EAST LAKE WATERSHED MANAGEMENT PLAN

A PLAN FOR THE RESTORATION AND RECOVERY OF EAST LAKE AND ITS HABITAT

Prepared by: The East Lake Management Plan Committee

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INTRODUCTION

The residents of East Lake Park realize that the impaired quality of East Lake is the cumulative result of the people and their activities within the lake's drainage basin or watershed. And, with ever increasing pressures upon East Lake, it cannot be expected to assimilate all impacts forever. The need to manage East Lake as a limited resource requiring purposeful planning and action is real and immediate. Lake management will require the collective resources of citizens, local, county and state governments and commercial enterprise. Neglect often results in negative impacts, water quality declines, lost fisheries, decreased wildlife habitat, and ultimately lost revenues and a degraded quality of life. This is most certainly the case with East Lake. The rehabilitation of East Lake and its habitat will be a very *costly long-term venture*, both in volunteerism and funding. However, we are stepping forward, and we will reach out to form partnerships with members of the East Lake Watershed Community and with our local governments. We will also garner the volunteerism of the surrounding community residents and businesses, apply for grants, and search out other resources necessary to the implementation and success of the East Lake Watershed Management Plan.

ABSTRACT

East Lake is the major natural feature in the East Lake Watershed. East Lake, sometimes referred to as Bellows Lake, is estimated to be a 98 to 106-acre fresh water lake located just east of the City of Tampa within unincorporated Hillsborough County, and contains approximately 200 million gallons of water. There are two active springs on the western side of the Lake. East Lake has a mean depth of 5 feet and a maximum depth of 8 feet. East Lake also has two canals within the East Lake Park neighborhood. One canal, which is arc-like in shape, connects with the Lake at two points on the northeast side of the Lake, and the other connects on the northwest side of the Lake. This canal splits, with one end terminating within East Lake Park, and the other end connecting with a stream/storm water outlet on the Mary Help of Christians' property.

There is also a small island that locals call Bird Island, which is purportedly owned by the Audubon Society and functions as a bird sanctuary. In addition to the 325 home residential neighborhood called East Lake Park, Mary Help of Christians Church, and the Iglesia Cristiana La Nueva Jerusalem Church properties also abut the Lake (hereinafter referred to as the East Lake Community). Recreational use of the Lake is limited to the East Lake Community and is therefore considered a private lake.

On the east side of East Lake on the opposite side of I-4 is the beginning of the East Lake Outfall, which catches the overflow of East Lake during rain events. On that same side of I-4 are two stationary or fixed weirs, which help to maintain water levels in East Lake and allow water to overflow into the Outfall, as well as through an alum treatment plant. Much of East Lake's watershed drainage passes over the weir, through the Outfall and into the Tampa

Bay By-Pass Canal, which is a primary drinking water source for residents in Hillsborough County. It is important to also note that the waters of the Tampa Bay By-Pass Canal ultimately end up in Tampa Bay. In other words, some of the waters that flow into East Lake ultimately become a part of Tampa Bay and have the potential to affect its ecosystem as well.

The property in and about East Lake is home to numerous species of wildlife, including bald eagles, osprey, hawks, wood storks, ibis, egrets, blue herons, mallards, cormorants, coots, brown pelicans, foxes, and raccoons. Within East Lake's waters are numerous aquatic and reptile species, including bream (blue gill), largemouth bass, tilapia, gar, catfish, apple snails, Florida soft shell turtles, brown water snakes and alligators.

For many years the residents of East Lake Park have voiced concerns about the increasing direct run-off from roadways and commercial development within the East Lake Watershed, causing large amounts of untreated storm water to enter East Lake. This untreated run-off has increased sediment, nutrients, and other pollutants, and negatively impacted East Lake's water quality, as well as its wildlife habitat. Within the last several months, the residents of East Lake Park have again voiced concerns about the continuing decline of the water quality and overall ecosystem of East Lake. In response to those concerns, the East Lake Management Plan Committee was formed to develop a plan of action designed to address the pollutants, non-native and invasive plant overgrowth, and other problems with East Lake and its canals.

The East Lake Management Plan Committee team consists of resident volunteers who have spent numerous hours training, researching and studying the causes and effects of storm water run-off, the upload of nutrients and suspended solids from Bird Island and elsewhere, and the solutions to those problems. Part of that research has included consultations with Gulf Coast Lakes and Wetlands, a lake recovery and management firm, New Earth Industries, the inventor and manufacturer of the WaterGoat, and various employees of Hillsborough County's Stormwater Management Department, Public Works Department. In addition, the Committee members have spent many hours on the Lake surveying various aspects of the Lake, surveyed the condition of properties within the Watershed that contribute to the pollutants, reviewed countless studies and reports regarding East Lake, talked with many long time residents of East Lake Park, and participated in several lake management information seminars.

The East Lake Management Plan Committee and the residents of East Lake Park recognize that there are no short-term solutions or "quick fixes" to the problems we face. However, based on water studies, assessments and other information regarding East Lake, if we adopt a "do nothing" approach, the impairments of East Lake will only continue to worsen. We also recognize that the success of the East Lake Watershed Management Plan depends on an investment of thousands of volunteer hours, whatever funding we can muster, and the cooperation of Hillsborough County. To that end, the East Lake Park Special Dependent Tax District, the East Lake Park Home Owner's Association, and the residents of East Lake Park have stepped forward and committed themselves to the success of this Plan.

It is important to note that, over the years, businesses located within the East Lake Watershed have partnered with East Lake Park on other projects and taken it upon themselves to enhance other areas of the East Lake – Orient Park Community. For example, the Seminole Tribe, who owns the Hard Rock Casino and Hotel to the east of East Lake Park, continues to invest in the fastidious maintenance and upkeep of their own property, as well as other areas of the community. We are therefore optimistic regarding a continuation of those partnerships and feel certain that the support of these community members will become an integral part of the success of this Plan. In addition, several neighborhoods and churches within the East Lake - Orient Park Community have, in the recent past, reached out to us, and given their support for the improvement and protection of the Community.

The East Lake Management Plan Committee, as the primary authors of this Plan, understand that this Plan is only the first draft and will likely be updated several times during the term of the Plan, and that it may fail to address all of the concerns and possible solutions to the problems we face at East Lake. However, we also believe that this is an important first step in the management and recovery of East Lake.

Based on the foregoing, the residents of East Lake Park and the East Lake Management Plan Committee hereby propose the implementation of the East Lake Watershed Management Plan. Our hope is that, in partnership with area businesses, other property owners, and residents in the East Lake Community and the East Lake Watershed, the water quality of East Lake, as well as the surrounding ecosystem will improve dramatically over the term of this Plan.

CONCERNS

East Lake is the depository for storm water runoff from the East Lake Watershed, which consists of properties and roadways within a roughly two and a half mile radius of the Lake. See Appendix A. A watershed (also called a drainage basin) is an area on the land surface from which water flows or has the potential to flow to a common destination. The term is not restricted to surface water runoff and includes interactions with subsurface water as well. East Lake is the common destination for run-off of approximately 1,200 acres of surrounding land.[1] This includes five major conveyance systems of stormwater that discharge directly into East Lake, as well as the run-off from the immediate drainage basin. See Appendix B for a more detailed description and map of these systems. These major systems pick up storm water run-off from probably hundreds of drains, culvert openings, basins, and ditches within the Watershed.

As a result of these five main storm water outlets, a large majority of the storm water and drainage basin run-off sources that enter East Lake originate outside of East Lake Park. Consequently, an inordinate amount of non-point pollution enters East Lake and its canals via

[1] East Lake Watershed Management Plan Update dated January 2007. Prepared by Ayres Associates for the Hillsborough County Stormwater Management Section, Public Works Dept.

storm drain outlets that flow directly into the Lake. Potential non-point sources of coliform include loadings from surface runoff, wildlife, livestock, pets, leaking sewer lines, and leaking septic tanks. The current topography of the properties surrounding the East Lake Community also causes a high amount of surface run-off into East Lake and its canals. The residents of the East Lake Park have been unable to this point to effectively abate the negative impact this is having on the water quality and the diminishing depth of East Lake and its canals, and requests to Hillsborough County for meaningful help have been largely ignored. The ecosystem of East Lake has, for more than 50 years, suffered at the hands of all who live, work and travel through the East Lake Watershed, as well as Hillsborough County and its contractors.

