may occasionally venture into coastal hammocks while dispersing to new territories or seeking cover. Typically, the permanent residents of this community type are not large and do not require extensive home ranges. Common vertebrate wildlife species, such as the squirrel treefrog, yellow rat snake, fish crow, common grackle, and solitary sandpiper find adequate cover in the understory vegetation in coastal

hammocks. However, rarer forms of wildlife such as eastern indigo snake and gopher tortoise occasionally may occur in coastal hammocks.

Xeric Hammock--Xeric hammocks provide an ecotonal habitat, with dry conditions necessary to xeric habitat species, as well as cover types used by species commonly found in hammocks. Examples of resident species may include glass lizards, skinks, corn snakes, dwarf salamanders, Eastern narrow-mouthed toad, spotted skunk, vultures, wild turkey, yellow-billed cuckoo, black-and-white warbler, and summer tanager.

Pine Flatwoods/Pine Prairie--The widespread distribution of pine flatwoods and pine prairie habitats within the Myakka River corridor supports considerable populations of wildlife species typical of these habitats. In addition, the occurrence of small wetland habitats within pinelands provides additional habitat. Both slash pine and longleaf pine stands provide habitat for a diverse range of vertebrate species. The proximity of open prairies and wetlands for hunting, to nesting trees in pine flatwoods provides good habitat conditions for raptors such as the osprey, bald eagle, hawks, and bats such as the eastern yellow bat and evening bat. Mammals such as the opossum, armadillo, bobcat, gray fox, raccoon, fox squirrel and white-tailed deer are likely to occur in flatwoods within the corridor. Other common residents of pinewoods habitats include the rufous-sided towhee, cotton rat, cotton mouse, brown-headed nuthatch, northern cardinal, box turtle, and pine warbler.

Dry Prairie--Dry prairies lack the overstory necessary to tree-dwelling vertebrates; however, the soils and vegetation of these systems support the activities of fossorial animals such as the gopher tortoise, gopher frog, and burrowing owl. The burrows of the gopher tortoise provide shelter from fires and desiccation for numerous commensals such as the Eastern diamondback rattlesnake, Eastern indigo snake, and gopher frog. Other species which forage and/or nest in dry prairies include the sandhill crane, black racer, burrowing owl, common nighthawk, and crested caracara.

Scrubby Flatwoods/Oak Scrub--The xeric character of the scrubby flatwoods/oak scrub habitat requires tolerance of harsh conditions by wildlife inhabitants. Habitat specialists potentially occurring within this habitat type in the

Myakka River corridor include the Florida scrub jay. The gopher tortoise and its burrow commensals are also endemic to this xeric habitat type.

Freshwater Wetlands/Aquatic Habitat--Freshwater wetlands include wooded habitat such as swamps and floodplain forests; herbaceous wetlands such as wet prairies and marshes; and aquatic habitats such as lakes, ponds, the Myakka River, and its associated waters. These systems support species completely dependent on standing water for at least their food base and/or reproductive stages, such as fish, toads and frogs, amphiumas, salamanders, alligators, aquatic turtles and snakes, West Indian manatee, and birds such as loons, grebes, ducks, pelicans, herons, egrets, ibises, and ospreys. These wetlands provide the most diverse systems within the Myakka River corridor, as they contribute to the survival of both characteristic wetland species as well as habitat generalists.

Mangrove Swamp--Since mangrove swamps play an important role as bird rookeries and nesting colonies, these relatively monotypic habitats are important to the ecology of other habitats within the region. Their importance to regional diversity is more extensive than is readily apparent. Mangrove swamps are also integral to the survival of strict habitat specialists such as the black-whiskered vireo, mangrove cuckoo, prairie warbler and mangrove watersnake. Two mangrove islands located within the Myakka River near the Sarasota/Charlotte County line support large rookeries of a variety of wading birds, including the endangered wood stork.

Brackish-Saltwater Marsh--Tidal marshes provide valuable foraging habitat for a variety of species such as gulls, terns, plovers, sandpipers, rails, marsh rabbits, raccoons, and alligators.

Agricultural Areas/Developed Lands--Agricultural areas may provide suboptimal habitat for species typical of habitats historically located on these properties. For example, pine plantations may support species common in pine flatwoods; however, the alteration of vegetative diversity and spatial relations and elimination of old-growth trees and snags will severely reduce animal species diversity and population levels within the system. In general, agricultural areas and developed lands favor species readily adaptable to

human presence and land alteration. Examples include the loggerhead shrike, raccoon, blue jay, European starling, cattle egret, muscovy duck, rock dove, house sparrow and northern mockingbird. Exotic wildlife species often displace native species in altered habitats. Therefore, fragmentation of natural habitats within the Myakka River corridor through, and alterative and development reduces the regional diversity of native fauna and flora.

2.6.2 Domesticated and Feral Animals

The two most destructive animal species to native habitat along the Myakka River are cattle and feral hogs. Cattle seek the cool shade of hammocks along the Myakka River and trample and forage on the understory vegetation. Cattle also move within the marshlands along the edges of the Myakka River during dry periods to forage on aquatic grasses and forbes. Hogs root within hammocks, marshes, and hardwood swamps. These feral pigs completely eradicate large areas of native herbs and often destroy native species of fossorial animals. Other non-native animals that inhabit the Myakka River area include cats, dogs, armadillos, horses, and muscovy ducks. Domesticated pets, such as dogs and cats, are undesirable in natural habitats. Domestic pets may compete with native wildlife species for food or hunt rare native fauna.

2.6.3 Listed Animal Species

The Myakka River corridor harbors numerous wildlife species listed by USFWS, the FGFWFC, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and FCREPA. A survey of species range maps, documented reports of species occurrences and field reviews revealed that up to 76 species listed by FCREPA and/or protected by FGFWFC, USFWS, and CITES may potentially utilize habitats along or directly adjacent to the corridor in the vicinity of the Charlotte Harbor estuary. The large corridor may simply provide a stopover point during migration for a number of these species. Appendix C, Table C-2, lists all protected amphibian, reptile, bird, and mammal species for this corridor as well as their status according to each agency.

Ten species of amphibians and reptiles may occur in the Myakka River and its estuary or on properties adjacent to the corridor. Five listed sea turtles, the Atlantic loggerhead, Atlantic green turtle, leatherback turtle, Atlantic

hawksbill, and Kemp's Atlantic Ridley, have been documented in the Charlotte Harbor area and may occasionally forage in more brackish areas of the river.

The American alligator occurs throughout the Myakka River and its tributaries, oxbows, and adjacent freshwater and brackish water wetlands. As a higher food chain carnivore, the alligator population is an indicator of the health and productivity of the system. At Myakka River State Park, where alligators are protected from hunters, these reptiles grow to a very large size. Large alligators create "gator holes," which are depressions in wetlands which often retain water even when other portions of the system have dried. Gator holes provide a microhabitat for fish, reptiles, and amphibians and a foraging area and water source for birds and mammals during the dry season.

The Eastern indigo snake is a habitat generalist and, as such, may utilize hammocks, wetlands, flatwoods, and prairies along the corridor. It is known to seek shelter in gopher tortoise burrows to survive in xeric habitats. This is the largest snake in North America, and individuals over 2.4 meters have been recorded. Due to the reduction of xeric habitats for development, it is important that the pine flatwoods/pine prairies, and scrubby flatwoods in the vicinity of Myakka River are preserved to ensure the availability of habitat within the region for this threatened snake.

Xeric habitats along the Myakka River provide high, well-drained soils necessary for burrowing by the gopher tortoise. These burrows, in turn, provide shelter from fire and desiccation for numerous commensals, such as the listed Eastern indigo snake and Florida gopher frog.

In addition to the potential occurrence of the Florida mouse, a state species of special concern, in xeric habitats, the Myakka River corridor may harbor eight other listed mammal species. Forests within the corridor may provide the dense understory required by the state threatened Florida black bear for cover. In particular, hammocks, swamps, and flatwoods can provide bear forage such as palmetto berries, acorns, and cabbage palms. The bobcat also requires dense cover to conceal itself, and it hunts numerous small animals inhabiting these forests.

The current known range of the endangered Florida panther in south Florida does not extend to Sarasota County, although the historic range of this species certainly must have included all forested areas of the Myakka River corridor. However, due to the secretive nature of this species, precise population status and range extensions cannot be verified. Therefore, the possibility that Florida panthers could occur along the Myakka River corridor cannot be discounted. Even if the area is not currently inhabited by the Florida panther, it should be considered as suitable habitat in any future restocking and recovery efforts. Such large, continuous corridors are absolutely essential to accommodate the large home ranges of panthers.

The big brown bat may nest and hibernate in buildings, bridges, and hollow trees along the Myakka River corridor. The river and associated wetlands may also provide a valuable foraging area for big brown bats seeking insects. The Charlotte Harbor area is at the extreme southern point of this species' range.

The Myakka River is a valuable resource for the river otter and West Indian manatee. The river otter travels throughout the Myakka River and may also venture onto land to reach oxbows and tributaries of the river. The river provides a rich food supply of fish, frogs, crayfish, mollusks and other aquatic invertebrates. Banks along the river provide ideal sites for denning.

The lower Myakka River is designated as critical West Indian manatee habitat from the southern boundary of Myakka River State Park to Charlotte Harbor. The West Indian manatee (Trichecus manatus latirostris) is listed as endangered by both FGFWFC and FWS. Manatees inhabit sluggish rivers, shallow estuaries, and saltwater bays. Populations tend to be concentrated in selected estuarine and riverine habitats including the Myakka River. Factors that appear to affect the choice of habitat include availability of vascular aquatic vegetation, proximity to channels of at least 2 meters depth, availability of warm water during winter cold snaps, and a source of fresh water. The principal threats to the survival of manatees are injuries caused by propellers of power boats, crushing by ship and barge traffic, harassment, poaching, and habitat degradation and destruction. The manatee ventures into Charlotte Harbor and up into Myakka River when temperatures in the Gulf of

Mexico drop during winter months. The river contains many species of aquatic plants included in the manatee diet, including the exotic water hyacinth.

Borders of slow-moving streams, tributaries and oxbows, and shallow emergent marshes along the corridor provide suitable habitat for the round-tailed muskrat. Round-tailed muskrats have been known to utilize the freshwater marshes in Myakka River State Park. However, due to its nocturnal, elusive nature, little is known of muskrat activity along the entire Myakka River corridor, although the area should be considered as potential foraging habitat for this species.

The Florida mink is thought to be restricted to coastal areas of north and central Florida. This species inhabits coastal salt marshes and estuaries of rivers where it feeds on fish, crustaceans, mollusks, round-tailed muskrats, and similar food items. Its existence at the Myakka River estuary is questionable, but the area may still be considered as suitable potential habitat.

Little is known of the life history or population ecology of the Florida (long-tailed) weasel. It has been collected in numerous habitat types, including pinelands, hardwood forests, swamps, hammocks, and scrub, all of which are included in the Myakka River corridor. It is possible that the corridor serves as weasel habitat and, as such, may help promote the continued survival of this species. In the future, more extensive surveys for Florida mink, Florida (long-tailed) weasel, and round-tailed muskrat may reveal more accurate information regarding the home ranges, biology, and population levels of these species within the region.

