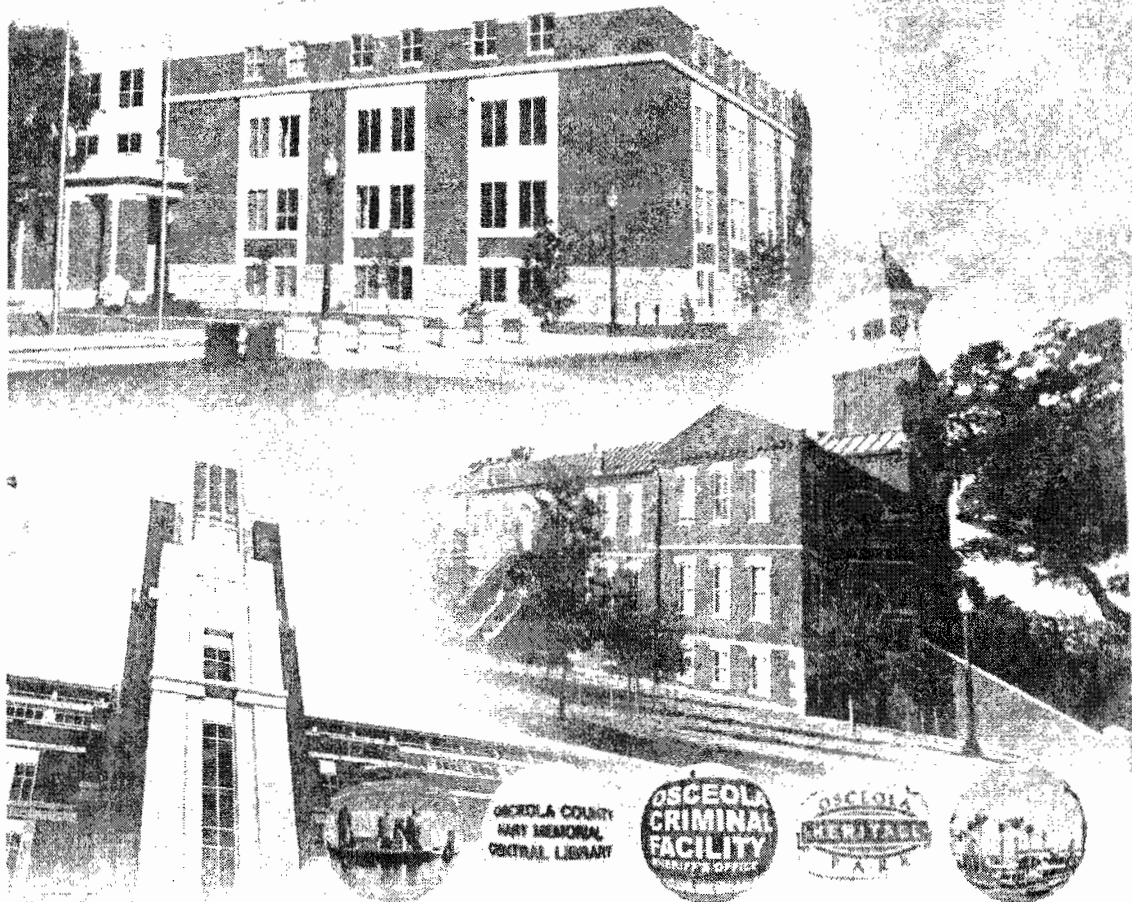


**Osceola County Comprehensive Plan**  
**Stormwater Management Element**  
**Data & Analysis**

# STORMWATER MANAGEMENT ELEMENT DATA & ANALYSIS



## OSCEOLA COUNTY COMPREHENSIVE PLAN 2025

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## CHAPTER SIX

### STORMWATER MANAGEMENT ELEMENT (Section 163.3177(6)(c), F.S., and Rule 9J-5.011, F.A.C.)

#### A. INTRODUCTION

According to the Designing and Implementing an Effective Storm Water Management Program (American Public Works Association, February 2000), stormwater is surface flow water from precipitation that accumulates in and flows through natural or man-made storage and conveyance systems. Stormwater management is important to control and store due to the amounts and types of pollution that are carried with rainfall during storm events. Stormwater carries pollutants as varied as bacteria, fertilizers, and motor oil. Stormwater management is also important to address flood prevention and protection.

The County's topography and geographic location require that stormwater management systems retain runoff during storm events and that systems are designed to prevent immediate discharge to surface waters, such as Lake Tohopekaliga and Shingle Creek. As the County develops the amount of permeable soil and natural areas are reduced, runoff has less area to infiltrate into the ground. Basin flooding in the County, as well as the need to protect and improve the existing water quality of our many streams and lakes are two future issues that must be fully integrated into the comprehensive planning process when addressing stormwater management.