The Hillsborough Avenue/Harney Road storm water conveyance system collects water from the commercial/industrial area north of Hillsborough Avenue and from other storm drains north of East Hanna Avenue into an inlet pipe that flows under the Good Shepherd Church property (owned by the Diocese of St. Petersburg) and then into East Lake. Of particular concern is the current existence of septic tanks on the Good Shepherd property. This property has mature oaks and other large trees that may have already breached these tanks. The property is not in regular use, is consistently overgrown, and the residents of East Lake Park would like to insure that these tanks have been regularly checked and maintained, as they may be a source of nutrient groundwater loading. In addition, in times of heavy rain, the water flows across the Church's property as run-off and enters the ditches along Hillsborough Avenue, which ultimately enters East Lake. This property is therefore a source of storm water and direct run-off pollution, including possible of fecal coliform. The outlet from this particular storm water conveyance enters East Lake on its north shore. The water flow coming through this outlet consistently brings trash and other visible floating debris, as well as yard debris, into East Lake.

The direct run-off from Hillsborough Avenue and Harney Road has long been a problem for East Lake Park and those properties on the south side of Hillsborough Avenue and along Harney Road. During periods of heavy rain, the drainage ditches overflow and the water washes through the properties on the south side of Hillsborough Avenue and the residences on the east side of Harney Road, bringing sediment, trash and other road debris into the East Lake Park neighborhood, which then enters the Lake as surface run-off and through storm water drains in the neighborhood.

The Suncoast Schools Federal Credit Union property is on the south side of Hillsborough Avenue and directly north of East Lake Park, abutting the back yards of numerous residences along Travis Blvd., Ansley Circle and Thrasher Drive. There are two retention ponds on this property. Residents there report that when it rains, the direct run-off, as well as the overflow of the retention ponds, flows south from the Credit Union property into their back yards and out into the streets of East Lake Park. From there this run-off enters the storm drains in East Lake Park and then flows into East Lake. The Credit Union Property consists of both paved and unpaved parking lots, causing increased nutrients and sediment to enter the streets of East Lake Park and flow into the Lake. There appear to be several storm

outlets on this property that connect with either the Hillsborough Avenue/Harney Road storm water conveyance system or the retention ponds. This writer was unable to access and visually survey this property, which is gated, prior to the publication of this Plan, and will try to do so in the near future.

Net Park, formerly East Lake Mall, has been converted to an office park, and is located within the East Lake Watershed to the west of East Lake. Net Park's property is the conduit of two major outfall conveyance systems. Their onsite retention pond, which also receives storm water run-off from several other properties as far west as the other side of 56th Street, is connected directly to East Lake waters by the East Lake Mall South System, a 48-inch drainage pipe. The two pipes within this conveyance system, both of which enter the canal system on the west side of East Lake, represent approximately 24% of the storm water run-off coming into East Lake.[2]

The 48-inch South System pipe enters the end of the canal on the western side of East Lake, and dumps a huge volume of water and sediment into the canal, especially during times of heavy rain. The most visible effect of this outfall, other than debris, is the large volume of sediment that has reduced the depth of that canal to less than 18 inches. As discussed further herein, two major events have also contributed substantially to the lower water depth there and resulted in additional impairment to the water quality.

The northernmost pipe, called the East Lake Mall North System, collects run-off from as far north as East Hanna Avenue. This System also picks up huge amounts of surface run-off, sediment and debris from Hillsborough Avenue and Harney Road. Most all of this run-off runs down open ditches and collects into a large drain on the west side of Harney Road, which, as of the writing of this Plan, was covered with trash, leaves and other debris. After entering the large drain, the run-off crosses under Harney Road, and enters East Lake Park via an underground pipe, which terminates/drains into the northern end of East Lake's western canal.

A visual survey of the Hillsborough Avenue/Harney Road area of this System indicates a severe lack of maintenance by Hillsborough County. The grass along the western shoulder of Harney Road is waist high and full of trash and leaves. From Hillsborough Avenue south down along the west side of Harney Road is a large build up of sand and sediment, which will ultimately end up in East Lake's west canal.

Two major events in the last 15 years have caused severe problems in the west canal of East Lake. In May 1995 a right turn lane was added on the south side of eastbound Hillsborough Avenue, allowing motorists to turn south on Harney Road. During construction, several large dump truck loads of dirt/sand were added to the proposed turn lane area and packed down. However, before the County paved the turn lane, three consecutive days of rain occurred. All of this fill dirt washed south on Harney Road, into the large drain outlet and into the canals, destroying precious fish habitat and rendering it impossible to navigate for

[2] East Lake Restoration Project report, April 30, 1997. Prepared for SWFWMD and Hillsborough County.

many residents. In the north end of the west canal, the water depth immediately went from over 5 feet to less than 10 inches. This rain event also reduced the water level on the west end of the west canal from 8 feet to less than 18 inches. One East Lake Park resident on that canal has, for more than 15 years, repeatedly requested the County remove this excess sediment. The County promised, on more than one occasion, to remove the excess sediment. Unfortunately the County has not done so.

To make matters much worse, sometime in 2000 or 2001, the South System drainpipe that runs under Harney Road and into East Lake Park collapsed. As a result, sand, sediment and other debris washed into the west canal and lowered the water level yet again. Again the County made more promises to remove the sediment, but none have been kept. A visual survey of this pipe indicates that it may be collapsing yet again.

The historical depth of the east canal has also been lost over the years because of an increase in untreated run-off from area roads, commercial development and construction projects. This run-off has dumped, in addition to nutrients and other pollution, inordinate amounts of sediment into this canal, substantially lowering its depth. Fish habitat has been lost and the canal remains in a constant state of algae bloom. The shallower water in this canal substantially impairs East Lake's water quality and surrounding habitat, makes the canal less navigable, and will hinder our efforts to restore East Lake.

The volume of storm water coming through the Net Park System (East Lake Mall Outfall System) has dramatically increased nutrients, sediment, and trash in the west canal and the Lake, has made it difficult to navigate the canal, has lowered water levels to less than 10 inches in some areas of the canal and has destroyed fish habitat. Residents living on that canal recently commented that they once enjoyed fishing from their backyard dock but no more. Not only has the sport fish population towards the ends of the canal virtually disappeared, residents can longer get their boats in and out from their backyard waterfront near the two interior ends of that canal.

A visual survey of the Net Park retention pond itself indicates that it is not well maintained. Among other things, mature oak trees surround it, and their falling debris has caused nutrients and other pollutants to flow into East Lake. Except during periods of rain, this pond is stagnant, covered with algae and likely contributing to the unhealthy bacteria, high nutrient levels, and increased sediment in East Lake.

This above described non-point pollution has, over the years, contributed to higher than normal levels of nutrients, sediment, bacteria and other pollutants, further impairing East Lake's ability to naturally recover or heal itself. In addition, sediment and other solids entering the canals and Lake has substantially decreased the navigability of the canals, and lowered the water levels/depth of the lake as well. In turn, the shallower water has caused decreased dissolved oxygen levels, thereby impairing the ability of the Lake to sustain levels of dissolved oxygen necessary for a healthy fish population. Shallower waters in the canals and along the shoreline of East Lake have also diminished the spawning habitat for fish.

Lower water levels appear to have made the waters of East Lake warmer in the summer causing more frequent and longer lasting algae blooms, increased bacteria growth, and more explosive growth of invasive plants in the canals and Lake.

