

1.0 INTRODUCTION

1.1 BACKGROUND

The Myakka River has been a rich, diverse, and important ecosystem since shortly after the subsiding seas exposed peninsular Florida and the Myakka River valley at the end of the Pleistocene Period, approximately 10,000 years ago. The Myakka River and its watershed possess abundant natural resources, which vary from the headwaters to river mouth and from river channel to the basin boundaries. The southerly location of the Myakka River is within the southwest portion of the State of Florida. The near subtropical to temperate climate and the high annual rainfall contribute to the development of a complex association of flora and fauna.

Early man's dependence on vegetation and fish and wildlife resources attracted him to the river, and present-day man continues to be attracted to the river, less for subsistence, but more for recreation and an appreciation for the natural environment.

In the mid-1970s, county planners recognized the river's resource values (e.g., the only river in Sarasota County, freshwater and nutrient transport to Charlotte Harbor, habitat and hydrologic cycle functions) in preparing the Sarasota County's Comprehensive Plan. In addition, previous efforts by groups such as the Myakka River Coalition have brought attention to the Myakka River. This group conducted an environmental study on the river system in the late 1970s.

In November 1978, Congress authorized the United States Department of the Interior, National Park Service (NPS) to study the Myakka River and determine its potential for inclusion in the National Wild and Scenic Rivers system. Public meetings or workshops were held locally in January 1979, April 1980, and September 1980 to disseminate information and obtain input from local elected officials, representatives of various governmental agencies, land owners, environmental interests, and other interested citizens. Press releases and study updates were developed and distributed in July 1979 and September 1981. The NPS prepared a Draft Wild and Scenic River Study/Environmental Assessment in September 1983. Based upon comments received by various federal, state, regional and local agencies, quasi-public agencies, and conservation and private organizations, a final Wild and Scenic River Study, was prepared in July 1984.

The final study proposed:

- The 12 miles of the Myakka River within the Myakka River State Park be included as a state-administered component of the National Wild and Scenic River System.
- The State of Florida continues its current management practices, protecting the natural and cultural qualities of the designated segment of the Myakka River within the Myakka River State Park.
- Additional segments of the Myakka River be designated as components of the National System if state and local initiatives to provide permanent protection for the river corridor are implemented and subsequent application for designation is made to the Secretary of the Interior pursuant to Section 2(a) (ii) of the Wild and Scenic Rivers Act.
- A Myakka River Commission is established to coordinate efforts to conserve the Myakka River area.

In response to local level citizen support, the Florida legislature designated the corridor of land surrounding and beneath a 34-mile segment of the Myakka River between river mile 7.5 (the Sarasota/Charlotte County line) and river mile 41.5 (County Road 780) a Florida Wild and Scenic River in 1985. The Myakka River Wild and Scenic Designation and Preservation Act (Appendix A) provided for the permanent preservation, management, and administration of the designated segment of the Myakka River, with the joint development of a plan by the Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP), formerly the Departments of Natural Resources and Environmental Regulation, and the Myakka River Management Coordinating Council (Council). The Act also established the Council to provide interagency and intergovernmental coordination in the management of the river. The Council was composed of one representative from the Florida Department of Transportation (FDOT), the Florida Fish and Wildlife Conservation Commission (FWC), the Department of Economic Opportunity (DEO), Division of Forestry of the Department of Agriculture and Consumer Services (DOF), Division of Historical Resources of the Department of State (DHR), Tampa Bay Regional Planning Council (TBRPC), Southwest Florida Water Management District (SWFWMD), Southwest Florida Regional Planning Council (SWFRPC), Manatee County, Sarasota County, Charlotte County, City of Sarasota, City of North Port, agricultural interests, and environmental organizations, as well as any others deemed advisable by DRP.

The Act also authorized DEP to adopt rules and a permitting program to regulate activities within the river area, which may have adverse impacts on resource values as adopted by the Council. The plan, as required by the Act, must provide for:

- Permanent protection and enhancement of the ecological, fish and wildlife, and recreational values within the river area, primary emphasis being given to protecting agricultural, aesthetic, scenic, historic, archaeological, and scientific features.
- Continuation of land uses and developments on private lands within the river area which are in existence on January 1, 1986.
- Periodic studies to determine the quantity and mixture of recreation and other public uses that can be permitted without adverse impact on the resource values of the river area.
- Regulation, control, and distribution of public access where necessary to protect and enhance the resource values of the river area.
- Consideration of need for basic facilities to absorb user impact on the river area, including necessary toilet or refuse containers, but, if found to be necessary, located to minimize their intrusive impact.
- Restriction of motorized travel by land vehicle or boat where necessary to protect the resource values in the river area.
- Agricultural and forestry practices similar in nature to those presently in the river area on January 1, 1986.
- Resource management practices for the protection, conservation, rehabilitation, or enhancement of river area resource values.
- Monitoring of existing water quality.
- Continuance of existing drainage and water management practices, unless such existing practices will adversely affect, degrade, or diminish existing water quality or existing resource values in the river area, and allowance of new water resource management practices that will not have an adverse impact on resource values in the river area.
- Review and regulation of all activities conducted or proposed to be conducted within the river area that will or may have an adverse impact on any of the resource values in the river area as

provided in this Act.

The Act also provides that the management plan may include any other provisions deemed necessary or advisable by DRP for the permanent protection of the river.

1.2 PLANNING AUTHORITY

The authority to develop a plan for the management, administration, and protection of the designated segment of the Myakka River as a Florida Wild and Scenic River was established under Section 258.501, Florida Statutes, the Myakka River Wild and Scenic Designation and Preservation Act. Development of the plan included public meetings and participation by numerous local, regional, and state agencies and private organizations, particularly the Myakka River Management Coordinating Council. Three plan presentation and public comment meetings were held for landowners, environmental groups, civic organizations, elected officials and their staffs, and other interested parties on September 8, 9, and 11, 1989, respectively. Two general public meetings were also held on September 11 and 12, 1989, to provide further opportunity for the public to comment and give input to DRP and the Council on the draft management plan. Four of the meetings were held during other-than-normal working hours. The comments provided by the public to DRP and the Council were summarized in the form of a written report and submitted for consideration by the Council and DRP in developing a final draft management plan. The final draft plan was submitted for consideration and approval in a public hearing by the Governor and Cabinet sitting as the Executive Board of DRP. The plan was reviewed in 2009-2011, and a draft of the updated plan was submitted to the Secretary of DEP for approval in October 2011.

1.3 PLAN DEVELOPMENT

The 1990 plan was developed jointly by DRP, and the Council, with assistance from a consultant contracted with DRP, Hunter Services, Inc. The consultants conducted a thorough data collection effort, including a computerized literature search, field investigations, interviews, and a recreational use survey. Resource values were identified by the Council and included specific economic, scenic, recreational, geologic, fish and wildlife, historic, cultural, or ecological features. These resource values were then assigned to work groups, comprised of Council members and appropriate resource value experts from the public and private sectors. Issues, problems, and priority concerns were identified by work groups for each resource value. Subsequently, guiding principles, objectives, and actions were developed to address the issues, problems, and priority concerns. The principles, objectives, and actions form the basis and direction for the river management program. Initial drafts of the management plan were distributed for review by Council members and other interested persons and organizations.

There was a sufficient amount of change in the Myakka Watershed to require an update of the management plan in 2001. The Council formed a subcommittee to make recommendations on changes or additions to the plan. The subcommittee's recommendations were then taken before the Council and approved, then forwarded to DRP. DRP then drafted an update to the plan which was distributed to the Council and interested parties for comment. Revisions were made to the plan, which were distributed to the Council prior to a public hearing held on May 10, 2001. The plan update was never finalized and approved. The plan was updated again during 2009 and 2010.

1.4 CONTENTS OF THE PLAN

Section 2.0 provides a detailed description and assessment of the river area, river viewshed, surface and subsurface geological characteristics, watershed, water resources, plant communities, fish and wildlife, archaeological and historical resources, land use patterns and regulations, and land ownership in the river area and watershed. Section 3.0 addresses the existing access and recreational use characteristics along the river. Section 4.0 identifies resource values, issues, and problems as identified by the Council and work groups. Section 5.0 identifies the general management principles and includes an overview of the river management program involving the river area, a wild and scenic protection zone, and the Myakka River watershed. Section 5.0 also includes the specific objectives and actions, which are the focus of the management program and a discussion of the need for a recreational use carrying capacity. Section 6.0 discusses the implementation and coordination activities, plan review and amendment, and areas for legislature consideration.

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, 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. Many of these large ranches are being subdivided into 5-10 acre ranchettes or converted to more intensive agricultural activities (i.e. row crops, sod farms, and orange groves). 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 (Figure 1), and Flatford Swamp is located below river mile 59. The first of four large subbasins within the Myakka River watershed, Flatford Swamp is formed from the confluence of nine different tributaries, which are Myakka River, Wingate Creek, Coker Creek, Boggy Creek, Ogleby Creek, Long Creek, Maple Creek, Young's Creek, and Taylor Creek. Immediately below Flatford Swamp, the river runs through pop ash swamp and marsh habitats. A tree die-off has occurred in Flatford Swamp which will be discussed in more detail in the Surface Water Section 2.4.1.

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 (prairie hammock). This vegetation remains the dominant association for the remainder of the designated segment of the river, except for the tidal 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. This 4,300-acre marsh is the second of the four natural depressions within the 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 Myakka River 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. At the outflow of the Upper Myakka Lake there is a concrete weir, which was constructed by the Civilian Conservation Corps (CCC) to regulate lake levels. This weir is bypassed by a water control structure (several culverts), which since 1979, has been generally kept open, to allow water to flow from the lake. Downriver from Upper Myakka Lake, the Myakka River flows through a large marsh area known as Big Flats. Originally, a secondary watercourse from the Upper Myakka Lake passed through Vanderipe Slough, but was severed by a dike constructed near the lake in the 1930s and 1940s. 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. An earthen weir exists across the southern end of the Lower Myakka Lake, near Deep Hole. This weir has been breached, which allows water to flow downstream from the 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, has been constructed across the river. Downs' Dam is capable of retaining approximately 4 feet of water. The river channel is undisturbed by manmade structures 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 sandbars 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 riverbanks occur in many places. The bottom and banks in many places are also covered by relic marine shells.

The first residential subdivision along the river is Hidden River on the west side of the river just downstream of the Clay Gully Bridge and north of Myakka River State Park. The next residential development does not occur until south of Myakka River State Park and Rocky Ford and extends to Interstate 75, at river mile 19.5. Downriver from Interstate 75 to U.S. Highway 41 there are several homes, Snook Haven Restaurant/Fish Camp, Venice Campground, Diocese of Venice Retreat, and Ramblers Rest Resort. Most of the development is on the west shoreline, with most of the east-shore still in a natural state. At U.S. Highway 41, there are several residences and the Myakka River Oyster Bar Restaurant.

Beginning just downstream from Snook Haven, the brackish water influence on the river bank vegetation is evident by the growth of leather fern and other halophytic plants. Mangroves are found growing as far upstream as Ramblers Rest. Tidal marshes and mangroves gradually become more extensive from this point downriver, towards Charlotte Harbor.

Downstream of U.S. Highway 41, to the Sarasota/Charlotte County line both shorelines of the river have been partially developed. In this area, the river widens, has a braided channel, and is relatively shallow with a sandy bottom. A small mangrove island in this area is the site of a bird rookery. The eastern bank, upstream of Myakkahatchee Creek, contains several large, fully developed manufactured home subdivisions associated with the river by finger canals. Another subdivision, Tarpon Point, is on finger canals located on the west-shoreline downstream of Myakkahatchee Creek. Here the shore has been armored with riprap and seawalls. Limited development exists along the remainder of the river, upstream of the Sarasota/Charlotte County line, as the river passes through the Myakka State Forest. Between the Sarasota/Charlotte County line and the El Jobean Bridge (County Road 771), much of the native vegetation has been replaced with bulkheads and finger canals associated with residential development. Downriver from El Jobean, the riverbanks 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 section of river. The methodology generally consisted of field trips by boat or canoe, where the general extent of view was mapped on 1986 blue-line 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 riverbank (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.

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 riverbank. 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 tree line generally limits the view while on the lake. Maximum viewing distance is approximately 2.5 miles between lakeshores. 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 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 soil 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). 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. This soil association contains nearly level poorly drained soils, which are sandy throughout, very poorly drained, 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.

The Sarasota County Comprehensive Plan categorizes the soils of the Myakka River watershed within Sarasota County as consisting basically of three soil categories. Along the river's mainstem the soils are considered to be 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 soil 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 underlain by 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 Suwannee 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 boundaries of the Myakka River watershed, in general consist of the surficial aquifer, an intermediate aquifer system, which consists of several water producing units, separated by confining units of varying thickness (upper Hawthorn Group and lower Hawthorn Group), and the Upper Floridan aquifer system. The surficial aquifer is contained within the shallow undifferentiated marine deposits consisting of the Caloosahatchee Marl, and the Bone Valley member of the Peace River Formation. The intermediate aquifer system is contained within the undifferentiated deposits of the Tamiami Formation and Hawthorn Group, which can include part of the Tampa Member. The Upper Floridan aquifer system includes the Tampa Member of the Hawthorn Group, when there is limited confinement between the Tampa and Suwannee Limestone, the Suwannee Limestone, the Ocala Limestone, and the Avon Park Limestone.

2.3 DESCRIPTION OF THE WATERSHED

The Myakka watershed 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 midpeninsular physiographic zone. The Gulf Coastal Lowlands is generally less than 30 feet above 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 (Figure 3). The extent of the 100-year flood boundaries for the Myakka River depicted in Figure 3 were derived from the most recent Flood Insurance Rate Maps (FIRM) of the Federal Emergency Management Agency (FEMA, 2004).

Many of the FIRMs are nearly 10-30 years old, and currently outdated due to natural and physical changes from land use, development and erosion. SWFWMD and Sarasota County have partnered with FEMA in an effort update and digitize the existing FIRMs within the county, including the Myakka watershed. New aerial imagery has been collected for the watershed using LiDAR and will be used to create new floodplain maps. The digital map for the watershed is projected to be completed during 2010 (Scott Woodman, Pers. Comm., 2009). Additionally, a Comprehensive Watershed Management Plan for the Myakka River was completed by SWFWMD in 2004. The watershed management plan includes protection initiatives, and outlines future goals that aim to address a variety of floodplain protection and water use issues present in the watershed.

The Upper Myakka Lake-Lower Myakka Lake system is comprised of associated sloughs and depressions, and has a large wide floodplain that is frequently inundated for long periods of time. Downstream of Myakka River State Park there is 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 water detention and storage from seasonal flooding events, to larger infrequent events. The upstream floodplain 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, with short channel lengths. 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.

The Myakka Head/Wingate Creek subbasin covers approximately 54 square miles (mi²), is comprised of several smaller hydrologic units, and contains the headwaters of the Myakka River. Phosphate mining activity has also occurred in this watershed, which has disturbed the watershed's hydrologic character. The Ogleby Creek subbasin covers approximately 42 mi² and contains the longest single tributary upstream of the Upper and Lower Myakka Lakes. Owen Creek is a subbasin, which covers approximately 39 mi² 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 mi² 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 mi² 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 mi². The Mossy Island Slough subbasin has an area of approximately 12 mi². 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 mi². The subbasin is characterized by a linear arrangement of intermittently flowing prairie depressions and swamps. The lower half of the subbasin has experienced a drainage modification 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 mi². 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 above 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 mi². 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 mi², 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, which is four times that of the Upper and Lower Myakka Lakes combined. The results of the Tatum Sawgrass diking have reduced the storage capacity of the marsh and increased 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 1930s and 1940s, 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 to prevent water from entering the slough, so that land near Vanderipe Slough could be converted to pasture.

A concrete weir is located where the Myakka River flows from the Upper Myakka Lake. It was bypassed by culverts in the 1970s. Since 1979, the culverts have generally been kept open, restricting no water flow (DEP, 2000). Occasionally the private concessionaire requests to close off the culverts, resulting in higher water in the upper lake for airboat tours (DEP, 2000). During periods of low flow, boards are used to block the outflow culverts to raise/maintain water levels in the Upper Myakka Lake. 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 sometimes acts as an obstacle to the movement of fish such as American eel, 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 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. Sarasota County completed a phased ditch-block project to restore the hydrology in Deer Prairie Slough in 2003. Grant monies from the SWFWMD and the Charlotte Harbor NEP were received to restore 8.4 miles of channelized Deer Prairie Slough within the T. Mabry Carlton, Jr. Memorial Reserve. The project restored approximately 1,370 acres of mesic hammock and 740 acres of freshwater marsh (Mike Jones, Pers. Comm., 2009).

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. It has experienced channelization within the mainstem, and extensive stormwater/flood control canals have been excavated within the City of North Port. Large east-west and north-south canals, R-580 and R-36, along the northern and western boundary of North Port, intercept the natural drainage flow towards the south and west respectively.

Within the lower watershed, a diversion channel (Curry Creek) connects the Myakka River with Roberts Bay on the Gulf of Mexico. The channel 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 Spring, Warm Mineral Spring, and numerous small depressional wetlands. 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 Border Road Bridge at river mile 20 (Figure 4). 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 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 is also classified as Outstanding Florida Waters. Myakkahatchee Creek is a Class I water 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 supports productive freshwater and estuarine habitats. The river is sluggish, often with no net flow during the dry season. Dissolved oxygen levels are typically low. Part of the upper basin drains phosphate-rich areas, which, combined with agricultural and rangeland runoff, elevate the river's nutrient levels. Upper Lake Myakka is eutrophic, with aquatic vegetation only along the shoreline and low concentrations of dissolved oxygen.

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 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 groundwater contributions to base flow and the runoff of groundwater 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, sludge disposal, and other sources of stormwater runoff.

From October 1998 to September 2001, the Charlotte Harbor Environmental Center, Inc. (CHEC), with its partners, monitored 5 sites monthly, in the Myakka Watershed. Turbidity, total suspended solids (TSS), total organic carbon (TOC), total nitrogen (TN), and total phosphorus (TP) were sampled and compared to the water quality index (WQI) developed for Florida streams by DEP (DEP Stream Index Reference). The DEP WQI indicated that the entire river had “good to fair” water quality conditions depending on the area, and the sampling site on Myakkahatchee Creek (Big Slough) had “good-fair” water quality conditions, while Howard Creek was classified as “fair-poor”, and Blackburn Canal had “poor” water quality (Sarasota County Water Atlas, 2009).

In January 1995, Sarasota County began a monthly sampling program for its coastal bays and the estuarine portion of the Myakka River (I-75 south to the County line). Mote Marine Laboratory (Mote) had been the contractor for both sampling and analysis since January, 1998. On November 9, 2004 the County entered into an agreement with Mote to continue the monthly sampling program for a period of three years with an option to renew the agreement at the end of the contract for two, one-year extensions. In anticipation of the impending contract expiration, the County entered into negotiations with the Mote for the first one-year extension. As a result of County budget restraints and rising costs of fuel, salaries, and overhead expenses for Mote, it was necessary to eliminate the five Myakka River stations from the agreement in order to keep costs down and be able to continue with the bay monitoring program. Realizing the importance of continuing to monitor the Myakka and desiring to avoid data gaps, Water Resources staff volunteered to develop a Myakka River monitoring plan and conduct the monitoring “in-house”.

Currently, Sarasota County is taking monthly water quality samples from 12 sites throughout the watershed with 5 sites in the Myakka River, 2 sites in Myakkahatchee Creek, and 1 site each in Deer Prairie Creek, Howard Creek, Clay Gully, Blackburn Canal and Little Salt Creek. The stations are monitored monthly for water temperature, pH, dissolved oxygen, salinity, specific conductance, biological oxygen demand, color, turbidity, total suspended solids, dissolved inorganic nitrogen, dissolved nitrate, total nitrite + nitrate, dissolved ammonia, total ammonia, dissolved nitrate, dissolved nitrite, TKN, total nitrogen, orthophosphate, total phosphorus, iron, chlorophyll, fecal coliform, and secchi depth. Meter calibrations, sample collection, and field measurements are conducted in accordance with Chapter 62-160 F.A.C. and the Department of Environmental Protection Standard Operating Procedures for Laboratory Operations and Sample Collection Activities (Meaux, Pers. Comm., 2009). After 13 months of data collection by the County, the upper portion of the Myakka River, in Manatee County, is a water body of concern for high amounts of fecal coliform, and Howard Creek was determined to be a significant source of phosphorus (Meaux, Pers. Comm., 2009). Additionally, the turbidity of the river is higher than it has been historically (Sarasota County Water Atlas, 2009).

Some portions of the river currently do not meet the designated uses under its water classification (Figure 5). The DEP has assigned all water bodies throughout the state a unique water body identification number (WBID) for identification purposes. According to the DEP’s

2008 305(b) GIS data, Taylor Creek/Upper Myakka River (WBID 1969B), Mud Lake Slough (WBID 1958), Owen Creek (WBID 1933), Wildcat Slough (WBID 1955) and Tatum Sawgrass/Clay Gully Bridge area (WBID 1877A) in Manatee County do not meet the designated use and are listed as impaired due to fecal and total coliform levels. Other impaired areas that do not meet the designated use in Sarasota and Charlotte Counties include the Myakka River between the Upper and Lower Myakka Lakes (WBID 1981B), the lower river just upstream of Charlotte Harbor (WBIDs 1991A, 1991B, 1991C), Rock Creek (2045), and Tippecanoe Bay (WBID 2055) due to various parameters including dissolved oxygen, iron, chlorophyll a, and fecal coliform levels. Howard Creek, Myakkahatchee Creek and Deer Prairie Creek, tributaries of the Myakka River, are considered to have fair water quality and are classified as potentially impaired.

Total maximum daily loads (TMDLs) were proposed by the U.S. Environmental Protection Agency (EPA) in 2001 for six watershed segments, and the DEP is in the process of developing TMDLs for impaired waterbodies. All of the impaired segments are listed as “medium” priority for the development. If no TMDLs are adopted, the segments will be resampled for impairment again in 2013.

For the years 1998 through 2005 (SWFWMD, 2005; Charlotte Harbor Environmental Center, Inc., 2008) the Myakka River near Sarasota showed statistically significant trends of increasing dry season discharge, annual runoff, annual average nitrite + nitrate, annual average ammonia, and specific conductance, while annual total nitrogen, total organic carbon decreased significantly throughout the watershed. The increases in specific conductance and monthly stream discharge probably resulted from the increased runoff associated with irrigation. Although only a 1% increase in agricultural lands has occurred since 1972, a shift from agricultural uses requiring less water (rangeland) to agricultural uses requiring more irrigation (row crops) may have resulted in an increase in runoff and dry season discharge (SWFWMD, 2005). The primary source of irrigation water in the watershed is groundwater, 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).

Changes in hydroperiods have had adverse effects within Flatford Swamp as well as within the 100-year floodplain of the Upper Myakka River. In a report prepared by Coastal Environmental for the SWFWMD, *Tree Mortality Assessment of the Upper Myakka River Watershed* (Coastal Environmental/PBS&J, 1998), the anthropogenic tree mortality in the Upper Myakka River Basin and Flatford Swamp in particular, is hydrological stress related. The cause of the hydrological stress is an increase in seasonal high water levels and longer seasonal hydroperiods. The primary contributor was subsurface seepage generated from agricultural irrigation which caused an excess baseflow to the swamp. In 1998, the zone of potentially abnormal mortality and stress (area with dead trees) in the Upper Myakka River Watershed (100-year floodplain from State Road 64 downstream to State Road 72) covered approximately 3,740 acres, or about 25 percent. C. Ford and J. Brooks (University of South Florida) for the SWFWMD in an *Assessment of Tree Conditions in Myakka River State Park* (Ford and Brooks, 2000) reported that the increased flows in the Upper Myakka Watershed is causing stress and mortality in trees within Myakka River State Park, most notably upstream of the dam at the outflow of the Upper Myakka Lake. To study the effects of hydroperiod changes in Flatford Swamp, the SWFWMD developed an environmental monitoring plan, which includes both hydrological and biological monitoring along four transects in the swamp. Additionally, monthly water quality monitoring

took place in 17 locations within the swamp and flow levels were monitored daily at 6 sites. In 2005 a summary of the tree transect surveys was completed for the SWFWMD. The results indicated that mean water levels at all transects were significantly higher in 2003-2005 than the previous three years, and water levels in 2005 were the highest of all (Tomasko, 2005). High water levels during this time period can be partly attributed to an El Nino event during 2002-2003. The tree health did not vary significantly from 2000-2004. In 2005, however, the mean tree health was significantly lower than previous years, most likely due to high water levels.

In general, Upper Myakka Lake has been characterized as a highly disturbed ecological system with excessive nutrient concentration. The lake has experienced numerous dissolved oxygen concentrations below the DEP state standards, Chapter 62-302, 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 loading (Priede-Sedgewick, Inc., 1983). Chapter 62-302, 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.

Both Upper and Lower Myakka Lakes and the river between the lakes have had an extensive exotic aquatic vegetation problem in the past. With efforts made by SWFWMD, the aquatic weed problem has been controlled in both lakes; however the Upper and Lower Myakka Lakes currently lack native aquatic vegetation throughout the open water portions (DRP, 2004). Florida Park Service biologists are currently developing a study to help determine the reason for the lack of vegetation in Upper and Lower Myakka Lakes.

Myakkahatchee Creek is a main tributary of the Myakka River. It is a Class I water and supplies potable water to North Port. 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 ceased discharge to Myakkahatchee Creek. The water quality of Myakkahatchee Creek is still threatened by the discharge of stormwater and encroaching development from North Port, and nutrient loading from agricultural runoff. DEP has rated Myakkahatchee Creek as partially meeting its designated use.