Stormwater regulations are established in the County's Comprehensive Plan and Land Development Code, and the County must coordinate with the U.S. Environmental Protection Agency (EPA), the Florida Department of Community Affairs (FDCA), the Florida Department of Environmental Protection (FDEP), and the St. Johns River (SJRWMD) and South Florida Water (SFWMD) Water Management Districts. Section 402 of the Clean Water Act, and Chapters 9J-5, 17-40, 62-25, and 62-40 of the Florida Administrative Code (F.A.C.) form the regulatory framework of these agencies. It is through these regulatory mechanisms that the County will be able to address flooding prevention and the protection of water resources and wildlife habitat that stormwater management may provide the community.

#### B. STORMWATER MANAGEMENT FACILITIES INVENTORY

##### 1. Basins

The surface drainage of Osceola County is dominated by the Kissimmee River and the St. Johns River. The Kissimmee River drains the western two-thirds of the County and flows in a southerly direction to Lake Okeechobee. The eastern third of the County drains to the St. Johns River, which flow northward for about 140 miles to empty into the Atlantic Ocean near Jacksonville. The hydrologic divide separating the Kissimmee and St. Johns River Basins is located along a north-south line

beginning at the Osceola-Orange County Line east of Lake Preston, crossing U.S. Highway 192 at the U.S. Highway 441 intersection near Holopaw, then intercepting the Osceola-Okeechobee County Line at a point about four miles west of US. Highway 441.

**a. St. Johns River Basin**

Water management in the St. Johns River Basin is under the jurisdiction of the St. Johns River Water Management District (SJRWMD). Major drainage basins in the St. Johns River Basin within the County are the Econlockhatchee River, Deseret Farms, Jane Green Creek, St. Johns Marsh, and Blue Cypress Creek.

Numerous streams, small creeks and sloughs that flow over very flat terrain to the St. Johns River, the St. Johns Marsh, or Blue Cypress Lake, characterize the St. Johns River Basin in Osceola County. Streams included here as tributaries to the St. Johns River are Taylor Creek, Wolf Creek, Crabgrass Creek, Bull Creek, Jane Green Creek, and Blue Cypress Creek. Within this system, some of the streams and their tributaries have been channelized or altered for agricultural purposes. Other streams, notably Bull Creek, Crabgrass Creek, and Blue Cypress Creek, remain in or near original condition.

Drainage within the County portion of the basin is controlled by a levee, L-73, which is operated and maintained by the SJRWMD. According to the Upper St. Johns River Basin Surface Water Management Project Publication (SJRWMD, June 2002), there were several spillways and locks built for flood control in this basin. A spillway, S-161A, was constructed to provide temporary detention within the Jane Creek Basin and to support L-73. In addition, a spillway, S-164, was constructed along L-73 to provide water storage and flood detention benefits in the Taylor Creek Basin.

**b. Kissimmee River Basin**

The Kissimmee River basin in Osceola County, which is under the jurisdiction of the South Florida Water Management District, has undergone significant alteration as a result of dredging and filling activities that began in the early 1880s to reclaim wetlands for agriculture and silviculture purposes.

Drainage practices from that time forward have resulted in the construction of more than 50 miles of canals and 15 water control structures within Osceola County. Upstream of Lake Kissimmee, the Kissimmee basin in Osceola County includes isolated lakes, as well as groups, or chains, of lakes. Nearly 100 percent of the County's 878 lakes with a surface area greater than 10 acres are located within the Kissimmee basin. When all of these lakes are combined, they cover 15 percent of the County's total land area. The

combined surface area of the eight larger lakes alone is 91,280 acres, 38 percent of which represents the 35,000-acre Lake Kissimmee.

The lake typography terminates south of Lake Kissimmee at S-65, a water control structure maintained and operated since 1964 by the South Florida Water Management District. Downstream of S-65, the channelized Kissimmee River has an average annual discharge of 1,100 cubic feet/second and drains 1,607 square miles upstream of S-65. Based upon the land use activities in this region, the Kissimmee River basin may be further subdivided into the Rural Kissimmee River Basin and the Urban Kissimmee River Basin.

### **1) Rural Kissimmee River Basin**

The Rural Kissimmee River Basin consists of the southern portions of the County within this basin. The limited amount of development within this basin has not substantially altered the rural nature of the basin. The major drainage basins located within the basin are Lake Marion Creek Basin, Reedy Creek Basin, Southport Canal Basin, Cypress Canal Basin, and the Lake Kissimmee Basin.

The basin is the site of a major river restoration project that will serve as a model for future ecosystem restoration projects. The impact of the Kissimmee River restoration will reach throughout Central Florida region, and as far as the Everglades National Park. The Kissimmee River watershed was dredged and filled, and the river channelized, in the 1960s to prevent flooding. At this time, the river is being restored to a more natural flow pattern. The U.S. Congress approved the restoration of the river in 1992. A joint project of the SFWMD and the U.S. Army Corps of Engineers, the restoration project will improve wildlife habitat and restore acres of wetlands throughout the basin.