In addition to non-point pollution, other pollutants enter East Lake via direct run-off. Bird Island is a substantial contributor to the pollutant load, especially nutrients, of the Lake. The 1997 Environmental Research and Design (ERD) report identified Bird Island as one of the major sources of nutrient loading in the lake, especially in the case of nitrogen and phosphorus.[3] The island is also a source of nuisance plant species, with its shore being ringed by a dense area of Southern cattails and the island itself being overgrown with Coastal Plains willow, lead tree and other exotics. The continuing growth of non-native and other nuisance plants growing on the landmass itself indicate that the Audubon Society has not adequately maintained the Island.

Due to the explosive growth of invasive plants on the outer perimeter, the visual width of Bird Island has doubled in size in the last four years. Furthermore, the visual length has increased by more than one third. The cattail growth has already extended more than 25 feet from the actual Bird Island landmass in many places. In addition, approximately 50% the large tree's tree line (where many birds roost and sometimes nest) extends directly over the water, causing direct nutrient loading and increased unfiltered suspended solids. The fecal coliform deposits coming from the island have likely increased as well, due to a lack of maintenance and a failure to install more appropriate plantings on the Island.

In the late 1990's the Public Works Engineering Division's Stormwater Management Section conducted a major review of available water quality data. Based on their findings, roughly one-third of the total nitrogen, almost three quarters of the total phosphorus, and one tenth of the total suspended solids introduced into East Lake at that time were the result of the run-off (bird waste) from Bird Island.[4] In addition, as will be discussed further in this Plan, the bird waste run-off is a major contributor to the high fecal coliform bacteria levels in East Lake.

Many residents of East Lake Park have expressed concerns about residents feeding the birds. The Audubon Society has a policy that prohibits the feeding of wild birds, even though their food may be scarce. Feeding wildlife tends to lessen an innate fear of humans, may create some dependency on humans for food, and may diminish its natural desire to hunt or forage. Then the only habitat in which it has learned to survive is around humans, not in the wild. Other wildlife care organizations also suggest that feeding animals could alter migratory patterns, increasing the likelihood of inbreeding of species and crossbreeding of different species. Some residents of East Lake Park have already observed examples of this in the bird population at East Lake, particularly among the mallard population.

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[3] East Lake Restoration Evaluation, December 1997. Prepared by Environmental Research & Design, Inc. for Hillsborough County Stormwater Management and SWFWMD.

[4] An East Lake Management Plan, August 2002. Prepared by the University of Florida for the Hillsborough County Public Works Department.

Some of the most visible evidence of high nutrients and other pollutants in East Lake can be seen in the canals. At times the canals have become impossible to navigate due to the explosive growth of spatterdock (sometimes called yellow pond lilies), cattails, and other invasive plants, as well as the build up of sediment due to the periodic decay of these plants. In addition, duckweed completely covers the water's surface in many parts of the canals, indicating high levels of nitrates and causing low dissolved oxygen levels. The uptake of nutrients, sediment and other pollutants over the years has, to our dismay, created the perfect environment for repeated algae blooms (brownish/green water), lowered the dissolved oxygen levels necessary to support aquatic life, and caused explosive overgrowth of non-native and invasive plants. Specifically, cattails, as the dominant aquatic plant in East Lake, have expanded to undesirable levels, and become invasive. Herbicidal management of this plant has been largely ineffective to date.

The storm water and run-off from Mary Help of Christians' Church, as well as those properties abutting Mary Help of Christians' Church, represents one of the five main storm water outlets in the East Lake Watershed. Storm water from the adjoining properties ultimately crosses the Church property through a stream (open culvert/waterway) that connects with the west canal of East Lake. The area of the East Lake Watershed in which Mary Help of Christians is the largest property owner contributes approximately 28% of the storm water run-off into East Lake via the west canal.[5]

The Mary Help of Christians' Church property is home to large livestock, including horses and cattle. These livestock have direct access to the stream/waterway, the west canal and the Lake, and are likely contributors to the exceedances of fecal coliform in the watershed run-off entering the Lake. The livestock deposit coliform bacteria with their feces onto the land surface as well as directly into the water. The feces on land can then be transported during storm events to the nearby storm water canal/stream and into the canal and Lake. The fecal coliform levels will be discussed in more detail below. During periods of rain, direct run-off from this property drains into the west canal and East Lake, causing increased nutrients, sediment, and suspended solids.

Trees and other brush on the Mary Help property overhang (and actually hang into the water in many places) the west canal, the Lake and the stream on the Church property, resulting in additional input of bird waste, as well as input of yard waste/debris. The stream itself is home to many thriving water hyacinth and other non-native and invasive plants, which cover the surface in many areas.

Tree overgrowth is visible along the canals and the shore within East Lake Park. This growth results in direct input of bird waste, as well as additional input of yard waste/debris during cold weather. A lack of understanding by residents regarding the impact this overgrowth has on the canals and Lake, as well as certain economic and physical constraints, is the likely cause of this condition. Visual surveys of the East Lake Park neighborhood

[5] Ibid 6

indicate that there are also residents who have failed to abate their contribution to the pollution of the Lake by allowing sand, sediment, grass clippings, leaves and other yard waste, to enter the Lake via direct run off and the storm water drains in the neighborhood.

Several years ago the Department of Transportation, as part of the expansion of I-4, tore down and later built a fixed weir in the East Lake Outfall, just east of I-4. The water overflow level of this fixed weir is 23.5 feet mean sea level, which is also the Southwest Florida Water Management District's established "maximum desirable" mean sea level for East Lake. Because higher water levels during heavy rain can diminish the flood protection capability within East Lake, the University of Florida, in its 2002 East Lake Management Plan, recommended the installation of an adjustable control structure that would be able to drop water levels below 23.5 mean sea level in case of a hurricane or large storm. In addition, an adjustable weir would allow dropping water levels to enhance fish and wildlife habitat.[6]

TROPHIC STATE INDEX AND FECAL COLIFORM OF EAST LAKE

The Trophic State Index (TSI) is a classification system designed to "rate" individual lakes and reservoirs based on the amount of biological productivity occurring in the water. The classifications are:

GOOD	0-59	Fully supports intended use
FAIR	60-69	Partially supports intended use
POOR	70-100	Does not support intended use

The Historical TSI of East Lake over a twenty-year period indicates that the water quality range has gone from 19 to 84. In July 1987, the TSI of East Lake was 19 or "good." However, as of January 2007 the TSI was 84 or "poor." In other words, the water quality has gone from ***fully supporting*** East Lake's intended use, to ***failing to support*** its intended use.

In September 2008 the University of South Florida's Center for Community Design and Research and Hillsborough County Stormwater Management Section conducted a Lake Assessment to update existing physical and ecological data for East Lake on the Hillsborough County Watershed Atlas. The purpose of the Lake Assessment was to provide lakefront property owners a better understanding of the general health of East Lake. In addition, such assessments are intended to assist Hillsborough County and its citizens to better manage lakes and lake centered watersheds.[7]

A critical element of this Lake Assessment was the long-term water chemistry data set. The primary source of water quality trend data for East Lake is the Florida Lakewatch volunteer monthly sampling and the Florida Lakewatch water chemistry data.

[6] Ibid 8

[7] Lake Assessment Report for East Lake, September 2, 2008. Prepared by the University of South Florida's Center for Community Design and Research and Hillsborough County Stormwater Management Section.

The trend data compiled from water samples at East Lake indicated that the Lake is considered "Poor" in terms of the TSI. East Lake is a clear water lake and as such it must maintain a TSI of below 40 to not be considered impaired by the State of Florida guidelines. The lake's long-term water quality data over the ten years preceding the Assessment indicates enough violations of these criteria to therefore be classified by the Florida Department of Environmental Protection as "***impaired***."

The measurement of total and fecal coliform has been the standard for assessing health risks and finding the sources of fecal contamination for many years. Total coliforms are a natural part of the bacterial community of plants. Pseudomonas aeruginosa, a major cause of skin rashes and ear infection, is present on aquatic plants. However, lakes having consistently high total coliforms but no fecal contamination have a high probability of being safe for recreational purposes. In addition, total coliforms typically do not live for extended periods of time in an aquatic environment.