Two major springs exist within the Myakka River watershed, Little Salt Spring and Warm Mineral Springs. Warm Mineral Springs discharges directly to the Myakka River through Warm Mineral Springs Creek (Salt Creek). The water quality characteristics of Warm Mineral Springs suggest 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 groundwater discharge. Low flow data indicate that groundwater contributions to streamflow are small (Hutchinson, 1984). Groundwater 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 natural groundwater contributions to the Myakka River between Myakka City and the outlet to Lower Myakka Lake. The lakes and 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. Dry season discharge (average low flows) in the upper Myakka River watershed have increased during the past three decades and most notably at the State Road 70 USGS streamflow gage during the mid-1980s as a result of agricultural irrigation (PBS&J et al., 1998). 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 2008, 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 years between 1937 to 1998 (USGS Streamflow Gage 02298830 Database, 2009). The average historic streamflow from 1937–2008 is shown in Figure 6.

The average annual rainfall in the Myakka watershed is 59 inches, approximately 60 percent of which occurs from June to September (Loper and Morris, 2008). 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 253 cubic feet per second annually for the period 1937 to 2008. Inflow of freshwater to Charlotte Harbor from the Myakka River averages 630 cubic feet per second annually.

During the wet season, areas around the river may flood. The flood stage of 15.86 feet above sea level (asl), or a water level of 7 ft or greater on the USGS gage in Myakka River State Park has been reached 158 days from August 1936 to June 2003 (DRP, 2004).

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 groundwater supplies for irrigation during the dry season. Factors which may serve to decrease the discharge of freshwater; 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 are critical to downstream estuarine areas. However, what is relatively unknown is the critical amount of freshwater necessary to maintain the proper functioning of estuarine areas. The SWFWMD is currently developing Minimum Flows and Levels (MFL) for the entire Southwest Florida region in an attempt to quantify the amount of water that can be used for public supply while causing no significant harm to the ecological functions in lakes, streams, and rivers.

A MFL study for the Myakka River was completed during 2005-2006. MFLs have been adopted for the upper freshwater portion of the Myakka River, while the lower Myakka River MFLs (Myakkahatchee Creek, Deer Prairie Creek, and Blackburn Canal) are scheduled to be established by the SWFWMD during 2010. During the study, the SWFWMD used flow data from 1940-1969 for their study, due to the evidence that dry season flows began to increase in the 1970s. The SWFWMD used a building block approach to establishing MFLs for the Myakka River to maintain or recreate the hydrological conditions under which communities existed prior to flow disturbance, and meet the ecological needs of the river. Block 1 considers the low flow conditions during the dry season, Block 2 considers the baseflow period during the cooler portion of the year when evapotranspiration is often lower, and Block 3 considers the high flow period during the wet season. The proposed MFLs must not significantly harm the water resources or ecology of the area and requires less than a 15% change of habitat availability (SWFWMD, 2005).

2.4.2 Groundwater

SWFWMD (1988a, 1988b) has conducted a Ground Water Resource Availability Inventory for Sarasota and Manatee Counties, and further groundwater modeling efforts are currently underway as part of the Myakka River Watershed Initiative. Groundwater within the Myakka River watershed consists of the surficial aquifer, intermediate aquifer system, and the Upper Floridan aquifer system. The surficial aquifer is 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 as a water supply source has low yields and may be limited by drought periods. It is however readily recharged by rainfall. It also has the greatest potential for contamination from surface sources.

The water of the Intermediate Aquifer system is generally within DEP primary and secondary drinking water standards. Water quality is best in eastern Sarasota County and degrades towards the southwest and with 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 Upper Floridan Aquifer system is the principal source of groundwater. Use of this water source in the Myakka River Watershed, is generally restricted because of poor water quality. Large withdrawals of water are made from the Upper Floridan Aquifer system and used primarily for agricultural irrigation and large public supplies. Recharge rates of the Upper Floridan Aquifer system are low, and no recharge occurs along the Myakka River.

2.5 NATURAL COMMUNITIES

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors, such as climate, geology, soils, hydrology and fire frequency generally determine the species composition of an area, and that areas which are similar with respect to these factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub, two communities with similar species compositions, generally have quite different climatic environments, and these necessitate different management programs.

For the purposes of this planning document, the emphasis on natural communities will be confined to those found along the wild and scenic designated portion of the Myakka River corridor within Sarasota County. This corridor contains 12 natural communities in addition to ruderal and developed areas. River corridor specific assessments of the existing natural communities are provided below. FNAI descriptions of these natural communities are contained below.

Vegetative communities identified for the Myakka River corridor include a variety of upland habitats. Uplands along the Myakka River consist of prairie hammock, mesic hammock, pine flatwood, dry prairie, and scrubby flatwoods. Wetlands include hydric hammock, bottomland forest, wet prairie, floodplain marsh, blackwater stream, mangrove swamp, and saltwater marsh. There are also some altered landcover types within the river corridor. The distribution of plant communities along the Myakka River is indicated in Figures 7a-7d.

Mesic Hammock--Mesic hammock occurs along both sides of the Myakka River, providing a forested buffer or transitional zone between aquatic/wetland and upland habitats. Fire rarely burns through hammocks but is necessary around its fringes to keep hardwoods from invading the adjacent habitat (Huffman and Blanchard, 1991). 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 prairie hammock along the Myakka River, this system functions as a travel corridor for a diverse array of wildlife.

Typically, mesic hammocks consist of live oak, laurel oak, and cabbage palm with saw palmetto, beautyberry, wild coffee and wax myrtle interspersed. Epiphytic plants are also common including Spanish moss, wild pine, golden polypody, shoestring fern, resurrection fern and butterfly orchid. Hardwoods in these hammocks provide cover and/or roosts for numerous wildlife species such as the gray squirrel, fox squirrel, cotton mouse, wood duck, eastern mole, raccoon, green treefrog, squirrel treefrog, yellow rat snake, crow, grackle, and red-eyed vireo. A myriad of warblers and songbirds are also dependent on hammocks during migration, and rarer

forms of wildlife such as eastern indigo snake and gopher tortoise may occasionally occur in this habitat. Mesic hammocks also are utilized by domesticated or feral animals such as cattle and hogs.

Mesic Flatwoods-Flatwoods along the Myakka River corridor are wet and can become flooded during the rainy summer months and dry during the winter. Flatwoods are fire dependant and require fire every one to four years (FNAI, 1990). Vegetation includes slash pine and/or longleaf pine with an understory of saw palmetto, gallberry, fetterbush, wax myrtle, winged sumac, wiregrass, and a variety of other herbaceous species.

The widespread distribution of pine flatwoods and 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, and 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 eastern towhee, cotton rat, cotton mouse, brown-headed nuthatch, northern cardinal, box turtle, and pine warbler.

Dry Prairie—Dry prairie is considered a globally imperiled habitat that is characterized as a nearly treeless habitat dominated by saw palmetto with a groundcover of wiregrass, bluestem, love grass, gallberry, and fetterbush (FNAI 1990; DRP 2004). Dry prairie lacks the overstory necessary to tree-dwelling vertebrates; however, the acidic, sandy soil and vegetation of these systems support the activities of fossorial animals such as the gopher tortoise and gopher frog. The lack of fire in this community has increased the density of trees and shrubs within the dry prairie along the river. The vegetation change has also caused a loss of animal species that have historically utilized this habitat such as the crested caracara and the Florida burrowing owl. Myakka River State Park has made an ongoing effort to restore the fire regime within this community, which historically occurred every 1-3 years.

Scrubby Flatwoods –Scrubby flatwoods consist of open canopy forests with scattered pine trees, a sparse scrubby understory consisting of a variety of scrub oaks, and patches of open sand. Typical plants include slash pine, scrub oak, myrtle oak, Chapman’s oak, blue jack oak, sand live oak, saw palmetto, staggerbush, and wiregrass. The xeric character of the scrubby flatwoods habitat requires tolerance of harsh conditions by wildlife inhabitants. Habitat specialists occurring within this habitat type in the Myakka River corridor include the Florida scrub jay. The gopher tortoise and its burrow commensals are also common to this xeric habitat type.

Hydric Hammock – Hydric hammock is often dominated by cabbage palm and laurel oak with a relatively open understory. Hydric hammock occurs on low, flat, wet sites and is saturated more frequently compared to mesic hammock. Hydric hammock generally lacks a saw palmetto understory and often has a considerable amount of organic matter in the soil compared to mesic hammock soils with a higher mineral content. Because of their generally saturated soils and the lack of herbaceous ground cover, hydric hammocks rarely burn. Hydric hammock generally grades into floodplain swamp, Scattered red cedar, red maple, swamp bay, sweetbay, water oak,

wax myrtle, saw palmetto, poison ivy, dahoon holly, myrsine, sugarberry, Florida elm, Walter viburnum, royal fern, cinnamon fern, chain fern, peppervine, yellow jessamine, and Virginia creeper are also known to occur in this community. Typical animals include green anole, flycatchers, warblers, and gray squirrel.

Bottomland Forest-- Bottomland Forest is characterized as a low-lying, closed-canopy forest with either a dense shrubby understory and little ground cover, or an open understory and ground cover of ferns, herbs, and grasses. Typical plants include water oak, live oak, red maple, sweetgum, cabbage palm, laurel oak, loblolly bay, dahoon holly, wax myrtle, swamp dogwood, water locust, Florida elm, and pop ash. Typically the permanent residents of this community are not large and do not require extensive home ranges. Common vertebrate species include five-lined skink, yellow rat snake, ringneck snake, eastern king snake, cottonmouth, wood duck, red-tailed hawk, turkey, screech owl, great-horned owl, hummingbird, flycatcher, woodpecker, fish crow, common grackle, warbler, opossum, gray squirrel, raccoon, gray fox, bobcat, and white-tailed deer.

Bottomland Forest occurs on low-lying flatlands that border the river. Soils are generally a mixture of clay and organic materials. The water table is high, but bottomland forests are inundated only during extreme floods or heavy rains. Because of these characteristics, fire is an unlikely occurrence in this community.

Wet Prairie –Wet prairies are primarily treeless systems that are saturated during the wet season. This community type is dependant on hydrology and fire, and is frequently surrounded by pine flatwoods that border the river. Wiregrass, love grass, maidencane, spikerush, beakrush, hatpins, marsh pink, sundew, meadowbeauty, yellow-eyed grass, tickseed, and St. John’s wort are commonly found in wet prairies. Wax myrtle will quickly invade this community if fire is excluded. Wet prairies are also prone to melaleuca infestations in this region. This system supports amphibians and reptiles including toads, frogs, black racers, yellow rat snakes, indigo snakes, and water moccasins. Northern harriers, southeastern kestrels, marsh rabbits, cotton rats, and cotton mice often take refuge or forage in this community.

Floodplain Marsh—Floodplain marshes are located within the river floodplain as far north as the headwaters of the Myakka River southward to Downs’ Dam (river mile 28) south of Lower Myakka Lake. This herbaceous system is often bordered by wet prairie or riverine communities. Floodplain marsh has decreased in acreage since 1948 due to fire exclusion (DRP, 2004). Much of the community is dominated by two exotic grasses: paragrass and West Indian marsh grass. The latter species was observed in Tatum Sawgrass during the 1970s and became a dominant species within floodplain marshes after 1987 (DRP, 2004). In 2000, a South American insect, *Ichnodemus variegates*, now known as the Myakka Bug, was seen on West Indian marsh grass. This was the first recorded sighting of this species in Florida (DRP, 2004). The University of Florida is currently researching the insect to determine its potential as a biological control for West Indian marsh grass (Diaz et al., 2008).

Other plant species found in this community include smartweed, alligator weed, cattail, spikerush, bulrush, maidencane, coreopsis, swamp mallow, button bush, and pop ash. When flooded, this community provides great foraging habitat for wading birds such as herons, egrets, and ibis. Ducks, small fish, frogs, alligators, and snakes also take refuge in floodplain marshes.

Floodplain Swamp—Floodplain swamps are often seasonal systems that can dry up during the winter months. The tannin colored water of the river is high in dissolved organic matter which prevents photosynthesis and the presence of submerged aquatic vegetation. The portion of the Myakka River south of Downs' Dam has a sandier bottom with limestone outcrops. The forest canopy also closes in on the river south of the dam compared to a marsh community at the northern end of the river. This community includes the Myakka River and supports species completely dependent on standing water for their food base and/or reproductive stages, such as fish, toads and frogs, alligators, aquatic turtles snakes, West Indian manatee, river otter, and birds such as ducks, herons, egrets, ibis, and ospreys.

Typical plants along the banks of the Myakka River include pop ash, water locust, and Carolina willow in the canopy, while maidencane, smartweed, bulrush, beakrush, flatsedge, and coreopsis make up the ground cover. Several different species of exotic vegetation are present in this community type including paragrass, West Indian marsh grass, parrot feather, alligator weed, water hyacinth, and water lettuce.

Mangrove Swamp--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. They are generally comprised of red, white, and black mangroves depending on the elevation and flooding frequency of the landscape. Mangrove swamps along the southern portion of the Myakka River are dominated by red mangroves. Mangrove swamps are integral to the survival of 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.

Salt Marsh--Salt marshes become abundant along the lower portion of the river where a saltwater influence and tidal fluctuation are present. Tidal marshes are important because of their storm buffering capacity and their water filtering abilities. Urban development in the lower portion of the river has resulted in minor alterations to tidal marshes including the installation of bulkheads, increased runoff, siltation, and erosion.

Black needlerush, cordgrass, and leather fern are the dominant species in this system. Other plant species may include mangroves, bulrush, oxeye, cattail, seashore paspalum, and seashore dropseed. This community provides valuable habitat for a variety of species such as wading birds, shorebirds, blue crab, fish, marsh rabbits, raccoons, and alligators.

Altered Landscapes— Some landscapes have been altered from their historic natural community. These habitats do not fit in FNAI's Natural Community Classification. The most common non-natural habitats observed within the river corridor include agriculture, developed lands, impoundments, pastureland, and successional hardwood forests.

Agriculture is not as prevalent within the watershed compared to historical aeriels. Near the headwaters of the river however, agriculture is common. With the help of Sarasota County's land acquisition program, development is fairly limited from Manatee County to Laurel Road. 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, alteration and development reduces the regional diversity of native fauna and flora.

2.5.1 Exotic and Nuisance Plants

Exotic or nuisance species include any plant species either naturalized or exotic within the State of Florida that out-competes 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.

Exotic and nuisance species have threatened the longevity of natural communities along the Myakka River, especially between Upper and Lower Myakka Lake which is dominated by paragrass and West Indian marshgrass and along the lower stretches of the river. There are over 103 species of exotic or nuisance plant species documented in Myakka River State Park (DRP, 1999), many of these occur in the Myakka River corridor (DRP, 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, West Indian marshgrass, alligator weed, hydrilla, cattail, melaleuca (punk tree), climbing fern, cogon grass, Australian pine, and Brazilian pepper. These exotic and nuisance plants out-compete native flora for growth space and, thus, threaten plant species diversity. Invasive exotic and nuisance plants are the biggest threat to the river, and should be controlled at every opportunity to preserve natural systems integrity. Although some of these exotic/nuisance plants are not at significant population levels, 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 climbing fern, water hyacinth, West Indian marshgrass, paragrass, cattail, melaleuca, and Brazilian pepper. There is ongoing exotic plant removal conducted along the Myakka River, through mechanical and/or chemical means, by Sarasota County, DOF, SWFWMD, and DRP. SWFWMD has an aquatic weed control program that includes the Myakka River. The Florida Park Service and Friends of the Myakka River, Inc. volunteers sponsor "exotic removal days" along the designated portion of the river.

2.5.2 Listed Plant Species

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. 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. The listed plant species and their associated habitats are listed in Appendix B, while the designated statuses of plant species occurring along the Myakka River are listed in Appendix C. The Myakka River contains some important plant species that may be considered to be either exotic, nuisance, or officially listed species

The Endangered Species Act of 1973, as amended by Public Law 105-18 in June 1997, 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 32 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). Florida coontie and Curtiss' milkweed are rare species that grow within longleaf pine flatwoods/shell mounds or scrubby flatwoods, respectively.

The other listed plant species include orchids, lilies, bromeliads, and ferns. The Florida Department of Agriculture and Consumer Services (DACS) lists these species, as endangered, 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:

- The clearing or other disturbance of land for agricultural or silvicultural purposes, fire control measures, or required mining assessment work;
- 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
- 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. An invasive exotic Mexican bromeliad weevil, *Metamasius callizona*, has also posed threat to these epiphytic plants. The introduced weevil has spread throughout south Florida and attacks and kills, both ornamental and native air plants. This exotic weevil has established in Myakka River State Park, killing many of the native bromeliads. The University of Florida has completed research within Myakka River State Park regarding the ecological and demographic trends of *M. callizona* and discovered that the weevil does not exhibit strong seasonal trends attacking either species of bromeliad host, *Tillandsia utriculata* or *T. fasciculata*. Additionally *T. fasciculata* was determined to be killed more easily by *M. callizona* than *T. utriculata*. Research is still underway to find a biological control for this pest.

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 (FGFWFCC, 1980).

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. A list of vertebrate wildlife species expected to occur in each of these broad community types is included in Appendix D.

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 feed on the understory vegetation. Cattle also move within the marshlands along the edges of the Myakka River during dry periods to feed on aquatic grasses and forbs. Hogs root in every habitat. 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, horses, black-bellied whistling duck, muscovy ducks, brown anoles, Cuban treefrogs, Nile perch, walking catfish, and South American armored catfish. Domesticated pets, such as dogs and cats, are undesirable in natural habitats. Domestic pets may compete with native wildlife species for food or hunt native fauna.

2.6.3 Listed Animal Species

The Myakka River corridor harbors numerous wildlife species listed by USFWS, the FWC, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). A survey of species range maps, documented reports of species occurrences and field reviews revealed that up to 86 species protected by FWC, 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 B, Table B-2, lists all protected amphibian, reptile, bird, and mammal species for this corridor as well as their status according to each agency. Due to past confirmed sightings in the region, Florida panther and Florida black bear are also included.

Five listed species of amphibians and reptiles are known to occur in the Myakka River and its estuary or on properties adjacent to the corridor. Additionally, five listed sea turtles, the Atlantic loggerhead, Atlantic green turtle, leatherback turtle, Atlantic hawksbill, and Kemp's Atlantic ridley, have been documented in Charlotte Harbor and may occasionally feed in more brackish areas of the river.

The American alligator occurs throughout the Myakka River and its tributaries, oxbows, and adjacent fresh and brackish water wetlands. This species can be observed in high numbers in the upper portions of the Myakka River, but remains listed as a state species of special concern because of the vital ecological niche of this species, including a large impact on the numbers and distribution of many other species. 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 feeding area and water source for birds and mammals during the dry season.

Xeric habitats along the Myakka River provide high, well-drained soils necessary for burrowing by the gopher tortoise. Gopher tortoises dig burrows that provide shelter from fires and desiccation for numerous commensals such as the Florida mouse (which may potentially occur within xeric habitats along the Myakka River corridor), eastern diamondback rattlesnake, eastern indigo snake, and gopher frog. Many acres of gopher tortoise habitat have been developed within the recent years, resulting in this species being uplisted from a species of special concern to threatened within the state of Florida. All tortoises must now be relocated prior to any land clearing activities due to the new level of protection.

The eastern indigo snake, a state threatened species, 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 nearly 8 feet long have been recorded. Due to the reduction of xeric habitats for development, it is important that the mesic flatwoods, and scrubby flatwoods in the vicinity of Myakka River are preserved to ensure the availability of habitat within the region for this threatened snake. Indigo snakes are vulnerable to habitat fragmentation and extirpation, because they have large home ranges (average of 370 acres), and are killed on roadways and by people (Tennant, 1997).

In addition to the potential occurrence of the Florida mouse, a state species of special concern, which may potentially occur in xeric habitats, the Myakka River corridor may harbor six 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 bears food such as palmetto berries, acorns, and cabbage palms. The bobcat, a CITES protected species, also requires dense cover to conceal itself, and it hunts numerous small animals inhabiting the forests.

The current known breeding range of the endangered Florida panther in south Florida does not extend to Sarasota County, although the historic range of this species 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. A single panther's (possibly a young male) tracks were first identified and confirmed by an FWC biologist, on the T. Mabry Carlton, Jr. Memorial Reserve in December 1999 and signs of the panther's presence persisted until 2001 when the panther was caught on film (D. Blanco, Sarasota County, Pers. Comm. June 2000). Panther sign was also observed at Myakka River State Park during this same time period and on the T. Mabry Carlton, Jr. Memorial Reserve in February 2010 by SWFWMD Staff. Large, continuous corridors of native habitat such as the T. Mabry Carlton, Jr. Memorial Reserve, Myakka River State Park, Pinelands Reserve, and Deer Prairie Creek are absolutely essential to accommodate the large home ranges of panthers.

The big brown bat, an FNAI listed species, is very rare in the region and 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, a CITES protected species, 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 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 (*Trichechus manatus latirostris*) is listed as endangered by both FWC 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 aquatic vegetation, availability of warm water during winter cold snaps, and a source of freshwater. The principal threats to the survival of manatees are injuries caused by propellers of powerboats, crushing by ship and barge traffic, harassment, poaching, and habitat degradation and destruction. The river contains many species of aquatic plants included in the manatee diet, such as the exotic water hyacinth.

As a part of a state effort to protect manatees, in 1992, the Myakka River from the south boundary of Myakka River State Park to the Sarasota/Charlotte County line was designated a manatee slow speed zone (slow speed minimum wake) under the Manatee Sanctuary Act 370.12(2) F.S., Rule 68C-22 F.A.C.

Manatee use of the Myakka River has been studied using several different methods. Through collection of manatee carcasses, rescues of injured manatees, tracking of tagged manatees, photo-identification of scarred manatees, and aerial surveys, biologists continue to discover many aspects of their life history. A Manatee Protection Plan (MPP) was adopted by Sarasota County in 2003. The MPP is a planning document designed to reduce detrimental human-related impacts to manatees and appropriately site boat facilities in Sarasota County. As part of the Boat Facility Siting Plan (BFSP) of the MPP, the Myakka River and its tributaries are not recommended for siting boating facilities with 5 or greater slips since the plan identified the Myakka River as one of the primary manatee habitats within Sarasota County. Twenty-six dead manatees were recovered from the Myakka River (not including Salt Creek and Big Slough) from January 1976-December 2008 (FWC, 2009). Three manatees were collected from the river in 2000, which was the greatest number collected within one year. However up to 4 dead manatees have been retrieved from the Myakka River, Big Slough, and Salt Creek area combined in 2000, 2003, and 2004. Most causes of death remained undetermined, but perinatal mortality ranked second. Four manatee deaths from 1976-2008 were determined to be watercraft related. Other causes of death include cold stress and natural causes such as red tide. Table 1 illustrates the cause of death for the thirty-seven manatees recovered from the Myakka River, Salt Creek, and Big Slough during 1976-2008.

A manatee photo-identification and tagging study was completed in Salt Creek during 2000-2003. This study helped provide information regarding manatee use of the waterway. Many manatees gather in Salt Creek during the colder winter months as the water temperature drops. As many as 147 manatees were observed during a single land survey conducted in November, 2002 (Florida Marine Research Institute). When manatees were photographed, a catalog was accumulated so that an individual manatee could be identified by its scar pattern and other characteristics. From year-to-year, this study allows biologists the opportunity to determine which manatees return to the same location at certain times of the year. From this study, so far, 148 different individuals have been identified in Salt Creek with a single day high count of 74

individuals.. Also, photo-identification and tagging studies throughout the state are regularly compared to track the movements of individual manatees from one area to another.

Aerial surveys of Sarasota County have been conducted regularly since 1985 by Mote Marine Laboratories and FWC. These surveys show that manatees are found in the Myakka River during every month of the year. Moreover, the winter counts are greater than the summer counts, which agree with the movement of manatees from colder offshore waters to the warmer inland waters during the winter months and their respective dispersion during the summer months.

Borders of slow-moving streams, tributaries and oxbows, and shallow emergent marshes along the corridor provide suitable habitat for the round-tailed muskrat, another rare species according to the FNAI database. 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 habitat for this species.

Little is known of the life history or population ecology of the Florida (long-tailed) weasel due to its secretive lifestyle and limited distribution. 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 (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 70 listed bird species are met, as detailed in Appendix B, Table B-2. Many of these species are resident year-round, while others overwinter in the area or pass through 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 12 mixed or single-species wading bird colonies have been established in the Myakka River corridor (FWC, 2009).

Native wading birds including the little blue heron, tricolored heron, reddish egret, snowy egret, black-crowned night heron, yellow-crowned night heron, green heron, white ibis, wood stork, limpkin and roseate spoonbill are all listed within the state of Florida due to the precipitous loss of wetland habitat in Florida. These species are locally abundant along the Myakka River, which has the resources to support both mixed and single-species breeding colonies. These species may nest in riverside vegetation such as mangroves, willows, buttonbush, and marshes. Similarly, wood storks frequent wetlands in the Myakka River corridor and have established nesting colonies in habitats bordering the river and on isolated small islands. As water levels drop in marshes and oxbows, feeding conditions improve for wood storks, as fish become more concentrated and easier to catch. Limpkins, ibis, and roseate spoonbills feed in stands of emergent vegetation along the river, on rafts of floating vegetation, on sandbars, shoals and mudflats in 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. A red mangrove

(mangrove swamp) island located within the Myakka River contains a rookery 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.