The diversity of the region including the Myakka River and its adjacent habitats assures that the habitat requirements of up to 56 listed bird species are met. As detailed in Appendix C, Tables C-2 and C-3, many of these species are resident year-round, while others overwinter in the area or pass through in the region on their way to overwintering areas.

The Myakka River is an invaluable resource for avian species as it supports many species preyed upon by birds and the vegetation necessary for cover and

nesting habitat. Up to 39 listed birds are directly dependent on its wetland habitats for survival. At least 14 mixed or single-species wading bird colonies have been established in the Myakka River corridor (FGFWFC, 1980).

Native wading birds including the great blue heron (including its white morph, the great white heron), little blue heron, tricolored heron, reddish egret, great egret, snowy egret, black-crowned night heron, yellow-crowned night heron, green-backed heron, eastern least bittern, white ibis, glossy ibis, wood stork, and roseate spoonbill are all listed due to the precipitous loss of wetland habitat in Florida. These species are locally abundant at Myakka River, which has the resources to support the mixed and single-species breeding colonies. These species may nest in riverside vegetation such as mangroves, willows, and buttonbushes in marshes, and even in pines near water (i.e., great blue heron). Similarly, wood storks frequent wetlands in the Myakka River corridor and have established nesting colonies in mangroves bordering the river and on isolated small islands. As water levels drop in marshes and oxbows, foraging conditions are improved for wood storks in the vicinity as fish become more concentrated and easier to catch. Limpkins, white ibises, glossy ibises, and roseate spoonbills forage in stands of emergent vegetation by the river and in swamps, marshes, and tidal flats along the river corridor. Vegetative cover in these habitats may also harbor the black rail and Florida clapper rail. Two red mangrove swamp islands located within the Myakka River contain rookeries for a variety of wading birds, including wood stork, white ibis, great egret, snowy egret, tri-colored heron, great blue heron, and yellow-crowned night heron (see Figure 2-7).

Mud flats near the estuary and other tidal flats in the corridor provide foraging areas for the American oystercatcher and American avocet. Plovers, including the threatened piping plover and southeastern snowy plover, also forage in these mud flats and beaches near the estuary. Since the Myakka River is so near the coast, it is also visited by gulls and terns, including the listed royal tern, sandwich tern, roseate tern, least tern, and Caspian tern, as well as the black skimmer, brown pelican, and magnificent frigatebird.

Along the Myakka River, mangrove habitats are also essential as nesting habitat for three occurring or potentially occurring bird species: the Florida prairie warbler, mangrove cuckoo, and black-whiskered vireo. Since these mangrove swamps are relatively undisturbed by Brazilian pepper, they may be important to the continued survival of these three habitat specialists as well as other water birds with more general habitat requirements.

The wooded swamps and marshes in the vicinity of the Myakka River provide potential nesting habitat for the Louisiana waterthrush and Florida sandhill crane, although these species also forage in drier habitats. The Upper Myakka Lake and Lower Myakka Lake margins are heavily utilized by sandhill cranes for foraging during the dry season.

Thirteen listed raptors, including the bald eagle, swallow-tailed kite, white-tailed kite, Everglades kite, burrowing owl, merlin, Arctic peregrine falcon, southeastern American kestrel, short-tailed hawk, Cooper's hawk, northern harrier, osprey, and crested caracara have all been observed in the region of the Myakka River or may potentially find suitable foraging and/or nesting habitat along the corridor. The mixture of wooded tracts with nest and perch trees and open spaces for hunting provides excellent conditions for the activities of resident and migrant raptor species. Several osprey nests are visible from the river in the vicinity of the Upper Myakka Lake and Lower Myakka Lake and below the U.S. Highway 41 bridge. Two eagle nests are also present along the river corridor, one near Upper Myakka Lake and the other near Lower Myakka Lake.

Pinelands associated with the Myakka River are suitable as woodpecker habitat, including the southern hairy woodpecker and red-cockaded woodpecker. Myakka River State Park contains large slash and longleaf pines, which may potentially serve as colony sites for the red-cockaded woodpecker.

Oak scrub habitats in Myakka River State Park support the Florida scrub jay. Scrub habitats and other xeric habitats in the region may provide habitat for the gopher tortoise and its commensals.

The Charlotte Harbor estuary falls within the limited range of the Florida prairie warbler, which is closely associated with mangroves, but may also utilize hammocks with live oaks. Therefore, this species may utilize habitats adjacent to or directly within the Myakka River corridor.

The American redstart, white-breasted nuthatch, worm-eating warbler, Kirtland's warbler, Arctic peregrine falcon, and Bachman's warbler fly over south Florida on the way to their wintering grounds. Although these species have narrow nesting habitat requirements within their nesting ranges, they will rest and forage in a wide variety of habitat types along their migration routes. It is possible that the Myakka River corridor is visited by these species for short periods of time.

Intensive field reviews of the entire Myakka River corridor will be necessary to accurately assess the extent of habitation by listed species. Much of the area has never been surveyed; therefore, effective management strategies that will protect all listed species occurring within the area have not yet been formulated.

2.6.4 Benthos and Fish

The Myakka River represents a continuum from fresh water to the estuarine Charlotte Harbor system and, as such, supports a number of different community types within the aquatic ecosystem. Classical distribution along this continuum is one of high species diversity within the permanently fresh waters, reduced diversity in the transitional zone between fresh and salt waters, followed by an increase in diversity in permanently salt waters. The Myakka River is no exception to this classical distribution.

The salinity structure of the river is determined by tidal stage on a daily basis and river discharge on a seasonal basis. As discharge increases and decreases with seasonal rains, the salinity zones of the river shift up and down river. The dynamics of the river's salinity structure, resulting from seasonal discharges, results in shifts of species composition, especially fish, of the lower river zones. Seasonal cycles of river discharge also affect the vertical stratification, or lack thereof, of the water column. During periods of high discharge, the lower river estuarine area may be

vertically stratified with significant differences in dissolved oxygen and salinity between the surface and bottom of the water column. During the dry season, the water column is generally unstratified. These periods of stratification and destratification also affect the composition and distribution of populations and communities of aquatic organisms. Perhaps most significant is the fact that the life histories of numerous species are correlated with the seasonal discharge of fresh water and the dynamics of shifting zones of salinity and stratification/destratification of the water column. The sustained productivity of aquatic vegetation, which forms important habitats for aquatic organisms, is also dependent upon seasonal cycles of river discharge.

The Myakka River is dynamic with respect to its salinity structure. During very low flow periods, relatively high salinity water may penetrate well upstream. Salinities has high as 15 parts per thousand (ppt) have been recorded at river mile 20 near Curry Creek, and salinities as high as 10 ppt have been recorded another approximately 2 miles upstream of this. Saline water (defined as >0.5 ppt) has been recorded as far upstream as river mile 28.5, and it probably was limited to further penetration by Downs' Dam. At river mile 26, USGS has measured a tidal oscillation 98-percent of the year (Hammett, 1989). During very high discharge, such as following hurricanes, fresh water may occur down to the river mouth.

Mote Marine Laboratory characterized the lower tidal portions of the Myakka River with respect to average salinity structure for both wet and dry seasons. In April, 1986 (dry season) the 1 ppt isohale extended to the general area of Ramblers Rest Resort, the 5 ppt isohale extended to just above Deer Prairie Creek, the 10 ppt isohale was approximately at Myakkahatchee Creek, the 15 ppt isohale was located near Rock Creek, and the 20 ppt isohale extended to just above El Jobean. During the wet season, these zones were shifted downstream with the 1 ppt isohale at approximately Myakkahatchee Creek and the 5 ppt isohale at near the Sarasota/Charlotte County line.

Benthos--Freshwater benthic invertebrate communities of the Myakka River are mainly comprised of species common to the majority of southwest Florida streams. Noticeably absent or existing in small populations are organisms

which are dependent upon permanently flowing water (Cantrell, 1978). Obvious components, to the unaided eye, of the benthic community are the mollusks. In the upper river below the lakes, one can see freshwater mussels and the exotic asiatic clam on the bottom of the stream. Downriver, in brackish areas, rangia clams and olive nerite snails (Neritina reclivata) are quite common. Blue crabs are commonly seen as far upriver as Downs' Dam.

On the Myakka River at State Road 70, qualitative benthic invertebrate sampling by DER in 1983-1984 resulted in a mean of 84 taxa and a Florida Biotic Index of 32.5 for four collection periods. Organisms from this station were strictly of freshwater origin. Collections at Border Road on the lower Myakka resulted in a mean number of taxa equal to 44 and a Florida Biotic Index of 13.5. This station consisted of organisms of predominantly freshwater origin. However, organisms of marine origin were also collected at this station. The reduced number of taxa at the Border Road station most likely represented the effects of fluctuations in salinity as well as reduced habitat diversity.

Results of the DER sampling indicated the Myakka River had good water quality. The Florida Biotic Index calculated for all areas sampled was highest at the upper Myakka River station, due to good water quality and high habitat diversity. Additionally, good representation of Florida Index organisms among the mayflies, dragonflies, damselflies, caddisflies, and midges indicated that overall water quality of the Myakka River was good.

Sampling of intertidal benthos at U.S. Highway 41 by Mote Marine Laboratory in 1980 revealed a brackish water/estuarine benthic community. The number of species equalled 23 and 32 for samples collected in September and May-June, respectively. Density of organisms equalled 8,277 (September) and 21,998 (May-June) per square meter. Number of species and densities declined during the summer (Estevez, 1986).

Additional studies of benthic communities in the Lower Myakka River by Mote Marine Laboratory (1986) generally indicated zonation of communities as a result of the salinity gradient. Densities and species richness increased, moving downstream to high salinity waters. As with DER data collected at

Border Road, Mote Marine Laboratory data indicated estuarine organisms up to the I-75 bridge. Based on benthic communities, which indicate average conditions, the lower river can be divided into faunal zones based on salinity. These zones roughly correspond to upstream areas that are less than 1 ppt salinity, an oligohaline-mesohaline zone, and a mesohaline-polyhaline zone in the Myakka Bay area.

Fish--Forty-nine species of freshwater fish have been recorded from the Myakka River. They are characterized by an abundance of sunfishes and top minnows. Four species of shiners have been recorded from the river. These fishes are generally associated with flowing clear high-quality water. The sailfin shiner (Notropis hypselopterus) apparently reaches the southern limits of its range within the Myakka River (Layne, 1978). The redbreast sunfish (Lepomis auritus) may also occur in the Myakka River, which is near the southern limit of its range (Champeau, 1989).

It is interesting to note that marine fishes occur within the Myakka Lakes. These include tarpon, snook (a Species of Special Concern), spotfin mojarra, striped mullet, and hogchoker. These fishes are well known to be euryhaline and to penetrate far up rivers into fresh waters. The catadromous American eel is also recorded for the state park.