In direct contrast to total coliforms, high contamination levels of fecal coliform bacterium indicate the presence of escherichia coli (E. coli). Studies have shown that fecal coliforms can survive and even multiply in the natural environment including lakes.

In September 2009, the Unites States Environmental Protection Agency prepared a Report on the Total Maximum Daily Load (TMDL) of Fecal Coliform in East Lake.[8] A TMDL represents the maximum amount of a given pollutant that a water body can assimilate and still meet water quality standards, including its applicable water quality criteria and its designated uses. TMDLs are developed for water bodies that are verified as not meeting their water quality standards. They provide important water quality restoration goals that will guide restoration activities.

During November and December of 2008, the Department collected water samples from East Lake and its canals and used the Identification of Impaired Surface Waters Rule (IWR) to assess water quality impairments in East Lake. As a result, East Lake was verified as ***impaired*** based on ***fecal coliform***, because using the IWR methodology, more than 10 percent of the values exceeded the Class III freshwater stream criterion of 400 counts per 100 milliliters (counts/100mL) for fecal coliform. Specifically, in 11 out of 15 samples, East Lake's fecal coliforms exceeded acceptable levels.

Based upon the results of the above test samples, the report concluded that non-point sources of fecal coliform entering East Lake should be reduced by 80 percent. This includes dogs, cats and other mammals, as well as septic systems.

The report further noted that pets (especially dogs) could be a significant source of fecal coliform pollution through surface runoff in the East Lake Watershed. In addition to

[8] Proposed Total Maximum Daily Load (TMDL) for Fecal Coliform in Bellows Lake Outlet, September 30, 2009. Prepared by the U.S. Environmental Protection Agency.

pets, other animal fecal coliform contributors commonly seen in urban areas include rats, pigeons, and sometimes raccoons.

Studies report that up to 95 percent of the fecal coliform found in urban storm water can come from nonhuman origins (Alderiso et al., 1996; Trial et al., 1993). The most important nonhuman fecal coliform and fecal streptococcus bacteria contributors appear to be dogs and cats. Using bacteria source tracking techniques, Watson (2002) found that the amount of fecal coliform bacteria contributed by dogs in Stevenson Creek in Clearwater, Florida, was as important as that from septic tanks.

According to the American Pet Products Manufacturers Association (APPMA), about 4 out of 10 U.S. households include at least one dog. *A single gram of dog feces contains about 23 million fecal coliform bacteria* (Van der Wel, 1995). Unfortunately, statistics show that about 40 percent of American dog owners do not pick up their dogs' feces.

In the case of East Lake, high fecal coliform levels are also attributable to the bird waste run-off from Bird Island, the feces produced by livestock at Mary Help of Christians, the direct input of bird waste from trees and other overgrowth along the shorelines, and the septic tanks in the Watershed.

PREVIOUS PLAN PROPOSED IN 2002

In June 2001, The Stormwater Management Section of Hillsborough County's Public Works Department contracted with the Department of Fisheries and Aquatic Sciences of the University of Florida to assist the residents of East Lake Park in the development of a Lake Management Plan. In August 2002, the Department of Fisheries and Aquatic Sciences presented the residents at East Lake Park with an East Lake Management Plan.[9]

This Plan recommended, among other things, that the canals be dredged to restore the historical configuration of the canals and to dredge elsewhere as needed to remove sediment, muck and other pollutants. This Plan also recommended that fecal coliform, bacteria, and urban pollutants be monitored, that East Lake Park volunteers continue monthly water sampling as participants in the Florida LakeWatch program, and that bird and aquatic life be monitored/counted to determine the ongoing effects of nutrients and other pollutants entering East Lake via the East Lake Watershed. In addition, the Plan recommended the initiation of an aquascaping program, including a maintenance control program for water hyacinth, cattails, and other non-native and/or invasive plants using hand removal and herbicides. Specifically, the plan recommended the removal of cattails and replacement with plants such as bulrush to enhance the aesthetic beauty of East Lake and minimize interference with human uses.

[9] Ibid 8

Unfortunately, due to a lack of funding, the only two components of that plan implemented and/or continued, were the water sampling and the use of herbicides to control unwanted plant growth. The monthly water sampling was discontinued in 2007 when the East Lake Park resident responsible was unable to continue sampling. This spring a new East Lake Park resident stepped forward and was trained by the University of Florida to take the samples and has done so for the last few months.

The use of herbicides has been largely ineffective in controlling the outgrowth of numerous invasive plants, which continue to thrive on the high nutrients and other pollutants in East Lake. Consequently, the residents of East Lake are currently experimenting with various lake tools, and looking at efficient ways to remove non-native and invasive plants by hand, thereby minimizing the use of herbicides.

GOALS

I. PRIMARY GOAL: Protect and improve the water quality and wildlife habitat of East Lake by reducing the non-point and direct run-off pollution entering the Lake from the East Lake Watershed, Bird Island and the immediate East Lake Community.

II. EDUCATIONAL GOAL:

a. Educate the property owners, businesses and residents in the East Lake Watershed regarding ways in which they can reduce or eliminate pollutants entering the canals and Lake through storm drains and direct run-off.

b. Educate property owners and residents in the East Lake Watershed on the function, operation and maintenance of septic tank systems.

III. ABATE POLLUTANTS AND INCREASE DISSOLVED OXYGEN:

a. Reduce the amount of nitrates, phosphorous, suspended solids, fecal coliform and other pollutants entering the Lake with the use of filtration and other abatement processes.

b. Dramatically increase dissolved oxygen levels in the canals and Lake by forced aeration.

c. Circulate the water in the canals and Lake to discourage non-native and invasive plant growth, reduce algae blooms and increase dissolved oxygen levels.

IV. TRASH AND SEDIMENT REMOVAL: Remove sediment build-up and trash/debris in the canals and along the shoreline making them more navigable and habitable for fish.

V. OVERGROWTH REMOVAL: Trim or remove tree overgrowth from the canal and lake shorelines to reduce nutrient input from bird waste and yard waste.

VI. AQUATIC PLANT AND WILDLIFE HABITAT MANAGEMENT: Remove non-native and invasive aquatic plants from the canals and lake and replace them with aquatic plants that are more manageable and beneficial to wildlife.

VII. LAKEWATCH PARTICIPATION AND WATER QUALITY MONITORING: To determine the effectiveness of this Plan, the East Lake Management Plan Committee recognizes the need to monitor changes in water quality throughout the duration of the Plan.

VIII. DREDGING: Dredge the canals to restore them to their historical depth and configuration, and remove pollutants that have settled on the canal bed. Dredge the shoreline and other areas of the Lake to restore it to its historical depth, and remove pollutants that have settled on the lakebed.

IX. FUNDING:

a. Participate, when possible, in grant application processes to supplement the funding of this Plan.

b. Develop financial partnerships with residents, property owners, and businesses in the East Lake Watershed to fund and implement this Plan.

X. VOLUNTEERISM: Garner volunteers from the Watershed residents, local schools, student clubs, citizens' groups, area businesses, and other organizations to implement this Plan.

PLAN IMPLEMENTATION/ACTIONS

RECOMMENDATION 1. EAST LAKE WATERSHED RESIDENT/OWNER EDUCATION

One of the most time consuming components of this Plan will be to educate the residents, businesses, and property owners within the East Lake Watershed regarding the need to mitigate their respective impacts on East Lake. We anticipate that some future partners will be unable to comprehend their potential impact on East Lake as they do not live or work near the Lake and likely have never even visited the Lake. However, we feel confident that there are ways to engage them.

Specifically, we intend to sponsor community wide events at the East Lake Park Civic Center and offer educational tours of the Lake. In addition, several residents of East Lake Park, as well as leaders in other neighborhoods, have already volunteered to go door to door to offer educational material, and speak with residents and business owners within the East Lake Watershed about their impact on the Lake. Part of this educational component will include the function, operation and maintenance of septic tank systems, and the impact that dog and cat feces is having on the fecal coliform levels in the Lake.