### **2) Urban Kissimmee River Basin**

Development is concentrated in the northern urbanizing portion of the County within the Kissimmee River Basin. The area is defined by the county line to the north and west, the south end of Lake Tohopekaliga and Lake Russell to the south, and the Alligator Chain of Lakes to the east. Due to the current and planned development and population growth projected for this area of the County, this portion of the County is the focus of the Master Storm Water Management Plan (Dyer, Riddle, Mills, and Precourt, Inc., September 1992). The surface drainage of this basin is dominated by five major watersheds, which include Reedy Creek, Shingle Creek, Lake Tohopekaliga, Boggy Creek, and East Lake Tohopekaliga.

**a. Lake Tohopekaliga Watershed**

Lake Tohopekaliga was altered as early as the 1880s when the canal to Lake Cypress was completed and the St. Cloud Canal was built between Lake Tohopekaliga and East Lake Tohopekaliga. Other inflows to the lake have been channelized, and the lake now receives about one-third of its total flow through channelized streams and ditches. Shingle Creek, St. Cloud Canal, and rainfall contribute to inflow to the lake. The remainder of inflow flows from Mill Slough; Pleasant Hill, Fanny Bass, Gator Bay and East City Ditch Basins; Johnson, Partin, and Kissimmee Ditches; Partin Canal; Judges Dairy Basin; and from seepage.

**1) Pleasant Hill**

The Pleasant Hill Basin covers approximately 5,300 acres and is located in the State Road 17-92 corridor, southwest of the City of Kissimmee. The basin, which is bounded by Ham Brown Road to the east, drains into the western shore of Lake Tohopekaliga. Pleasant Hill is one of the fastest developing areas of the County. Because this area is rapidly developing with residential subdivisions, this basin is considered a high-priority basin due to the existing development within the basin and the great amount of approved development within the basin that has not been constructed at this time. In 1996, Stottler Stagg and Associates completed a basin study to support the proposed widening of Pleasant Hill Road.

**2) Mill Slough**

Mill Slough is a natural drainage system with a watershed area of 11.6 miles. Mill Slough drains an area of 6,830 acres and 59 percent of this total area is in Osceola County. The remaining area includes the headwaters in Orange County. Camp, Dresser, and McKee completed a stormwater study of the City in February 1988 that included Mill Slough. In this report, the consultant identified deficiencies in the City's stormwater infrastructure and recommended areas in need of updated infrastructure.

Improvements to Mill Slough basin, City Ditch West, East City Ditch, and Thacker Avenue, as well as ongoing maintenance to these systems and other basin systems within the City, have occurred since the study was completed. Thus, the City of Kissimmee is implementing the study and plans to expand and add new systems as growth requires in the future.

- a) The **Jackson Street Ditch** is the largest subbasin within the Mill Slough Basin, and is located within an area with that has experienced extensive development since the 1950s. In addition, there is additional development planned for the future in this region. Hanson, Walter and Associates, Inc., prepared a basin study for the Jackson Street Ditch in 1996. In this basin study, the consultant noted that the ditch was begun in the 1930s as part of a Works Progress Administration project, and the ditch was also constructed prior to 1960. The study was to assist the County in finding solutions to controlling flooding and preventing overflow into the Donegan Avenue drainage system.

### 3) **East City Ditch**

The East City Ditch, which drains into Lake Tohopekaliga, is another developed basin that has been the focus of recent study. The City of Kissimmee and Osceola County funded a joint basin study, which was conducted by Hanson, Walter and Associates, Inc., in 1997. While most of this basin is within the City, drainage continues from Bermuda Avenue, U.S. Highway 192, and East Oak Street to unincorporated areas of the County and eventually to Lake Tohopekaliga. According to the study, 2,221 acres drain into this watershed. The study identified the capacity of the existing culverts in the stormwater management infrastructure and recommend improvement projects to control peak storm events.

### 4) **Judges Dairy**

This basin is approximately 950 acres in size and is located along the northeast shore of Lake Tohopekaliga



on the southeast side of the City of Kissimmee. Most of this basin consists of an agricultural farm that has its runoff pumped to Lake Tohopekaliga, since much of the area lies below the normal water elevation of the lake. The topography of the basin is relatively flat with a small amount of wetland and marsh, so there is little to no depressional storage within the basin. The predominant drainage feature of the basin is a series of canals, which traverse the basin collecting runoff and directing it to Lake Tohopekaliga. Soil characteristics within the basin are sandy and poorly drained.