Mote Marine Laboratory (1985, 1986) conducted studies during both wet and dry seasons to characterize the ecology of the lower Myakka River. The following description of the fishery resources are based on the Mote Marine Laboratory studies.

The lower tidal portions of the Myakka River serves as a nursery area for many recreationally and commercially important fish species. The nursery area of the river shifts seasonally with the cycle of dry and wet seasons. In general, the distribution of fishes in the lower river is related to the horizontal salinity structure of the river, and fish species richness tends to increase from upstream to downstream.

During the dry season, fish eggs have been collected only in the lower river from just above Myakkahatchee Creek. They increased in density in a

downstream direction. Bay anchovy eggs dominated, with scianid (drum/croaker) eggs comprising the majority of the remainder of collections. Initiation of spawning by spring and summer spawners began in March. Fish larval densities and richness increased in a downstream direction, and their distributions were related to salinity. Pipefishes, spotted seatrout, sand seatrout, and whiting larvae were only collected at salinities higher than 5 ppt. Mosquito fish, catfish, killifish, and hogchoker larvae were mainly collected at salinities less than or equal to 5 ppt. Bay anchovy and goby larvae occurred at all stations, and they were numerically dominant up to the I-75 bridge. Based on their fish larval collections, Mote Marine Laboratory identified two zones of larval recruitment within the Myakka River. One zone occurred where salinities were less than 5 ppt, and the second zone occurred where salinities were greater than 5 ppt. The dry season penetration of saline water upriver offers an expanded area of recruitment for spring spawning estuarine species.

Based on their collections of juvenile and adult fish, Mote Marine Laboratory identified three river zones. The upriver zone was situated between river miles 14 to 21.5. Habitat included an area of limestone or sand bottom, and shoreline vegetation changed from floodplain forest to brackish marsh. A mid-river zone extended between river miles 8 to 14 and included the Deer Prairie Creek and Myakkahatchee Creek tributaries. The lower river zone extended from the Myakka River mouth to river mile 8. In this area the river resembles a bay and contains fine muddy sands with seagrasses. Shoreline vegetation includes mangroves and marsh.

Species richness generally increased in a downstream direction. For the upriver zone, 10 species of fish were collected, four of which were freshwater species. In the mid river zone, 12 species were collected, and in the lower river zone 18 species were collected. Mote Marine Laboratory identified the area between Warm Mineral Springs and El Jobean as an important dry season nursery area for juvenile estuarine/marine species. Species included menhaden, sand seatrout, spot, croaker, pinfish, and silver perch. Wet season data showed the highest abundances of juvenile sand seatrout, whiting, and spot at the lower Myakka Bay station. The portion of the river in the vicinity of Tarpon Point appeared to be a transition zone for fish larvae

during the wet season. The data indicated that nursery areas for juvenile fishes moved up and down river in response to seasonal river discharge cycles.

Numerous sawfish (Pristis spp.) have been observed in the lower Myakka River (Estevez, 1989). Populations of these fish have apparently declined along the west coast of Florida. The sawfish is a K-selected species and as such, does not increase populations rapidly. The presence of sawfish in the lower Myakka River and the Charlotte Harbor area may indicate this area has remained particularly suited to this species. The sawfish may warrant consideration as a locally unique or specially protected species.

From the limited studies conducted on the aquatic ecology of the Myakka River, it appears that the estuarine zone, based on faunal collections, extends to somewhere between the I-75 bridge and Border Road. Based on emergent vegetation communities, the fresh water/brackish water interface lies between Snook Haven and Ramblers Rest Resort.

Virtually no data exist on the aquatic ecology of the Myakka River between Downs' Dam and Border Road. Sarasota County has recently initiated studies to define the aquatic communities in this river reach and to determine the interface between estuarine and freshwater fauna.

Within Upper Myakka Lake, the heavy growth of hydrilla has had a measurable effect on lake fish populations. In general, the extensive hydrilla and water hyacinth infestations have reduced the quality of the largemouth bass and black crappie fisheries. These plants have reduced open water areas, and this limits the production of planktivorous forage fishes, the preferred prey of largemouth bass and black crappie. Conversely, hydrilla increases the production of prey favored by bluegill and warmouth, which has resulted in high percentages of harvestable fish of these species.

2.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

The Florida Master Site File contains 62 archaeological/historic sites recorded for the Myakka River watershed (see Table 2-2 for archaeological site data). Because the majority of the watershed has not been subjected to a systematic cultural resource assessment survey, the known data base must be

viewed as skewed towards above-ground mounds or middens, historic structures, and other sites with readily identifiable surface components. The majority of the as yet unrecorded prehistoric sites in the watershed has subsurface components that cannot be assessed by superficial study.

The majority of the recorded sites is generally located within 2 miles of the present river. Archaeological evidence generated from a study of the Carlton Reserve suggests that the river itself has drifted westward during the last 5,000 years. The clustering of sites along the river is evidence of its economic importance to prehistoric and early historic peoples as a transportation route and resource catchment area.

The earliest documented evidence for human occupation in Florida, the Paleo-Indian, comes from two sites located in the Myakka watershed in Sarasota County. These important National Register sites, the Warm Mineral Springs site (8So19) and the Little Salt Springs site (8So18) have yielded radio-carbon dates of 10,000 B.C. A historic marker located at Warm Mineral Springs documents the site as follows:

> Prehistoric Man Lived Here-Spring Was Once A Cave
> Warm Mineral Springs, US 41, 13 miles south of Venice
>
> Prehistoric Man Lived Here (Side 1)
>
> More than 10,000 years ago prehistoric man, saber-tooth cats, giant sloths, mammoths and mastodons lived in this area of Florida which eons later became a part of Sarasota County. Warm Mineral Springs, here, and Little Salt Spring, which is approximately three miles away, have preserved scientifically accepted evidence of this. Carbon dating of human and animal skeletal remains, as well as wooden artifacts found in these springs since 1958 by underwater archaeologists and other divers has determined their antiquity. These explorations and scientific studies have resulted in much recognition being given to these springs.
>
> Spring Was Once A Cave (Side 2)
>
> Lieut. Col. William Royal, underwater explorer and author, while diving in Warm Mineral Springs in 1958 discovered stalactites and stalagmites well below the water line which provided evidence this spring was a dry cave over a very long period of years, possibly during the last ice age. Other dives resulted in the finding of ancient human skulls, bones and animal remains which gave indication of the presence of human and animal life in this part of Florida long before the beginning of written history. In 1977 the national significance of Warm Mineral Springs was recognized when it was placed on the National Register of Historic Places.

The prevailing view of Paleo-Indian existence is that of a nomadic society based on gathering and hunting which included the now extinct Pleistocene megafauna (mammoth, mastodons, bison etc.). The climate of the region during the late Pleistocene was cooler and drier than at present, and the sea was as much as 110 feet lower.

The Archaic stage of cultural development is believed to have begun around 6500 B.C. and was characterized by a shift in adaptive strategies stimulated by the onset of drier Holocene environmental conditions and the floral and faunal changes that resulted. Many Archaic-period occupations no doubt existed in the watershed, but they have not been located due to a relative lack of archaeological investigations. The best evidence for Archaic occupation in the watershed comes from the Little Salt Springs site (8So18) and the Vickers Head site (8So442).

The Archaic component at the Little Salt Springs site contains a wetland cemetery estimated to contain the remains of more than 1,000 individuals that were preserved along with items such as fiber matting and wooden artifacts making it of statewide importance. A large habitation area and midden are located on the adjacent upland. Radiocarbon dates indicate the site was inhabited from 4800 to 3200 B.C. The Vickers Head site is a campsite of the middle Archaic period.

The first of the post-Archaic cultures to be significantly represented in the watershed is the Manasota culture which dates from 500 B.C. to A.D. 800. Manasota peoples where primarily coastal dwellers with their material culture dominated by sand-tempered ceramics and shell and bone tools. During its later stages, the Manasota culture was influenced by the extensive Weedon Island socio-political complex which is best known in northern Florida. Mound burial customs, artifactual evidence of an extensive trade network, and the outstanding Weedon Island ceramics characterize this stage of the Manasota culture. Whereas many culture periods are represented at the important Myakkahatchee site (8So397), this site may contain the best evidence of Manasota utilization of the watershed. The site contains seven components including a lithic reduction area, an extensive midden, a burial area, a

Table 2-2. Myakka River Basin Archaeological Site Data Base

Site No.	Site Name	Site Type	Culture Period	Comments
8So18	Little Salt Springs	spring	prehistoric	preserve (NR)
8So19	Warm Mineral Springs	cave	prehistoric	preserve (NR)
8So21	Deep Hole	surface scatter	UNK	assessment survey
8So22	---	mound	UNK	assessment-EXLOCUNK
8So31	Brothers Site	shell midden	Glades I/II	preserve or test
8So32	Tarpon Point	clay outcrop	Pleistocene	assessment survey
8So70	Wilson Mound A	sand mound	UNK	preserve
8So77	Wilson Mound B	burial mound	Post contact	destroyed
8So80	Handcock Mound Complex	sand mound	UNK	destroyed
8So85	Cocoplum	midden	Glades	preserve
8So86	Bernhard	midden	Glades	assessment survey
8So87	Star	midden	Glades	assessment survey
8So88	Rhapsody	midden	Glades	assessment survey
8So389	Hi-Hat Ranch 1	---	Archaic	assessment survey
8So390	Mumford	---	Pleistocene	assessment survey
8So393	Lazy River Midden	midden	Glades	assessment survey
8So397	Myakkahatchee Site	midden/burial md.	Paleo-Ind./Archaic	preserve
8So447	Slat Creek Site	underwater	UNK	assessment survey
8So403	Blackburn Site	mound	S.Har/Englwd/Contact	assessment survey
8So422	Vicker's Head 1	artifact scatter	Archaic/Post-Arc/His	preserve
8So423	Vicker's Head 2	lithic scatter	UNK	assessment survey
8So424	Hot Shot Site	lithic scatter	Archaic	assessment survey
8So425	South Power Line	lithic scatter	Archaic	destroyed
8So426	Turpentine Camp 2	lith sc/hist refuse	UNK	preserve
8So427	Venice-Arcadia 1	lithic scatter	UNK	no further wk. recom.
8So428	Venice-Arcadia 2	single artifact	UNK	no further wk. recom.
8So429	Honey Bee Site	single artifact	UNK	in preservation area

Table 2-2. Myakka River Basin Archaeological Site Data Base (Continued Page 2 of 3)