Mud flats near the estuary and other tidal flats in the corridor provide feeding areas for the American oystercatcher, a state species of special concern, and American avocet, an FNAI listed species. Plovers, including the threatened piping plover and southeastern snowy plover, also feed on mud flats and beaches near the estuary. Since the Myakka River is near the coast, it is also visited by gulls and terns, including the FNAI listed royal tern, sandwich tern, Caspian tern, and magnificent frigatebird, as well as the state listed roseate tern, least tern black skimmer, and brown pelican.

Along the Myakka River, mangrove habitats are also essential as nesting habitat for three, occurring or potentially occurring, FNAI listed bird species: the Florida prairie warbler, mangrove cuckoo, and black-whiskered vireo. Mangrove swamps along the Myakka River are relatively undisturbed by Brazilian pepper, and 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 search for food in drier habitats. The Upper Myakka Lake and Lower Myakka Lake margins are heavily utilized by sandhill cranes during the dry season.

Twenty-one state, federally, FNAI, and CITES listed raptors occur or could potentially occur in the Myakka River corridor including the bald eagle, swallow-tailed kite, white-tailed kite, Everglades kite, burrowing owl, screech owl, barred owl, barn owl, great-horned owl, merlin, Arctic peregrine falcon, southeastern American kestrel, short-tailed hawk, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, red-shoulder hawk, broad wing hawk, northern harrier, osprey, and crested caracara. There is suitable hunting and/or nesting habitat along this corridor for many of these species. 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 have been visible from the river in the vicinity of the Upper Myakka Lake and Lower Myakka Lake and below the U.S. Highway 41 bridge. Five eagle nests are also present along the river corridor, two near Upper Myakka Lake, two near Lower Myakka Lake, and one near Downs' Dam.

Pinelands associated with the Myakka River are suitable as woodpecker habitat, including the southern hairy woodpecker and red-cockaded woodpecker. Myakka River State Park and other publicly owned lands along the Myakka River north of U.S. Highway 41 contain large slash and longleaf pines, which may potentially serve as colony sites for the red-cockaded woodpecker in the future.

Oak scrub habitats in Myakka River State Park and Deer Prairie Creek Preserve once supported the Florida scrub-jay. Restoration efforts are currently underway to make the scrub suitable to support a Florida scrub-jay population once again. Scrub and other xeric communities in the region also provide habitat for the gopher tortoise and burrow commensals. Sarasota County Natural Resource Department's staff surveyed and mapped scrub jay distribution, and potential habitats within the county in 2000. Sarasota County is in the process of developing a habitat

conservation plan to preserve the federally listed Florida scrub-jay and its habitat within the county.

The American redstart, white-breasted nuthatch, worm-eating warbler, Kirtland's warbler, and Arctic peregrine falcon 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.

An experimental reintroduction of whooping cranes to Florida is began in 2004 when an ultralight aircraft successfully led a flock of whooping cranes to the Chassahowitzka National Wildlife Refuge. One of these birds has been observed in Myakka River State Park. The habitat along the river could be important to the successful reestablishment of this species in Florida.

Additional field reviews of portions of the Myakka River corridor have been completed to accurately assess the extent of habitation by listed species, as the state and Sarasota County have acquired additional land along the Myakka River corridor. However, there are areas within the corridor that have never been surveyed. Where appropriate, management objectives for listed species have been included in the unit management plans for each of the publicly owned conservation lands in the river corridor.

2.6.4 Benthos and Fish

The Myakka River represents a continuum from freshwater 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 freshwaters, reduced diversity in the transitional zone between fresh and saltwater, followed by an increase in diversity in permanently saltwater. 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 shift up and down river. The dynamics of the river's salinity structure, 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 not stratified. 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 freshwater 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 as 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, freshwater 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 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 DRP 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 DRP 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.

Results of a DRP BioRecon Assessment at the Myakka River at State Road 70 during March 1997, indicated that the Myakka River Supports a very healthy aquatic community. In the Ecosummary (DRP 1997), "the Myakka passed all three BioRecon thresholds for a healthy stream by wide margins. There were 36 different taxa (minimum threshold =18), a Florida index score of 19 (threshold=10), and 10 caddisflies or mayflies (threshold=4)."

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 equaled 23 and 32 for samples collected in September and May-June, respectively. Density of organisms equaled 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 a zonation of communities as a result of the salinity gradient. Densities and species richness increased, moving downstream to high salinity waters. As with DRP 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-four species of fish have been recorded from the designated portion of the Myakka River by DRP staff. The freshwater fish are characterized by an abundance of sunfishes and topminnows. Four species of shiners have been recorded from the river. These fishes are generally associated with clear flowing 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, spotfin mojarra, striped mullet, and hogchoker. These fishes are well known to be euryhaline and to penetrate far up rivers into freshwaters. The catadromous American eel is also recorded for the state park.

Mote Marine Laboratory (1985, 1986, 1990, 1991) conducted studies during both wet and dry seasons to characterize the ecology of the lower Myakka River. The following description of the fishery resources is based on the Mote Marine Laboratory studies.

The lower tidal portion 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. Pipefish, 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 abundance 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 sharply declined along the west coast of Florida and this species is now listed as federally endangered. 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 indicate this area has remained particularly suited to this 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 the emergent vegetation communities however, the freshwater/brackish water interface lies between Snook Haven and Ramblers Rest Resort.

Fisheries-Independent Monitoring River Study Program conducted by the Florida Marine Research Institute (FMRI), has been occurring on the Myakka River since 1989. Seasonal sampling took place prior to 1996, and year-round monthly sampling has taken place since. Monthly sampling includes 3 trawl and 5 seine samples/month. Sampling sites are randomly selected between the US-41 and El Jobean bridges on the Myakka River. Eighty-six species have been collected during sampling in the Myakka River, with diversity being lowest in the winter, and generally higher in the lower portion of the sampling area (downstream of Bird Key), than the upper portion. Currently FMRI is completing an 18 month fisheries monitoring study to help determine MFLs in the Myakka.

By far the most abundant fish collected is the bay anchovy, *Anchoa mitchelli*. The most abundant fish collected in shallow waters (<1 meter) are bay anchovy, silversides (*Menidia* spp. and *Membras martinica*), the majorras (tidewater majorra *Eucinostomus harengulus*; silver jenny *E. gula*), eastern mesquito fish (*Gambusia holbrooki*), rainwater killifish (*Lucania parva*), and spot (*Leiostomus xanthurus*). The species most abundant in deeper areas (>1.5 meters) are the bay anchovy, sand seatrout (*Cynoscion arenarius*), hogchoker (*Trinectes maculatus*), southern kingfish (*Menticirrhus americanus*), and hardhead sea catfish (*Arius felis*). The commercial crustaceans, pink shrimp (*Farfantepenaeus duorarum*) and blue crab (*Callinectes sapidus*) were among the most abundant animals collected in deep areas as well.

Most species present in substantial numbers were seasonally abundant, which reflected recruitment of recently-spawned juveniles. The species abundant year-round are bay anchovy, silversides, and rainwater killifish. The species abundant primarily in winter (January-March) include pinfish (*Lagodon rhomboides*), spot, striped mullet (*Mugil cephalus*), and red drum (*Sciaenops ocellatus*). The species abundant primarily in spring and summer (April - September) include sand seatrout, southern kingfish, and silver perch (*Bairdiella chrysoura*). The species abundant primarily in summer (July -September) include hardhead sea catfish, spotted seatrout (*Cynoscion nebulosus*), silver jenny, hogchoker, and clown goby (*Microgobius gulosus*). The species abundant primarily in fall (October-December) include blue crab, eastern mesquito fish, and sailfin molly (*Poecilia latipinna*).

A total of 106 different species of fish (including freshwater, marine, and introduced exotic species) have been collected in the Myakka River System (FMRI, unpublished; Dunson, unpublished; DRP, 1999).

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 that were once present on Upper Myakka Lake have reduced the quality of the largemouth bass and black crappie fisheries. These plants have reduced open water areas in the past, which 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. Currently SWFWMD sprays portions of both Upper and Lower Myakka Lakes and stretches of the river within Myakka River State Park for water hyacinth which can impede navigation during the summer and fall.

2.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

The Florida Master Site File contains 148 archaeological/historic sites recorded for the Myakka River watershed (Table 2). 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 have subsurface components that cannot be assessed by superficial study.

In 1989, a historic resource survey was performed by the University of South Florida of Old Myakka and a portion of the Myakka River (Williams et al., 1989). The survey resulted in the recording of 34 sites, which includes nine prehistoric, 14 historic and eleven standing structures. Access to private lands was a hindrance, and prevented a complete survey of the river.

The majority of the recorded sites are generally located within 2 miles of the present river. Archaeological evidence generated from a study of the T. Mabry Carlton, Jr. Memorial 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 (SO00019), and the Little Salt Springs site (SO00018) have yielded radiocarbon dates of 10,000 B.C. A historic marker located at Warm Mineral Spring 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, has 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 that 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 (SO00018) and the Vicker's Head site (SO00422).

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 Vicker's 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 were 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 (SO00397), 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 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 on 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 (CH00075) 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, and today only 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.

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 (SO00397) shows evidence of Seminole Indian occupation, making it important because there is little other evidence 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 (Historic Structure SO00596) 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 (SO00613), 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 (SO00426).

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. 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. North Port has experienced growth in a manner consistent with most urban coastal areas of southwest Florida. In 2009, North Port's residential population was estimated at 55,759, an increase of nearly 60% compared to the 2000 population of 22,797. It has become the largest city in Sarasota County both in land mass and population (Bureau of Economic and Business Research, 2009; City of North Port, 2009)

The main agricultural activity within the watershed is cattle grazing on rangeland, unimproved

pasture, and improved pasture. These activities occur throughout the watershed on ranches of various sizes ranging from less than 100 acres to several thousand acres. Most of the cattle-grazing activity occurs in areas set back from the river. Row crop, field crop, and citrus activities are also located within the watershed. They have become more intense operations 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.

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 Ranch, Manhattan Farms, and The Forest at Hi-Hat Ranch. There are also estate-type homes in Myakka River Trails along River Road and a multi use development north of Laurel Road, Venetian Golf and River Club.

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 Sarasota County (Jelks Preserve, Pinelands Reserve, Sleeping Turtles Preserve, T. Mabry Carlton, Jr. Memorial Reserve, and Deer Prairie Creek Preserve), and the SWFWMD (Myakka State Forest, Myakka Prairie, and Schewe Tract).

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, or pine flatwood communities. Ranchette-type residential development occurs north of Upper Myakka Lake (Hidden River), west of Vanderipe Slough (Myakka Valley and The Forest at Hi-Hat Ranch), subdivisions adjacent to and within the vicinity of Laurel Road, Border Road and River Road, including Venetian Golf and River Club, Manhattan Farms, Myakka River Estates, Royal Palms, and Myakka River Trails, and mobile home communities (Lazy River, La Casa, Harbor Cove, and River Walk) off of U.S. Highway 41. Other land uses within the river vicinity include recreational and support facilities associated with Myakka River State Park and commercial enterprises including Snook Haven, Venice Campground, Ramblers Rest Resort, and the Myakka River Oyster Bar. Various types of infrastructure are present along the river and include highway bridges and approaches, electrical transmission, distribution lines, and water distribution pipes. Several radio towers are also visible from the river, but these towers lie outside the immediate river vicinity.

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. Myakka River State Park, Myakka Prairie, Schewe Tract, Jelks Preserve, T. Mabry Carlton, Jr. Memorial Reserve, Pinelands Reserve, and Myakka State Forest comprise the public resource lands (Figure 8). 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 moderate to medium density residential (Figure 9). The rural designation is located north and east of US 41 and along the Myakka River. The residential designations are located east of the river along US 41. The moderate density designation allows a maximum of 5 dwelling units per acre, and the medium density residential allows for a maximum of 9 dwelling units per acre. A comprehensive plan amendment may be possible in the future to change the land use designations mentioned above.

The function of these rural areas according to the Sarasota County Comprehensive Plan is the protection of agriculture, maintenance of large expanses of open space, and the conservation of native habitats. Additionally, the Comprehensive Plan 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 areas, and agricultural estates, and activity centers further buffer the river (Figure 10). Most of the land within North Port is designated for low-density residential use. In 1995, the SWFWMD purchased 8,532 acres along the Myakka River within the City of North Port. Through a lease agreement, the DOF is managing this land as the Myakka State Forest.

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 that Florida has experienced has been well publicized, and the Florida legislature as well as the state's regional planning agencies and local governments are still addressing growth management issues. Accommodating increasing seasonal and resident populations has necessitated residential and commercial land development along with the attendant infrastructure, development of public water supply, agricultural development, and the need for recreational space. Accommodating 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. Both agricultural and urban development results in increased use of fertilizers, pesticides, and herbicides, plus an increased need for wastewater and solid waste disposal. Impervious surfaces, from roads and parking lots, results in increased stormwater runoff and loss of rainfall infiltration into the land surface to replenish groundwater aquifers. Runoff may contain sediments, nutrients, chemicals, oil and grease, petroleum hydrocarbons, and litter. Development generally also results 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. Total maximum daily loads (TMDLs) were proposed by the U.S. Environmental Protection Agency (EPA) in 2001 for six watershed segments that exceeded the DEP water quality criteria. Although the document was never finished, the proposal generally recommended no additional nitrogen or bacteria loads to the watershed until an additional study could be conducted to determine if bacteriological, dissolved oxygen, and biological conditions found within the watershed were natural or anthropological impairments.

DEP is in the process of developing TMDLs for impaired waterbodies. All of the impaired segments are listed as “medium” priority for the development. If no TMDLs are adopted, the segments will be resampled for impairment again in 2013. The TMDL is the maximum amount of a given pollutant that the Myakka River can assimilate without exceeding surface water standards that protect natural system function and human health.

While growth has increased water demand in recent years, the current economic downturn has quelled this considerably. There is a significant amount of existing housing inventory that has, in many cases, already been accounted for in future demand. While potential use of excess flows in the Upper Myakka Watershed (Flatford Swamp) is possible, there are no plans by the SWFWMD or the PRMRWSA to develop surface water resources on the Myakka River. Further, no development of supply in the upper watershed is planned, but is listed as an option for local governments for potential future supply. This option, and its potential benefits and/or impacts, is currently being extensively studied as part of the Myakka Watershed Initiative (Dianne Davies, Pers. Comm., 2010).

Future land development could 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 groundwater, 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

Appendix E, Exhibit B depicts 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 are also located in the Cities of North Port and Venice.

The Florida Wild and Scenic River segment is confined to portions of unincorporated Sarasota County, the City of North Port, and the City of Venice. 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 Commission and the City of Venice Commission.

Sarasota County Regulations--Sarasota County regulates land development through its comprehensive plan and through other codes and ordinances. *Apoxsee: The Revised and Updated Sarasota County Comprehensive Plan* was first adopted by the Board of County Commissioners in 1989, and was most recently updated in 2006. The Plan identifies public resource lands, including Myakka River State Park, T. Mabry Carlton, Jr. Memorial Reserve, Deer Prairie Creek, Jelks Preserve, and Pinelands Reserve, as areas of special designation that are to be preserved in perpetuity. In addition to preservation of native habitat, a portion of the Pinelands Reserve is the site of the Central Sarasota County Solid Waste Disposal Complex. The Plan also designates the majority of the watershed east of the river as rural land use. 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.

Chapter 2 of the Plan, Environment, provides the basis for conserving, maintaining, and where necessary, restoring the natural environment in Sarasota County. It provides a framework for guiding planning and development activities to attain these goals. The Plan identifies and describes native habitats in the County, and in the section "Principles for Evaluating Development Proposals in Native Habitats" provides guidelines for use by staff in evaluating development proposals in native habitats.

The Myakka River is listed as a specific habitat. Management guidelines for the river are as follows:

- a) Dredging and filling in the Myakka River shall be prohibited.
- b) For development orders, implement the requirements of the Myakka River Protection Zone Code during development proposals.
- c) Reduce pollution entering the Myakka River. All new construction adjacent to the river and within a semi-rural or urban designation shall connect to a County-approved central service for wastewater treatment.
- d) Closely monitor the regional effects of phosphate mining and other potentially detrimental land uses.
- e) Prohibit phosphate mining in the Myakka River Watershed.
- f) 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.
- g) Prohibit shoreline hardening of the Myakka River, discourage it in its tributaries, and promote shoreline softening through vegetation projects.
- h) Stormwater runoff from new development shall comply with governing regulations. The Sarasota County Stormwater Environmental Utility shall use Best Management Practices to protect water quality of stormwater runoff to receiving waters. For wetland habitats

stormwater runoff from impervious surfaces must be pretreated prior to its discharge. Pre-treatment may be in the form of sediment sumps, baffles or grassed swales. Such facilities shall be designed and constructed in accordance with applicable regulations so that the discharge does not violate applicable local, state or federal water quality standards or degrade the quality of the receiving waterbody. Water discharges into natural wetlands must be done by overflow and spreader swales as to avoid degradation of the ecosystem.

- i) If fill is stockpiled near a wetland, appropriate sediment control measures (e.g., hay bales, silt screens, etc.) shall be employed to prevent sedimentation within the wetland. When building sites adjacent to wetlands are elevated by filling, the same erosion control requirements apply and the fill must be stabilized to prevent entry of sediment into the wetland.

Additionally, freshwater wetlands with specific habitats (swamps, marshes, sloughs, wet prairies, and heads) shady hammocks, pine prairies, and high dry scrubs are identified as valuable native habitats, with management guidelines listed for each. Swamps and bay heads, due to their high degree of environmental importance and rarity in Sarasota County, shall be preserved and should be restored where practicable. Guidelines applying to other freshwater wetlands include protection of vegetation in areas subject to seasonal water level fluctuations, protection from impediments to water flow in contiguous wetlands, provisions for the mitigation of lost wetlands, pretreatment of stormwater runoff, and buffers around wetlands, employment of turbidity barriers around wetlands to prevent sedimentation, and buffer requirements around all wetlands to protect from adverse impacts due to development.

Special protection is given to mesic hammocks along the river and its tributaries. Limitations are placed on the developable area and buffer requirements are widened. Where there is a native habitat open space requirement, areas of pine flatwoods, dry prairie and grassy dry prairies may be conserved. Additionally, canopy and understory vegetation of pine flatwoods shall be maintained in conservation areas and in wetland buffer preservation areas, and fire should be recognized as an important management tool for pine prairie habitat.

The Environment Chapter of the Comprehensive Plan also outlines goals, objectives, and policies through which the County seeks to ensure that environmental quality is maintained and enhanced. The following goals and objectives, and their supporting policies relate to protection of the river:

Goal 2 Protect and enhance wherever possible, the quality of the estuarine environment throughout Sarasota County.

- Objective 2.1 Improve surface water quality including estuarine, freshwater, coastal streams, rivers, and bays, including the Myakka River and its tributaries.
- Objective 2.2 Increase the area and improve the habitat quality of coastal wetlands and marine resources.

Goal 3 It shall be the Goal of Sarasota County, as a member of the Sarasota Bay and Charlotte Harbor National Estuary Programs to support the implementation of their regional

Comprehensive Conservation and Management Plans (CCMP) to restore and improve the natural estuarine systems and related coastal components.

Objective 3.1 Participate in intergovernmental processes designed to pursue the goals and objectives of the Sarasota Bay and Charlotte Harbor Management Plans.

Goal 4 Protect, maintain, and, where necessary, restore the natural resources of Sarasota County to ensure their continued high quality and critical value to the quality of life in the County.

Objective 4.2 Protect the quality and quantity of all jurisdictional waters, recognize the ongoing study efforts, and ensure that the current water quality in the County be improved through the year 2010.

Objective 4.4 Identify, manage, and protect all ecological communities, habitat corridors and wildlife, especially critical habitats and endangered, threatened, and species of special concern identified in official federal, state, or international treaty lists.

Objective 4.5 Preserve a network of habitat connectivity across the landscape that ensures adequate representation of native habitats suitable to support the functions and values of all ecological communities.

Objective 4.8 Coordinate future land uses and provision of urban services with the protection of environmental resources.

Objective 4.9 Implement the environmental standards of the adopted Joint Planning Agreement/Interlocal Service Boundary Agreement with the City of Venice. (RU-142, Ord. No. 2007-090, October 10, 2007)

Specifically, Policy 4.2.2 and 4.2.3 supports the efforts and recommendations of intergovernmental organizations concerning the river watershed, and directs staff to enact ordinances to specifically protect the river. Policy 4.2.1 directs staff to utilize the County's regulatory authority to encourage shoreline softening practices and require effective vegetative buffer zones for new construction adjacent to watercourses in accordance with Policy 2.2.3. Policy 4.2.4 states that mining activities are not permissible under the Zoning Ordinance within areas of special environmental significance or sensitivity, including the river and its tributaries.

Other Codes and Ordinances--The County has also adopted policies that will affect the County's Land Development Regulations (LDR), Ordinance No. 81-12, as amended. Policy 4.4.1 states that the County shall continue to review development proposals for consistency with "Principles for Evaluating Development Proposals in Native Habitats" as required by the LDR.

The LDR was revised in 1997 to include an Environmental Technical Manual. The Manual contains requirements for a littoral zone plan, wetlands mitigation, maintenance and monitoring,

a wetlands hydroperiod maintenance plan, a tree protection plan, and a management plan for the conservation and preservation of native habitats.

The Myakka River Protection Ordinance No. 2008-002 provides for protection measures for the Myakka River relating to regulations governing subdivisions and the development of land. The Myakka River Protection Ordinance includes a 220-foot wide Myakka River Protection Zone which regulates construction, earthmoving, sewage disposal, vegetation/tree removal activities and wetland preservation within 4 zones of the 220ft buffer of the river. The Tree Protection Ordinance No. 2008-041 Water Navigation Control Authority Ordinance No. 2006-091, Earthmoving Ordinance No. 2008-040, and Zoning Ordinance No. 2008-039 each provide for additional protection of the Myakka River by protecting mangroves and other trees, controlling excavation and dredge and fill activities along the river, and regulating zoning and proposed development within unincorporated areas of Sarasota County.

City of Venice Regulations – In 2000, the City of Venice annexed the properties along Laurel Road east to the Myakka River and commonly known as the Henry Ranch (currently Venetian Golf & River Club). As part of the consideration for annexing these properties, the City has imposed specific regulatory and policy provisions to guide development of this area. The following outlines the hierarchy of standards and criteria applied when these properties presented their development plans:

1. **Pre-Annexation Agreement:** Specifies dedication of regional public park with limit to passive uses on the Myakka River at the eastern terminus of Laurel Road.
2. **Comprehensive Plan:** Specific policies have been adopted through the Future Land Use Element and Conservation Element that establish a conservation open space buffer for all areas along the Myakka River that lie within the City’s corporate boundaries and that limit use to passive recreation and green space uses. These policies also specifically reference compliance with the Myakka River Wild and Scenic Designation and Preservation Act and Management Plan. The City’s comprehensive plan is currently under revision and is scheduled for completion in 2010.

The Environment Chapter of the Draft Comprehensive Plan outlines goals, objectives, and policies through which the City seeks to ensure that environmental quality is maintained and enhanced. The following goals and objectives, and their supporting policies relate to protection of the river:

GOAL PROTECT, MAINTAIN, AND CONSERVE OPEN SPACES AND NATURAL RESOURCES FOR THE SUSTAINABILITY OF THE COMMUNITY.

Objective 4: Regional Environment Coordination. Utilize intergovernmental partnerships to expand the City’s ability to protect, enhance, and maintain its open spaces and natural resources.

GOAL PRESERVE VENICE’S WATER-BASED LIFESTYLE AND COMMUNITY CHARACTER BY PROTECTING AND IMPROVING THE CITY’S COASTAL AREAS, WATERWAYS, AND LANDS ADJACENT TO THEM.

Objective 4 Marine Habitats and Resources - Preserve, restore, expand, and protect marine resources for both people and natural communities. The marine resources in Venice include Gulf of Mexico, Roberts and Dona Bays, Intracoastal Waterway, Myakka River, Curry and Hatchett Creeks, and their tributaries.

Objective 5 Water Resource Coordination - Coordinate with marine resource intergovernmental partners to improve coastal and waterfront development areas and protect water resources.

Specifically, Element 2, Policy 4.3 and Element 3, Policies 5.6 and 5.9 support the effort of intergovernmental organizations concerning the river watershed.

3. **Other Codes and Ordinances:** Ordinance No. 2003-032, adopted October 28, 2003, adopted a new Land Development Code. When development proposals within the City come forward, the City's land development regulations will apply to ensure consistency with the adopted Comprehensive Plan, Zoning Regulations, Subdivision Regulations, Environmental Protection and Design Standards of the City and State statute.

City of North Port Regulations--The City of North Port regulates future development by means of the Comprehensive Plan (updated in 2009), various ordinances, Land Development Regulations (updated in 2010), Subdivision Regulations, and a site development review procedure. Ordinance No. 2008-036 added Chapter 57, Myakka River Protection Zone Ordinance to the Land Development Code in 2008. Although all of the above are essential to regulate future growth in the City of North Port, the Comprehensive Plan and the Land Development Regulations are the guiding framework for the City's future development.

Besides the Future Land Use Element, the Conservation and Coastal Zone Management Element serves as the primary guide for environmental issues/protection within the City. This element devotes several objectives and policies to participation in regional planning activities and local initiatives devoted to the protection of the Myakka River, Myakkahatchee Creek, and Charlotte Harbor. Other Comprehensive Plan Elements that address environmental issues and coordination include the Recreation and Open Space Element and the Intergovernmental Coordination Element.