**5) Fanny Bass**

Fanny Bass Basin, which includes most of west St. Cloud Manor, is approximately 4,850 acres in size. The basin drains into the southeastern shore of Lake Tohopekaliga. Florida's Turnpike and Canoe Creek Road traverse the basin, and the Fanny Bass Pond is the major feature of this basin. Channels and swamps extend to the eastern portion of the basin and empty under the Florida's Turnpike into Friars Cove, which is a portion of Lake Tohopekaliga.

**6) Gator Bay Branch**

Gator Bay Slough is another large watershed of approximately 3403 acres originating at the St. Cloud Water Reclamation Facility/Golf Course and the Cypress Drive Ditch. The basin stretches six miles from its origination point and empties into Lake Tohopekaliga. Most of this basin is used for agricultural purposes as pasture lands and includes acres of wetlands. However, the basin is evolving toward residential development at this time. The Gator Bay Slough Drainage Basin Study was completed June 2001, and the consultant, Ron Howse, P.A., recommended minor improvements to the system and the upgrading the culverts to meet the County's Land Development Code.

**7) WPA Canal**

The WPA Canal Basin is approximately 4,700 acres. This basin is located on the south side of the City of St. Cloud and empties into Friars Cove, which is part of Lake Tohopekaliga. Population densities vary from high at the headwaters in southern St. Cloud to low at the ditch's intersection with Gator Bay Branch. The basin includes mostly agricultural and residential land uses

**b. East Lake Tohopekaliga Watershed**

East Lake Tohopekaliga, covering 11,968 acres, is the major surface water feature of the watershed. It receives inflow from Boggy Creek, which enters the lake on its northwest shore, and Jim Branch, which enters Fells Cove at the northeastern arm of the lake. Three other inflows are Dakota Ditch on the south end of the lake, Lake Runnymede on the southeast side of the lake, and discharge from S-62, which conveys drainage from Lake Hart in Orange County. East Lake Tohopekaliga discharges southwest to Lake Tohopekaliga via the St. Cloud Canal. The following watersheds are located within the East Lake Tohopekaliga Watershed:

**1) Boggy Creek**

Boggy Creek and its tributaries drain approximately 4,600 acres. The basin is bordered by Orange County to the north and is located along the northwest shore of East Lake Tohopekaliga. Approximately 46 percent of the basin is residential. The predominant drainage feature within the basin is Boggy Creek, which flows into East Lake Tohopekaliga. Since the Osceola County portion of the multi-county Boggy Creek Basin is relatively undeveloped and includes mostly agricultural uses, water quality in the basin is good. There are very little wetland or marsh areas within the basin. Soil types vary within the basin but generally are poorly drained.

**2) Jim Branch**

The Jim Branch Basin is approximately 850 acres and is located north of East Lake Tohopekaliga along the Orange County border. The basin drains into Fells Cove at the northeast end of East Lake Tohopekaliga. Most of this basin is located within Orange County. There are very little wetland or marsh areas within the basin. The predominant drainage feature is the Jim Branch stream, which originates in Orange County. Water quality within this basin is considered of good quality.

3) **St. Cloud Basin**

The City of St. Cloud includes numerous watersheds. However, the main basin within the City is the St. Cloud City Basin, also known as Basin 2600, which drains into East Lake Tohopekaliga. According to the City's Comprehensive Plan, the basin has adequate capacity to control flooding and no improvements are required for this system.

Due to the City of St. Cloud's elevation and location on East Lake Tohopekaliga, stormwater management is a major concern for the City. The City completed a Stormwater Master Plan in January 1992, and this study was revised in 1994.

Basins throughout the City that drain into the unincorporated County have undergone improvements or future improvements are planned for these basins. In addition to maintaining Basin 2600, in the older part of the City south of Thirteenth Street, the City is retrofitting its outdated stormwater system. In addition, along the lakefront, a swale and natural area on the lakeshore has been enhanced to provide additional stormwater capacity and provides additional filtration.

The City is improving these systems based on its current adopted level of service. According to the City's Comprehensive Plan, the City's arterial road drainage facilities must contain a 100-year storm event; collector roads must contain a 25-year storm event, and local roads must contain a five-year storm event.

c. **Shingle Creek**

The Shingle Creek basin encompasses 9,700 acres in Osceola County and is bounded by Orange County to the north and the City of Kissimmee to the east. State Roads 192 and 17-92 are located within this basin. Shingle Creek, the main feature of this basin, originates in Orange County. The creek meanders south through Osceola County and enters the north end of Lake Tohopekaliga. Approximately 85 percent of the basin is within Orange County, with the remainder of the basin within Osceola County. Due to the development occurring along the Creek, the City of Kissimmee, Orange, and Osceola Counties, as well as the SFWMD, are coordinating efforts to protect the Creek. The SFWMD, City of Kissimmee, and Osceola County have purchased property along the creek.