The Committee believes that the most effective approach to resident education will be to simplify residents' initial participation in the implementation of this Plan. In the beginning, their active participation will require them to do only a few very simple things: Scoop and properly dispose of the pet poop/feces, rake and properly dispose of leaves and other yard

debris, blow all sediment and grass clippings into their grass/yards, and reduce the use of nitrogen based fertilizers during rainy season.

For the educational component of the Plan, The East Lake Management Plan Committee and other volunteers also intend to draw upon the resources of the Hillsborough County Stormwater Environmental Programs Department for educational literature and other educational resources.

In an effort to raise awareness about the impact of storm water run-off into East Lake, The East Lake Management Plan Committee intends to use a community involvement education program modeled after one used in Pinellas County in the 90's. We plan to enlist volunteers from student groups, residents and local citizen groups and train them as ambassadors for the improvement of the Watershed and East Lake. These volunteers will speak with residents about environmentally friendly ways to improve the Watershed and lessen their impact on the water quality of East Lake. In addition, we intend to use these same volunteers to paint the storm drains within the East Lake Watershed with "Don't Dump! Drains to East Lake" with a fish or other logo. Our hope is that this component can become a source of volunteerism for the students and others involved, spread awareness beyond the East Lake Community, and engage more residents and businesses within the East Lake Watershed in the implementation of the Plan.

RECOMMENDATION 2. DREDGE THE CANALS AND LAKE

The residents of East Lake Park understand the benefits to the ecosystem of restoring the canals to their historical depth and configuration. As a major water resource in the region, Hillsborough County and SWFWMD will receive indirect benefits to the management and recovery of East Lake and its canals.

The excess sediment forced into the west canal by Hillsborough County's negligence will dramatically hinder our efforts to restore the water quality and wildlife habitat in that canal, as well as the rest of the waters in East Lake. We therefore intend to request the County to dredge this canal immediately. We will also propose that Hillsborough County dredge the east canal to restore it to its historical depth and configuration as part of a partnership to recover and manage East Lake. This canal's historical depth has also been lost over the years due to the excess sediment and debris entering the canal via untreated storm water run-off. The obvious need to better maintain Hillsborough Avenue, Harney Road and other roads with the Watershed will also be discussed with the appropriate County departments. Needed maintenance of these roads, including easements and shoulders, must include regularly mowing the grass, and keeping these areas free of excess sediment/sand and debris.

Long-range plans for the restoration of East Lake will also include dredging the shorelines and other areas where water depth has been diminished by increased untreated run-off from area roads and development.

RECOMMENDATION 3. LAKE AND CANAL AERATION, FILTRATION AND SEDIMENT ABATEMENT

In May of this year, the East Lake Park Special Dependent Tax District voted unanimously to assist in the funding of a 5 horsepower two-stage display aerator near the eastern cove of East Lake just south of the Civic Center. The proposed display aerator will pump/circulate 500 gallons of water per minute in that area. This will introduce much needed oxygen to the water in that area of the lake and provide a focal feature for the East Lake Community. In addition, in order to generate increased rental revenues, the East Lake Park Homeowner's Association voted to make the Civic Center available for rental to the public beginning August 1, 2010. Our hope is that the presence of the display aerator will increase rental revenues and thereby supplement partner and other funding sources for the Plan.

The East Lake Park Special Dependent Tax District also agreed to fund the purchase of several lake clean-up tools, including a long reach lake rake, and a gas powered semi-trash water pump. This pump will be converted to a venturi vacuum system, which will be used by volunteers to remove duckweed, debris and relocate debris from the canals and elsewhere. The cleaning of the canals and lake shoreline will enhance spawning habitat for the major sport fish in East Lake and improve navigability for boaters.

The East Lake Management Plan Committee has been able to locate 7 storm drain outlets within East Lake and the canals. In order to lessen the amount of nutrients, suspended solids and fecal coliform flowing from these outlets, we propose having New Earth Industries install a WaterGoat with chemical booms at each outlet. The chemical booms will filter nutrients, and will be replaced every six months or more often as needed. The incoming trash and debris will be removed as needed by volunteers, particularly after heavy rain outfalls.

Several members of the East Lake Management Plan Committee have had an opportunity to observe an electrically powered venturi pump system. Either a 110-volt or a 220-volt Flotec irrigation pump will power each system. This system has been successfully used to forcibly inject oxygen into pond and lake water and remove phosphorus and sediment from the water before it is returned to the water source. The end result is increased dissolved oxygen levels, improved water circulation, and a dramatic reduction in nutrient and sediment levels, thereby reducing algae growth.

The East Lake Management Plan Committee proposes use of this system within East Lake and its canals, and other locations within the East Lake Watershed. Essentially, these systems will draw water from the canals and Lake, inject oxygen into the water, filter phosphorus and sediment from the water via a polyacrylamide floc log within the discharge pipes, and return the water to the canals and Lake. These systems will also provide much needed circulation in the canals. With the consent of shoreline property owners, the East Lake Management Plan Committee proposes to install a minimum of six 220-volt pump systems in the northeastern canal, and a minimum of four 220-volt pump systems in the

northwest canal (for a total of ten 220-volt systems in the canals). The polyacrylamide floc logs will be replaced every 1,000,000 gallons (or every 100 hours) of water filtration or as needed.

The East Lake Management Plan Committee also proposes the installation of a total of twenty-six 110-volt and 220-volt venturi pump systems at additional locations along the shoreline of East Lake, provided property owners consent to installation and funding is available. The installation of these systems will remove phosphorus and sediment, circulate the water, inject much needed oxygen into the Lake and reduce algae growth.

RECOMMENDATION 4. PARTNER WITH PROPERTY OWNERS AND BUSINESSES WITHIN THE EAST LAKE WATERSHED TO ABATE THEIR IMPACT ON EAST LAKE'S ECOSYSTEM.

The East Lake Management Plan Committee proposes a partnership with Net Park to abate the impact that the storm water run-off from their retention pond is having on the west canal and East Lake. We recommend that with the assistance of volunteers, the trees and brush surrounding the retention pond on the Net Park property be trimmed and maintained. In addition, the leaves and other debris from the trees should be collected before entering the pond. We also recommend that Net Park remove the existing muck and debris from the pond and allow the installation of bulrush, alligator flag, pickerelweed, and other aquatic plants designed to lessen the impact of nutrients entering the pond. Long-range plans for the recovery of this pond should include the installation of a minimum of two 220-volt venturi pump systems to circulate, filter and aerate the water. There already appears to be an electrical source for the systems on site.

As an additional component in the Net Park partnership, the East Lake Management Plan Committee proposes that Net Park encourage volunteerism, education and other participation from the businesses/tenants at Net Park in the implementation of this Plan.

The East Lake Management Plan Committee proposes a partnership with Mary Help of Christians to abate the impact their livestock and other run-off has on the water quality and wildlife habitat of East Lake. We recommend that Mary Help of Christians, with the help of volunteers, build a swale inland/upstream of where the storm water drainage outlet connects to the canal on the west side of East Lake, and that they eliminate access by livestock to the canal and Lake. Water for the livestock appears to be available by way of a retention pond on the west side of their property. In the alternative, Mary Help could redirect the livestock and allow them to drink upstream of the proposed swale.

Next, the Committee recommends that Mary Help trim and remove all overgrowth from their property along the west canal and Lake shoreline, as well as along the storm water stream/outlet that runs through their property and connects to the west canal. Removal of non-native and invasive aquatic plants from this stream is highly recommended, as these plants will continue to flow into the canal and Lake, and propagate. In particular, we

recommend the removal of all water hyacinth from the stream as it is thriving there and flowing into the northwest canal. We suggest that these plants be replaced with bulrush, pickerelweed, duck potato, tape grass, alligator flag and other beneficial aquatic plants in the mouth and upstream of the connecting storm water outlet/stream, as well as along the Lake and canal near their shoreline.

The East Lake Management Plan Committee also proposes that Mary Help of Christians encourage volunteerism, education and other participation from their parishioners, employees and students in the implementation and support of this Plan.