Site No.	Site Name	Site Type	Culture Period	Comments
8So430	Lincer Site	historic refuse	1920s-1950s	in preservation area
8So431	cow Trail Site	single artifact	UNK	in preservation area
8So432	Alhambra Site	UNK	UNK	destroyed
8So596	Miakka School House	structure	built 1914	preserve (NR)
8So1293	Lincer 2	historic refuse	1930s-1960s	in preservation area
8So1294	Resin Collection	historic refuse	1900-1925	in preservation area
8So1295	Windy Sawgrass Camp	hist ref/structures	20th century	assessment survey
8So1296	Farmstead	historic refuse	UNK	in preservation area
8Ch60	---	UNK	UNK	assessment survey
8Ch70	Huckaby Creek Mound	mound	UNK	assessment survey
8Ch71	Muddy Cove 1	shell midden	UNK	assessment survey
8Ch72	Muddy Cove 2	shell midden	UNK	assessment survey
8Ch73	"No Name Creek Midden"	shell midden	Glades	further testing
8Ch74	West Coral Creek Site	lithic scatter	Paleo-Ind./Archaic	assessment survey
8Ch75	Wrecked Site	burial md, shell mid	Safety Har/Archaic	destroyed
8Ma57	---	burial mound	UNK	assessment survey
8Ma58	---	cemetery	UNK	assessment survey
8Ma59	---	2 sand mounds	UNK	assessment-EXLOCUNK
8Ma60	---	2 sand mounds	UNK	assessment survey
8Ma61	---	non-existent	UNK	no further testing
8Ma62	---	mound	UNK	destroyed
8Ma66	---	mound	UNK	destroyed
8Ma70	---	burial mound	UNK	destroyed
8Ma71	---	sand mound	UNK	assessment survey
8Ma73	---	non-existent	UNK	no further testing
8Ma127	Stanley Mound Site	burial mound	Weedon Island	further testing

Table 2-2. Myakka River Basin Archaeological Site Data Base (Continued Page 3 of 3)

Site No.	Site Name	Site Type	Culture Period	Comments
8Ma141	Sugarbow 1 Campsite	camp	intermittent	no further testing
8Ma142	Rainbow Ranch Homestead	homestead	historic	no further testing
8Ma146	Long Creek 1	hunting camp	late Archaic	assessment survey
8Ma180	---	structure	historic	no further testing

UNK - Unknown
(NR) - National Register
EXLOCUNK - exact location unknown

Sources: Florida Department of State, Division of Historical Resources, 1989.
Piper Archaeological Reserach, 1989.

curved earthwork, a sand mound, and a borrow area. The site demonstrates the considerable use made of the extensive wetlands located in the Myakka River watershed.

The final prehistoric cultural manifestation found in the watershed is the Safety Harbor culture which was geographically centered around Tampa Bay. This period, beginning about A.D. 800, is typified by ceremonial centers with truncated temple mounds and open village plazas surrounded by middens. The Wrecked site (8Ch75) located in Charlotte County consists of a Safety Harbor period burial mound and two linear shell middens. The burial mound was destroyed by vandals in the early 1980s; little but spoil remains. The shell middens are composed primarily of Carolina marsh clams and oysters. One of the middens extends 375 feet along the Myakka River.

The Timucuan Indians that were native to the Myakka River watershed during this period were decimated and dispersed by repeated conflicts with Europeans and exposure to European diseases. Remnants of this ethnic group may have joined the Cuban-Spanish fisherman who were active in the Tampa Bay and Charlotte Harbor area in the first half of the 18th century.

Whereas several European expeditions may have reached the Myakka River, including Juan Ponce de Leon in 1513 and Bernard Romans in 1771, the watershed was not occupied by new groups until the arrival of the Seminole Indians, originally members of the Creek nation, during the early 18th century. The Myakkahatchee site (8So397) shows evidence of Seminole Indian occupation, making it important because there is little evidence elsewhere of Seminole occupation in the watershed.

The Seminole Wars which occurred in the first half of the nineteenth century resulted from the attempt by the U.S. Government to remove the Seminole Indians from Florida. These conflicts had a negative impact on historic settlement in the watershed, as people were afraid to attempt homesteading in an area where safety could not be guaranteed. In 1842, the Armed Occupation Act was passed to encourage settlers to build homes and cultivate the land. Many of the settlers that first came to the Myakka watershed engaged in

farming, but the topography is so well suited to cattle ranching that it eclipsed farming as the predominant industry.

During the Civil War, when Union troops and naval blockade forces threatened Florida, Hillsborough County cattleman Jesse Knight sent herds south to the Myakka watershed for safety. His son-in-law, Shadrack Hancock, moved to the area which latter became the community of Miakka. The Miakka School House (8So596) is a late nineteenth century historic structure on the National Register of Historic Places, and of regional significance a historic marker in Miakka notes:

> "Miakka" Near Miakka United Methodist Church and Cemetery Verna Road, Miakka Community
>
> Miakka (Side 1)
> Indians were still living in this area when the first settlers arrived. The deep pine forests were rich with game, the nearby Myakka River supplied them with fish. Pioneers felled the tall trees used in building their cabins and barns. Following the Civil War, the Homestead Act and burgeoning railroad industry opened up vast sections of the country including this area of Florida for more settlers. Evidence of the Pine Level Trail that led to the County Seat can still be seen at the nearby Crowley Nature Center. Here also is where John J. Crowley built the first blacksmith shop.
>
> Miakka (Side 2)
> One half mile south of this marker once stood a log structure where church services were held by circuit riding preachers. During the week the building was used as a school. William Rawls and A.M. "Gus" Wilson each donated land for what is now the church and cemetery. In 1886 the church was built and the graves of some of the early settlers dot the small cemetery. Gus Wilson served as State Senator from this area and played a prominent part in state and local government. One fourth mile NW of here, on Wilson Road is the site of the one room school built in 1926 now used as a community meeting house.

In addition to Miakka, cattle camps, such as the Windy Sawgrass camp (8So434), and the early homesteads represent important sites in the watershed.

In the first quarter of the 20th century, the forest industry began operations in the watershed. Florida slash pine was predominant in the river watershed and a good source of pulpwood and resin for turpentine. Several turpentine camp sites, run with convict labor for higher profit, are known to be located in the watershed, such as the Turpentine Camp #2 (8So426).

2.8 LAND USE PATTERNS AND REGULATIONS

2.8.1 Existing Land Use Within the Myakka River Watershed

Land uses in the watershed are predominantly rural, with the principal exception being portions of the City of North Port and several estate-type residential subdivisions (see Figure 2-8). Except for these areas, development has been basically limited to agricultural activities and drainage alterations designed to facilitate agriculture.

The watershed has historically developed through the establishment of small towns located along the primary highways and rail lines that cross the watershed. These towns include Myakka Head on State Road 64; Verna, Parmalee, Myakka City, and Edgeville along State Road 70; and North Port on U.S. Highway 41. Except for North Port, these communities provide limited services and are relatively stable or have declined in terms of population growth. Only North Port has experienced growth in a manner consistent with most urban coastal areas of southwest Florida. In 1987, North Port's permanent residential population was estimated at 8,828, an increase of 42.3 percent over the 1980 population of 6,205 [Bureau of Economic and Business Research (BEBR), 1988].

The main agricultural activity within the watershed is cattle grazing on rangeland, unimproved pasture, and improved pasture. These activities occur throughout the watershed on various sizes of ranches ranging from less than 100 acres to several thousand acres. Most of the cattle-grazing activity occurs in areas set back from the river; however, there are several ranches south of the state park between the Myakka Lake and I-75, and on the east side of the river south south of the Carlton Reserve where cattle grazing on improved pasture occurs. Row crop, field crop, and citrus activities are also located within the watershed. They are becoming more prominent and intense with respect to land management activities as urban and suburban development along U.S. Highway 41 and adjacent coastal areas forces agricultural activity eastward into the watershed. Engineering practices and economic feasibility of planting citrus groves in the watershed have also facilitated citrus movement.

Residential development has historically been limited to farmsteads associated with ranch operations and small subdivided lands in the communities previously described. More recently, estate-type residential subdivisions have been developed to facilitate the suburban homeowner who desires rural-type housing densities or desires to own horses or other farm animals. These ranchettes occur along the principal east-west highways and include Myakka Valley and Manhattan Farms.

Except for the areas that have been subdivided for residential or ranchette uses, most of the watershed is under large tract ownership. Ownership patterns vary and include phosphate mining interests (in the northern and eastern portions of the watershed), and agricultural interests elsewhere with the exception of publicly held lands within and in the vicinity of Myakka River State Park. Public lands in addition to the State Park include land owned by the City of Sarasota and Sarasota County, (the Walton Tract, and the Carlton Reserve). DNR and SWFWMD have also expressed interests in acquiring lands in the vicinity of the Myakka River.

2.8.2 Existing Land Use Within the River Vicinity

Existing land use in the river vicinity is primarily composed of vacant land, consisting of either freshwater or saltwater marsh, hammocks, and pine flatwood communities. Ranchette-type residential development occurs north of Upper Myakka Lake (Hidden River), west of Vanderipe Slough (Myakka Valley), and subdivisions adjacent to and within the vicinity of Border Road, including Manhattan Farms, Myakka River Estates, and Royal Palms. Other land uses within the river vicinity include recreational and support facilities associated with Myakka River State Park and commercial enterprises including Snook Haven, Ramblers Rest Resort, and Becky's Bait. South of U.S. Highway 41, residential subdivisions occur on both sides of the river. Various types of infrastructure are also present and include highway bridges and approaches and electrical transmission and distribution lines. Several radio towers are also visible from the river, but these towers lie outside the immediate river vicinity. Figure 2-8 depicts the location of these types of land uses as well as land cover.