The Conservation and Coastal Zone Management Element is broken into a section devoted to conservation issues and a section devoted to Coastal Zone Management issues. The element consists of two major goals and subsequent objectives and policies under the two sections. The Conservation Goal and 12 objectives can be summarized as follows:

Goal 1 – The City of North Port shall protect, conserve, and enhance its natural environmental and historic resources to ensure sustainable environmental quality for the future.

Objective 1 – Review, revise, and/or create City regulations providing for the protection and enhancement of critical water resources, flora and fauna, and native habitats.

Objective 2 – Identify, conserve and maintain sustainable natural vegetative communities within the City.

Objective 3 – Encourage the preservation of existing native vegetation, the creation of an urban forest, and the use of xeriscape landscaping which will result in a build-out tree canopy equal to 80% of the canopy that existed at the time of Plan adoption.

Objective 4 – Protection of surface waters within, and adjacent to, the City.

Objective 5 – Continue management and protection programs to preserve and enhance the Myakkahatchee Creek as a Class I potable water supply and a natural resource amenity.

Objective 6 – Wetlands protection

Objective 7 – Implement programs and procedures for protection, preservation and conservation of coastal and fresh water resources.

Objective 8 – Protection of the FEMA 100 year floodplain.

Objective 9 – Air Quality

Objective 10 – Preservation of historical and archaeological resources.

Objective 11 – Soils

Objective 12 – Public Awareness

The Coastal Zone Management Goal and four objectives are summarized below:

Goal 1 – Lessen the impact of a destructive storm or other natural or man-induced event on human life, public facilities, private structures, infrastructure, and coastal natural resources in the City of North Port.

Objective 1 – Continue to require infrastructure necessary to meet its future land use demand for coastal infrastructure consistent with public safety, to maintain Levels of Service as described in the various elements of this Comprehensive Plan, while limiting impacts to natural and historic resources.

Objective 2 – Land Development Regulations consistent with local and regional hurricane plans.

Objective 3 – Regulation of structures within the FEMA/FIRM 100 year floodplain and Category 1 SLOSH zones.

In terms of impact upon the Myakka River, the City's most significant environmental initiative is related to the protection of the Myakkahatchee Creek. The Myakkahatchee Creek is a tributary of the Myakka River that bisects the City from north to south. Besides being a prime natural resource, the Myakkahatchee Creek serves as a primary potable water resource for the city. As originally platted, single-family residential lots abut the creek for almost its entire length, therefore the potential for intensive development, and its associated impacts, has been a very real

issue. Any concentration of residential development will impact the health of the creek by increasing runoff and pollutant loads, decreases native habitat, and heavy development along the creek greatly alters the natural floodplain and increases the chances of flooding.

Seeing the potential for such problems, the North Port City Commission has aggressively pursued the purchase of the first two tiers of lots along the creek. This City Commission directive is reflected in Objective 5, and its associated policies, in the Conservation and Coastal Management Element of the Comprehensive Plan. For those lots along the Myakkahatchee Creek where buy-back purchase is not feasible, strict local ordinances continue to regulate stormwater runoff, the handling and storage of hazardous and special wastes, and native vegetation removal. Accordingly, the Future Land Use Map will designate this area as Recreation/Open Space, which will provide strict regulations to mitigate the impacts of future development. These ordinances and regulations shall provide for incorporation of upland buffers, identifying and remedying artesian wells, remedying any point-sources of inadequately treated stormwater which may be identified, strict land development regulations, stringent regulations regarding sewage disposal methods appropriate to the area, and other restrictions as deemed appropriate.

Manatee County Regulations--Manatee County submitted its Comprehensive Plan pursuant to Chapter 163, Florida Statutes, on November 16, 1988 and was most recently updated in September, 2010. 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 90-01). 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 (updated June 20, 2002), land development code (updated June 21, 2007), and subdivision regulations. Environmentally sensitive areas and future development are currently regulated by the Future Land Use and Conservation Elements of the Comprehensive Plan. The Future Land Use Element contains specific objectives for conservation land. The Conservation Element addresses air and water quality, water resource conservation, habitat conservation, wildlife protection.

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 was adopted on August 28, 2007. This new plan has set forth policies regulating development throughout the county within the Future Land Use and Conservation Elements.

Charlotte County Regulations—Charlotte County approved the Smart Charlotte 2050 Plan and it was transmitted to the Department of Community Affairs (now Department of Economic

Opportunity) on December 15, 2009. The Plan will include Future Land Use, Natural Resources, and Coastal Planning Elements which will provide for the efficient use of land, build community value, limit urban sprawl, and protect natural resources and coastal areas.

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. Beginning at County Road 780 and traveling south, approximately 20 river miles are in public ownership. This public ownership includes large tracts of the Myakka River State Park, the Myakka Prairie, the T. Mabry Carlton, Jr. Memorial Reserve, the Pinelands Reserve, and Sleeping Turtles Preserve.

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 nearly to the county line. In addition to the privately owned tracts there are publicly owned lands mixed in, such as, the Jelks Preserve, Deer Prairie Creek Preserve, and Myakka State Forest. The Myakka Conservancy and the Trust for Public Lands purchased 62-acres, north of Myakka River State Park on the river, for preservation.

Land ownership patterns have been changing in two ways. Some large tract ownership has been subdivided as suburban development spreads eastward from coastal areas. In addition, public ownership has increased, due to Sarasota County's Environmentally Sensitive Lands Program and SWFWMD acquisition projects.

3.0 PUBLIC ACCESS AND RECREATIONAL USE

The Myakka River, like many rivers in Florida, is a popular destination for outdoor recreation activities. Existing access and support facilities are clustered in two areas: the Upper Myakka Lake of Myakka River State Park and the southern portion of the river along River Road and US 41. This section describes the existing access and support facilities that exist within the river area and describes current use.

3.1 EXISTING ACCESS FACILITIES

The Myakka River State Park is the primary public access point to the Myakka River. The park, which covers more than 37,000 acres, is located in Manatee and Sarasota Counties approximately 12 miles east of Sarasota. The southern entrance is located off of SR 72 and may be accessed 7 days a week. The northern entrance is located off of CR 780 and is open on weekends and holidays.

The park offers scenic natural features and facilities for both active and passive recreational activities. The park contains wilderness areas; Upper Myakka Lake; Lower Myakka Lake; and diverse natural communities including marshes, sloughs, and unique upland communities as

significant natural features. Visitors can enjoy viewing a virtually unchanged Florida landscape. Deer, alligators and many species of wading birds are abundant, as well as thousands of waterfowl in the winter months. In addition, ospreys, bald eagles, sandhill cranes, and many other species are commonly seen in the park. Approximately 7,500-acres of the park is designated as a wilderness preserve. The preserve resembles a Florida undisturbed by man's activities. The area is open to the public for such activities as hiking, fishing, sightseeing, canoeing/kayaking, nature study, and research.

The park offers many environmental education facilities, beginning with a visitor's center with exhibits of wildlife and plant communities and video presentations. Park rangers provide guided walks and campfire programs seasonally and offer bird watching education during the winter season. Concessionaire-run boat and land tours are also available at the park. Two 70-passenger airboats offer a panoramic view of the Upper Myakka Lake while narrators describe the ecology of the shoreline, streams, flora, and fauna. A 50-passenger tram tour offers a view of remote areas of subtropical forests and marshlands while a guide explains the native habitat and history of the area.

The park also offers a wide range of recreational uses. Among the activities offered are hiking trails (39 miles), a 25-foot high canopy walkway with a 75-foot high observation tower, photography, fishing, picnicking, canoeing/kayaking, equestrian trails (16 miles), bicycling, camping (both full facility and primitive), and overnight cabins. The Myakka River State Park boat ramp is the main launching point for canoeing/kayaking, fishing, and other river and lake-related activities for the north portion of the park. Several other public access points exist north of the park, including SR 70, SR 64, and Myakka City-Wauchula Road. However, these are highway/road crossings and only provide an opportunity to fish from the roadside or bridge.

The T. Mabry Carlton, Jr. Memorial Reserve is an undeveloped 24,565-acre tract located south of the state park and Myakka Prairie, on the east side of the Myakka River. There are hiking trails and limited public use facilities in the reserve. In addition to these, there is a public non-motorized boat launch that provides access to the river in the vicinity of Border Road for such activities as canoeing and kayaking.

Deer Prairie Creek Preserve is an undeveloped 6,400-acre tract that was purchased between 2000 and 2004 and is located on the east side of the Myakka River. The main access is located off of Forbes Trail, however there is another access located off of US 41, near the southern portion of the preserve. The preserve encompasses Deer Prairie Creek, a major tributary of the river, and provides protection for nearly 6 miles of shoreline along the Myakka River. Deer Prairie Creek contains over 70 miles of hiking, bicycling, and equestrian trails.

The Jelks Preserve is an undeveloped 614-acre tract located on the west-side of the Myakka River. It is located east of North River Road, approximately between East Venice Avenue and Center Road. This preserve encompasses nearly a mile of river frontage. There are currently more than 8 miles of hiking trails on the Preserve.

The City of North Port's Butler Memorial Park is located adjacent to Price Boulevard and contains a canoe launch, hiking path, and other non-resource-based recreational facilities. The 40-acre park is located on Myakkahatchee Creek, several miles north of its confluence with the Myakka River. Marina Park provides motorboat access to the Myakka River via Myakkahatchee

Creek. Marina Park is located on Chancellor Boulevard in North Port.

Crane Park, a small community park operated by Manatee County in Myakka City, borders the Myakka River. The park has limited facilities, including picnic tables and restrooms, but no river access for boating. SWFWMD also owns a portion of Flatford Swamp in Manatee County which serves as the headwaters of the Myakka River. Access to Flatford Swamp is limited due to flooding, however there are some walking trails available.

The Myakka State Forest is an 8,532-acre state forest managed by the DOF under SWFWMD ownership and located primarily within the City of North Port and adjacent to the Englewood community. It is managed for multiple use activities such as: timber management, recreation, wildlife management, watershed management, and environmental education. Currently there are approximately 30-miles of dirt/woods roads that are used as hiking, biking, and equestrian trails. Other recreational activities include hunting, fishing access, and primitive camping.

Snook Haven has recently become a County Park in 2006. Snook Haven currently provides access to the Myakka River with a boat launch, fishing access, and canoe rental. Ramblers Rest Resort is a private recreational facility, for public use, located along the southern portion of the Myakka River, north of US 41.

3.2 RECREATIONAL USE

The Myakka River's unique natural features and its proximity to the urban areas of West Central Florida make it a popular outdoor recreation area. The river supports many types of recreational activities. Some of the activities include fishing, canoeing/kayaking, swimming, birding, nature study, photography, camping, hiking, motor boating, picnicking, and hunting. Motor boating is restricted by physical limitations to the portion of the river north of Upper Myakka Lake and from Lower Myakka Lake downstream to Downs' Dam, near river mile 25.5. Activities such as hiking and camping are restricted to public use lands within the state park, state forest, and county parks.

Sarasota County's Comprehensive Plan indicates that in terms of regional recreational facilities (e.g., Myakka River State Park) the area has sufficient facilities to accommodate the population it serves. Additionally, T. Mabry Carlton, Jr. Memorial Reserve and Deer Prairie Creek Preserve provide for limited public-use facilities, and public recreation lands along the river extend from the northern boundary of the Myakka River State Park at CR 780 to Border Road and south of I-75 to US 41.

The river has three distinct segments: the state park area of lakes, the midstream area, and the downstream southern area. The frequency of use and types of use vary significantly between segments. The segments have different facilities available and are used differently. The northern segment of the river lacks the private river-related facilities that the southern segment has. This is due in large part to lack of access and natural restrictions to varied boating use. People who have smaller fishing boats and canoes/kayaks tend to use the upper part of the Myakka River, while larger more powerful pleasure craft tend to stay in the downstream area of the river. The reasons for this seem to be due primarily to the natural features and resultant physical limitations of the river's shallow depths. As described in Section 2.0, the northern portion of the river is narrow and shallow (often seasonally dry) with large marsh areas, while the southern portion of

the river tends to be wider and deeper with more open water.

The southern segment has adequate private river-related facilities and considerable boat traffic. The facilities at Snook Haven are utilized by pleasure craft, whereas, pleasure craft are generally unable to use the state park boat ramp, in the northern portion of the river. The ability of larger boats to use the lower Myakka River is primarily due to the natural widening and the availability of deeper water during high tides in the river as it approaches its confluence with Charlotte Harbor. However, this section of river has areas of shallow controlling depths, which is a limiting factor for large boats with deep drafts.

The southern third of the river may be the most frequently used not only because of the width of the river and deeper water at this location, but also because this area of the river is more heavily populated than any other section. The southern third portion of the river includes several communities including Myakka Shores, Charlotte Beach, North Port, Port Charlotte, and El Jobean, which are located near the southern end of the river, but outside the designated river area. All have increasing populations and relatively easy access to the river.

Boats from the Charlotte Harbor communities of Punta Gorda, South Punta Gorda, and Port Charlotte are able to travel up the river to use the facilities such as those available at Snook Haven. However, people who frequently use the lower areas of the river do not usually use the upper areas of the river. Few people in any location frequently use the upper reaches (north of Upper Myakka Lake) of the river because of the lack of a readily distinguishable channel and related physical restrictions and navigation problems.

Data collected during the monthly river inspections completed during weekdays from 1995 to 2008 was used to determine actual usage of the river throughout the year. Observations of boat traffic, number of passengers, type of watercraft, and recreational activities were recorded. According to the monthly river inspection data, 31% of the boats observed on the river from 1995-2008 were located from rookery island, south of US 41, to Charlotte County (Figure 11a). Downs' Dam to Snook Haven received the second highest amount of use with 24%, and 18% of vessels observed during this time period were observed from Snook Haven to Ramblers Rest. The portion of the river that received the least amount of use was from the pavilion within Myakka River State Park to Downs' Dam. The fishing pressure in each section of river was synonymous with the river usage percentages, and boats utilized for fishing accounted for approximately 54% of all watercraft. The low number of vessels observed from the park pavilion to Downs' Dam could be attributed to the early starting time of the monthly river surveys, which is usually before many visitors enter the park. Although the river inspections are preformed during weekdays, it is expected that the lower portions of the river continue to have the highest amount of use from boaters during the weekends as well. Boating activity was consistently highest within the southernmost portion of the river from the rookery island, south of US 41, to the Charlotte County line, except during 2000, 2006, and 2007 when the river section from Ramblers Rest to Snook Haven had the highest boating activity (Figure 11c). This southern section of the Myakka River also had the highest number of fisherman observed during monthly river surveys followed by the stretch of river from Downs' Dam to Snook Haven (Figure 11d). River sections from Downs' Dam to US 41 had nearly the same number of fisherman observed from 2000-2009 and the Pavilion to Downs' Dam and US 41 the Rookery Island had the lowest amount of fishing activity.

A total of 38 vessels were seen between the rookery island and the Charlotte County line throughout 1999 during the monthly river inspection surveys. A high number of boats were recorded from Downs' Dam to Snook Haven during 1995, 1996, 2002, and 2004. During these years, the boating activity from Downs' Dam to Snook Haven was nearly as high as or higher than the boating activity within the southernmost stretch of the river. This may be attributed to easy access from I-75 and US 41 and the existing facilities located onsite, including a restaurant and bar. Significant changes in overall boating activity or activity by river segment have not been observed.

4.0 RESOURCE VALUES, ISSUES, AND PROBLEMS

The Myakka River Wild and Scenic Designation and Preservation Act defines resource value as "any one or more of the specific economic, scenic, recreational, geologic, fish and wildlife, historic, cultural, or ecological features associated with the river area as determined by the coordinating council". To ensure that resource values and associated features were fully described and all issues identified, the Council members were assigned to work groups to develop lists of resource values and issues. These activities, in addition to the resource descriptions, management authority, and management principles, served as the foundation for developing specific management objectives and actions.

Four work groups were established to develop lists of resource values and issues. These work groups were based on major environmental disciplines and included aquatic ecology/water resources, terrestrial ecology, and cultural/land use.

The specific features defined in the Act were also reorganized to facilitate discussion on a discipline basis. Economic, scenic, recreational, and geologic features were identified as specific resource values. Historic and cultural features were combined into one specific resource value. Fish and wildlife and ecological features were redefined into aquatic ecology, terrestrial ecology, and water resources values.

The work groups defined resource values and issues as follows:

Aquatic Ecology/Water Resource Work Group

- Geologic resource
- Aquatic ecology resource
- Water resource

Terrestrial Ecology Work Group

- Terrestrial ecology resource

Cultural/Land Use Work Group

- Economic resource
- Scenic resource
- Recreational resource
- Historic and cultural resource

Each work group met three times independently and then together as the Council to discuss individual resource values, and features and issues which were prevalent in more than one work group or resource value. The resource value elements listed in Table 3 depicts a summary of results of the work group's efforts with additional input from the Division.

The following sections describe each resource values, issues, problems, and resultant priority concerns. The listing of resource values, issues, problems, and priority concerns in the following sections does not represent a designated ranking of importance.

4.1 ECONOMIC RESOURCE VALUE

4.1.1 Description

The economic resource value of the Myakka River watershed is significant and is growing in size and diversity as Sarasota County and west-central Florida expand their economic base. The most significant and extensive element of the resource value is land development activity. Other components include agricultural, transportation, and mining activity.

Land development activity has increased substantially within the past five years and is concentrated throughout the southern portion of the watershed within the City of North Port, and west of Myakka River State Park. The amount of agricultural activity has declined in the watershed, but is still a significant resource value. Agricultural areas are primarily located in Manatee County, north and northeast of Myakka River State Park, however large agricultural areas still exist in eastern Sarasota County. Agricultural activities include field crops, row crops, plant nurseries, silviculture, and cow-calf operations . Currently, livestock grazing is the most significant economic resource element and includes improved and unimproved pasture and rangeland.

The economic resource elements most closely related to the river itself are commercial fishing, sport fishing, and commercial boat touring. Commercial boat fishing activity is generally limited to the lower reaches of the Myakka River, primarily south of U.S. Highway 41. Sport fishing is a popular activity throughout the entire length of the river south of Upper Myakka Lake. Popular fishing spots include both Upper Myakka Lake and Lower Myakka Lake, in the vicinity of Snook Haven, and where tributaries discharge into the Myakka River. Commercial boat touring is limited to tours provided by Myakka River State Park in Upper Myakka Lake and at Snook Haven.

Land development in the watershed for other-than-agricultural interests has historically been limited to very low residential estate-type development in areas such as Myakka Valley and Manhattan Farms. Suburban-type densities exist in Myakka City, located adjacent to the river on State Road 64 in Manatee County, and Warm Mineral Springs, an established community east of the river adjacent to U.S. Highway 41. The City of North Port is a relatively young community located east and south of Warm Mineral Springs and with relatively high residential densities. Growth of the coastal communities in southwest Florida has been significant and is anticipated to increase. Development trends in Sarasota County and Venice indicate an eastward expansion in the vicinity of I-75. This expansion has begun to impact the western fringe of the drainage watershed, particularly in the vicinity of Laurel Road, Jacaranda Boulevard, and River Road where significant urban-intensities of commercial and mixed-use developments have been proposed and communities such as the Venetian Golf and River Club have been developed.

Significant residential development has already begun in North Port with the West Villages Improvement District located on both sides of South River Road.

Infrastructure to support existing and proposed developments are also located in the watershed, including landfills, water and wastewater treatment facilities, transmission and/or disposal facilities, and electrical power transmission and distribution lines. Transportation infrastructure is also prevalent, including highways, bridges, marked river channels, and airfields. Highways and bridges, the marked river channel, and electric transmission and distribution facilities are specific facilities located within the river corridor. Sarasota County water transmission facilities cross the Myakka River north of Border Road, and an additional pipeline will be installed within two years as urban and suburban expansion intrudes into the watershed. A City of North Port water transmission line crosses the Myakka River at the US 41 bridge.

Mining resources are also located within the watershed and corridor. These resources consist of dolomite, phosphate, shell, marl, sand, and fill. The most extensive mineral resource in the watershed is phosphate, which exists within the Manatee County portion of the watershed, and the Hardee and DeSoto County portions of the watershed. Phosphate mining has historically occurred north of the Myakka River watershed; however, due to resource depletion in these areas and a relatively healthy market for phosphate products, phosphate mining activities are increasing in the watershed and expected to continue. The only mining activity which has occurred within the river corridor was a dolomite mine, which is east of the Myakka River in the area south of Border Road, and Venice Minerals, a sand and shell mining facility, is currently in operation west of the river near the end of Laurel Road.

4.1.2 Issues and Problems

Agriculture --Agricultural issues and problems are varied but are generally related to existing or potential adverse impacts to the natural resource values. Agricultural expansion into the watershed and river vicinity can result in increased use of fertilizers, pesticides, and herbicides that are likely to degrade water quality through nonpoint discharge of stormwater runoff into tributaries, wetlands, and the river itself. Water table fluctuations due to ground water withdrawals are also important with regard to water quantity effects on the river (see Section 4.6 for more detailed water resource issues and problems). Additional impacts occur to the natural resource values from conversion of wetlands to pasture and accelerated erosion of sediments into the river from land impacts in general.

Consumption of natural communities for agricultural purposes may displace wildlife habitat and feeding and breeding grounds, however low intensity cow-calf ranch agriculture in the watershed conserves water quality and supports diverse plant and wildlife populations. The loss of ranchlands to more intensive agriculture or residential uses undermines the benefits of low intensity cow calf ranchlands.

Land Development--The projected expansion of urban and suburban levels of land development in the watershed and particularly along the river corridor generates a number of issues and problems, however Sarasota County regulations are designed to ameliorate/prevent these adverse impacts. The increase of impervious surface and resultant increases in stormwater runoff are important issues with respect to flooding and water quality. An increase in development can result in an increase in traffic, which can cause an increased contamination of stormwater by vehicular-generated hydrocarbons, as well as degradation of existing air quality. The practice of

allowing septic tanks at high densities or in flood prone areas has been an ongoing problem. There has been an increase in number of single family boat docks and other structures visible from the river, plus an increase in boat traffic associated with river front development.

Other specific issues that have been raised are outdoor storage as it relates to flooding, and interaction of pets with wildlife. Issues that have been raised as potential solutions to adverse land development impacts include clustering of development and/or transfer of density and land use type and density restrictions. The maintenance of property rights of landowners, particularly adjacent to the river and within the river corridor, is also very important.

Transportation and Infrastructure--An increase in access to the Myakka River is an important issue in that access has the potential to open the river to levels of recreational use that burdens the river's resource values, as well as provides the opportunity for development in proximity to the river. Existing and future bridges can have significant impacts on the river's floodplain. Utility corridors not aligned with highways and bridge crossings also provide the opportunity for future highway development and can have adverse impacts on visual and water resource values. Other utility issues include the presence of sanitary landfills and wastewater treatment and disposal facilities in proximity to the river, and surface and groundwater withdrawal. When these types of corridors run through natural communities, they often become a source of invasive exotic plant species (Brazilian pepper, Australian pine, and melaleuca) that then invade the natural communities.

Mining/Mineral Resources--Mining issues are based on dewatering and water quality and quantity impacts, and destruction of wildlife habitat. The anticipated increase in phosphate mining activity in the watershed will likely result in the impacts described above. Since mining is an intense activity, impacts can be substantial and mitigation difficult to achieve. Closer to the wild and scenic portion of the Myakka River, mining for other mineral resources will likely be on a much smaller scale. However, due to the proximity of these activities to the river, the consequences of mining can be significant.

4.1.3 Priority Concerns

The highest priority concerns associated with the economic resource value consist of the following:

- The increase and intensity of agricultural activity including livestock grazing and row crops and the associated stormwater runoff/water quality problems;
- The demand for irrigation for agricultural use as well as for land development activities (irrigation and potable consumption);
- Over fishing of the Myakka River by commercial and recreational interests;
- The types and intensity of future land use, particularly along the river corridor;
- Pollution impacts from land development, especially stormwater runoff; floodplain displacement; septic tank system and underground storage tank contamination; and sanitary landfill, wastewater treatment/disposals, and corroded well casings of groundwater and surface water;
- Access to the river by highways or utility corridors;
- Mining and excavations activities and associated water resource impacts; and
- Property rights for landowners adjacent to the river and within the river corridor.

4.2 SCENIC RESOURCE VALUE

4.2.1 Description

The most prominent scenic resource value associated with the Myakka River is its vista as seen from the river and its bank. The river offers a wide variety of scenic views from the intimate closeness associated with hardwood forests situated along the narrow river reaches to the wide open spaces of the lakes and the broad lower river.

Portions of the river north of County Road 780 have limited access and navigability and vistas are confined to forested swamps. Forested areas adjacent to or near the river are also prominent from the outlet of Lower Myakka Lake to the vicinity of Ramblers Rest Resort. Panoramic views are provided from the vicinity of County Road 780 to the outlet of Lower Myakka Lake. Visual components consist of open water and broad marshes set against an almost continuous forested horizon. The scenic resource features south of Ramblers Rest Resort are similar to the lake areas, with broad expanses of open water, marsh and mangrove swamp, and forested horizon features. The marsh component of these features is comprised of halophytic species and is quite distinct in comparison to the open views associated with the lakes segment of the river.

Additional scenic resource components consist of bluffs, sandbanks and bars, and river bottom. Bluffs and associated soil profiles are an important feature to the river and unique in southwest Florida. These features exist intermittently from an area near Downs' Dam to Border Road. Sandbanks and bars are prevalent from the vicinity of Downs' Dam to Ramblers Rest Resort, and bottom characteristics vary from rocky-bottom composition south of Lower Myakka Lake to sandy bottoms south of Ramblers Rest Resort.

Two additional features that provide unique scenic value to the Myakka River are its water quality and clarity, especially in the middle sections of the river, and air quality, which due to a lack of intense development north of North Port provides significant opportunity for sky watching during the day and stargazing at night.