The East Lake Management Plan Committee will request that the aging septic tanks located on the Good Shepherd property be inspected for possible breaches and repaired if necessary. Since the Good Shepherd Parrish relocated to Mary Help some years ago, the property is rarely if ever used. This will eliminate the risk of nutrient groundwater loading, including fecal coliform, via the storm water conveyance system underneath the property and in direct run-off during heavy rains. Ideally, the East Lake Management Plan Committee would like to see these tanks removed and any future use of the property include a new sewer system thereby eliminating these septic tanks.

The East Lake Management Plan Committee proposes a partnership with Suncoast Schools Federal Credit Union whereby the Credit Union will encourage volunteerism, education and other participation by its employees in the implementation of this Plan. It is expected that the education component alone will lessen pollutants leaving the Credit Union property and entering East Lake Park and the Hillsborough Avenue/Harney Road storm water conveyance system. A visual survey of this property may lead to additional recommendations regarding the improvement and maintenance of their retention ponds, including aquatic plantings and the installation of venturi pump systems.

RECOMMENDATION 5. AQUATIC PLANT MANAGEMENT

The explosive growth of cattails, spatterdock, duckweed, Plains willow, lead tree, Brazilian pepper trees, water hyacinth and other invasive plants in the canals and along the shoreline of East Lake and Bird Island has become unmanageable. These plants diminish the ability of residents to navigate the canals and Lake shoreline, and prevent the growth of those aquatic and shoreline plants that are more beneficial to wildlife and fish habitat. The use of herbicides has been largely ineffective in controlling the growth of these plants.

The East Lake Management Plan Committee proposes the removal of all cattails from the Lake shoreline and in the canals. Our preference is that these be removed by hand, cutting them below the surface of the water and just above the lakebed, causing the remnants of the plant to die. The resulting debris will be removed with a lake rake and disposed of on shore. Where appropriate, these plants will be replaced with giant bulrush, pickerelweed, duck potato, tape grass, alligator flag and other aquatic plants beneficial to wildlife and fish habitat.

These replacement aquatic plants will also absorb and reduce the intake of nutrients into the water.

Likewise, the East Lake Management Plan Committee proposes the removal of spatterdock, duckweed, water hyacinth and other invasive growth by hand from the shoreline and in the canals. Where appropriate, these plants will be replaced with giant bulrush, pickerelweed, tape grass, duck potato, alligator flag and other aquatic plants beneficial to wildlife and fish habitat. These replacement aquatic plants will also absorb and reduce the intake of nutrients into the water.

Prior to replacement and placement of aquatic plants on the shoreline and in the canals, the East Lake Management Plan Committee and its volunteers will survey property owners regarding placement of new plants so as to not hinder boat traffic, visibility from their properties, and fishing opportunities from shore.

RECOMMENDATION 6. REMOVAL AND TRIMMING OF OVERGROWTH ALONG THE SHORELINE OF THE LAKE AND CANALS.

The East Lake Management Plan Committee, supported by volunteers, will conduct a survey of East Lake Park property owners and residents along the canals and shore regarding removal of overgrowth from their properties. Volunteers will coordinate several work party days to trim and remove canal and shoreline overgrowth for those residents and owners who are unable to do so themselves. In addition, we will make recommendations regarding the type of plants that should be planted on the residents' property adjacent to the water, which will enhance the wildlife habitat of the Lake, add to the aesthetic appearance of the shoreline, and add an additional layer of nutrient absorbing/filtering plants.

RECOMMENDATION 7. ABATEMENT OF BIRD ISLAND IMPACT

Based on several reports and studies, the impact of Bird Island on the water quality and wildlife habitat at East Lake must be addressed. Even though the Audubon Society has failed to maintain Bird Island and have not been eager to work with the residents in East Lake Park towards an agreeable solution, the East Lake Management Plan Committee proposes what we believe to be several solutions that will be agreeable to the Audubon Society. Our proposal will not in any way impact the nesting of marsh and other birds on the Island and will hopefully lessen the impact of the nutrients, bacteria and suspended solids that are discharged from Bird Island. In the long term, we expect that our proposal will ultimately improve the wildlife habitat on and around Bird Island, including additional food sources and a more favorable nesting environment.

Due to a large, explosive outgrowth of the cattails surrounding the Island this year, it is unlikely that herbicidal spraying will be an effective management tool. The cattails have extended to more than 25 feet beyond the actual land mass. The East Lake Management Plan Committee therefore proposes that hand tools be used to remove the growth/expansion of

cattails that has occurred in the last two years. Specifically, it is recommended that, in the fall, these plants be cut below the surface just above the lakebed, and the debris be raked and removed from the lake. In addition, it is recommended that an outer swath (approximately 5 feet deep) of cattails no closer than 5 feet from the land mass be cut to no less than 12 inches above the water. The increased growth cycle of these cattails will improve the absorption and filtration of nutrients by these plants.

The East Lake Management Plan Committee also proposes that at some point, the outer swath of cattails be removed incrementally and replaced with giant bulrush, pickerelweed, duck potato, alligator flag and other more manageable aquatic plants conducive to the wildlife habitat at East Lake. These plants will provide food sources for the birds, as well as reduce the nutrient uptake caused by bird waste. The proliferation of these plants will eventually displace the cattails and other non-native/invasive plant species. Removal and replacement will only occur during those times of the year when the birds are not nesting, typically from September through November.

The East Lake Management Plan Committee proposes a partnership with the Audubon Society to ultimately remove those non-native plants that are growing on the land mass and replace them with plants more conducive to a bird sanctuary. These plants would include giant bulrush, a food source, and possibly other plants recommended by the Audubon Society. Removal and replacement will only occur during those times of the year when the birds are not nesting, typically from September through November, or possibly at other times that may be recommended by the Audubon Society.

The East Lake Management Plan Committee is currently investigating the advisability of placing chemical booms in the waters surrounding Bird Island. These booms will absorb nutrients and will not interfere with the ingress and egress, or the nesting of birds on the Island. These booms would be replaced every six months or as needed during those times when birds are not nesting.

RECOMMENDATION 8. MONITOR WATER QUALITY AND WILDLIFE HABITAT

The East Lake Management Plan Committee will continue to encourage the training and participation of volunteers in the Hillsborough County LakeWatch water-sampling program to assist in monitoring the progress of the water quality component of this Plan. Additionally, our LakeWatch volunteer will contact the County regarding the expansion of water sampling locations, to extend water sampling into the canals. This will enable us to monitor the effectiveness of the venturi pump systems in those areas.

With the assistance of volunteers, the East Lake Management Plan Committee will conduct regular surveys of residents within the East Lake Community regarding improved fish habitat and the corresponding improvement in the sport fish population.

In addition, the East Lake Management Plan Committee will continue to seek the advice and input of Gulf Coast Lake and Wetlands, the Hillsborough County's Stormwater Management Department, and other sources regarding the progress of the Plan.

RECOMMENDATION 9. WATER LEVEL MANAGEMENT

The East Lake Management Plan Committee proposes the installation of an adjustable weir on the west side of I-4 just upstream of the existing weir. This will allow East Lake Park Community to adjust the water levels of East Lake to enhance fish and wildlife habitat, as well as lower water levels in anticipation of a hurricane or large storm.

RECOMMENDATION 10. FINANCIAL PARTNERSHIPS

Although the East Lake Park Homeowner's Association and the East Lake Park Special Dependent Tax District have committed themselves to the financial support of this Plan, their funds are limited. The scope of this Plan and the financial requirements of the various components of the Plan are way beyond the financial reach of East Lake Park alone. The East Lake Management Plan Committee and the residents of East Lake Park therefore understand that forming financial partnerships with area businesses is integral to the success of the Plan.

We believe that, because East Lake is the major natural feature in the East Lake Watershed, and therefore an invaluable resource, those who live and work in the East Lake Watershed area will understand the importance of protecting and restoring East Lake and its wildlife habitat. The East Lake Management Plan Committee will therefore immediately begin its efforts to form financial partnerships with area businesses.