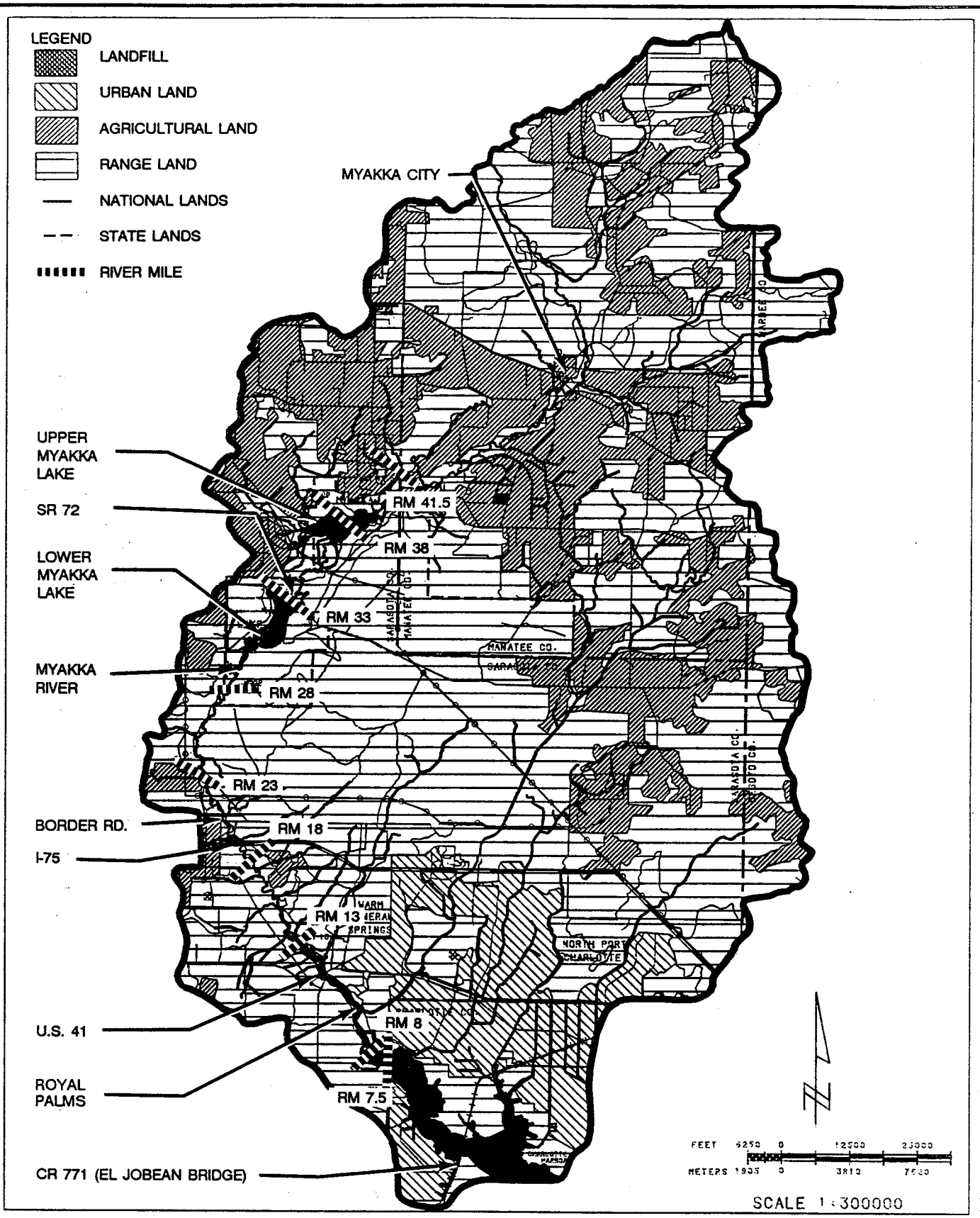


Figure 2-8
EXISTING LAND USE-WATERSHED

SOURCES: SARASOTA COUNTY, 1989; USGS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

2.8.3 Future Land Use

The future land use elements of the various relevant comprehensive plans designate the area within the Myakka River watershed for varying land uses. The majority of the land within the watershed is planned for public resource lands and rural land uses. The central portion of the watershed is dominated by public resource lands. The Myakka River State Park, the Carlton Reserve, and the Walton Tract comprise the public resource lands. The designation of these areas as public resource lands precludes any residential and commercial development in these areas. Within the Manatee County portion of the watershed, land is designated AG/R (Agricultural/Rural), which allows agriculture, agricultural-related uses, varying numbers of dwelling units (net) per gross acre, and mining. RES-1 and RES-3 designations allow 1 and 3 dwelling units per gross acre, respectively, in areas confined to Myakka City. In addition, the R/OS designation (Major Recreation/Open Space) is found within the confines of Myakka River State Park.

The southern half of the watershed within Sarasota County is planned for rural and future urban (rural) land uses. The rural designation is located north and east of I-75 and along the Myakka River from West River Road to a point 1 mile east of West River Road. The designation allows a maximum of 1 dwelling per 5 acres. The future urban (rural) designation is located south of I-75 and allows for the same density as rural until such a time as those areas are designated urban.

The function of these rural areas according to APOXSEE is the protection of agriculture, maintenance of large expanses of open space, and the conservation of native habitats. Additionally, APOXSEE designates areas from I-75 south as preservation habitat areas to provide further protection.

Within the City of North Port, the future land use designation along the river is conservation restricted area. Recreation/open space areas or agricultural land use designations buffer the river. Most of the land within North Port and the watershed is designated for low density residential use, including Myakka Estates portions, which are to be developed at approximately 1 unit per acre.

2.8.4 Future Land Use Impacts

The coastline of Florida is one of the state's most attractive features and draws people to both vacation and live in Florida. The tourist industry of Florida is a major economic factor in the state. The tremendous population growth which Florida is experiencing has been well-publicized, and the Florida legislature as well as the state's regional agencies and local governments are addressing growth management issues. Accommodating increasing seasonal and resident populations will necessitate future residential and commercial land development along with the attendant infrastructure, development of public water supply, agricultural development, and the need for recreational space. The potential for development to accommodate increased populations within the Myakka watershed as described in Section 2.8.3 also has the potential to impact resource values of the Myakka River.

The State of Florida recognizes the increase of nutrients in the state's waters as one of the most pressing issues. The federal government also considers nonpoint source pollution a primary factor in degradation of surface waters. Future development may potentially result in increases of these sources of pollution. Development, both agricultural and nonagricultural, results in increased use of fertilizers, pesticides, and herbicides and an increased need for wastewater and solid waste disposal. Increased impervious surfaces, from roads and parking lots, results in increased stormwater runoff and loss of rainfall infiltration into the land surface to replenish ground water aquifers. Runoff may contain sediments, nutrients, chemicals, oil and grease, petroleum hydrocarbons, and litter. Development generally will also result in modification to the natural hydrologic regime of the land surface through increased impervious surface, clearing of vegetation, and drainage modifications. Effects of development may potentially be manifested in degraded water quality and alteration of freshwater flow to the Myakka River and downstream estuarine area.

Future land development will potentially result in the loss of fish and wildlife habitat and extirpation of threatened and endangered species. Important habitat may be lost through the development of both uplands and wetlands. However, much stricter controls are in place for development and

loss of wetlands than exist for upland habitat protection. Development may also result in habitat fragmentation and the disruption of wildlife corridors.

With increased population comes the need for additional outdoor recreational space. The increased use of recreational space may result in the degradation of the resources upon which the use is based.

Future development within the Myakka watershed may also include the development of new mines for phosphate and other resources such as dolomite. Phosphate mining disturbs large tracts of land for extended periods of time, and results in loss of habitat, discharges to surface waters, pumping of ground water, and alterations in surface land forms and flow patterns. Finally, wastewater treatment and disposal and brine disposal from both public and private desalinization water treatment systems are additional factors that may adversely affect water quality in the watershed.

2.8.5 Land Use Planning and Regulation

Figures 2-1 and 2-2 depict the political jurisdictions within the Myakka River watershed and the river area and vicinity, respectively. The majority of the watershed lies within unincorporated Sarasota County. A significant portion of the upper reaches of the river, including headwaters, lies within unincorporated Manatee County. The extreme eastern portions of the watershed lie in unincorporated portions of Hardee and DeSoto Counties. The mouth of the Myakka River as it enters Charlotte Harbor lies in unincorporated Charlotte County. Portions of the watershed near the river mouth are also located in the City of North Port.

The Florida Wild and Scenic River segment is confined to portions of unincorporated Sarasota County, with the exception of an area south of U.S. Highway 41, which is located in the City of North Port. Land use regulations are adopted and enforced by the respective county commissions in Sarasota, Manatee, Hardee, DeSoto and Charlotte Counties as well as the City of North Port City Commission.

Sarasota County Regulations--Sarasota County regulates land development through its comprehensive plan and through other codes and ordinances. The

Sarasota County Comprehensive Plan, APOXSEE, as adopted by the Board of County Commissioners in March 1989, identifies public resource lands, including the Carlton Reserve and the Walton Tract, as areas of special designation that are to be preserved. In addition to preservation of native habitat, a portion of the Walton Tract (also known as the Central County Complex) is intended for use as a county landfill. The plan also designates the majority of the watershed east of the river as a rural land use classification. This classification is part of Sarasota County's urban containment policy which consolidates growth. The rural land use classification provides for the protection of agriculture, the maintenance of large expanses of open space, and the conservation of native habitat.

APOXSEE's Chapter 2, Environment, also provides for the regulation of land development. The section entitled "Guiding Principles" provides guidelines which pertain to native habitats in Sarasota County. These guidelines are applied by the county in the evaluation of land development proposals. The guidelines, which are divided into two parts, list the major natural values and functions of the specific habitat and show how the values and functions listed in the first part can be maintained and/or conserved.

The Myakka River is listed as a specific habitat in that section. Specific management guidelines for the river are as follows:

1. Prohibit dredging and filling in the Myakka River.
2. Adopt a shoreline protection ordinance establishing a requirement for vegetation buffers for all new construction and prohibiting additional artificial shoreline stabilization and channelization of watercourses.
3. Strive to reduce pollution entering the Myakka River.
4. Closely monitor the effects of phosphate mining and other potentially detrimental land uses.
5. Establish a special conservation management area that includes the Myakka River and appropriate lands adjacent to the river to ensure the future conservation of the Myakka River and its watershed.

Additionally, freshwater wetlands with specific habitats (swamps, marshes, sloughs, wet prairies and heads) are listed in the Guiding Principles section.

There are several important management guidelines within that section which apply to the Myakka River watershed.

Swamps and bay heads, due to their high degree of environmental importance and their relative rarity in Sarasota County, shall be preserved and should be restored where practicable. Guidelines applying to marshes, sloughs, and wet prairies include: protection of vegetation in areas subject to seasonal water level fluctuations; protection from impediments to water flow in contiguous wetlands; provision for mitigation of lost wetlands; pretreatment of stormwater runoff; and buffers around wetlands. Additionally, these guidelines regulate buffers and the developable areas within mesic hammocks. The environment plan chapter of the comprehensive plan provides goals, objectives and policies through which the county may implement land development regulations. Goal 5 of the plan states endeavors to conserve, protect, maintain, and restore the natural resources of the county. Several policies have been created to reach this goal. Policies 5.2.2 and 5.2.4 enjoin the county to implement ordinances that will provide shoreline protection from encroaching development and protect the Myakka River. Policy 5.2.5 designates the watersheds of the Cow Pen Slough and the Myakka River as areas of special environmental significance and also prohibits mining activities in these areas. Policy 5.2.6 requires the county to continue to monitor and assess any variations in the hydroperiod of wetlands and impacts to aquifers, flora, and fauna located on the Carlton Reserve.

Other Codes and Ordinances--The county has also adopted policies that will affect the county's Land Development Regulations. Policy 5.4.1 states that the county shall adopt a site development review section within the Land Development Regulations. This review section shall include a comprehensive review of the natural environment for land development proposals.

Policy 5.5.8 states that the county shall establish guidelines in the Land Development Regulations, Zoning Ordinance, and/or other existing regulations that regulate development in environmentally significant/ sensitive areas.

Additionally, subdivision regulations and site and development plan regulations also provide measures to regulate land development. These

subdivision regulations require that all development be in conformance with the comprehensive plan and show that it is to be developed in an environmentally sound manner. The county may also require that an applicant meet certain performance criteria (such as standard setbacks in areas that are environmentally sensitive) as a condition of approval. This process, along with appropriate land use designations, directs land development activities out of sensitive areas in the watershed.