These natural components of the scenic resource value exist despite cultural features in and adjacent to the river and within the river vicinity. Cultural features include bridges and highway approaches, electric power transmission and distribution towers and lines, cell phone towers, fences, water control structures, boat ramps, and picnic areas within Myakka River State Park. From the vicinity of Border Road to the south, most of the features are also within view, as well as residential dwellings, docks and other yard improvements and several commercial businesses. Radio towers and navigational aids are also visible in certain areas.

4.2.2 Issues and Problems

Pristine Views--The scenic resource value of the Myakka River is critical to the foundation of the Wild and Scenic River designation. Scenic views along portions of the river are unobstructed by structures and improvements by man, and the maintenance of this characteristic is desirable. Wilderness characteristics are also desirable in protecting wildlife habitat. The fauna of the river corridor, as well as migrating species, is an important feature of the scenic river value.

Litter and Structural Features--Litter, primarily in the form of plastics, bottles, and aluminum cans, is often observed along the river, especially near bridges. Geologic features are recognized as being dynamic scenic resources, and concern centers around impacts to these features by boats

and land development activities.

Artificial Light--The issue of artificial light is a recent problem, which will grow in importance as land development activity increases. The interchange lighting at I-75 and River Road impact the river corridor during the day when the towers are visible and during the night when highway lights are visible.

4.2.3 Priority Concerns

The highest priority concerns associated with the scenic resource value consist of the following:

- Increased development within the viewshed, particularly in areas that are presently pristine;
- The quality of existing development and related improvements along the river;
- The intrusion of tall structures which impact substantial portions of the river corridor (such as the proliferation of communication towers); and
- Artificial light as it relates to the disruption of stargazing, wilderness experiences, and plant and animal life.

4.3 RECREATIONAL RESOURCE VALUE

4.3.1 Description

The recreational resource value centers upon resource-based recreational activity and opportunity. Unlike economic and water resource values, which have significant implications throughout the watershed, the recreational features are concentrated for the most part along the river and its banks. Notable exceptions include certain activities associated with Myakka River State Park, Warm Mineral Springs, Myakka State Forest, T. Mabry Carlton, Jr. Memorial Reserve, and other parks and recreational facilities along the Myakka River. However, most of the recreational activity in the watershed is centered on the river.

Fishing, boating, and canoeing/kayaking are the primary recreational activities on and adjacent to the Myakka River. Fishing occurs throughout the river, from Upper Myakka Lake south to the mouth of the river and at the County Road 780, State Road 70, and State Road 64 access points. Fishing occurs both on and offshore and includes commercial fishing, primarily south of U.S. Highway 41.

Recreational facilities to support fishing include boat docks. Several public and private boat ramps are located in these areas as well as in the state park and along tributaries to the Myakka River south of U.S. Highway 41. These facilities support motorized vessels and canoeing/kayaking in Upper Myakka Lake and, to a lesser extent, Lower Myakka Lake; canoeing/kayaking south of Lower Myakka Lake to north of Border Road; and a mixture of boating activity south of this area to approximately U.S. Highway 41, where powerboats become almost exclusive.

Picnicking, nature study, photography, birding, and sightseeing are additional activities associated with boating. These activities are also experienced by foot, bicycle, and vehicle at public access points and within Myakka River State Park.

Additional recreational resource value elements include hiking, bicycling, horseback riding, camping, shooting, and hunting. With the exception of shooting and hunting, these additional activities occur primarily within the state park and also occur on other public lands, especially T.

Mabry Carlton, Jr. Memorial Reserve and Deer Prairie Creek Preserve.

4.3.2 Issues and Problems

The primary issue associated with the recreational resource value is the utilization of the Myakka River and its impact on the terrestrial and aquatic resource values. The problem consists of overuse, which degrades natural resources and limits the use of the river for the most sensitive recreational activities such as nature study and birding.

Other user-related issues include noise, odor, and water pollution problems associated with powerboat motors, boat speed and resultant wakes and erosion, and user limitations due to water-control structures. Potential conflicts between boaters and the manatee are also a particular concern,.

Safety--As the popularity of the Myakka River for boating activity increases, the concern for safety on the river also increases. Water related accidents are becoming an increasing problem in Florida as well as the Myakka River. The river is patrolled by officers of the Florida Fish and Wildlife Conservation Commission, the Sarasota County Sheriff's Department and the Florida Park Patrol. All these agencies have expressed concern regarding boating safety on the Myakka River and have formed an interagency task force that is designed to increase coordination between various agencies. The task force currently patrols the river 1-2 times per year during the busy winter months.

The Florida Fish and Wildlife Conservation Commission's (FWC) primary responsibility is the enforcement of the fish and wildlife codes of the state, and boater safety in accordance with Ch. 327 and 328, Florida Statutes and Ch. 68, F.A.C. FWC Officers are authorized to perform vessel safety inspections to ensure boaters have all necessary safety equipment on board and that the vessel is properly registered, enforce vessel speed restrictions and fishing regulations on the river. The Sarasota County Sheriff's Department has a team that patrols the rural and remote areas of the county including the Myakka River vicinity. Park Patrol Officers are responsible for law enforcement within the state park and the wild and scenic designated portion of the Myakka River.

Boating speed restrictions have been adopted under the Myakka Wild and Scenic River Rule 62D-15 Florida Administrative Code and the Manatee Protection Rule 68C-22.026 Florida Administrative Code. Boater compliance to these slow speed/minimum wake zones is directly related to the amount of law enforcement on the river.

Access points and boat ramps and docks are issues that concern the need to provide additional opportunity for use of the river. In addition, the intrusion of boat docks into the river and the structural integrity of older docks and riverbank stabilization features are of particular concern.

Unauthorized use of private land for hunting, hiking, portaging, and camping has been a historical problem and is associated with vandalism, theft, noise, littering, poaching, and trespassing.

4.3.3 Priority Concerns

The highest priority concerns associated with the recreational resource value consist of the following:

- Overuse of the Myakka River and resultant impacts to the natural resources, including fish populations and manatees;
- The provision of access to the river and resultant opportunity to increase use of the river; and
- Unauthorized use of private lands and illegal activity within public lands.

4.4 CULTURAL AND HISTORICAL RESOURCE VALUES

4.4.1 Description

The significant cultural and historical sites of the Myakka River watershed are valuable because they provide the present and future residents and visitors tangible monuments to their distant and immediate predecessors and provide a sense of place by showing links to earlier people.

As educational or tourist destinations, these sites can emphasize the unique character of communities through preservation and restoration of historic structures. These sites also represent scarce, nonrenewable repositories of scientific information on the economic, biological, social, and ceremonial aspects of 12,000 years of human occupation in the watershed. In addition, research information about previous climatic conditions of the watershed and the response to these changing conditions made by humans, animals, and plants are an important resource. The sites within the watershed give scientists studying human remains at prehistoric cemeteries the opportunity to see the health consequences of various diets, lifestyles, and diseases. These prehistoric human interments are protected from vandalism and development by Chapter 872, Florida Statutes, Human Unmarked Burial Law.

4.4.2 Issues and Problems

The primary issue concerning the cultural and historic aspects of the Myakka River watershed is the incomplete knowledge of the resource base. Because of the small amount of systematic field research, both the location and distribution of the cultural/historical sites of the watershed are severely limited. Even for those few sites that are recorded on the Florida Master Site File, in most cases, insufficient information is available to determine the site's potential significance or present condition.

Protection of prehistoric wetland, mound, or cemetery burials and historic cemeteries is necessary to enable qualified archaeologists to complete research of this area. Both prehistoric and unmarked early historic interments can easily be overlooked and impacted during construction or vandalized by artifact collectors.

It is important to protect significant cultural and historical sites from development, collection, erosion, vandalism, and mining. These resources are viewed as scarce, irreplaceable monuments to earlier inhabitants that add a unique distinction to the watershed. The cultural resources of the watershed are exposed to impacts through intentional and unintentional human factors and by natural erosion processes. Artifact collecting on the river bottom has also been a problem.

There is a need for recognition of, and education on, the contributions made by pioneer settlers in the watershed. Early homesteads, farmsteads, dams, fords, and trails provide tangible monuments to the determination and courage of the early settlers.

4.4.3 Priority Concerns

The highest priority concerns with respect to the cultural resource value consist of the following:

- The protection of important archaeological and historical sites from several major potential impacts including development, vandalism, artifact collecting, and erosion;
- Further cultural resource studies to better understand the real extent of the archaeological record in the watershed; and
- A need to better educate the public about American Indians and early pioneers to the Myakka River watershed and the early development of the area.

4.5 GEOLOGIC RESOURCE VALUES

4.5.1 Description

The Myakka River watershed contains two springs, Little Salt Spring and Warm Mineral Springs. Warm Mineral Springs is a second magnitude spring and flows into the Myakka River through Warm Mineral Springs Creek at an average rate of about 10 cubic feet per second. Based on water quality parameters of this spring, the water is derived from the deep aquifer. Warm Mineral Springs has a constant temperature of about 90 degrees Fahrenheit, and as such is attractive to manatees and fish during cold weather. In addition to its ecological value, Warm Mineral Springs has archaeological and cultural/historic value as well. Little Salt Spring discharges at a rate of 0.89 to 1.53 cubic feet per second.

A sinkhole, known as Deep Hole, is present in the southwest corner of Lower Myakka Lake. It is approximately 300 feet wide and 180 feet deep (DRP, 2004). Water flow from Deep Hole probably ceases when the stage of the Myakka River is exceptionally high and during low flow periods. However, according to Joyner and Sutcliffe (1976) flows as high as 1.5 cubic feet per second have been measured from Deep Hole. It may serve as habitat particularly when lake levels are low.

A conspicuous aspect of the Myakka River, are the bluffs, which form the riverbanks in a number of areas. These bluffs may be 10 to 15 feet high. When they occur on the outside of river bends, the bluffs show the effects of erosion from river flows. The inside of the bends, generally show accretion in the form of sandbars. The bluffs are interesting and of scenic value in that they may show the different soil horizons of the near surface soils. They also tend to provide a feeling of isolation along the river inherent in the Wild and Scenic designation. Limestone outcroppings may occur with some of the bluffs, as well as along additional segments of the river.

In several places, layers of relic marine shells are also visible along the banks of the river. In certain segments of the river, particularly just downstream of Downs' Dam, at low water these relic marine shells can be viewed along the river bottom.

Additional geologic resources of the Myakka River corridor are the dolomite and marl deposits. An inactive dolomite mine exists just south of Border Road, and Venice Minerals, a shell and sand mining facility, is currently in operation on the west side of the river off of Laurel Road.

A sill is present near the confluence of the Myakka River and Deer Prairie Creek. This feature may serve to inhibit the upstream penetration of saline water into the creek during periods of low flow.

A line of seeps exists in the upper river just downstream of Myakka City. These seeps are the result of a hardpan layer, which cause surficial water to discharge to the river. The discharge of these seeps is minimal.

The primary geologic resource of the Myakka River is the subsurface geologic lithology and stratigraphy, which results in the hydrogeologic framework of the Myakka River watershed. The subsurface geology results in the aquifers of the area: the surficial aquifer, intermediate aquifers (three different zones), and the Floridan Aquifer. The surficial and intermediate aquifers are generally suitable as potable water, but often require treatment to reduce mineralization. The Floridan Aquifer provides the majority of water, which is used as an irrigation source during the dry season.

4.5.2 Issues and Problems

Bluffs--Protection of the bluffs along the Myakka River is a primary concern. These bluffs provide a scenic quality to the river. Several are located along the outside bends of meanders, and as such are subject to long term erosion and migration and may be unsuitable for stream-side development.

Aquifers--Aquifer water levels should be protected from potential drawdown. Significant drawdown of the surficial aquifer can affect surficial water levels and water levels in wetlands and tributaries, which contribute to surface flow of the Myakka River. Additionally reduced flows in the aquifers also reduces flow discharging through Warm Mineral Springs and Little Salt Springs.

Mining--The river area should be protected from potential mining of resources such as dolomite, sand and gravel, and marl. Phosphate reserves are mainly in the upper watershed in Manatee County and not within the Wild and Scenic River segment. The only dolomite reserve of potential commercial significance in Sarasota County is centered on the Myakka River.

4.5.3 Priority Concerns

The primary concern with respect to the geologic resource value consists of the following:

- The protection of the groundwater aquifers from significant drawdown, which might potentially affect the surface water levels and result in a reduction of flow within the river and springs in the watershed;
- The protection of bluffs which occur along the river. Several of these bluffs are subject to long-term erosion and may be unsuitable for stream-side development;
- The protection of the Myakka River from potential adverse effects of mining, excavations, and fill within the river area; and
- The contamination of aquifers due to improperly constructed or deteriorating artesian wells.

4.6 WATER RESOURCE VALUES

4.6.1 Description

The three key elements of the water resource value of the Myakka River are the quality of the water, the quantity of the freshwater discharge, and the time distribution of the discharge (maintaining natural hydroperiods). The Myakka River is designated in Chapter 17-3, FAC, as Class I waters (potable water supplies) from the Manatee County line through the Upper Myakka

Lake and Lower Myakka Lake to Border Road. 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, south to the Charlotte Harbor is designated as Class II water (shellfish propagation or harvesting). From State Road 771 (El Jobean Bridge) to the Sarasota/Charlotte County line the lower Myakka River is an Outstanding Florida Water by virtue of the fact that this area is a designated Special Water, which are waters demonstrated to be of exceptional recreational or ecological value. Charlotte Harbor and associated aquatic preserves are also classified as Outstanding Florida Waters. Myakkahatchee Creek is a Class I water down to the dam at U.S. Highway 41. All other surface waters are designated Class III (recreation; propagation and management of fish and wildlife). The Outstanding Florida Water designation of the Wild and Scenic River segment and additional segments down through Charlotte Harbor provides these waters with the highest level of protection under Florida State law. Because the State of Florida has designated the Sarasota County portion of the Myakka River as a Florida Wild and Scenic River, and the high level of protection that have been assigned to additional waters of the river and Charlotte Harbor is testimony to the fact that these waters possess high values to the citizens of the area.

Maintaining the high water quality of the Myakka River is important for healthy fish and wildlife populations that inhabit the area and vegetative communities along the river. Good hydrology is dependent upon both the quantity of water discharge and the timing of the discharge. Biotic communities and the resultant ecosystem structure have evolved with and adapted to the seasonal water cycles. This is particularly true with respect to the functioning of the lower Myakka River as a fishery nursery area. It is usual to have periods of no flow within the river and tributaries of the Myakka River. During these periods available space for nursery areas expands.

The Myakka River is also a potential source of potable water for public supply, and a large segment of the river, as well as Myakkahatchee Creek, are designated Class I waters. It is critical to maintain this value of the resource by protecting the water quality in sufficient quantities. The water resource to some extent is also utilized for irrigation and livestock watering.

The water resource of the Myakka River provides a valuable source of recreation. Recreational activities may be consumptive or non-consumptive, both of which are highly dependent upon the integrity of the water resource values of the river. Commercial uses are also dependent upon maintenance of the water resource.

The water quality, quantity, and time distribution of discharge are primarily dependent upon seasonal rainfall cycles. The characteristics of the Myakka River watershed largely control the water resource through filtration, storage, and discharge to the river system. Water is distributed to the river through runoff from the land surface and the contribution of the cumulative inputs from tributaries and associated subbasins, which form headwater areas. Agricultural irrigation has substantially altered this seasonal cycle in the upper portion of the river by introducing water into this system during the dry season, and impacting the natural biotic communities along the river (as documented in Flatford Swamp). Dry season irrigation runoff has also caused a change in water quality that result in mineralized water with a distinctly different pH than surface water runoff and rainfall.

4.6.2 Issues and Problems

Myakka River Wild and Scenic River Boundaries--Protection of the Myakka River water resources including water quality, water quantity, and time distribution of discharge can only be accomplished through a holistic approach of watershed management. The Myakka River Wild and Scenic segment extends for 34 miles within Sarasota County, and only includes the river corridor up to the landward extent of wetlands. However, Sarasota County adopted the Myakka River Protection Zone Ordinance No. 2008-002 in 2008 which established regulations within the 220-foot upland protection zone buffer, and utilizes a holistic approach to watershed management by further protecting water resources that do not fall within the designated Wild and Scenic River boundaries. Additionally, the SWFWMD has taken on the Myakka River Watershed Initiative, which is a comprehensive watershed study and planning effort designed to develop strategies to protect, enhance and restore natural systems and water quality, while addressing issues of water supply and flood protection (SWFWMD, 2009).

Nonpoint Source Pollution--The U.S. Environmental Protection Agency has identified nonpoint source pollution as the dominant factor of the nation's remaining water pollution problem. The EPA estimates that greater than 64 percent of the nonpoint source pollution in the nation's rivers is from agricultural operations within the rivers' watersheds. Excessive nutrients constitute one of the most severe water quality problems facing the state. Nonpoint loading of nutrients into waters of the state may result from runoff from agricultural lands, septic tanks, and general stormwater runoff. Nonpoint sources may also result in the loading of pesticides, herbicides, fungicides, sediments, bacterial contamination, oil and grease, metals, and petroleum hydrocarbons. TMDLs are in the process of being established for the Myakka River.

Loss and Alteration of Wetlands--The loss of wetlands results in the loss of a critical buffer zone between uplands and open waters. With the loss of this buffer, pollutants contained in upland runoff may enter the water resource directly without being filtered by wetlands. The loss of shoreline wetlands may also result in an increase in shoreline erosion and introduction of sediments into the water and an increase of turbidity. The ditching and connection of isolated wetlands and the channelization of tributary creeks and sloughs within the river's floodplain and watershed may also cause a loss of the filtration and storage capacity of these wetlands resulting in the more rapid discharge of pollutants to the riverine system. The clear-cutting of vegetation to the water's edge as part of shoreline development results in the loss of the vegetative buffer and its associated water filtration functions resulting in bank destabilization and increased erosion potential.

A large number of acres of land within the Myakka River watershed are under the control of phosphate mining companies. Many of these areas comprise the headwaters of the Myakka River. Recent applications for mine expansions/new mine permits, indicate the economic climate has improved in the phosphate industry and that the future mining of phosphate will be expanded from the historic mining areas towards the south into Manatee, Hardee, and DeSoto Counties. Phosphate mining operations resumed in the Wingate Creek area in 1999.

Agriculture is a major land use component near the headwaters of the Myakka River. Changes in hydroperiods due to agricultural runoff have had adverse effects within Flatford Swamp and have resulted in a major tree die off. The cause of the hydrological stress is an increase in seasonal high water levels and longer seasonal hydroperiods. The primary contributor was subsurface seepage generated from agricultural irrigation which caused an excess baseflow to the

swamp.

The diking of Tatum Sawgrass and Vanderipe Slough has resulted in a rerouting of water flow and the loss of their historic storage capacity. As a result, flooding potential has increased, and water discharge quantity and timing of discharge have been altered. The loss of storage and purification functions may partially contribute to water quality problems in the Upper Myakka Lake and Lower Myakka Lake.

Alterations in Hydrologic Characteristics--The natural hydrologic characteristics (i.e., water quantity and time distribution of discharge) of the river in large part determine the quality of the water resource. Biotic communities of the river and downstream areas have evolved with and are adapted to the flow regime, and are dependent upon the seasonal cycles of flow, including the optimum quantity of discharge delivered at the appropriate time.

A number of alterations have occurred in the Myakka River area, which have served to alter the natural hydrologic characteristics of the river. These alterations may also affect water quality of the water resource. These alterations may be generally divided into two categories, although they are not mutually exclusive. These include water diversions and water control structures.

Water diversions include the Clay Gully diversion, Canal R-36, Blackburn Canal (Curry Creek), dikes in Tatum Sawgrass and Vanderipe Slough, and channelization of tributaries and wetlands for agriculture and stormwater conveyance. Also, wildfire control plow lines alter natural drainage patterns. Potential diversions for the development of public water supply are also being considered. Potential development within the river floodplain may also act to divert water through alterations in floodplain storage and conveyance. Water control structures include Downs' Dam, the structure at the outlet to Upper Myakka Lake, salinity barriers on Deer Prairie Creek and Myakkahatchee Creek, State Road 72, and elevated backcountry access roads.

Point Source Pollution--The Myakka River Wild and Scenic segment has few point sources, which discharge to the river. Phosphate mining occurs in the upper river. Permitted point sources are regulated through the NPDES program. The designations of the Myakka River waters generally protect the river from point source degradation. Potential phosphate mines in the upper Myakka River watershed may result in additional point sources to the river or its tributaries.

Infestations by Exotic and Nuisance Aquatic Plants--The principal aquatic nuisance plant species are paragrass, West Indian marsh grass, and water hyacinth. These plants affect water quality and the flow of water through the system. Attempts at their control result in changes in water quality parameters and result in the introduction of herbicides into the environment.

4.6.3 Priority Concerns

The highest priority concerns associated with the water resource value consist of the following:

- Development of a Myakka River watershed master plan;
- Protection of good water quality and designated uses of the Myakka River and enhance areas where the Myakka River does not completely meet designated use through control of both nonpoint source and point source pollution;
- Preservation of wetlands and restore damaged or lost wetlands and their functions relating to water quality purification and storage;

- Preservation and restoration, to the extent feasible, the natural hydrologic regime of the river;
- Protection of aquifer flows to Warm Mineral Springs and Little Salt Springs;
- Restoration of native freshwater marsh grasses in the riverine marshes in Myakka River State Park;
- Restoration of Tatum Sawgrass Marsh wildlife habitat and its natural marsh capacity to hold and slowly release runoff;
- Remove the dike separating Upper Myakka Lake from Vanderipe Slough and restore natural hydroperiods in the slough; and
- End the unnatural dry season flows from agricultural tail water that have been responsible for tree die-offs from Flatford Swamp downstream through Myakka River State Park.

4.7 TERRESTRIAL ECOLOGY RESOURCE VALUE

4.7.1 Description

The terrestrial ecology resource value comprises all of the plants and animals associated with the uplands and wetlands of the Myakka River corridor. The terrestrial ecology resource value deals with these plants and animals at individual, species community and ecosystem levels. Table 3 identifies the 9 resource value elements of terrestrial ecology. Under the resource value element of plant communities/wildlife habitats, various plant community/wildlife habitat types were identified. These upland and wetland plant community/wildlife habitats occur along the Myakka River corridor and are described in detail within Section 2.5, Plant Communities, Section 2.6, Fish and Wildlife, and Appendix C.

The next resource value element, listed species, includes all of the recorded or potentially occurring listed plant and animal species of the Myakka River corridor. A listed species can include any species of plant or animal that has been officially listed or is under review for listing by federal, state, or local government agencies and/or conservation groups as species that are threatened with extinction. A discussion of the listed species that either inhabit or could potentially occur along the Myakka River corridor is provided in Sections 2.5.2, Listed Plant Species, and 2.6.3, Listed Animal Species. The list of listed plants is provided in Appendix A and B, and listed animals are included in Appendix B.

The resource value elements of game and non-game animals include all vertebrate species that are either hunted or not hunted, respectively. Animals that could be potentially hunted along the Myakka River include hog, waterfowl, dove, turkey, quail, deer, squirrel, and other vertebrates to a more limited degree, such as frog, alligator, rattlesnake, armadillo, and opossum.

Special ecological features refer to any specific area, species or individual plants and/or animals along the Myakka River corridor that deserve some special recognition and/or protection. The lack of naturally growing cypress within the Myakka River corridor is a special ecological feature of scientific interest since local conditions are conducive to the growth of this aquatic conifer (i.e., cypress were planted and are growing vigorously within Myakka River State Park). Another special ecological feature is sawgrass, which apparently is only growing naturally in a limited area of the Wild and Scenic segment of the river in the vicinity of Deer Prairie Creek. Like cypress, it is rather odd that this fresh-to-brackish-water species is not growing throughout the Myakka River corridor. Another interesting species occurrence within the Myakka River corridor is longleaf pine. Longleaf pine in Sarasota and DeSoto counties is at its southernmost distribution in the State of Florida, except for extremely small disjunct colonies as far south as

Hendry County. Thus, a special ecological feature is the small stands of longleaf pine that occurs in well-drained flatwoods near the Myakka River. In addition to particular species, certain plant communities or groupings of plant species can be considered to be of special ecological significance. The maritime hammock community is considered to be an important depository of rare and interesting plant species, which are at their most southern (e.g., southern red cedar) or northern (e.g., stoppers) limits. This special ecological plant community is typically small in size and isolated within larger associations along the Myakka River. Species diversity/density can be considered to be a resource value element and a measure of the value of other resources such as individual communities and/or community mosaics. High plant and animal species diversity is considered to be an important value of upland and wetland habitats.

Two other resource value elements, wildlife corridor and waterfowl flyway, are both considered to be important wildlife uses of the Myakka River. Large and small mammals, songbirds, raptors, snakes, turtles, and other animals use the contiguous upland and wetland habitats along the Myakka River for a number of functions important to their survival such as travel, shelter, resting, and feeding. As a waterfowl flyway, the surface waters and wetlands of the Myakka River are utilized by migratory ducks as an overwintering area.

The nesting/den sites resource value element refers to all the recorded or future sites along the Myakka River that wildlife uses to procreate and rear their young. This resource value element pertains more specifically to nesting and den sites of species considered to be especially important such as listed or otherwise protected species. Examples of important nest sites include wading bird rookeries, eagle, osprey, and owl nests, alligator holes and nests, sandhill crane nesting sites, and river otter dens. Noteworthy nest sites along the Myakka River includes a large wading bird rookery located south of the U.S. 41 Bridge in a mangrove swamp island within the Myakka River and five eagle nests located along the Lower Myakka Lake, Upper Myakka Lake, and near the southwestern boundary of Myakka River State Park.