CONCLUSION

As the largest destination for storm water run-off in the East Lake Watershed, East Lake is impaired. Based on the reports and studies cited herein, as well as the water quality data collected over the last fifteen years, there can be no doubt. East Lake's wildlife habitat and fisheries are disappearing, the water regularly looks like pea soup, and its fecal coliform levels are dangerously high. East Lake and its wildlife are calling to us. We have a responsibility to answer this call, as we are the only ones who can reverse this damage and restore East Lake to its natural and historical beauty.

ACKNOWLEDGEMENTS

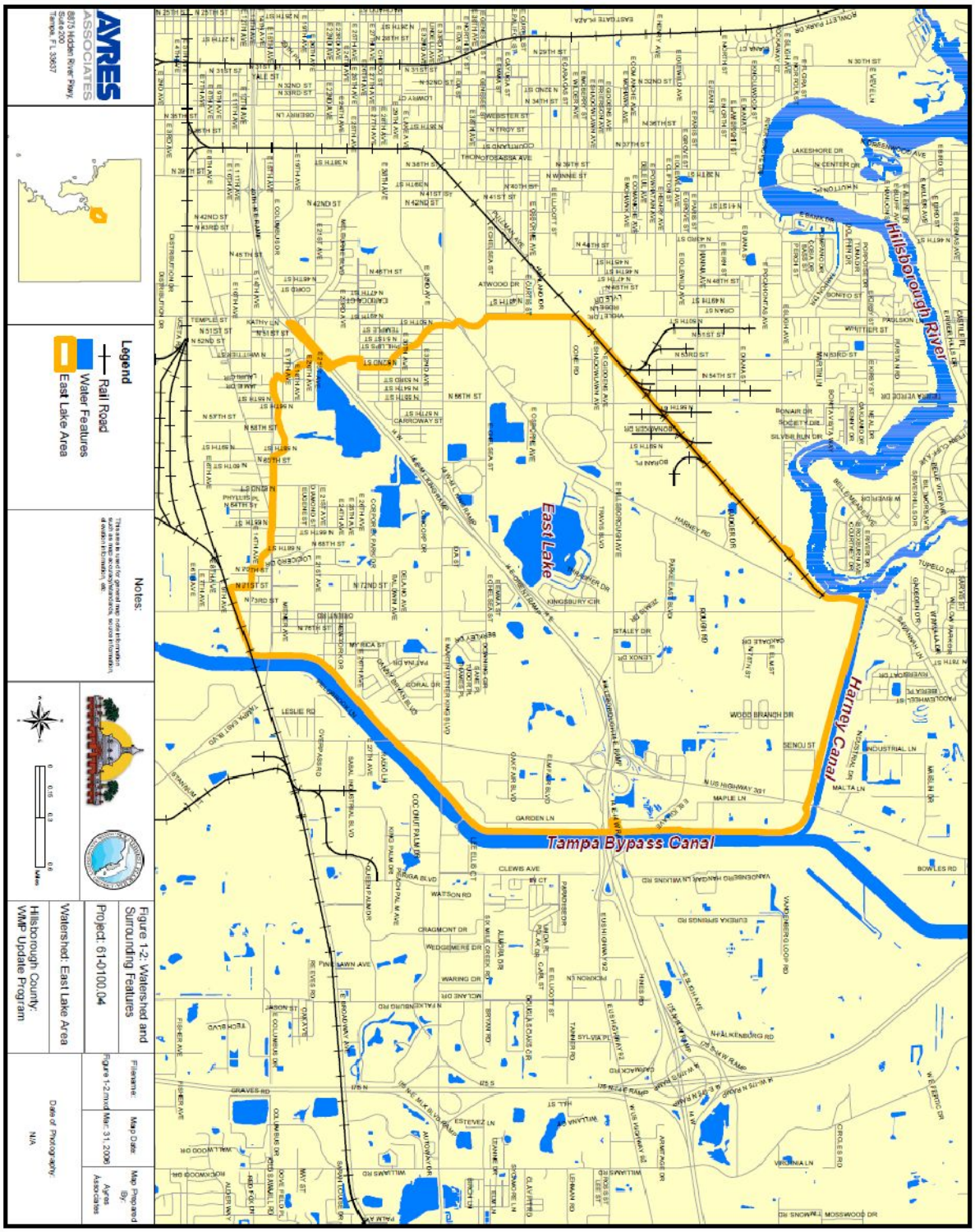
The East Lake Management Plan Committee would like to thank the residents of East Lake Park for their input and tireless efforts in the formulation of this Plan. We would also like to thank Gulf Coast Lakes and Wetlands, New Earth Industries, and the employees of Hillsborough County's Stormwater Management Department for their willingness to share their invaluable knowledge and to educate us on how to best address the problems within the East Lake Watershed.

The East Lake Management Plan Committee:

Hal Hart
Craig Williams
Eric Easterling
Paul Cotter
Brad G.

Please contact Hal Hart with questions and comments: hhart56@verizon.net

APPENDIX“A”


AYRES ASSOCIATES
8875 Hidden River Pkwy, Suite 200
Tampa, FL 33637
Legend
Rail Road
Water Features
East Lake Area
Notes:
Hillsborough River
East Lake
Harney Canal
Tampa Bypass Canal
Figure 1-2: Watershed and Surrounding Features
Project: 61-0100.04
Watershed: East Lake Area
Hillsborough County: WMP Update Program
Filename: Figure 1-2.mxd
Map Date: Mar 31, 2006
Map Prepared By: Ayres Associates
Date of Photography: N/A

APPENDIX "B"

SOURCES OF STORMWATER AND OTHER POLLUTANTS ENTERING EAST LAKE – OUTFALL SYSTEMS

The below information was taken directly from the EAST LAKE WATERSHED MANAGEMENT PLAN UPDATE dated January 2007. This report was prepared by Ayres Associates for the Hillsborough Stormwater Management Section, Public Works Department. Please note that the descriptions provided herein are not all inclusive as they fail to mention numerous outlets and several retention ponds that also feed/drain into these conveyances prior to entering East Lake.

The East Lake Outfall is a storm water conveyance system, which contains other major contributing systems. The East Lake Outfall conveyance system begins at the outflow point of East Lake. The other identified storm water conveyance systems are located upstream of East Lake and direct flow into East Lake. These other systems are the Hillsborough Avenue/Harney Road System, the East Lake Mall-North System, the East Lake Mall-South System, the 50th/56th Street System and the Mary Help System. These five contributing systems are described below.

East Lake, which receives stormwater runoff not only from the previously described five conveyance systems, but also from its own immediate drainage basin, is the point of beginning of the East Lake Outfall. The lake's outflow or discharge point is at its southeast corner. Flow from the lake passes under I-4 and toward the lake's control structures which are located in a channel approximately 200 feet south of I-4. Two large, non-adjustable concrete weirs regulate the lake's water levels, and direct all flow toward Orient Road. Once passed Orient Road, the flow is joined by flow coming from the Fairgrounds-South System. From this point, the conveyance system can be characterized as having deep channels with steep side slopes. The channel passes mostly through areas with developed residential subdivisions on both sides. The flow direction is southeasterly until the outfall's termination at the Tampa Bypass Canal.

THE HILLSBOROUGH AVENUE/HARNEY ROAD OUTFALL SYSTEM

The northernmost major system contributing flow to East Lake is the Hillsborough Avenue/Harney Road System. This system begins in the vicinity of the intersection of Hanna Avenue and Harney Road. At this location is the Kash-n-Karry warehouse complex. The complex contains a high percentage of impervious area, some of which discharges down a riprap flume onto Harney Road. Stormwater runoff from the warehouse complex and adjacent areas discharges to the right-of-way of Harney Road and collects at the road's low point, which is approximately 300 feet north of Hillsborough Avenue. The flow is then conveyed through an inlet/pipe system to the Good Shepherd Church property, which is located adjacent to the east side of Harney Road. During higher frequency storms, the stormwater can flow overland through the church property and to the ditch system along Hillsborough Avenue, located to the south. Flow is then conveyed under Hillsborough Avenue and through a County-modified detention pond situated at the northern boundary of the East Lake subdivision. A pipe system then transfers stormwater from the pond's control structure into East Lake.