Current county regulations include County Ordinance 83-44, which affords some regulation on the clearing and trimming of mangroves in the county. However, a new mangrove protection ordinance may be adopted in the immediate future. Provisions of the Earthmoving Ordinance (No. 81-60, soon to be amended) and the Water and Navigation Control Authority Ordinanace (No. 72-84, as amended) both regulate dredge and fill activities along the Myakka River. The location and use of pits, lakes, excavations and fills is controlled by Sarasota County Ordinance No. 81-60, to be amended by Ordinance 89-112.

I-75 Corridor Plan--Another policy which regulates development in the watershed is the Sarasota County I-75 Corridor Plan. The policies in the corridor plan are consistent with the environmental plan element of APOXSEE and, therefore, provide similar land use regulations for the I-75 corridor within the Myakka River watershed.

The corridor plan requires vegetative buffers of 200 feet to be developed along the Myakka River where the interstate crosses the river. Additionally, the plan calls for a special conservation management area for the Myakka River. This management area would require the mesic hammock habitat along the river to serve as the primary buffer area. The slough systems, located on both sides of River Road, would also be conserved to protect the environmental integrity of the river. Buffers would also be established along the tributaries of the Myakka River.

City of North Port Regulations--The City of North Port regulates future development by means of the Comprehensive Plan, Zoning Ordinance, Land Development Regulations, Subdivision Regulations and a site development review procedure. Although all of the above are essential to regulate future growth

in the City of North Port, the Comprehensive Plan is the guiding framework for the City's future development. The Future Land Use Element (Element 1) sets the tone for future development activities. This element's primary goal requires land development regulations that will manage the development through the preparation, adoption, implementation, and enforcement of land development regulations.

Within the conservation and coastal zone management element (Element 9), the following areas have been identified for continued conservation and enhancement due to their value as a significant natural resource, their natural beauty and aesthetic value, along with their immeasurable significance as recreational resources for the City's population:

- Those coastal marsh areas along the Myakkahatchee Creek and Myakka River that are within the confines of the City of North Port.
- The Outstanding Florida Water (OFW) and Wild-and-Scenic-designated portions of the Myakka River that flows through the City of North Port.

Objective 1.4 in Element 9 requires that a wetland ordinance be written and adopted by the year 1991. This ordinance will be designed to protect, conserve, or restore water resource systems and attendant biological functions within the city.

Manatee County Regulations--Manatee County submitted its Comprehensive Plan pursuant to Chapter 163, Florida Statutes, on November 16, 1988. The plan contains specific chapters on Future Land Use and Conservation Elements. The Future Land Use Element contains specific objectives for wetlands, rivers, lakes, streams, and watershed protection. The Conservation Element addresses water quality, water conservation, mineral resource extraction and wildlife protection.

The County also has a Comprehensive Zoning and Land Development Code (Ordinance 81-4, as amended). The Code regulates development by establishing zoning district regulations, special regulations pertaining to cluster development, and environmental and open space regulations. Requirements for subdivisions and site plans are specified. Manatee County has a mining

ordinance which requires state-of-the-art mining facilities to reduce environmental impacts and stringent mitigation requirements.

Hardee County Regulations--Currently, Hardee County regulates development by its comprehensive plan, land development code, and subdivision regulations. Environmentally sensitive areas are not specifically addressed in the regulations at this time; however, environmentally sensitive areas and developmental policies will be included in its updated Comprehensive Plan due to the Department of Community Affairs on September 1, 1990. Until the adoption of Hardee County's updated comprehensive plan, future development will be regulated by a site plan review conducted by the building and zoning board and the county commission special exception is required to develop a parcel of land.

DeSoto County Regulations--DeSoto County controls development by the use of a countywide zoning code, comprehensive plan, subdivision regulations and a site plan review conducted by the zoning director and code enforcement officer. The county's updated comprehensive plan is due to the Department of Community Affairs by August 1, 1990. This new plan will set forth policies regulating development throughout the county and future land use designations in that portion of the county located within the Myakka watershed.

2.9 LAND OWNERSHIP

Land ownership in the vicinity of the river area consists of several categories: public land (state and county), privately owned large tracts, and privately owned small tracts (see Figure 2-9). Beginning at County Road 780 and traveling south, approximately 16 river miles are in public ownership. This public ownership includes large tracts of the Myakka River State Park, the Carlton Reserve, and the Walton Tract. Additionally, SWFWMD has recently proposed to purchase, through voluntary acquisition, an additional 2,400 acres along a portion of the Myakka River south of the Walton Tract. This acquisition would include six river miles and be conducted under the State of Florida's Save Our Rivers program, which may acquire land only on a willing-seller basis.

Downriver from the large publicly owned tracts, the ownership patterns change; tracts ranging from 5 to 50 acres occur along the river as well as several smaller lots around river mile 22. The eastern bank of the river is characterized by large privately owned tracts with generally less intensive uses except for land immediately south of Border Road, which has numerous small residential lots. In the vicinity of North Port, small tracts and lots are present on both sides of the river to the county line.

Land ownership patterns will likely change in two ways. Large tract ownership will likely be subdivided as suburban development spreads eastward from coastal areas. In addition, public ownership will likely increase, due to the Save Our Rivers program (Myakka River and Upper Myakka River Save Our Rivers projects) and DNR's interest in purchasing a portion of Tatum Sawgrass.

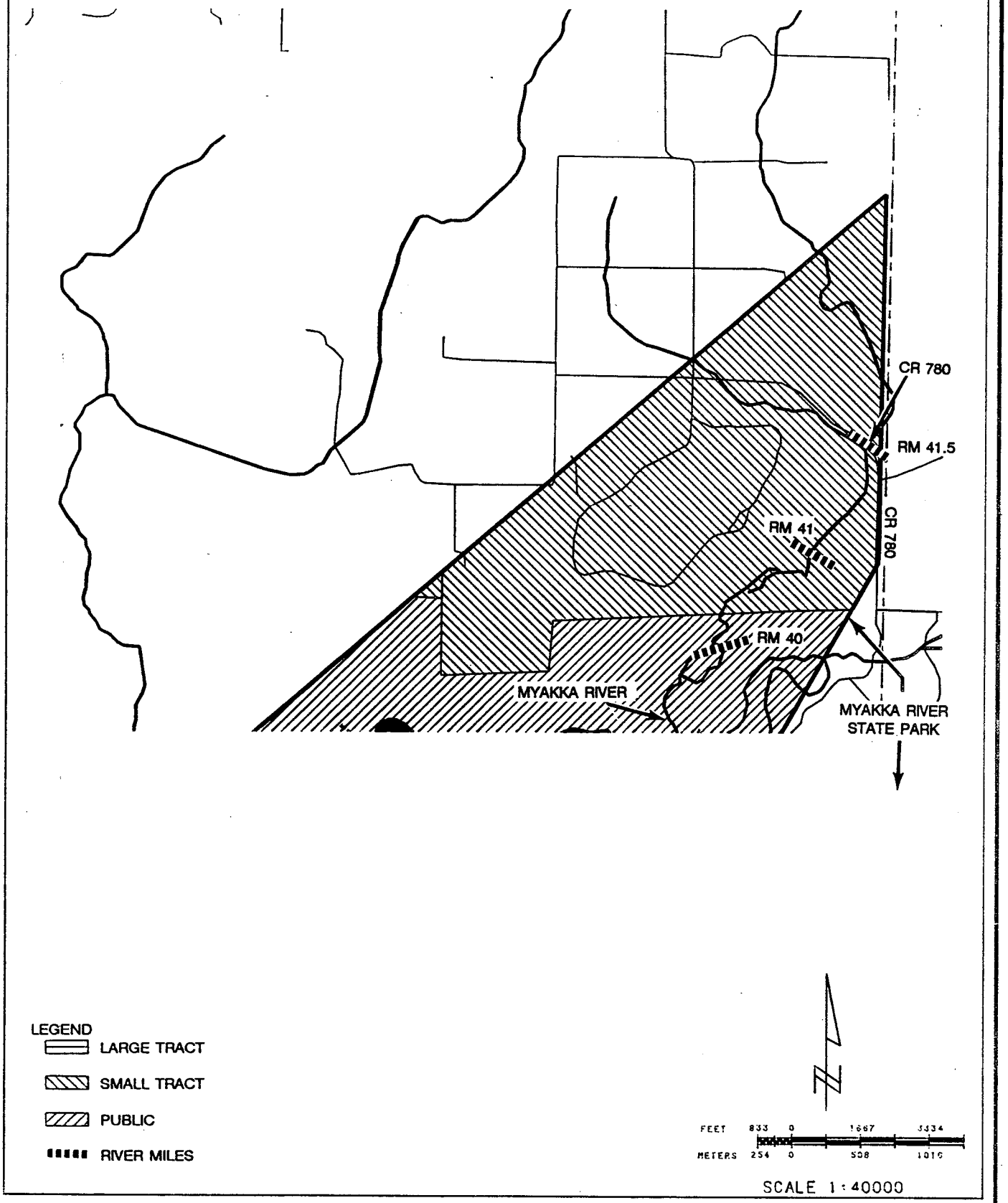


Figure 2-9
OWNERSHIP PATTERN (1 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER
MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