A master drainage plan, prepared for the City of Kissimmee (Camp, Dresser and McKee, February 1998), studied the area and indicated that pavement and increased flows from future developments are negatively affecting the storage capacity within the basin. However, as development occurs, stormwater improvements will be required and new ponds must be constructed.

**d. Canoe Creek Watershed**

The Canoe Creek watershed contributes flow to Lake Cypress via Canal C-34 and enters the lake on its eastern shore. The watershed is essentially a chain of several lakes connected by canals and controlled by a series of four water-control structures.

Major lakes in the watershed include, from upstream to downstream, Lake Mary Jane in Orange County; Lake Preston, which is connected to Lake Myrtle; Lake Joel; Lake Center; Coon Lake; Trout Lake; Lake Lizzie; Buck Lake; Live Oak Lake; Alligator Lake; Brick Lake; and Lake Gentry.

**e. Reedy Creek Watershed**

The Reedy Creek watershed is located within the Reedy Creek Improvement District and includes Reedy Creek Basin and Bonnet Creek Basin. Both basins drain into conservation areas to the south of the developed northern portion of the District near the Town of Celebration. Although Celebration is no longer a part of the District (Celebration deannexed from the District in 1992.), Celebration remains under the jurisdiction of the District for stormwater management purposes. According

to the District's Comprehensive Plan, facilities within this district are operating well due to diligent monitoring and improvements to these systems.

## **2. Design Capacity and Level of Service Standards for Stormwater Management Facilities**

Osceola County establishes regulations for stormwater management in Chapter 6 of the Osceola County Land Development Code and the Flood Damage Prevention in Chapter 16. All residential, industrial and commercial development is required to provide a stormwater management system that meets County, SFWMD, and SJRWMD requirements.

To protect the water quality of surface waters, the County requires the control of pollution, sedimentation, and flooding. All development is required to pre-treat the required volume of runoff, in accordance with the applicable water management district regulations, for pollution abatement purposes. Pretreatment of this volume of runoff is defined as retention (no surface discharge) or detention with filtration (surface discharge) prior to release. Additionally all development is required to limit the rate of discharge from the developed site to the rate of discharge emanating from the site prior to development.

Standards are based upon a 10-year/72-hour frequency storm event within the SFWMD and a 25-year/24-hour storm event within SJRWMD. When pollution abatement volumes and detention volumes (to reduce the peak-rate of discharge) are incorporated in the facility, the volume of water impounded (to reduce peak discharges in excess of the pollution abatement volume) must be evacuated by a positive, non-filtering system within 14-days of the storm event. When a positive outfall is not available or discharge into a lake without a positive outfall is proposed, the retention/detention pond design detains the 100-year/24-hour storm event. Should the standards established by the respective water management districts change, this section of the Stormwater Element's Data and Analysis will be revised accordingly.

In addition to establishing the design storm return frequency and maximum capacity for stormwater retention and detention facilities, the County has established requirements for individual facilities (see Table 6-1). These standards are based on the SFWMD and SJRWMD standards. Furthermore, these standards in the Osceola County Land Development Code serve as the County's level of service standards and are included in the Goals, Objectives, and Policies portion of the Stormwater Management Element.

**Table 6-1: Stormwater Management Facilities Level of Service Standards**

<b>Facility</b>	<b>Design Storm Frequency</b>
Bridges	50 year
Outfall Ditches -Drainage area greater than one square mile	25 year
Outfall Ditches -Drainage area less than one square mile	10 year
Cross Drains-Arterial Roads	50 year
Cross Drains-Collector Roads	25 year
Cross Drains-Local Roads	10 year
Sidedrains and roadside swales	10 year
Retention/Detention Basins	10 year/72-Hour (SFWMD)
Retention/Detention Basins	25 year/24-Hour (SJRWMD)
Retention Basins	100 year/24-Hour (no positive outfall)

The County allows development within the 100-year floodplain, as identified in the official Flood Insurance Rate Maps (FIRM). However, development within the floodplain must be elevated based on the Osceola County Flood Damage Prevention Ordinance (Chapter 16), commercial and industrial construction must provide flood proofing in lieu of elevating the finished floor, and compensatory storage must be provided for all floodwater displaced by development below the elevation of the base 100-year flood. In addition, compensatory storage between the average wet season water table in the special flood hazard area and the 100-year floodplain, and all developments within riverine flood hazard areas are designed to maintain the flood carrying capacity of the floodplain, such that the base flood elevations are not increased upstream or downstream. Furthermore, development within the SJRWMD requires compensatory storage within the 100-year floodplain.

The County assesses the capacities of stormwater management systems based on the design standards established in the County’s Land Development Code, and the F.A.C. (see Table 6-1). Only the basin-specific stormwater management plans provide the detailed information necessary to ensure that new development does not overburden the existing stormwater management system. Currently, small- and large-scale drainage basin studies are on going.