The regionally significant resource value element was provided as an index of major environmentally sensitive land tracts of the Myakka River drainage watershed. Eight specifically named areas identified as regionally significant resources of the Myakka River watershed include the Myakka River, Upper Myakka Lake, Lower Myakka Lake, Flatford Swamp, Vanderipe Slough, Warm Mineral Springs, Tatum Sawgrass, and Myakkahatchee Creek.

4.7.2 Issues and Problems

Conversion Practices--Destruction/alteration of natural upland and wetland habitats through conversion practices such as development, intensive agriculture, mining, rangeland, and forestry.

Prescribed Burning--A properly designed and implemented burning program is necessary to maintain a fire-dependent plant community in a sub-climactic condition. Appropriate fire frequency must be maintained to permit healthy, fire dependent, communities to exist. If fire is excluded for long periods or used improperly, destructive, crown fires, and/or undesirable changes in habitat diversity could result.

Exotic and Nuisance Species--Invasion by exotic or nuisance species can violate the integrity of plant communities by outcompeting the native flora for growth space and nutrients. Exotic plant

species in uplands/wetlands include woody plants, grasses and vines, such as Brazilian pepper, Melaleuca, carrotwood, Australian pine, cogongrass, Japanese/Old World climbing fern, and air potato. Feral animals such as feral dogs, cats, and pigs also threaten native vegetation and wildlife, and exotic snakes and lizards such as pythons, iguanas, and monitors are a rising concern.

Boat Traffic--Disturbance to the natural environment through uncontrolled boat traffic (e.g., boaters coming too close to rookeries frighten wading birds during breeding, erosion of shorelines via wakes, collisions with West Indian Manatees causing injury and mortality, etc.).

Exploitation--Exploitation of natural resources (e.g., collection of rare plant species for personal or commercial gain, timber harvest, excavation of Indian mounds and/or middens within hammocks by "amateur archaeologists," etc.).

Habitat Fragmentation--Through various "improvement" activities, man can cause the loss of a particular habitat or habitats, or portions of habitats, within a geographic area and thereby restrict the wildlife use and species diversity/density of that region.

Edge Effect--When a portion of a natural area is altered, the altered area could potentially become habitat for opportunistic species. These opportunistic species can then affect the existence of native species that are still associated with the natural areas situated adjacent to the altered habitat. For example, a road could be built along a relatively pristine wetland area. After clearing and construction, an exotic species such as Melaleuca could become established along the road right-of-way. If not maintained in proper fashion, the Melaleuca could reach maturity and slowly encroach upon the adjacent wetland. Thus, the invasion of Melaleuca to this previously undisturbed wetland from the road right-of-way is considered to be an edge effect.

Importance of a Habitat Mosaic--The existence of several habitat types within a specific geographic region typically connotes other resources of high value: high species diversity, high species density, a large number of threatened and endangered species populations, etc. Therefore, the disruption of this habitat mosaic through man's intervention, such as development, threatens the survival of Florida's rich and varied fauna and flora.

Off-the-Road Mechanized Traffic--Off-the-road vehicles such as all terrain vehicles (ATVs), four-wheel drive vehicles, and tractors damage natural areas, disrupt hydrology, and enhance the potential for invasion of opportunistic species.

Humans and Domesticated Animals--Introduction of humans and domesticated animals such as pets and farm animals into or adjacent to a relatively pristine area will lead to the deterioration of that environment.

Lack of Knowledge/Respect--Ignorance of the importance of natural resources can result in the unintentional or deliberate irreplaceable loss of these resources.

Water Quality--Excess nutrient loads from intensive agricultural and sewage treatment operations (including the land application of sludge and effluent), together with other sources of pollution such as phosphate strip mining, dredge and fill operations, golf courses, and aquatic weed control and/or other biological controls (e.g., herbicides, pesticides, fungicides, etc.) can

result in a deterioration of water quality within the Myakka River.

Hydrologic Alterations--Impoundment, dredge and fill operations, drainage canals, mosquito ditches, stream channelization, groundwater pumpage or other manmade manipulations of the river's hydroperiod/hydrology could result in detrimental impacts to the natural environment. As an example, stream channelization provides faster, more silt-laden deliveries of freshwater into the downstream reaches of the Myakka River which could adversely affect the growth and productivity of brackish-saltwater vegetation that in turn provides habitat to marine organisms, stabilizes shorelines, and functions in nutrient cycling.

Aesthetics--Any manmade or man-induced artifact that provides a visual impact to or impairment of the otherwise natural setting within the viewshed of the Myakka River is considered to be aesthetically offensive including seawalls and riprap, and the trimming and cutting of woody vegetation (especially mangroves and oak trees).

Other Wildlife Issues--This category includes all of the direct or indirect impacts to wildlife that have occurred as a result of man's intervention along the Myakka River, including the hindrance of wildlife travel due to fences, roads, housing developments, transmission lines, etc.; the hunting of game and non-game animals; and the loss of wildlife habitat, wildlife species diversity/density, listed animal species, and wildlife use (e.g., feeding, nesting, travel corridor, shelter, resting, and staging) due primarily to intensive agricultural and development activities.

4.7.3 Priority Concerns

The highest priority concerns associated with the terrestrial ecology resource value consist of the following:

- A need to protect, enhance, and maintain the unique and irreplaceable values, functions, and benefits of the natural upland and wetland plant communities/wildlife habitats and associated resources along the Myakka River;
- A need to preserve the natural species diversity and density associated with the Myakka River through the control of exotic and nuisance species;
- A need to restrict and reverse the harmful effects of hydrologic alterations and water pollution to the Myakka River ecosystem;
- A need to protect listed plant and animal species along the Myakka River; and
- A need to implement a habitat management program to protect the natural resources of the Myakka River using proven, accepted techniques.

4.8 AQUATIC ECOLOGY RESOURCE VALUE

4.8.1 Description

Aquatic resources of the Myakka River provide ecological, recreational, and commercial values. These values are embodied in the biotic communities and aquatic habitats of the river.

The river encompasses fresh and saltwater fishery resources, which are used both recreationally and commercially. Freshwater fisheries are primarily recreational and include species such as largemouth bass, bluegill, warmouth, black crappie, tilapia, and catfish. Saltwater fisheries provide both recreational and commercial value. Species such as snook, tarpon, redfish, sea trout, whiting, mullet, black drum, and sheepshead are commonly pursued recreational fish. Blue crabs are fished both commercially and recreationally, as are mullet. Species such as

tarpon, snook, mullet, and blue crabs also penetrate well into freshwater portions of the river and are known to occur into Lower Myakka Lake. Non-game species such as sawfish and the American eel also occur in the Myakka River.

Benthic communities of the Myakka River form a continuum from fresh to salt water. These communities provide food for organisms at higher trophic levels within the food web including invertebrates, such as blue crabs and shrimp; fish; birds; and mammals. Benthic communities also function within the ecosystem through their interaction with the sediments in and on which they live. Through their activities, benthic organisms may stabilize or destabilize sediments, aid in the oxygenation of surface sediments, and affect the recycling of nutrients.

Oyster bars create habitat that increases the diversity of the associated community. Well-developed oyster bars do not occur within the Wild and Scenic River segment of the Myakka River, but do occur in the lower river, which is conditionally approved as a shellfish harvesting area. Oyster bars are well known as areas, which provide good fishing.

The Myakka River is valuable as habitat to a variety of aquatic species. Aquatic habitat consists of the river, lakes, tributaries, swamps, and marshes. Marshes of the Myakka River that encompass freshwater, tidal freshwater, and estuarine/marine marshes are particularly important in providing both emergent and submergent niches. The diversity of habitat types within the Myakka River corridor serves to provide a great diversity of fish and wildlife. These wetland communities/aquatic habitats serve to provide important fish and wildlife habitat, stabilize shorelines, and provide functions critical to the preservation of water quality, water quantity, and the time distribution of water discharge.

One of the greatest values of the Myakka River is its function as a fishery nursery area. The vast majority of recreationally and commercially important fish and shellfish species are dependent upon the estuarine zone at some point in their life cycle. The combination of the water resource and the available aquatic habitats serves to maintain this important function of the river.

The Myakka River is a designated critical habitat for the West Indian manatee. This marine mammal is considered endangered by both the FWC and USFWS. Bottlenose dolphins also use the lower river.

The American alligator, a protected species, is common in the Myakka River. Alligators occur in great numbers within Lower Myakka Lake and Upper Myakka Lake. They can also be observed in the lower river down into brackish waters. Large numbers of turtles, primarily peninsula cooter, occur along the river and may be observed as one travels down the river.

4.8.2 Issues and Problems

Loss of Fish and Wildlife Habitat--Loss of aquatic habitat is generally cited as one of the key factors resulting in declining species populations. A large majority of recreationally and commercially important fish species is dependent upon the estuarine area at some point in their life cycle. The lower Myakka River serves as a nursery area for a number of these species. Important habitat consists of submerged grass beds, marshes, and mangroves. Protection of existing habitats and restoration of damaged habitats important to the protection of fish and wildlife populations. Loss of habitat occurs through shoreline development including dredging and filling of wetlands, bulkheads, seawalls, clear cutting vegetation down to the water's edge,

and construction of residential canals. Additionally predicted sea level rise over the next 50-100 years could potentially alter the fish and wildlife and wetlands associated with the lower Myakka River. Seawalls and rock revetments do occur in the lower Myakka River, however new shoreline hardening is prohibited along the Myakka in Sarasota County. Cutting of submerged grass beds by boat propellers and sedimentation from either in-stream or upland construction activities may result in the loss of these important habitats. Infestations of exotic plants may also result in the loss of fish and wildlife habitat. Invasions of marshes and mangroves by Brazilian pepper, if left unchecked, can completely alter the functions of these habitats by crowding out the natural vegetation. The invasion and treatment of hydrilla and other exotic plant species in the Upper and Lower Myakka Lakes is believed to have resulted in the alteration of lake fisheries populations through habitat changes affected by nuisance plants. Additionally exotic fish species that persist in the river have further changed the aquatic vegetative composition of the lakes and altered wildlife habitat.

Protection of Listed Species--Aquatic species occurring in the Myakka River which are listed include the West Indian manatee (endangered) and American alligator (species of special concern). The 2009 West Indian manatee population survey count produced a total of 3,802 animals in Florida. One of the greatest threats to manatees is collision with boats. Manatees have been sighted in the Myakka River year around which is one of the reasons for the slow speed, minimum wake restriction on the Myakka River in Sarasota County.. Although listed as a species of special concern due their vulnerability to habitat modification and the important ecological niche they provide, the American alligator population in Florida has risen from once dangerously low levels. Currently, limited special permit hunting seasons have been instituted for alligators in selected waters of the state.

Protection of Nonlisted Species--Numerous non-listed aquatic species occur within the Myakka River, many of which are of recreational and commercial importance. The snook and redfish are both highly prized sport fish, which have experienced population declines in the past. Regulations currently govern the size of fish, the number of fish, and the season in which snook and redfish may be taken. The same concerns regarding fish populations exist for a number of other species as well. Relatively rare occurrences of sawfish have been witnessed in the Myakka River and the extreme southern portion of the river south of S.R. 776 has been designated critical habitat for the smalltooth sawfish. The American eel is known to occur in the lakes and upper river. This fish migrates to the ocean to spawn, and as such requires free passage of the river to complete its life cycle.

4.8.3 Priority Concerns

The highest priority concerns associated with aquatic ecology resource value consist of the following:

- Protection and restoration of the water resource upon which aquatic floral and faunal populations and communities are dependent for their continued healthy existence (i.e., water quality, water quantity, and the timing of flow);
- Preservation and restoration of aquatic habitat, particularly emergent and submergent aquatic habitat;
- Protection of the fishery nursery function of the lower Myakka River;
- Protection of listed species, which may be experiencing population decline and/or which, may be relatively rare to the Myakka River;
- Protection of non-listed species which may be experiencing population decline and/or may be

relatively unique to the Myakka River; and

5.0 RIVER MANAGEMENT PROGRAM

Section 5.1 identifies the general management principles that will guide the management program. Section 5.2 describes the geographic areas that are the subject of the management program. Specific management objectives and actions are described in Section 5.3. Objectives are organized into two general thematic areas: natural resources, which include terrestrial and aquatic ecology and geologic and water resources; and human resources, which include economic, scenic, recreational, and cultural and historic resources. Finally, Section 5.4 describes factors affecting recreational carrying capacity along the Wild and Scenic River segment.

5.1 GENERAL MANAGEMENT PRINCIPLES

The recommendations for the day-to-day management of the river are based on principles derived from the management program's statutory and policy directives. For the purpose of this plan, principles are general statements that guide the development of specific management objectives and actions. The following principles, together with subsequent policy direction, legislation, and public input, will direct the river management program and the implementation of this plan.

- The permanent preservation, enhancement, and management of the river's resource values are the primary purpose of the management program.
- Effective management of the river requires effective management of uplands along the river and in the river's watershed. Management of the watershed will be in accordance with existing authorities.
- When the utilization of the river and its resource values conflicts with the protection and enhancement of these values, the protection and enhancement of resource values should prevail.
- The intensity of management may vary on different segments of the river area. Management activities will be developed for specific portions of the river area based on management needs in the immediate locale.
- Existing management authorities will not be curtailed or limited by any action of the management program. The management plan may recommend establishment of additional authorities or modification to existing authorities to accomplish the purposes of the management program.
- Land uses and developments on private lands within the river area, in existence on January 1, 1986, will continue.
- Management will be a continuing effort. Management actions will be evaluated and revised as necessary for best management results.
- Coordination and cooperation between local, regional, state, and federal agencies and the public are crucial to the success of the management program. The plan's management actions are intended to be implemented to the fullest extent possible under each management agency's statutory authority.
- Maintaining the cooperation and support of affected landowners and river users is essential to long-range understanding and support of the program.

5.2 OVERVIEW OF RIVER MANAGEMENT PROGRAM

The river management program is aimed at bringing existing governmental authorities together to protect the river's resource values. In order to accomplish this, interagency interaction must be coordinated. New authorities will be sought only as they are needed to correct management deficiencies identified in the planning process.

The program recommended in this plan for protecting the Myakka River's resource values will focus on three geographical areas: the river and adjoining wetlands ("river area"), a contiguous protective zone ("wild and scenic protection zone"), and the watershed ("watershed"). Each geographical area will require different levels of management by different combinations of agencies and authorities in order to accomplish the most effective overall management results.

The river area is identified in the Myakka River Wild and Scenic Designation and Preservation Act as consisting of the river and its adjoining wetlands. Of the three management areas, the river area is the zone of maximum protection. Section 258.501, Florida Statutes (Appendix A), authorizes DEP to adopt and enforce regulations addressing any activity that adversely affect resource values in the river area. In 1991, the Myakka River Wild and Scenic River Rule (62D-15 F.A.C.) was adopted (Appendix F). The rule identifies activities that are prohibited, require permits, or are exempt from the permitting process in the river area. Standards for issuance or denial of a permit are also established in the rule.

The Wild and Scenic Protection Zone has been established as a 220-foot corridor of uplands surrounding the river area. In 1997, Sarasota County, DEP, and DCA (currently the Department of Economic Opportunity) signed a State/Local agreement to provide the basis for the County's Management of the Protection Zone (Appendix E), and the city of North Port also entered into the State/Local agreement in 2007 (Appendix G).

In 1998, Sarasota County adopted Ordinance 98-025 relating to protection measures for the Myakka River, and the "Myakka River Protection Plan" (Appendix H). Such a zone is required to buffer the river area from manmade physical and visual intrusions. The wild and scenic protection zone is intended as an area of intermediate management protection. Management should be aimed at ensuring the compatibility of land development within the zone. Many uses and activities could be permitted in the protection zone consistent with maintaining the resource values of the river area. In 2003 Sarasota County adopted amendments to the Earthmoving, Tree Protection, Land Development, and Zoning Ordinances and amended them in 2008 (Appendix I). Also in 2008 Sarasota County adopted the Consolidated Myakka River Protection Code (Ordinance No. 2008-02) that brought all the related regulations pertaining to the river into one document and included minor revisions (Appendix J). Additionally adoption of the Myakka River Protection Zone by City of North Port occurred on October 14, 2008 (Appendix K).

The watershed is proposed as the zone of least intensive management. Watershed management is aimed primarily at minimizing hydrological impacts on the river from development activities in the watershed. Typical uses in the watershed that can have a direct or indirect adverse impact on the river include intensive agricultural, residential, and commercial development; mining; and construction of urban infrastructure facilities.

5.2.1 River Area

The river area is defined in Subsection 258.501(3)(g) as ". . . that corridor of land beneath and surrounding the Myakka River from river mile 7.5 to river mile 41.5, together with a corridor extending from the center of the river to the maximum upland extent of wetlands." The river area is further defined in this plan as the upland extent of wetland vegetation, hydric soils, and hydrologic indicators established by DEP, pursuant to Chapter 373.019(17), Florida Statutes, and Chapters 62-340, Florida Administrative Code. The line is generally represented by the river and contiguous wetlands (which includes freshwater and tidal marshes, hardwood swamps, and in certain areas prairie hammock, and other areas identified as wetlands). A series of maps illustrating the approximate location of the river area and protection zone (used for administrative purposes) is depicted in Appendix E, Exhibit B.

DEP is the primary agency responsible for the management of the river area. The river area is the zone of most intensive management and over which maximum protection will be achieved. Immediately after the approval of the plan in 1990, DEP promulgated the Myakka Wild and Scenic River Rule 62D-15 F.A.C., which established a process for reviewing activities in the river area, that have an adverse impact on the river's resource values. This program is administered by DRP, District 4 Administration, and staff. The program applies only to activities proposed to occur in the river area, and no other geographic area is affected.

5.2.2 Wild and Scenic Protection Zone

During the development of this plan in 1990, DRP and the Council determined that management of the river area, as defined in subsection 258.501(3)(g), alone would not be adequate for the permanent protection of the resource values that were identified by the Council in the management planning process. Therefore, to meet the legislative intent of providing "permanent protection and enhancement" of these resource values, adequate management and protection of an upland buffer adjacent to the river area was needed. The act, subsection 258.501 (5)(d), states that the management plan may also include such provisions as deemed necessary by the DRP to for the permanent protection of the Myakka River as a wild and scenic designated river. Section 258.501, Florida Statutes, was amended in 1990, to establish a "wild and scenic protection zone" surrounding the river area to buffer the river area and its resource values against impacts from adjoining land uses.

In establishing the protection zone along the river, three considerations were paramount:

- Ensure an adequate width along the river area to minimize potential adverse physical and visual impacts on resource values,
- Provide a uniform boundary configuration to facilitate management, and
- Minimize potential adverse impacts on private landowners.

Based upon the research previously conducted to develop the Myakka River Protection Zone, the river's visual corridor (the area along the river that is visible from the river) was estimated. This distance varies significantly based on season, time of day, river stage, successional stage, and other factors. Generally, the visual corridor ranges from as wide as 2,200 feet in non-forested communities, too as narrow as 150 feet in the denser hammock areas. These distances were determined as a result of onsite observations taken along the river. Observations were recorded for a range of different vegetative communities including oak hammock (35 observations), pine flatwoods (35 observations), palm hammock (15 observations), scrub (15 observations), and non-forested communities. Over the entire length of the wild and scenic segment of the river, the

average width of the visual corridor was determined to be 220 feet landward from the edge of the river area. Based on these factors, it was recommended that a "wild and scenic protection zone" be created as a supplemental buffer area extending 220 feet on each side of the river, measured from the landward edge of the river area (see Figure 12 for a conceptual diagram and Appendix E, Exhibit B for its approximate location).

Additional legislation was required to create the wild and scenic protection zone. To this end, Section 258.501, Florida Statutes, was amended in 1990, to formally establish this zone and to provide policy direction for its management. DEP, with the former Department of Community Affairs, was directed to develop guidelines and performance standards for local governments to apply in managing the wild and scenic protection zone. Guidelines and performance standards were adopted in state-local agency agreements between DEP and the former Department of Community Affairs and the local governments (an agreement with the City of Venice still needs to be adopted). Local governments are directed to amend their comprehensive plans as may be necessary to be in conformance with, or more stringent than, the act, this plan and the management guidelines and performance standards. Local governments are also required to adopt any necessary ordinances and regulations to carry out the purposes of the act, this plan, and the guidelines and performance standards.

In developing management guidelines and performance standards for the wild and scenic protection zone, consideration is given to the numerous single-family residences along the river. The intent of the wild and scenic protection zone is to provide for such residential use along the river while instituting appropriate safeguards to reduce the threat of adverse impacts to the resource values in the river area. To effectively manage the wild and scenic protection zone, consideration should be given to those activities which should be prohibited altogether, or must undergo review and either be denied, or permitted with or without conditions, to minimize potential adverse environmental and visual impacts to the resource values in the river area, and to private landowners' use of land for residential purposes. Activities that should be prohibited, except their appurtenant structures which may be permitted if they have no adverse visual or measurable adverse impacts to resource values in the river area, include, but are not limited to, the following:

- Landfills,
- Clear-cutting,
- Major new infrastructure facilities,
- Major activities that would alter historic water or flood flows,
- Multifamily residential construction,
- Commercial and industrial development, and
- Mining and major excavations.

5.2.3 Watershed

The permanent protection and enhancement of the wild and scenic segment of the Myakka River cannot be completely achieved without effective management of the river's watershed. Covering approximately 550 square miles in Sarasota, Manatee, Hardee, Charlotte and DeSoto Counties, the watershed is managed by an array of federal, state, and local agencies; special districts; and private landowners. The main objective of managing the watershed, as far as this plan is concerned, is to bring all existing management authorities to prevent future adverse impacts on water quality, water quantity and timing of flow in the river.

Existing management and regulatory authorities are adequate for accomplishing this objective. No new authorities are required. In some cases, however, existing regulatory programs need to be strengthened or improved to increase the level of protection the river receives.

Specifically, Sarasota County should adopt strict performance standards for reviewing new subdivisions, developments, and changes in zoning densities in the basin to prevent adverse impacts on water quality, water quantity, and timing of flow in the river. The County should avoid placing new infrastructure facilities in a way that would encourage development east of the Myakka River. The County should examine the possibility of providing tax incentives to landowners in the watershed to maintain land in agricultural and other non-urban uses. Manatee County should also adopt these provisions.

The SWFWMD has adopted a willing-seller purchasing program and much of the river's headwaters have been identified as a purchasing priority (Figure 13). Additionally the District developed a Comprehensive Watershed Management Plan for the Myakka River in 2004 is currently implementing the plan. However, the Myakka River Watershed Initiative is a much more intensive study effort and will result in a more comprehensive planning document when complete.

5.3 SPECIFIC MANAGEMENT OBJECTIVES AND ACTIONS

Objectives are specific long- or short-term conditions toward which management actions are directed. Actions are the specific measures and procedures that are implemented by management agencies to protect and enhance the river's resource values and to resolve priority concerns.

DRP shall implement those actions for which it is primarily responsible, subject to the availability of staff and funds for those purposes. Other agencies are expected to implement the actions assigned to them, within their funding and staff capabilities. DRP and the Council shall coordinate and encourage each agency to implement specific actions to achieve the management objectives.

Table 4 summarizes each of the management program's objectives and corresponding actions. Each action contains a responsible agency, geographic area subject to management actions, estimates of funding requirements based on available information, and implementation/completion dates. The ability of agencies to perform many of the actions listed below and summarized in Table 4 is contingent upon the availability of funding. A comprehensive list of accomplished actions is included within Appendix L.

OBJECTIVE 1

To protect, enhance and maintain the unique and irreplaceable values, functions, diversity and benefits of the natural resources along the Myakka River.

Action 1.1 - Implement a prescribed burning and fuel reduction program involving landowners along the Myakka River.

DRP shall coordinate with all landowners along the Myakka River to implement a prescribed burning and fuel reduction program. Ecological burning should be utilized where appropriate to control the encroachment of hardwood vegetation into the river marsh, restore and perpetuate pine

flatwoods, reduce fuel levels, increase species diversity and reduce the threat of wildfire along the Myakka River. A long-range program should be established to identify the timing, location, and extent of ecological burning needed to restore and enhance vegetation within the river area and the wild and scenic protection zone, where practicable. The burn plan should be implemented by a series of annual work programs to be conducted by the Division of Forestry and DRP, and should provide for periodic reviews of progress made toward implementing the program. The plan should also provide for restoration of firebreaks and plow lines. A program for controlling wildfire along the river should also be established.

Status: Most of the larger tracts of land along the Myakka River are in public ownership. The resource management components of the unit management plans for Myakka River State Park, Myakka Prairie, T. Mabry Carlton, Jr. Memorial Reserve, Myakka State Forest, Jelks Preserve, Deer Prairie Creek Preserve, and others, identify the fire dependant communities under their management. Roller chopping, timber management, and fire are used by the managing agency to restore/maintain fire dependant communities.

A burn plan for all landowners along the designated portion of the river has not been developed.

Action 1.2- Implement an integrated program of exotic and nuisance species management for the river and the wild and scenic protection zone.

DRP shall implement an integrated program of exotic and nuisance species management for the river area and the wild and scenic protection zone to eradicate or control exotic and nuisance species of plants and animals. Procedures should be devised for locating exotic plant species and removing them to the maximum extent possible. Priority consideration will be given to paragrass and West Indian marsh grass within river area and to those portions of the wild and scenic protection zone, which are in public ownership.