THE EAST LAKE MALL *(NET PARK)* OUTFALL – NORTH SYSTEM

This system begins north of Hillsborough Avenue in an area of commercial/light industrial land use located east of the CSX Railroad. Stormwater runoff is collected in small roadside ditches, and is discharged toward Hillsborough Avenue. Flow is then conveyed under Hillsborough Avenue into the North storm sewer collection network within the East Lake Mall property. The North System discharges

into the mall's stormwater pond, at which point it joins with the South System. After being attenuated in the pond, flow is discharged to a pipe system which carries it to East Lake.

THE EAST LAKE MALL *(NET PARK)* OUTFALL – SOUTH SYSTEM

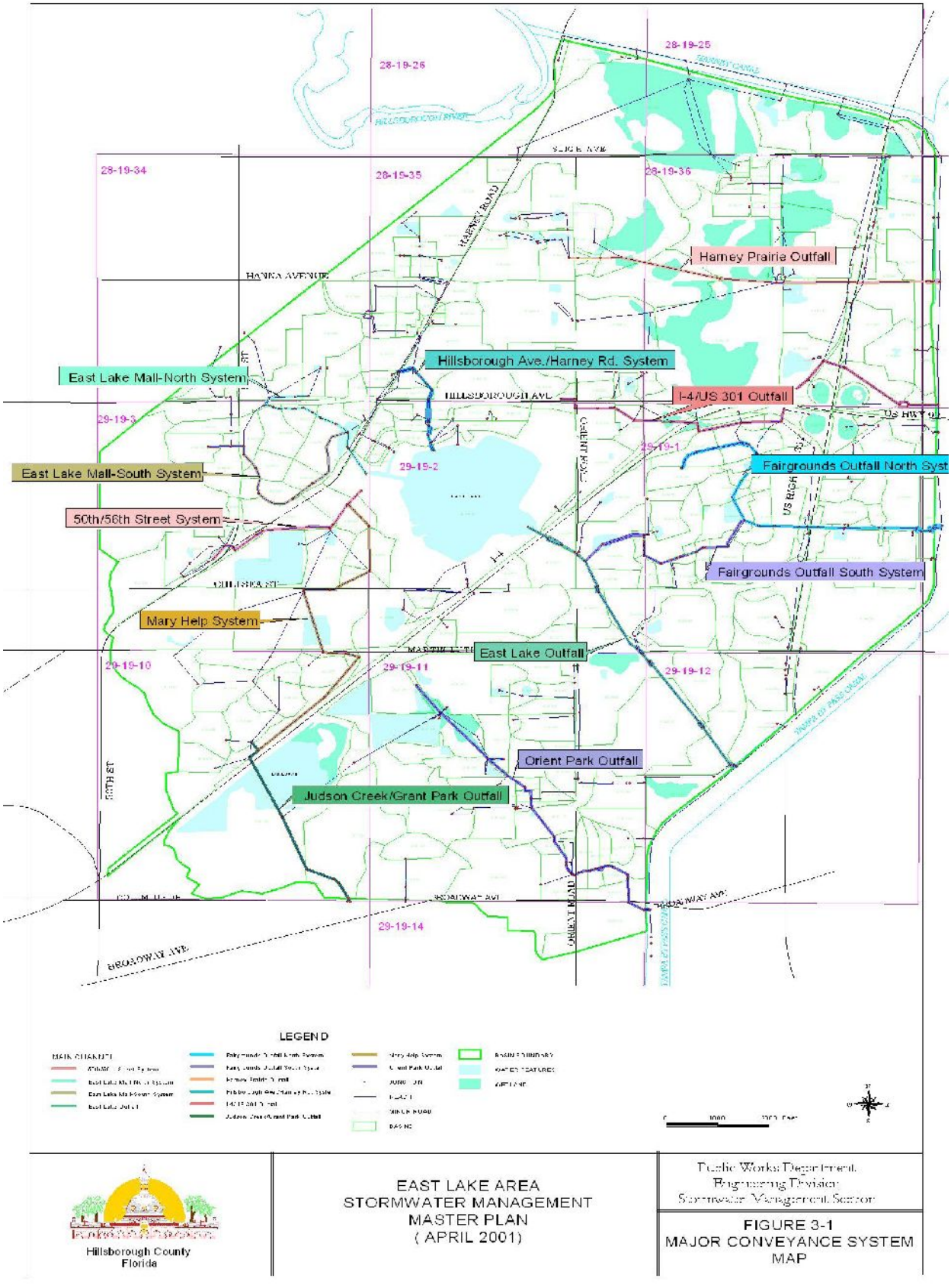
The South System begins at the northwest intersection of Hillsborough Avenue and 56th Street. From this location, stormwater is conveyed through a series of roadside ditches and culverts to a low point in the west right-of-way of 56th Street, approximately 500 feet south of Hillsborough Avenue. This low point is known to flood and overtop 56th Street. Under non-flooding conditions, the flow is generally conveyed under 56th Street and into a depressed, wet area on the west side of the East Lake Mall property. Stormwater collected in this depressional area is discharged into the mall's South storm sewer collection
system, and ultimately through the mall's stormwater pond and into East Lake.

The 50th/56th Street Outfall System

The fourth major stormwater conveyance system discharging to East Lake is the 50th/56th Street System. This system originates at the 56th Street Commerce Park at the intersection of Harney Road and 56th Street. The stormwater runoff from the Commerce Park is attenuated in an onsite stormwater collection facility, and is discharged to the roadside ditch in the west right-of-way of 56th Street. The stormwater is then conveyed under 56th Street to the east, and into the east roadside ditch of Harney Road. Flow from the Harney Road ditch discharges onto private property, into a steep concrete channel. This well maintained concrete channel moves the flow in an easterly direction and delivers it through a series of pipes to a large unlined channel. At this point, flow from the Mary Help System (to be described below) joins with the flow from the 50th/56th Street System. From this confluence, the large channel flows in a north, then east, direction and discharges to East Lake. The 50th/56th Street System is unique in that it contains one of the few concrete-lined channels in the project area. Overall, the system is well maintained, with mowed roadside ditches and culverts free of debris.

THE MARY HELP OUTFALL SYSTEM

The final stormwater conveyance system that has East Lake as its depository is the Mary Help System. The Mary Help System provides an interconnection between the Judson Creek/Grant Park outfall and East Lake. From the ditches in the west right-of-way of I-4, the Mary Help System flows west in the south right-of-way of Martin Luther King Boulevard. The flow is then conveyed under the road to the north, and into the storm water pond of the Fairgrounds Outlet Mall site. The mall's pond attenuates the flow and discharges north, under Chelsea Avenue, into an extensive pipe system within the grounds of the Mary Help School. The pipe system, which also collects stormwater runoff from the school site, eventually joins the 50th/56th System.


28-19-25
28-19-26
28-19-34
28-19-35
28-19-36
HARNEY ROAD
HANNA AVENUE
Harney Prairie Outfall
East Lake Mall-North System
Hillsborough Ave./Harney Rd. System
HILLSBOROUGH AVE
I-4/US 301 Outfall
29-19-3
29-19-1
29-19-2
East Lake Mall-South System
Fairgrounds Outfall North Syst
50th/56th Street System
US HWY 41
Fairgrounds Outfall South System
CORTEZ BLVD
Mary Help System
MARTIN LUTHER
East Lake Outfall
29-19-10
29-19-11
29-19-12
Orient Park Outfall
Judson Creek/Grant Park Outfall
56TH ST
BROADWAY AVE
29-19-14
LEGEND
Hillsborough County
Florida
EAST LAKE AREA
STORMWATER MANAGEMENT
MASTER PLAN
(APRIL 2001)
Public Works Department
Engineering Division
Stormwater Management Section
FIGURE 3-1
MAJOR CONVEYANCE SYSTEM
MAP