**C. ANALYSIS OF EXISTING AND PROJECTED NEEDS**

**1. Master Surface Water Management Plan**

Osceola County initiated a four-step process for meeting its goals associated with stormwater management facilities. Step one of the process entailed the preparation of a Master Surface Water Management and Funding Alternative Plan. Step two includes the preparation of detailed studies required for specific basin planning efforts. Step three develops the engineering design plans and specifications for needed improvements to existing drainage facilities. Step four provides for the implementation or construction of the improvements.

The Master Surface Water Management Plan (Dyer, Riddle, Mills, and Precourt, Inc., September 1992) provides funding recommendations that are still used to date. The County continues to request matching funds from the SFWMD to perform basin specific studies, development of basin specific plan, and to perform construction that enhances our stormwater management systems. In order for Osceola County to obtain the most outside funding in the future, the Master Storm Water Management Plan must be kept current, so new funding sources may be identified and the County's effort in this regard may be efficient and effective.

The County requests funding from the Osceola County Board of County Commissioners for detailed basin studies. The County also requests that the SFWMD provide matching funds to perform these studies. Both funding sources must be available for projects to proceed.

The information and recommendations contained within these studies are effectively a catalyst to obtaining funding from outside sources. These mapping and basin studies provide County development review staff with critical elevation, stage, flow, and infrastructure data. They provide an irrefutable picture of existing drainage patterns and clearly identify critical drainage deficiencies.

Carefully conceived alternatives are presented to resolve large scale concerns by quantifying the level of service improvements and performing cost benefit analyses. They clearly capture and summarize existing environmental permitting, wetland, and shoreline information. The projects also allow the refinement of County FEMA floodplain maps, require development to match historical drainage patterns, provide staff with crucial information utilized in the development of plans to resolve countless isolated drainage problems, and helps the Planning Department responsibly plan for the future. Many funding opportunities have very abbreviated deadlines. These studies provide the basis of funding request submittals and their detail significantly increases the probability of obtaining funds.

**a. National Pollutant Discharge Elimination System (NPDES) Program**

When the EPA amended the Clean Water Act of 1972 in 1987, the federal government recognized that stormwater runoff was one of the main reasons for the contamination of surface waters due to the poor water quality of runoff. When the Clean Water Act was first implemented, the federal government sought to monitor point source pollution sources (pollution that may be traced to a source) rather than non-point pollution sources (pollution that may be traced to multiple producers without clear sources). The act was amended again in 1990 to include communities with a population of at least 100,000 and in 1999 to include smaller communities. Therefore, the County must regulate stormwater systems and monitor these facilities to prevent additional non-point source pollution in the County's watersheds. The County is permitted by the FDEP under the NPDES Phase II, Municipal Separate Stormwater System (MS4) Generic Permit.

Meeting the NPDES regulations have implications for the future. As a result of the NPDES program, the County must continue to improve, maintain, and monitor its stormwater systems as the community grows in size and population. One of the key components of this program is education of County staff and the public to do their part in eliminating pollution at the source.

The MS4 Generic Permit requires that a substantial stormwater management program be fully implemented during the five-year permit cycle. The FDEP has established five minimum measures that must be implemented to the maximum extent practicable:

- Public Education and Outreach;
- Public Participation and Involvement;
- Illicit Discharge Detection and Elimination;
- Construction Site Runoff Control;
- Post-Construction Runoff Control; and
- Pollution Prevention and Good Housekeeping

These measures must be implemented with the use of Best Management Practices (BMPs). The County's NOI submittal includes a description of the BMPs the County intends to implement during the five-year permit cycle in order to be compliant with the NPDES permit requirements. After the FDEP accepts or requests amendment to the County's proposed plan, necessary funding and staffing needs may be estimated. It is imperative that funding for the NPDES stormwater management plan be obtained, to remain in compliance with the federal and State mandated program. Once the FDEP grants the County an NPDES permit, funding needs are established for the initial five-year permit cycle and subsequent permit cycles.