Status: The eradication or control of invasive exotic and nuisance species of plants and animals is an ever-increasing management burden. New species of exotics continue to invade natural communities and considerable financial resources are needed for their removal. Exotic Removal Days are held several times a year to remove invasive exotic plants from private lands in the river area and protection zone. The DRP provides equipment and herbicides, and labor is provided by DRP staff and volunteers. DRP staff also routinely treats new invasive exotic species within the river area or river area buffer before they become widely established throughout the watershed. The SWFWMD, Sarasota County, DOF, DOT, and other public land managers target invasive exotic removal from natural communities as a management goal. Myakka River State Park and the Myakka Wild and Scenic River Program are currently treating areas of West Indian marsh grass in the river area.

Because of the amount of destruction to natural communities (rooting, eating terrestrial plants and animals) caused by feral hogs, they are targeted for removal on the T. Mabry Carlton, Jr. Memorial Reserve, Myakka River State Park, and other public and private lands. Contract hog trappers remove 800-1000+ hogs from MRSP annually, and a nearly equal number from the T. Mabry Carlton, Jr. Memorial Reserve.

Sarasota County has adopted Ordinance No. 97-024, amending and restating Ordinance No. 90-01, prohibiting the importation, transportation, sale, propagation, or planting of nuisance, invasive species melaleuca, Australian pine, Brazilian pepper, carrotwood, Chinese tallow, and beach naupaka. Further, Sarasota County uses removal of these invasive exotic and nuisance plant species as a mitigation option associated with development orders and other permits requiring mitigation.

Action 1.3 – Continue to develop and implement a plan to locate, catalog, and protect listed plant and animal species and species of local concern within the river and the wild and scenic protection zone.

DRP shall coordinate with the FWC and FNAI to continue to develop and implement a plan to locate, catalog, and protect listed plant and animal species and species of local concern within the river area and the wild and scenic protection zone. The study should include all native animals and plants that are of interest and worthy of protection. This listing of animals and plants will be proposed by FWC and then be reviewed by the Council.

Status: A monthly wildlife survey is conducted by DRP. These observations are entered into a database in the Bureau of Parks, District 4 Office. A monthly report is also written for each survey. The FWC is monitoring West Indian manatees in the river, wading bird rookeries, bald eagle nests, and other listed wildlife species along the river. Additionally, a request for a comprehensive list of species observed during survey efforts was obtained from FWC in July 2010. Wildlife observations are also recorded for Myakka River State Park and a species list of plants and animals is included in the *Myakka River State Park Unit Management Plan*. Species lists for other public lands are included in their management plans.

DACS is responsible for the conservation of listed plant species. A vascular plant reference collection is available at the Myakka River State Park herbarium. The collection for the wild and scenic designated section of the Myakka River is ongoing and is located at the District 4 Office. Once a herbarium specimen is made and verified by a botanist, one of each species is kept in the herbarium at Myakka River State Park or the District 4 office, a sister specimen is kept in a research herbarium (like the one at the University of South Florida).

Appendices A and B contain naturally occurring animals and plant species that occur in and around the Myakka Wild and Scenic River and are worth protecting. The bold species detailed in Appendix A indicate plants that have been collected from the river and incorporated into the herbarium at the District 4 Office

Action 1.4 - DRP shall continue to coordinate with DACS to encourage riverfront property owners to protect any endangered or threatened plant species in the River Area and the wild and scenic protection zone.

DRP shall continue to coordinate with DACS to encourage riverfront property owners to protect any endangered or threatened plant species in the River Area or the Myakka River Protection Zone through educational programs and enforcement of the Myakka Wild and Scenic River Rule 62D-15 and the Sarasota County Myakka River Protection Zone Ordinance No. 2008-002.

Status: The Myakka Wild and Scenic River Rule 62D-15.005(2) F.A.C., prohibits “removing or cutting native vegetation except as a function of an activity permitted under Rule 62D-15.006 or that has received a Myakka River Permit prior to the effective date of this rule, and except for the minimum required to provide riparian ingress and egress necessary for docking, boating, bathing and fishing access”. Additionally the Sarasota County Myakka River Protection Zone (Ordinance No. 2008-002) prohibits removal of native vegetation within 220 feet of the Myakka River without written approval.

Educational presentations are given on an annual basis to communities along the river corridor regarding the benefits of native vegetation as well as nuisance exotic plant id and removal methods. These presentations are usually given in coordination with nuisance exotic plant removal workdays.

The protection provided for listed plant species under the Preservation of Native Flora of Florida, Chapter 5B-40, Florida Statutes (1998 amended) is minimal. A private landowner can remove state-listed plants from his/her property without a permit. Others interested in harvesting listed plants are required to get written permission from the landowner, and a permit to collect from DACS. Plants listed on the state’s regulated plant index cannot be used to prevent development, 581.185 (12) states “The Regulated Plant Index is to be used solely to restrict unlawful harvesting of native flora without the authorization of the landowner. The Regulated Plant Index is not to be used to regulate construction or other land alteration activities on any property”.

Action 1.5 - Continue to compile an inventory of special ecological features along the Myakka River.

DRP shall compile an inventory of special ecological features along the Myakka River. These features should be protected to the maximum extent possible by law or public ownership. A program for public education should be implemented to inform the public of the special attributes these features possess that should be protected.

Status: Some of the special ecological features along the Myakka River are shown during public presentations (slide programs), as well as threats to the resource, and what can be done to preserve these features. Additionally, a hydrological study of the Myakka River was completed, and there has also been historical and present day plant mapping efforts along the river.

The DRP supports public acquisition of lands along the Myakka River through public education, letters of support, and other methods.

DRP prints and distributes brochures to the public about the Wild and Scenic Myakka River. An updated version of the Wild and Scenic Myakka River brochure has recently been completed in 2009. Once copies are printed, updated brochures will be available at public access points to the river (Snook Haven and Myakka River State Park). Additionally, a detailed Myakka Wild and Scenic Trails map was completed in 2005. This map is currently available at Myakka River State Park and Snook Haven for a \$2.00 donation. The map includes GPS coordinates and descriptions for points of interest along

the designated portion of the river, and trailheads on public land.

Action 1.6 - Inventory and monitor changes to animal and plant communities in the river area and wild and scenic protection zone.

DRP shall inventory and monitor changes to animal populations and plant communities in the river area and the wild and scenic protection zone. DRP, in conjunction with appropriate state agencies and local governments should inventory and monitor changes to animals and plants in these areas to manage these resources properly.

Plants--A periodic inventory should be conducted through the use of long-term aerial photography to document the changes to the flora.

Animals--Research should be conducted by interested agencies on topics concerning local animal life for later use in wildlife management activities and public education programs. Animal populations will be cataloged and monitored thereafter on a regular basis to provide data on which detailed biological carrying capacities and management criteria can be evaluated. A particular emphasis of these activities should be to monitor the effects of public recreational use of the river. The development of this environmental database should be coordinated with other appropriate agencies to maximize utilization of the information collected (e.g., current studies being conducted by the Sarasota County Ecological Monitoring Division and cooperative United States Geological Survey programs).

Status: The SWFWMD is closely monitoring changes in vegetation (flora) in the upper Myakka watershed, because of the changes (tree die-off) caused by agricultural irrigation.

DRP wildlife survey data has been distributed to the South Florida Water Management District for use in the Kissimmee River Restoration Project. Data collected on activities at the wading bird rookeries is distributed to the FWC, for their rookery monitoring program. Periodically, SWFWMD and DEP prepare vegetation maps for the tidal portion of the Myakka River and conduct vegetation change analyses. During the wildlife survey recreational use is also recorded, incidences such as boats speeding in the manatee slow speed zone are noted.

Action 1.7 - Expand the existing inventory program to monitor nesting, roosting, and breeding sites along the Myakka River corridor to protect these sites from actions that may disrupt their continued use.

Status: Monitoring these sites is part of DRPs monthly wildlife survey. Some of the nesting sites (bald eagle nests, swallow-tailed kite nests, and wading bird rookeries) located in the river corridor are monitored by Myakka River State Park as well as FWC staff, the Audubon Society and various Friends groups.

Action 1.8 - DRP will continue to encourage coordination with different agencies to develop habitat and restoration plans for the river area and wild and scenic river protection zone.

DRP will coordinate with applicable management agencies and continue to implement a program of habitat restoration in the river area and wild and scenic protection zone. The program should provide for replanting and other restoration actions in areas that have been historically altered.

Reforestation of areas on the upland fringes of the wild and scenic protection zone will be accomplished where past lumbering and agricultural land clearing have eliminated large areas of woody shrubs and trees, such as slash pine and oaks. Disturbed wetlands should also be restored where practical through manipulation of water levels, replanting native aquatic vegetation, and other management methods. The vegetation plan should determine priority habitat restoration needs within the wild and scenic protection zone and establish a schedule for meeting them.

Status: Habitat restoration projects are being done in the river corridor (including the river area and protection zone) by the public land management agencies. Hardwoods that are invading marshes contiguous with the river in Myakka River State Park are being removed through the reintroduction of fire to this natural community, or through manual removal. Prairie restoration through the use of roller chopping and prescribed fire is also being done in the park. Previous hydrologic alterations have caused changes to natural communities. Projects are proposed and underway in Myakka River State Park to restore the hydrology in Vanderipe Slough, Howard Creek and Clay Gully, and eliminate ditches and obstructions to natural sheet flow. The park has also completed hydrological restoration projects to restore sheet flow and wetland hydroperiods within its boundaries including lowering the grade along 5.5 miles of powerline road and constructing low water crossings on the raised roadways.

Restoration needs are usually included in the resource management plans for the different public lands. Restoration on private lands is usually done as mitigation in order to comply with the specific conditions for an issued permit. Mitigation, which may include restoration, is used to offset the negative impacts of the proposed activity to be permitted.

Sarasota County staff completed a phased ditch-block project to restore the hydrology in Deer Prairie Slough in 2003. Grant money was received from the SWFWMD and the Charlotte Harbor NEP to restore 8.4 miles of Deer Prairie Slough within the T. Mabry Carlton, Jr. Memorial Reserve that was once channelized.

Action 1.9 - The Council (DRP, Friends of Myakka, or the Myakka Conservancy) should conduct a survey of Myakka riverfront property owners in Manatee and Charlotte Counties to see if they perceive any management needs for the river.

Status: No progress, new action item.

Action 1.10 - Seek additional funding sources to acquire Vanderipe Slough as a conservation easement.

Status: No progress, new action item.

OBJECTIVE 2

To protect and/or enhance the surface and groundwater resource values of the Myakka River, including protection and enhancement of water quality and designated uses, and protection and restoration of optimal quantity and timing of freshwater discharge.

Action 2.1 – Applicable management authorities should strictly enforce regulations relating to water resources.

Status: The Myakka River, in Sarasota and Charlotte Counties, is designated as Outstanding Florida Water, as such it receives the strictest water resource regulations. Activities proposed in the river area of the designated portion of the river are reviewed under the Wild and Scenic River Rule, Standards for Issuance or Denial of a Permit 62D-15.008 F.A.C. Projects that adversely impact the water resource values of the river cannot be permitted under this program.

Water resource violations are reported to the Agencies that have the statutory, or other, authority to enforce water resource regulation (SWFWMD, DEP, Sarasota County, and the City of North Port). Total maximum daily loads (TMDLs) were proposed by the U.S. Environmental Protection Agency (EPA) in 2001 for six watershed segments, and the DEP is in the process of developing TMDLs for impaired waterbodies. Currently, no adopted TMDLs exist for the Myakka River Basin.

Action 2.2 - Applicable management authorities should identify and seek funding sources to develop, institute, and monitor programs for best management practices to control non-point source pollution within the Myakka watershed and develop an integrated pest management strategy.

Status: The reduction of non-point source pollution is included as part of the water quality priority problems/goals of the Charlotte Harbor National Estuary Program (CHNEP), and BMPs are being outlined within the Myakka River Watershed Initiative which is an ongoing study by the SWFWMD.

The Myakka River is scheduled to have Total Maximum Daily Loads (TMDL) adopted for waterbodies that do not meet the water quality standards. The TMDL is a quantitative assessment of water quality problems and the contributing pollution sources. Once the TMDLs are in place, goals to control non-point source pollution can be made. All of the impaired segments are listed as “medium” priority for the TMDL development. If no TMDLs are adopted, the segments will be resampled for impairment again in 2013.

Action 2.3 - Applicable management agencies should evaluate existing water quality monitoring programs to determine whether to continue and/or expand these programs to include:

- a. Better coordinated and more comprehensive monitoring efforts,
- b. Linkage to regulatory actions and programs,
- c. Landfill and borrow pit monitoring, and
- d. Monitoring of tributaries; for example, Howard Creek and Myakkahatchee Creek.

Status: Water quality monitoring efforts have become more streamlined within the past few years. In 1995 the Sarasota County Water Resources staff developed a Myakka River water quality monitoring plan and has performed the majority of the water quality sampling throughout the watershed since that time. Currently, Sarasota County samples 12 sites located within the river and its surrounding tributaries monthly. Five sites are located within in the Myakka River, 2 sites in Myakkahatchee Creek, and 1 site each in Deer Prairie Creek, Howard Creek, Clay Gully, Blackburn Canal and Little Salt Creek. Additional water quality monitoring efforts may be needed by the outflow near the Border Road Bridge.

Once TMDLs are established for the Myakka River, monitoring efforts can be directed to those areas that need them.

Action 2.4 - Conduct hydrologic study that considers all existing and potential water control structures and diversions of river water and eliminate water quality problems.

Applicable management agencies should conduct a hydrologic study that considers all existing and potential water control structures and diversions of river water. The study should evaluate all aspects of the water resource, including net benefits, as well as the living resources of the river, and develop guidelines for preserving, enhancing, and restoring the hydrologic regime of the river. The study should specifically include, but not be limited to:

- Downs' Dam,
- Blackburn Canal (Curry Creek),
- The restoration of the Clay Gully diversion,
- The restoration of Tatum Sawgrass,
- The restoration of Vanderipe Slough,
- The restoration of Deer Prairie Creek and Slough,
- The water control structure at the lower end of Upper Myakka Lake,
- The shoal area at Deer Prairie Creek,
- The proposed Sarasota County potable water reservoir project, and
- The existing dolomite mine discharge.
- The study should assess potential effects of these areas and provide recommendations to mitigate negative impacts where indicated. The study should also be coordinated with Sarasota County's river modeling efforts and the results of the U.S. Geological Survey's (USGS) study. Efforts should be coordinated with agencies and organizations that are presently evaluating individual aspects or projects referenced above.

Status: Many of the projects recommended for the hydrologic study are included in the CHNEP's *Comprehensive Conservation and Management Plan (2008)* as quantifiable objectives and priority actions, and the *Myakka River State Park Unit Management Plan (2004)*, and the SWFWMD's *Myakka River Watershed Initiative*. A hydrologic study of the Myakka River impediments to flow and a sheetflow study as recommended by previous research performed by Duever and McCollom is proposed within the Park's Unit Management Plan. The SWFWMD looked at several of the water control structures while it was researching the tree die-off in the Upper Myakka River Watershed. The SWFWMD *Regional Water Supply Plan (2006)*, identifies several projects for the supply of water for consumptive use from the Myakka River. The 2006 Regional Water Supply Plan was approved by the Governing Board in 2006 and has been updated for the 2011-2016 planning period and is awaiting Governing Board approval. In 2004 the SWFWMD completed the *Myakka River Comprehensive Watershed Management Plan* which also contains public supply, water quality, and tree die-off information from previous projects within the watershed.

Water quality from the existing dolomite mine discharge point, near Border Road Bridge has been sampled occasionally by Sarasota County whenever turbidity was observed in the area. The water quality samples from the turbid water at discharge point have not caused concern in the past. There was a fish kill incident located near the discharge point in April after a long period of drought. Sarasota County monitored the site on several occasions during the event and determined that the dissolved oxygen and pH were both lower than other areas in the river. Since the event, the County is working with the property owners to remove the invasive exotic plants from the old mining pit and investigating the possibility of installing a weir upstream of the discharge point.

Action 2.5 - DRP shall coordinate with applicable management agencies and petition the Environmental Regulation Commission to amend Chapter 17-3, FAC, to designate the entire Myakka River as Outstanding Florida Water (OFW).

Status: The Manatee County portion of the Myakka River has not been designated as Outstanding Florida Water.

The Sarasota and Charlotte County portion of the Myakka River have been designated as an OFW.

Action 2.6 - DRP should seek a U.S. Army Corps of Engineers exemption from the exotic aquatic plant control program within Myakka River State Park to allow the limitation or prohibition of recreationally used power boats on the Upper Myakka Lake and Lower Myakka Lake.

As part of *Myakka River State Park Unit Management Plan (2004)*, the park is making an effort to coordinate with other agencies to document the effects of motorized watercraft on the spread and re-establishment of hydrilla. Additionally, a two-year research project is proposed on the "Effects of motorized water craft on the spread and re-establishment of hydrilla". If the study is funded at \$45,000/year, the data obtained might be used to get an exemption from the U.S. Army Corps of Engineers exotic aquatic plant control program, and allow for limits or the prohibition of power boats on the Upper and Lower Myakka Lakes.

Action 2.7 - DRP shall investigate possible alternatives to the chemical control of aquatic weeds and

encourage effective and environmentally sound management and control practices for chemical, mechanical, biological, or physical weed control.

Status: Whenever possible the most environmentally benign method of aquatic weed control is used.

Action 2.8 - SWFWMD should maintain and coordinate monitoring programs for the consumptive use of groundwater within the Myakka River watershed. Particular emphasis should be placed on the maintenance of wetland hydroperiods and protection of groundwater flows at Warm Mineral Springs and Little Salt Springs.

Status: The SWFWMD performed an ecological evaluation for setting minimum flows and levels within the upper section of the Myakka River in 2005 (Appendix M), and the agency will adopt minimum flows for the lower river in 2011. The draft Lower Myakka Minimum Flows Report is currently available and attached as Appendix N. The SWFWMD also monitors groundwater use permit conditions and compliance and cumulative withdrawals for the Myakka River Basin. The movement off-site of agricultural irrigation waters has caused changes in hydroperiods of Flatford Swamp. Wetland hydroperiods are being monitored in Myakka River State Park and the T. Mabry Carlton, Jr. Memorial Reserve, to determine the effect of the Carlton Wellfield on them.

Action 2.9 - DRP shall petition applicable management agencies to conduct a master watershed study to allow for comprehensive stormwater master planning.

Status: SWFWMD and Sarasota County have partnered with FEMA in an effort update and digitize the existing FIRMs within the county, and create a Myakka Watershed Plan. New aerial imagery has been collected for the watershed using LiDAR and will be used to create new 2, 5, 10, 25, and 100 year floodplain maps. The digital map for the watershed is projected to be completed during 2012.

In 1990, a *Hydrologic Study Within the Myakka River State Park* was done by M. Duever and J McCollom, which recommended additional research projects in the watershed. As part of *Myakka River State Park Unit Management Plan (2004)*, a follow-up sheetflow study is proposed.

Additionally, SWFWMD developed a Comprehensive Watershed Management Plan for the Myakka River in 2004 and is currently working on the Myakka Watershed Initiative effort which will result in the identification and recommendation of technical BMPs to address stormwater and flooding issues.

Action 2.10 - DRP (Friends of Myakka, or the Myakka Conservancy), should post “You Are Entering The Myakka River Watershed” signs along roadways which cross through the watershed, to create public awareness of the Myakka Watershed Basin.

Status: No Progress, new action item.

Action 2.11 - Encourage that salt water intrusion resulting from water withdrawals be minimized through SWFWMD water use permitting.

Status: No Progress, new action item.

Action 2.12 – Support the SWFWMD’s efforts, through the MFL process, to develop strategies to restore the historic timing, quantity, and quality of flows in the Myakka upstream of Sarasota County and then restore the swamps killed by excess dry season flow.

Status: No Progress, new action item.

OBJECTIVE 3

To preserve, protect and restore natural aquatic habitat necessary for the continued healthy existence of aquatic populations and communities within the Myakka River.

Action 3.1 - DRP shall identify, prioritize, and implement feasible aquatic habitat restoration projects..

Status: A hydrologic study has been conducted by both DRP and FWC staff and aquatic restoration areas are being identified through the MFL process.

Action 3.2 - Sarasota County, SWFWMD, and USGS should continue monitoring programs and baseline studies with respect to major potential water withdrawals, including Consumptive Use Permit and potable water withdrawals affecting the Myakka River.

Status: The SWFWMD *Regional Water Supply Plan (2010)* outlines several potential surface water storage and withdrawal projects associated with the Myakka River as well as water demand estimates and projections. SWFWMD has established minimum flows and levels (MFLs) within the upper section of the Myakka River in 2005 (Appendix M). MFLs were proposed for the lower portion of the river in 2010 and are scheduled to be adopted in December, 2011.

Action 3.3 – Applicable management agencies should promote the use of aerial imagery and web based maps to educate boaters as to where shoal locations exist within the river to reduce the incidences of prop cuts caused by boat traffic in these shallow and sensitive areas.

Status: The distribution of significant submerged aquatic vegetation beds have not been identified and mapped in the Lower Myakka River. In some cases signs can draw boaters towards sensitive areas and cause an unwanted increase in traffic.

Action 3.4 - DRP should create an annual state of the river report. The monthly river reports and other activities of the river biologist should be reformatted into an annual report that is distributed to libraries, decision makers, Council members, schools, etc.

Status: No progress, new action item.

Action 3.5 - Restore marsh conditions in Tatum Sawgrass to restore its historic ecological and hydrologic functions.

Status: No progress, new action item.

Action 3.6 - Project a range of sea level rise scenarios and their potential effects on the aquatic habitat of the Myakka River.

Status: This is a new action item that is being taken on by the CHNEP and the SWFRPC.

OBJECTIVE 4

To coordinate with local, regional, state and federal agencies in the use and regulation of land management practices that protects the quality of the Myakka River and its tributaries.

Action 4.1 - After adoption of this plan, DRP and the Council shall continue to jointly evaluate the function and composition of the Council as a management coordination body and implement any necessary modifications.

Status: The composition of the Council changes as members resign and new agencies, programs, environmental groups, and others that have a stake in the management of the Myakka River, are appointed by DRP.

Action 4.2 - Maintain an officer who will be in charge of reviewing significant permits/development applications and review and comment on proposed land development controls that regulate development within environmentally sensitive areas of the Myakka River watershed.

DRP shall maintain an officer who will be in charge of reviewing significant permits/development applications within the Myakka River watershed, including but not limited to Department of Environmental Protection (DEP) and Army Corps of Engineers (COE) dredge and fill permits; SWFWMD Water Use Permits; SWFWMD Stormwater and Surface Water Management permits; Coast Guard Bridge Permits, Development of Regional Impact/Applications for Development Approval documents; and, Sarasota County, City of North Port, Manatee County, Hardee County, Charlotte County, and DeSoto County development applications. It will be the DRP officer's responsibility to determine whether any adverse effects to the Myakka River's resources will result from the issuance of a permit/development approval and provide comment to the permitting/approval agency. On substantial issues, the Division's officer shall elicit the assistance of the Myakka River Management Coordinating Council in an advisory capacity. After adoption of this plan, the Division and Council will develop procedures for keeping the Council informed.

The DRP officer shall be located in a field office along the Myakka River. The field office should be established on public land adjacent to or within the Myakka River Wild and Scenic River segment. DRP shall seek funding for staff to operate the permit program and will establish reasonable fees to help defray the cost of processing applications.

In addition to the review of permits/development applications of the Myakka watershed, the onsite field officer shall be responsible for coordination of DRP permits necessary for activities within the river area. In accordance with Section 258.501(12), Florida Statutes, the DRP officer is also responsible for providing field reviews of the Myakka River area and enforcing the Act.

Status: DRP has an Environmental Specialist assigned full time to the duties listed above. In order to reduce regulatory related costs and require only one DEP permit and fee for activities along the Myakka River, an effort should be made to transfer the permitting portion of the Myakka Wild and Scenic River Program to the DEP Southwest District located in Tampa. This would eliminate the situation where DEP could contradict itself and issue one permit while denying the other permit application, consolidate the permitting process and reduce the regulatory burden. The Environmental Specialist will continue to coordinate MRMCC Meetings, review and comment on permit applications within the river corridor, and conduct biological and resource management activities on the river.

Action 4.3 - Encourage consistent land use planning and regulations in the watershed among all local governments and regional and state agencies to be consistent with the management plan.

Status: This is an ongoing activity.

Action 4.4 - DRP and others instrumental in the management of the Myakka River should seek all appropriate funding sources for the implementation of the management plan. Sources should include, but not be limited to, Manasota Basin Board, Charlotte Harbor National Estuary Program, Department of Economic Opportunity, etc.

Status: No progress, new action item.

Action 4.5 -DRP shall monitor local codes and review and comment on proposed land development controls that regulate development within environmentally sensitive areas of the Myakka River watershed.

Status: This is an ongoing activity.

Action 4.6 – DRP and Sarasota County should encourage and provide information to help create a homeowners guide to regulatory requirements on the Myakka River and promote awareness, appreciation, and understanding of the history and ecology of the Myakka among people living and working in the watershed.

Status: No progress, new action item.

Action 4.7 – Coordinate and collaborate the management of the extensive public lands in the Myakka watershed towards common goals and objectives. Focus should be put on watershed restoration and management of key wildlife species such as Wood Storks, future panther expansion, snook and meadowlarks.

Status: No progress, new action item.

Action 4.8 – In order to reduce regulatory related costs and require only one DEP permit and fee for activities along the Myakka River, an effort should be made to transfer the permitting portion of the Myakka Wild and Scenic River Program to the DEP Southwest District located in Tampa. This would eliminate the situation where DEP could contradict itself and issue one permit while denying the other permit application, consolidate the permitting process and reduce the regulatory burden.