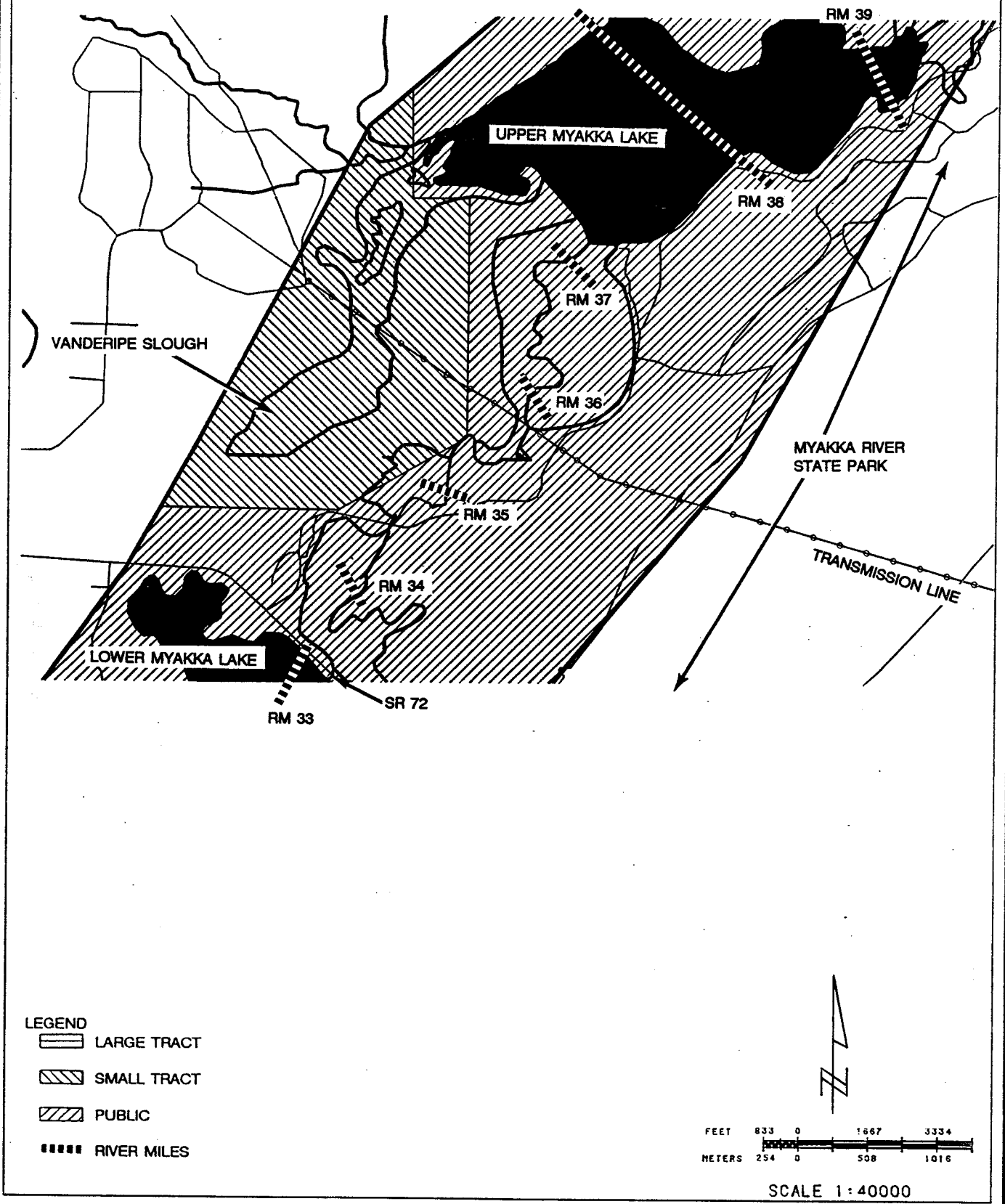
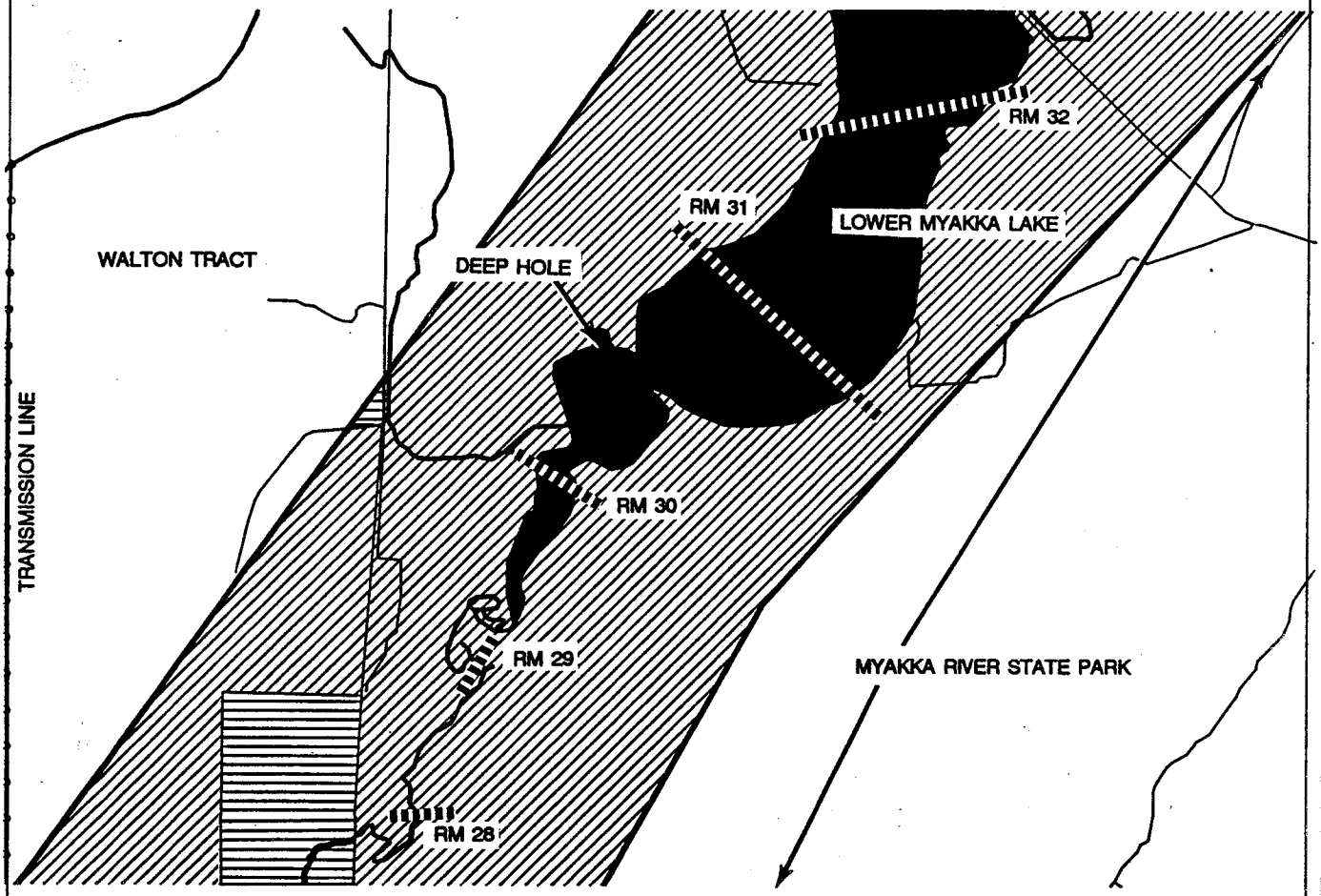


Figure 2-9
OWNERSHIP PATTERN (2 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND
- LARGE TRACT
- SMALL TRACT
- PUBLIC
- RIVER MILES

FEET 833 0 1667 3334
METERS 254 0 508 1016

SCALE 1:40000

Figure 2-9
OWNERSHIP PATTERN (3 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

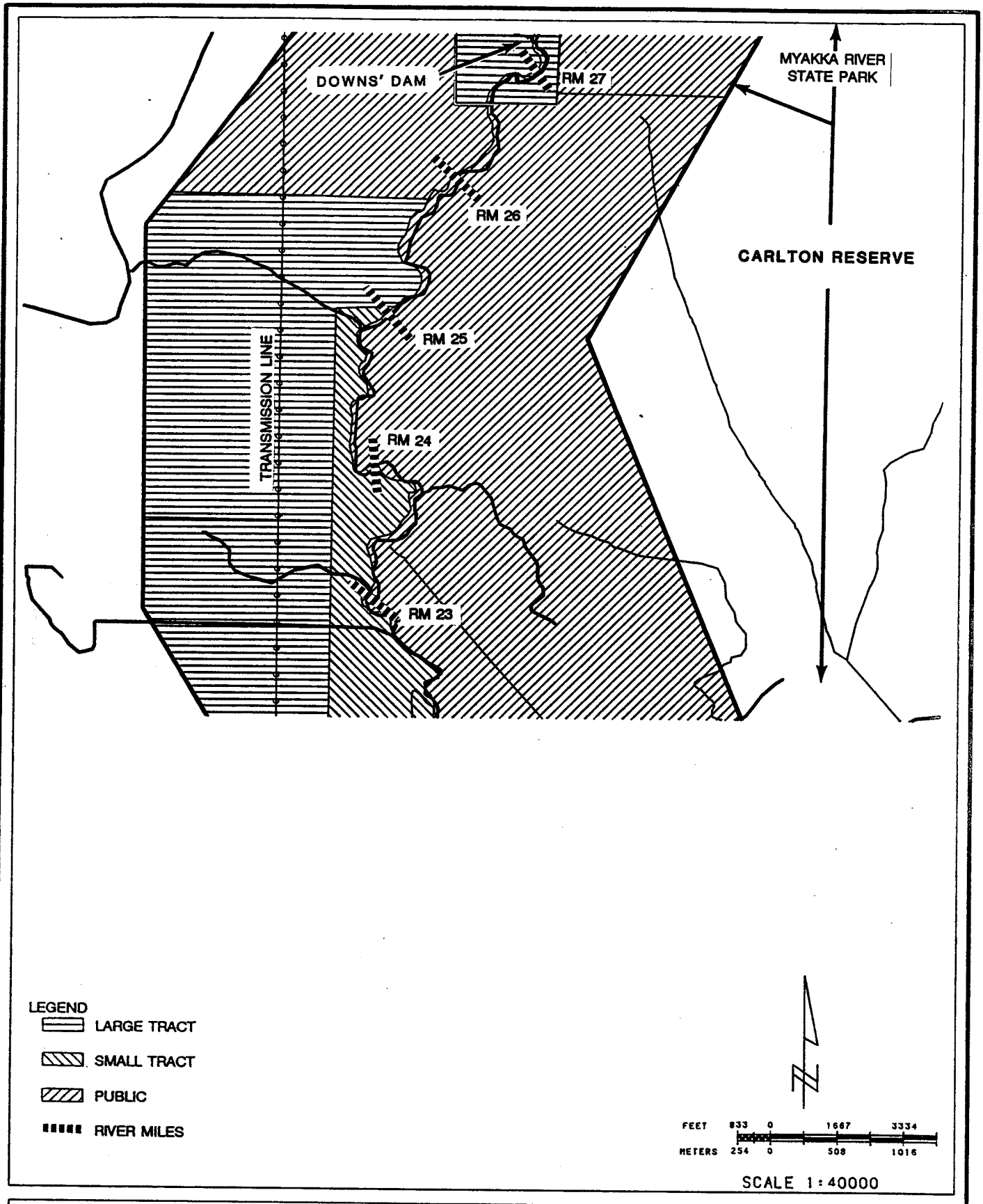


Figure 2-9
OWNERSHIP PATTERN (4 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES

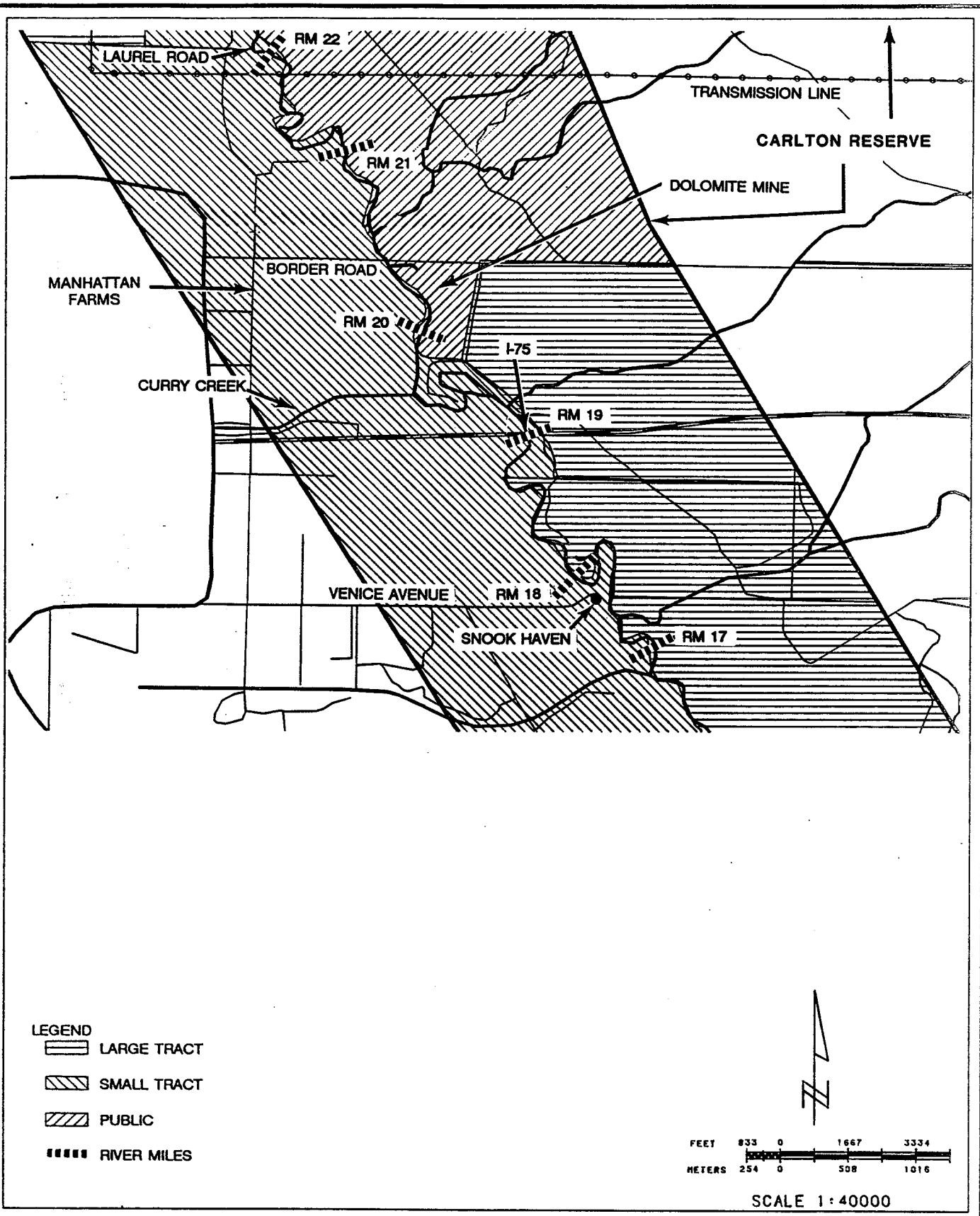
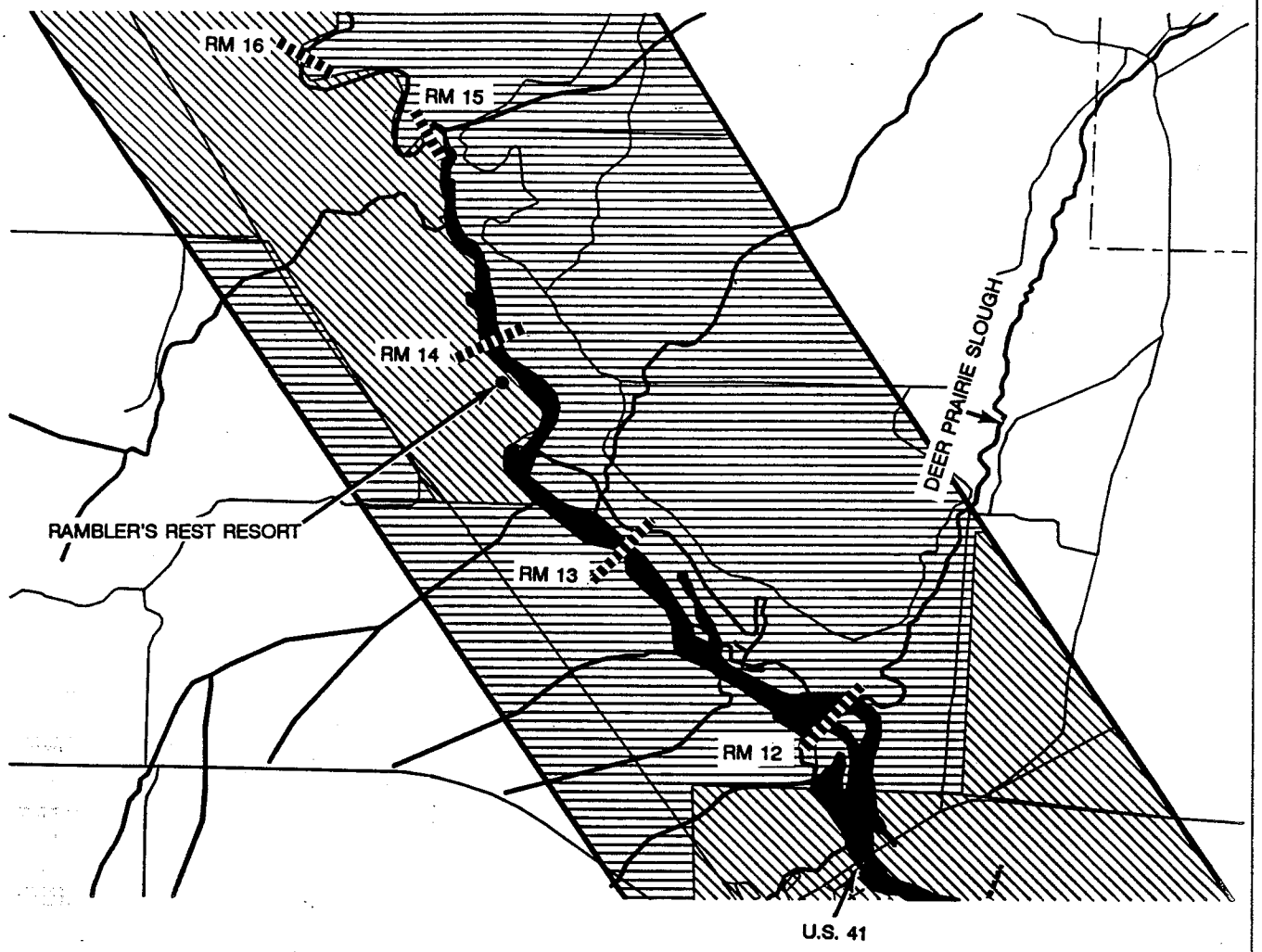


Figure 2-9
OWNERSHIP PATTERN (5 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND
- LARGE TRACT
- SMALL TRACT
- PUBLIC
- RIVER MILES

FEET 833 0 1667 3334
METERS 254 0 508 1016

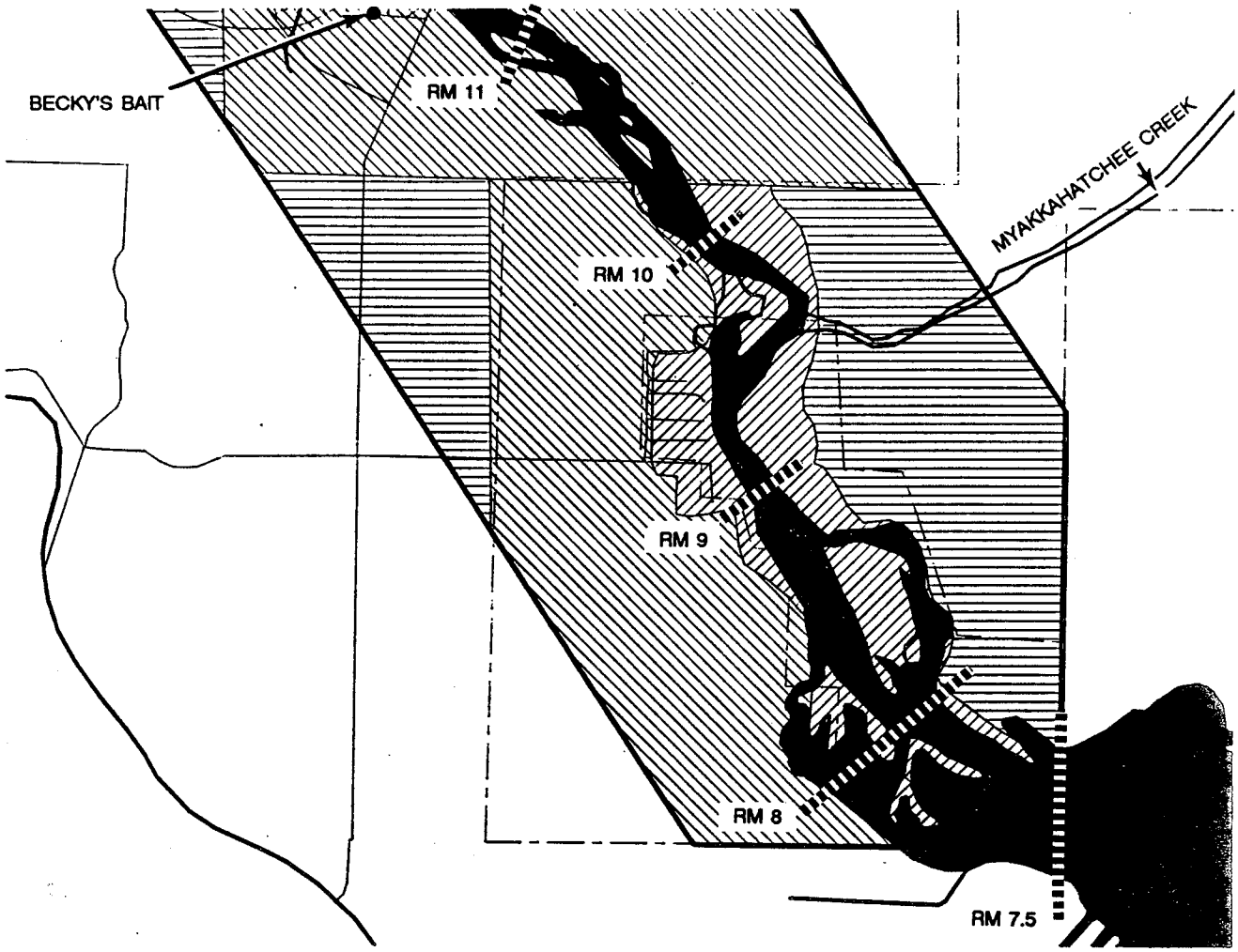
SCALE 1:40000

Figure 2-9
OWNERSHIP PATTERN (6 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES



LEGEND
- LARGE TRACT
- SMALL TRACT
- PUBLIC
- RIVER MILES

SCALE 1:40000

Figure 2-9
OWNERSHIP PATTERN (7 OF 7)

SOURCE: FLORIDA PLATS, 1989.

MYAKKA WILD AND SCENIC RIVER MANAGEMENT PLAN

FLORIDA DEPARTMENT OF NATURAL RESOURCES