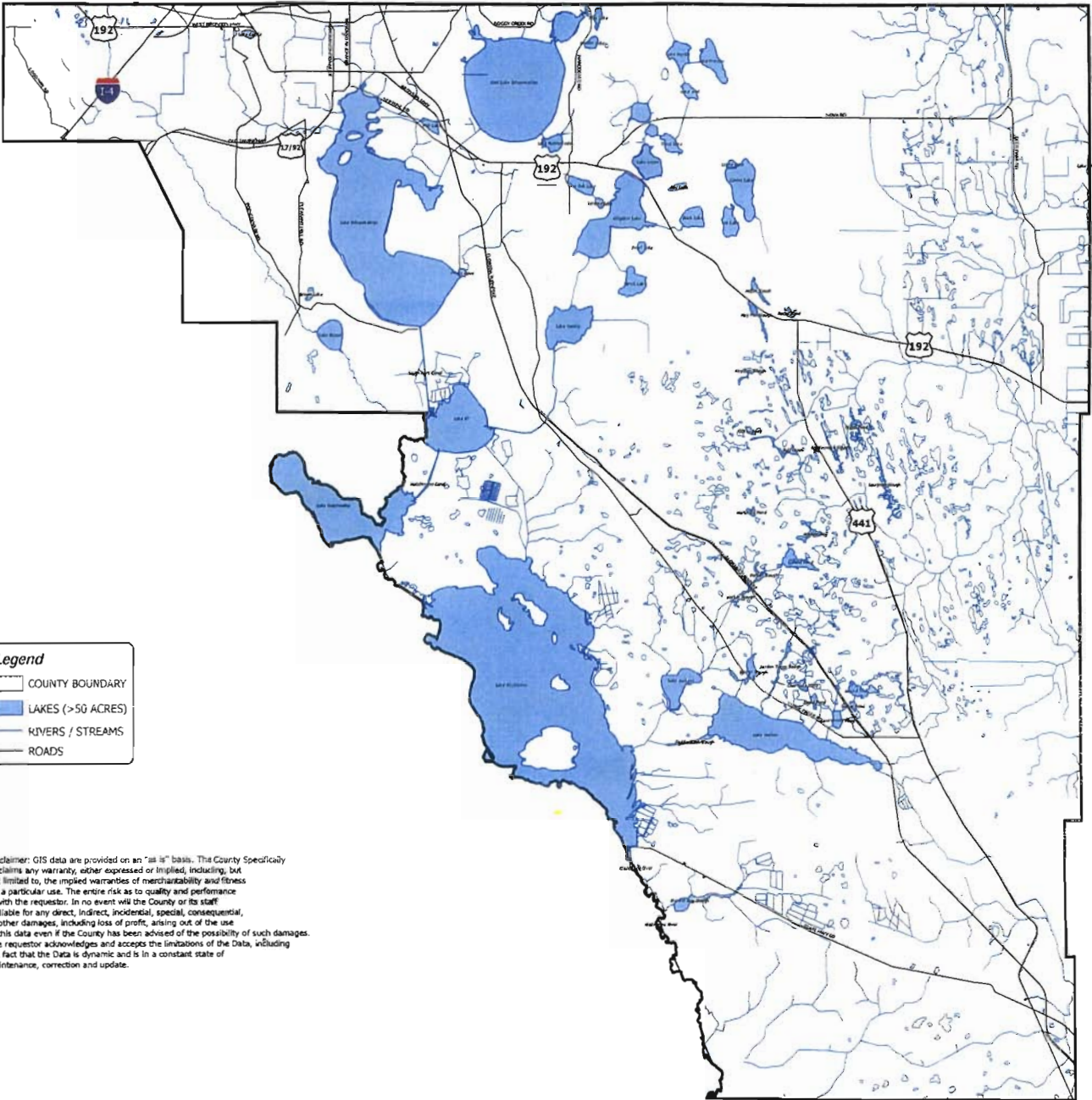
**b. Total Maximum Daily Loads.**

As part of the Clean Water Act, the FDEP will establish Total Maximum Daily Loads (TMDLs) for surface waters that do not meet applicable water quality standards. The regulations for these requirements are established in Section 303(d) of the Clean Water Act. In theory, scientists establish specific amounts of particular pollutants that a specific lake is able to receive without adversely affecting the uses of the water body. The FDEP will likely establish TMDLs for water bodies within the county. Once these TMDLs are established the FDEP will quantify how much of various pollution constituents must be reduced or eliminated. The FDEP will equitably allocate the load reduction amongst the contributors. It has not been established how the FDEP will require specific constituent pollution reduction, but it is likely that the County will be required by the FDEP to implement significant BMPs. At this time, it is not possible to estimate the future cost of the implementation or construction of these BMPs.

**D. CONCLUSION**

The County must continue to evaluate the overall countywide stormwater management system, perform detailed studies as needed, search for outside funding sources, modify regulations as necessary to reduce or eliminate flooding and pollution and remain compliant with other regulatory agencies. There are many challenges that are apparent. The NPDES, Phase II, MS4 permitting and the TMDL regulations are in their infancy, but will likely require significant funding and effort in the near future. The County must develop a much better understanding of the existing drainage patterns in the County so future development may be designed appropriately. Lack of significant planning in the near future, may require substantially more costly stormwater management modification later. Frequent updates and revisions to the countywide Master Storm Water Management Plan will provide the detailed analysis of all stormwater management issues, and recommend how expenditures and effort may be most effectively utilized in the foreseeable future.