Status: Although this is a new action item, a review of 62D-15 was completed during the spring and summer of 2011 pursuant to the Governor’s Executive Order 11-01, and the above recommendation was included in the rule review.

OBJECTIVE 5

Minimize urban and suburban encroachment and resultant adverse impacts upon the river and allow appropriate land uses within the watershed.

Action 5.1 – Continue to ensure through comprehensive plans, land development regulations and/or appropriate ordinances that urban and suburban land uses are minimized within the river area, wild and scenic protection zone and the watershed.

Status: This activity is ongoing, local governments (except the City of Venice), regional planning councils, and DEO are members of the Council and keep the Council apprised of these issues.

Action 5.2 – DEP and DRP shall regulate and minimize infrastructural impacts to ensure that adequate protection is given to wild and scenic values. New river crossings shall be discouraged in undeveloped areas. Improvements and new infrastructure should be added to existing facilities.

DEP and DRP shall regulate river crossings and minimize infrastructure impacts to the river corridor within Sarasota County to ensure that adequate protection is given to the wild and scenic values. New infrastructure crossings shall be discouraged in undeveloped areas and co-location of new and existing infrastructure should be promoted. Improvements should be made to existing facilities which cross the river to minimize the demand for new facilities that must cross the river.

Additionally, the Council should comment on an infrastructure project that crosses the Myakka River at the inception instead of during the permitting stage.

Status: DRP regulates river crossings under the Wild and Scenic River Rule and a Myakka River permit is required under 62D-15.006(2)(e) F.A.C., “Renovating, replacing, or expanding facilities required for utilities, bridges, or roads”, and under 62D-15.006(2)(j) F.A.C.,

“Constructing or creating after the effective date of this rule utility, bridge or road crossing in unimpacted areas, or utility crossings in unimpacted areas”.

The standards for issuance or denial of Myakka River permits 62D-15.008(1) F.A.C., “no permit shall be issued unless the department finds that the proposed activity will not adversely impact resource values in the river area”.

The Myakka Conservancy, Inc. in 1996 contracted a study on linear facilities in the basin. One of the Myakka Conservancy’s goals is to get public utilities to co-locate structures that cross the basin.

Action 5.3 - Encourage land development review and approval consider sea-level rise, subsequent landward migration of wetlands, and resultant need for an upland buffer.

DEO, DRP, the water management district, the applicable regional planning councils, and local governments should encourage that land development review and approval process consider sea-level rise, subsequent landward migration of wetlands, and resultant need for an upland buffer.

Status: This is an ongoing process within Sarasota County and is stated in the County's Comprehensive Plan as ENV Policy 1.2.3. The current criteria for considering sea level rise is not authorized in the State's Environmental Resource Permit Rules.

Action 5.4 – Continue to encourage Sarasota County to acquire the rest area located at the Interstate 75 / River Road Interchange.

Status: The rest area is closed, and there is no interest in opening it at the present. Sarasota County has shown interest in this parcel under its environmentally sensitive lands program and may work towards leasing this property from FDOT.

Action 5.5 – Mitigate and reduce spill light from all road crossings and the communities lying south of the T. Mabry Carlton, Jr. Memorial Reserve.

Status: No progress, new action item.

OBJECTIVE 6

Provide for the regulation, control and distribution of public access to the Myakka River where necessary to protect and enhance the resource values of the river area.

Action 6.1 - DRP, DEP, DOF and Sarasota County should limit uncontrolled public access to the Myakka River on public lands to the extent allowed by the river's carrying capacity, and include toilets, designated campfire areas, and refuse containers with a suitable vegetated buffer from the river area.

Status: Public facilities on public lands are located away from the river area. Only day use activities are allowed on public lands at this time with the exception of the primitive campsite along the river in the Myakka State Forest.

Action 6.2 – Restrict additional public motorboat access on the Myakka River until a recreational carrying capacity is established and enforceable.

DRP shall restrict additional public access on the Myakka River until a recreational carrying capacity is established and enforced. Also, DRP shall monitor and regulate boat traffic in that portion of the Myakka River from State Road 72 to Border Road to study recreational/natural systems carrying capacity, as proposed for further research.

Status: Access to the Myakka River within the Myakka River Wilderness Preserve from State Road 72 to the south boundary of the park is already restricted to 30 people per day. The natural features of the river from the south boundary of the park to Border Road are usually not conducive to motor boats [shallow depths and navigation hazards (palm logs, fallen trees, and limestone river bottom)].

The recreational carrying capacity has not been established however the DRP is currently performing a literature search on projects that have been completed for similar river systems in order to establish a methodology.

OBJECTIVE 7

Minimize the disturbances to natural resources of the Myakka River from river-related recreational uses.

Action 7.1 -DRP shall undertake a comprehensive boat utilization study to quantify recreational carrying capacity by river segment.

Status: Recreational use on the river is recorded by the Environmental Specialist during patrols of the river and on a monthly basis as part of the monthly wildlife survey.

Within the Myakka River Wilderness Preserve recreational use by all users (hiking, boating, and canoeing/kayaking) is limited to 30 people per day. Permits are issued by Myakka River State Park to regulate this recreational use.

A subgroup of the Council members held a preliminary workshop on October 11, 2000, to discuss the feasibility of a recreational carrying capacity study. Ten river segments were identified that had different physical characteristics, accessibility, and type of recreational use. The development of a map with unique characterization of each segment was proposed.

Action 7.2 -DRP shall encourage the prohibition of airboats, except for official, permitted use by agencies in the designated area of the wild and scenic Myakka River.

Status: Airboats are prohibited upstream of U.S. Highway 41 (except for official governmental agencies) under the river rule 62D-15.005(7), F.A.C.

Action 7.3 - DRP shall educate the public through a sign program at river access points briefly describing resources values and regulations in the designated river area.

Status: Signs are located at public access points to the river (boat ramps). In addition to the signs, brochures on the Myakka Wild and Scenic River are available to the public at these access points. Additional educational opportunities within Myakka River State Park may be achieved through CHNEP or SWFWMD grants.

OBJECTIVE 8

To protect archaeological/historical/paleontological sites from adverse impacts associated with development, vandalism, and artifact collecting and expand the knowledge and database of the archaeological/historical resources in the Myakka River vicinity and watershed.

Action 8.1 - Support a policy on the preservation of archaeological/historical sites on public lands in the watershed.

State executive branch agencies shall preserve archaeological and historical sites on state-owned or administered lands. The water management district and local governments should preserve archaeological and historical sites on their lands.

Status: The preservation of archeological and historical sites is a component of the resource management plan for each public land management area (state park, state forest, county reserve/park, and SWFWMD lands).

Action 8.2 - State and local agencies should enforce existing laws and coordinate with police authorities to protect paleontological sites within the river from divers and educate law enforcement officials and the general public of these laws and regulations.

Status: Dredging is defined in 62D-15.002(8) of the Myakka Wild and Scenic River Rule, and as such DRP regulates dredging by any method within the river area to protect paleontological sites unless the proposed activity will not adversely impact resource values and is clearly in the public interest pursuant to 62D-15.008(3)(b). DRP staff has educated law enforcement officials on the collection of paleontological items in the past and staff have given verbal warnings to people caught collecting sharks teeth in the river using shovels, pumps, and sieves.

Action 8.3 – Commission a cultural resource assessment survey of the watershed and the wild and scenic protection zone to acquire greater knowledge and understanding of the watershed’s archaeological/historical resources.

DRP or its Citizen Support Organization should apply for grant funds from the Division of State to conduct a cultural resource assessment survey of the wild and scenic protection zone and the river area to acquire a greater knowledge and understanding of the river’s archaeological/historical resources. The surveyor shall consult existing sources of information retained by DHR, DRP, and Sarasota County’s Division of Historic Resources, and obtain an archaeological research permit from DHR where state lands are involved. The surveyor shall develop a sensitivity map of areas having high probability of cultural resource distribution.

Status: A cultural resource assessment survey has not been done for the protection zone and river area.

In 1989, a historic resources survey was done for Old Myakka and selected portions of the Myakka River by USF. An archaeological sensitivity map of the Myakka River is used by Sarasota County’s Department of Historical Resources to help determine the potential presence of archaeological sites where development is proposed.

According to the Florida Master Site Files, Myakka River State Park contains 26-recorded cultural resources, including 22 historic sites and 4 prehistoric sites. The park has never been comprehensively surveyed for cultural resources. No survey has ever been conducted in the western half of the park, while the portions of the park in Manatee County and the former Ringling-MacArthur Reserve have been subjected to surface inspection and limited subsurface testing of high site potential areas.

Action 8.4 – Designate a local museum in the Myakka River vicinity as an educational and curatorial facility to receive artifacts collected within the Myakka River watershed.

- Applicable management agencies should designate a local museum in the Myakka River vicinity as an educational and curatorial facility to receive artifacts collected within the Myakka River

watershed. Such agencies should develop educational materials on the prehistoric and historic heritage of the watershed to describe the responsibility of all users to be stewards of such resources.

Status: The Crowley Museum and Nature Center, Myakka River State Park, or Snook Haven may be the facility for this Action.

Action 8.5 – Sponsor an annual Myakka River Pioneer Festival at a restored homestead, farmstead or the Miakka School House.

DRP, in conjunction with its CSO and other local public and private agencies should sponsor an annual Myakka River Pioneer Festival at a restored homestead, farmstead or the Miakka School House with demonstrations of pioneer crafts, music, storytelling, exhibits, and costumes. The festival should involve or include the media, school groups, and lawmakers.

Status: No action has been taken.

Action 8.6 - Based on the location of known cultural sites or those identified during the cultural resource survey, appropriate public and private agencies should apply to DHR for approval to erect official state historical markers on such sites.

Status: No action has been taken.

5.4 RECREATIONAL CARRYING CAPACITY

One of the most important functions of the Myakka River management program is to determine and monitor the amount and kinds of recreational uses that are permitted on the river without creating adverse impacts on the resource values of the river area. Although the term "carrying capacity" of rivers is used frequently, there is no definitive methodology for estimating a river's recreational carrying capacity. There are many concepts and factors involved in assessing carrying capacity, and these factors and concepts can differ from river to river and also along different segments of the same river.

In determining the recreational carrying capacity of the Myakka River, an identification of the constraints on recreational use due to the physical characteristics of the river must first be made. The predominant physical constraints are width and depth of the river channel and the water control structures located south of Lower Myakka Lake and at the outfall to Upper Myakka Lake. These constraints limit the type of recreational use (i.e., canoeing/kayaking or power boating) and the actual areas where recreational use may occur. For purposes of determining carrying capacity of the Myakka River in this management program, the river should be considered in four segments. The first segment consists of the state park, including Upper Myakka Lake, and the Lower Myakka Lake. The second segment runs from the southern state park boundary to Border Road. The third and fourth segments run from Border Road to U.S. Highway 41 and U.S. Highway 41 to the Sarasota/Charlotte County line, respectively.

5.4.1 Considerations in Determining Recreational Carrying Capacity

After differentiating the river segments by physical constraints, the concept of carrying capacity can be addressed. The two perspectives from which to address carrying capacity are the capacity

of natural features, and the demands of the human population. When considered with variables such as seasonal climatic fluctuations, geographic service area, and river water level fluctuations, these perspectives can be further differentiated into four categories: physical capacity, ecological capacity, facility capacity, and social capacity.

Human recreational impacts on the river's resource are immensely important. The recreational use becomes significant when any adverse impacts created outweigh any recreational benefit gained. The ultimate physical limit of capacity is the amount of space available for people and their defined recreational needs. In the case of the Myakka River, it might include the number of recreational uses that could physically occur on the river segments at any one time with enough spacing between them to allow for a minimum level of user safety. The ultimate carrying capacity under such conditions would be far more than the current use levels on the river.

Currently, there is no segment of the river on which the physical capacity has been attained. Ecological carrying capacity of the river is probably also above current use levels, although certain areas exhibit impacts from use. There are problems with the agitation of sediment, the destruction of grass beds, and the possibility of injuries to manatees by motorboat use.

To facilitate recreational use of the river, public access and facilities are required. The limited access to the northern segment of the Myakka River currently imposes a limited facility carrying capacity. When uses of these facilities are maximized, the facility carrying capacity of these facilities has been attained. Access and facility capacity are probably the most flexible of the categories since they may exact the smallest initial cost and may be the most acceptable solutions in the general public view.

Facility capacity in the state park is partially measured in terms of the size of the parking area at the State Park boat ramp. This capacity is exceeded on many weekend days during the year, particularly in the spring. Facility capacity could be increased by the construction of additional parking areas. The southern segment of the river has many private facilities that can generally accommodate peak demands.

Probably the most subjective capacity perspective is social capacity. Social capacity involves the issue of visitation level in an area before the recreational experience is significantly degraded. Social carrying capacity is complex due to many different recreational uses available on the river. A single canoeist's impact on social carrying capacity is quite different from that of tourists on a 70-passenger tour boat.

The most significant variable affecting recreational carrying capacity on the Myakka River is probably social capacity. In establishing a recreational carrying capacity for the river, the management program recognizes that there is no widely shared preference regarding experience types by recreational users of the river. The management program should, therefore, accommodate a wide range of recreational uses and preferences without promoting overcrowding, safety problems or degradation of natural resources.

5.4.2 Derivation of Recreational Carrying Capacity

Two basic patterns of recreational use presently occur on the Myakka River. The first is recreational use, which provides the solitude associated with the unique natural attributes of the river. The second is recreational use more socially oriented in nature. These patterns reflect

preferences for two distinct types of recreational experiences. The first type is a wilderness experience, typified by quiet, slow movement affording the opportunity to appreciate the river's vegetation and wildlife. Types of activities associated with this type of use are small groups of canoeists, fishermen, and nature observers. Such activities generally occur on the northern river segment and selected areas of the southern segment of the river distant from development. The participants who prefer this type of experience may tolerate some visual or auditory contact with other people but only on a limited basis. Generally, the morning hours are preferred for such activities, since this is usually the time of least human activity and greatest wildlife activity on the river.

The second type of experience is less of a wilderness-oriented, resource-based activity than it is a people-oriented experience. Such activities include large groups of canoeists and pleasure boaters. Generally, such uses occur on the southern segment of the river where access, adequate width, and depth of the river, and private recreational facilities are available. An anomaly to these experiences is the tour boat operating on the Upper Myakka Lake, which accommodates groups of people trying to obtain the first type of wilderness-oriented, resource-based experience in a social atmosphere.

Additional criteria have been used to derive the recreational carrying capacity for the Myakka River. These include interviews with facility operators along the river, an informational survey, guidelines for resource-based, outdoor recreational activities, and the estimated 1990 outdoor recreation demand-supply ratios for Manatee and Sarasota Counties.

Based on information at hand, it has been determined that the segments of the river will have different recreational carrying capacities. Upper Myakka Lake will contain a recreational carrying capacity based on current recreational facilities available. Boat ingress should be limited to the boat ramp on the lake and access along the lakeshore should be discouraged. The segment, which occurs from Upper Myakka Lake downstream to Border Road, will have a carrying capacity based on wilderness-oriented, resource-based activity and experience. The majority of this area is within the boundaries of the Myakka River State Park or adjacent to the T. Mabry Carlton, Jr. Memorial Reserve and based on activities originating at the park or from downstream private launch facilities.

Presently, the state park does not limit the number of users of the boat ramp. The actual number of parking spaces available at the boat ramp is 92. Parking, ingress, and egress at undesignated access points along the park road and State Road 72 should be restricted.

A determination of the recreational carrying capacity for the segment of the river from Border Road to U.S. Highway 41 is also based on physical restrictions. The river is not appreciably wider than upstream segments and contains numerous meanders and bluffs that restrict visibility. Erosion is also a greater problem in this river segment due to the presence of steep, river-banks and meanders, which cause greater wakes due to boat turning movements. Currently, there is a public canoe launch located near the Border Road Bridge on the T. Mabry Carlton, Jr. Memorial Reserve and a boat ramp located at Snook Haven which is owned by Sarasota County. Ramblers Rest Resort is a private facility within this river segment. These facilities promote various recreational activities. The recreational carrying capacity of the Myakka River from Border Road to U.S. Highway 41 should be set by the existing private facilities, which provide access to the river. In the extreme southern area of the river there are several residential communities and

extensive private access to the river. Limiting the recreational carrying capacity for this area of the river should also be based on existing access for recreational use. Additional facilities for access to the Myakka River should be discouraged by the various river management agencies.

Because of the limited duration of research conducted during the development of the Myakka Wild and Scenic River Management Plan, there is a need to establish a more accurate recreational carrying capacity for the wild and scenic segment of the Myakka River. Therefore, the DRP has been monitoring recreational use and impacts resulting from the levels of use on the Myakka River.

A preliminary workshop on the feasibility of conducting a recreational carrying capacity study was held October 11, 2000.

5.4.3 Scheduling and Enforcement

After adoption of the plan, DRP and other appropriate agencies, with input from interested groups and individuals, will develop and implement a system for the determination and enforcement of recreational carrying capacity. This system would be jointly implemented by the Division and other appropriate agencies in accordance with formal interagency agreements. It shall not be the DRP's policy to deny public recreational use on the river, except as noted under certain actions in the plan.

6.0 PLAN IMPLEMENTATION

In preceding chapters, this plan has sought to identify the outstanding economic, scenic, recreational, geologic, fish and wildlife, historic, cultural or ecological features that combine to make the Myakka River an area of unique natural resource values. The plan has also sought to set forth a program of principles, objectives, and specific actions to be undertaken to ensure that these resource values are permanently preserved and enhanced for the citizens of the State of Florida both present and future.

The permanent management and administration of the river involves a complex interaction of local, regional, state and federal interests that require balancing and coordination of purpose. By working together, both public and private interests can be achieved through the implementation of the actions of this plan.

6.1 MANAGEMENT COORDINATION

Management of the Myakka Wild and Scenic River segment will be accomplished through the cooperative actions of many local, regional, state, and federal agencies having vested interests in the river. An important function of the river management program will be to coordinate the management activities of the various involved agencies.

The Council was established in part to ensure effective interagency and intergovernmental coordination of management for the river. The Council is represented by a broad spectrum of local, regional, and state agencies; agricultural interests; environmental organizations; public entities; and others recognized by the Legislature and Division as having an interest in matters

that affect the administration and management of the river (Appendix O).

The purpose of the Council is to function as a collective organization. Council members are appointed because they represent larger interests and the public at large. The Council should strive to coordinate in the management of the river area in a collective fashion. The Council has the responsibility and authority to review and make recommendations on all proposals for amendments or modifications to Section 258.501, Florida Statutes, and to this management plan, as well as on other matters that may be brought before the Council by DRP, any local government, or any member of the Council. The Council shall render its non-binding advisory opinion to DRP, Southwest Florida Water Management District, Sarasota County, the City of North Port, and other affected agencies.

The Council will play a key role in ensuring that the objectives of the plan are realized by identifying and resolving coordination problems and enhancing communication between all interests in the river area. The Council may formally review problems associated with the plan and provide recommendations to the appropriate decision making or management agencies. The Council may also review and may provide advisory recommendations on any permits required by Section 258.501, Florida Statutes. However, the Council's review may not impede the timely processing of those permits.

Monitoring the implementation of the plan is also an important activity. Due to the number of affected agencies and the size and complexity of the Council, issues and problems, and recommended actions, an independent review by the Council of implementation efforts is suggested to accurately monitor and determine implementation progress. This review should be conducted on an annual basis.

6.2 PLAN REVIEW AND AMENDMENT

The Myakka Wild and Scenic River Management Plan will be reviewed and, if necessary, revised periodically, at least at 10-year intervals, to ensure that the objectives and actions of the management program remain relevant to achieving the plan's preservation and enhancement principles. All regular (10-year) reviews of the plan will be conducted by DRP with the assistance of the Council.

Any revision or modification of the approved management plan will be accomplished through essentially the same process used to adopt the original plan. Amendments to the plan may be proposed at any time by DRP, or the Council. The Council may, at its discretion, appoint a subcommittee or other appropriate work group to further analyze the proposed revision before making its final recommendations. The analysis of the Council will identify or predict: 1) any potential adverse affect on any resource value of the river area which may result as a direct or indirect consequence of the proposed plan amendment; and 2) any other matters the Council finds desirable. The Council will meet to make its recommendations to DRP. All amendments to the plan must be approved by DRP.

6.3 AREAS FOR SPECIAL MANAGEMENT CONSIDERATION

The final section of this plan summarizes the major actions that are recommended to be taken to implement the findings of the plan. Some of the actions are the responsibility of DRP. Many

local, regional, state, and federal agencies, as well as private interests, however, will play vital roles in the overall execution of the management program (Appendix P).

Specific actions for special consideration include the following:

- Seek funding for a hydrologic study that considers all existing and potential water control structures and diversions of river water and eliminate water quality problems (Action 2.4)
- Amend Chapter 17-3 F.A.C. to designate the entire Myakka River as an Outstanding Florida Water (Action 2.5).
- Develop strategies to restore the historic timing, quantity, and quality of flows in the Myakka upstream of Sarasota County (Action 2.12)
- Undertake a comprehensive boat utilization study to quantify recreational carrying capacity by river segment (Action 7.1).
- Commission a cultural resource assessment survey of the watershed and the wild and scenic protection zone to acquire greater knowledge and understanding of the watershed's archaeological/historical resources (Action 8.3).

Adequate funding for the studies identified in Section 5.0 to implement the various actions should be identified through cooperative efforts. It is projected that a minimum staffing to implement various actions of this plan will require coordination with appropriate law enforcement agencies. The permitting component of this program is recommended to be moved from the Division of Recreation and Park to the DEP Southwest District. This will enable the existing environmental specialist position to perform biological and resource management activities, public outreach and intergovernmental coordination.

Specific actions and accomplishments that have occurred since the last plan update include:

- Adoption of the Myakka Wild and Scenic Protection Zone by Sarasota County in 1997 and the incorporation of protections measures into the County's Comprehensive Plan
- Adoption of Earthmoving, Tree Protection, Land Development, and Zoning Ordinances by Sarasota County in 2003 and the development of the Myakka River Protection Zone Consolidated Ordinance 2008-02 in 2008.
- Additional acquisition projects have occurred along the river corridor in Manatee and Sarasota Counties since the original plan was released. These include Deer Prairie Creek Preserve, Wingate Creek State Park, Jelks Preserve, Myakka State Forest, Myakka Islands Point, and Sleeping Turtles Preserve. Many of the Sarasota County Preserves were acquired through the development of the Environmentally Sensitive Land Protection Program. Approximately 20 miles of shoreline are currently protected in Sarasota County.
- The Preservation of Native Flora, Chapter 5B-40 F.S., which provides for increased protection of listed plant species, was amended in 1998.
- A Myakka Wild and Scenic Trails Map was developed in 2005, and an updated version of the Myakka Wild and Scenic River Brochure was completed in 2009.
- Habitat restoration projects have been ongoing throughout the watershed. Prairie restoration through the use of prescribed fire has occurred at Myakka River State Park. Hydrological improvements are underway for Vanderipe Slough, Howard Creek, and Clay Gully. Sheet flow has been restored along a stretch of Powerline Road in Myakka River State Park by the installation of low water crossings. SWFWMD has restored Deer Prairie Slough using ditch blocks.
- Manatee County Mining and Reclamation Ordinance was amended in 2004.
- The Sarasota County Water Quality Program is performing ongoing water quality monitoring

at 12 sites within the river corridor.

- SWFWMD completed the Myakka River Comprehensive Watershed Management Plan in 2004, which addresses public supply, water quality issues, and the tree die off in Flatford Swamp.
- In 2005, Minimum Flows and Levels were developed for the upper Myakka River and Minimum Flows for the lower Myakka River are expected to be adopted in December 2011.
- Sarasota County adopted the Manatee Protection Plan in 2003.
- Approval of the State-Local Agreement for administering the Myakka River Wild and Scenic River Protection Zone between FDEP, FDEO and the City of North Port dated Sept 24, 2007 (Appendix G)
- Adoption of the Myakka River Protection Zone by City of North Port on October 14, 2008 (Appendix K) and incorporating it as a new Chapter 57 into the City's Unified Land Development Code
- Pedestrian nature trails are now present within the Myakka River Protection Zone at the Jelks Preserve, Sleeping Turtles Preserve, Deer Prairie Creek Preserve, Myakka Islands Point, and Myakka State Forest.
- The expansion of the Myakka Wild and Scenic Designation into Charlotte and Manatee Counties was considered in 2007.
- The MRMCCC Bylaws were updated in 2009, which helped expand membership.
- Roadways crossing the river were inventoried by the DRP and MRMCC in 2009, which led to increased communication with the FDOT.
- The Regional Water Supply Plan was updated in 2010.
- Through increased coordination with FDOT, less invasive turf grass is now used for projects, and better stormwater treatment practices are used which improve the water quality of the river.
- The Myakka Wild and Scenic River Program has completed various monitoring activities such as wildlife surveys and plant inventories. However the Program no longer provides for the daily presence of a river ranger.

While the actions set forth in Section 5.0 represents the plan's major recommendations, it should not be viewed as a comprehensive listing of all the activities that will be taken to implement the plan. Rather, it should be viewed as indicative of the types of actions that will be needed to ensure that the river's special attributes are permanently preserved and enhanced. Some of the actions represent ongoing activities of the various agencies. Additional actions may be identified as implementation of the plan progresses. Applicable law and the availability of the funds govern the implementation of these actions. All agencies are expected to assume responsibility for implementing those recommended actions relevant to their functional areas of responsibility.