# Major Natural Drainage Features



**Legend**

- COUNTY BOUNDARY
- LAKES (>50 ACRES)
- RIVERS / STREAMS
- ROADS

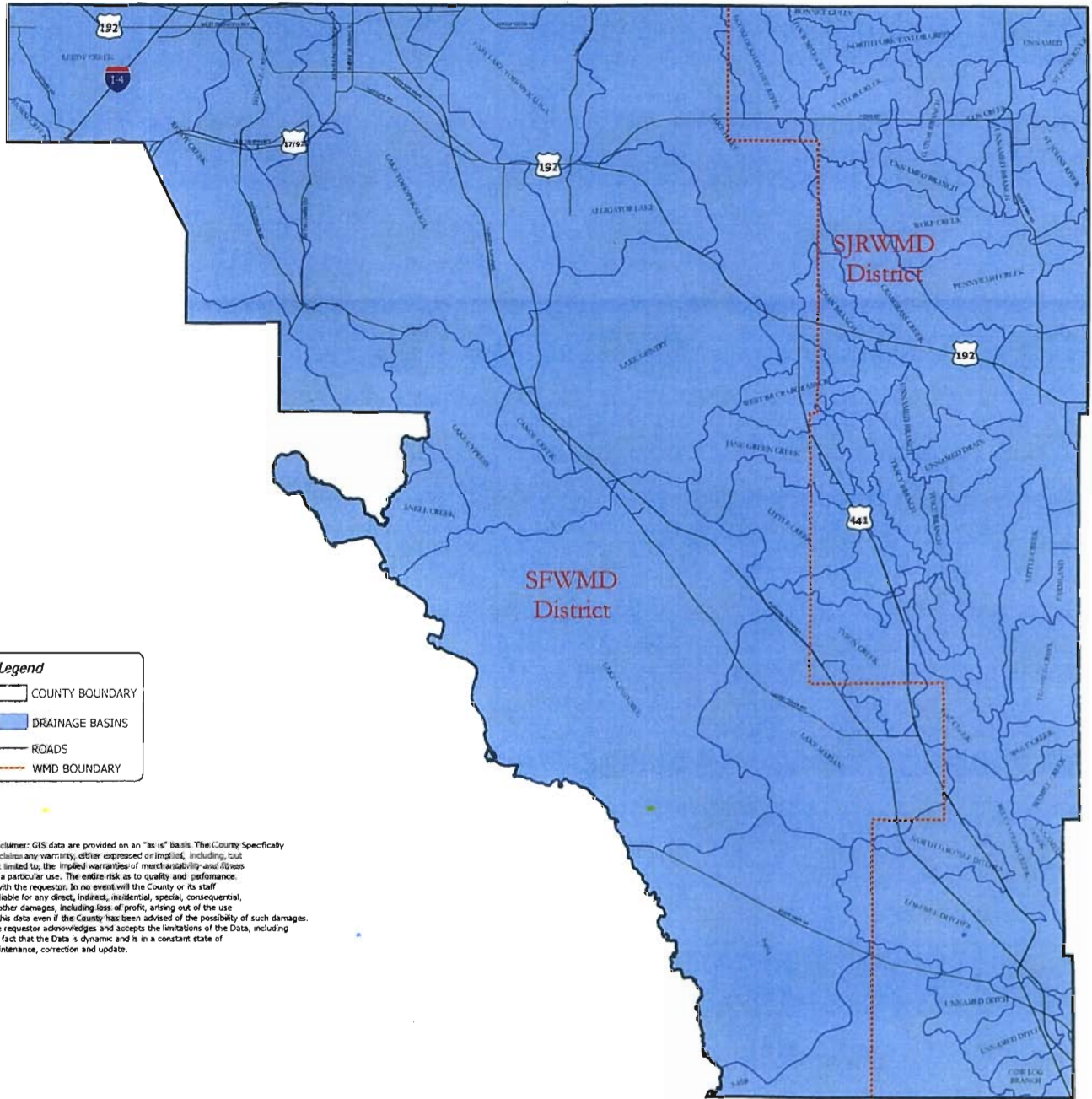
Disclaimer: GIS data are provided on an "as is" basis. The County Specifically disclaims any warranty, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular use. The entire risk as to quality and performance is with the requestor. In no event will the County or its staff be liable for any direct, indirect, incidental, special, consequential, or other damages, including loss of profit, arising out of the use of this data even if the County has been advised of the possibility of such damages. The requestor acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update.



Osceola County Planning Department  
GIS Section



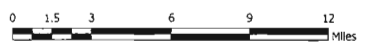
# Drainage Basins



**Legend**

[Outline]	COUNTY BOUNDARY
[Blue Area]	DRAINAGE BASINS
[Line]	ROADS
[Dashed Line]	WMD BOUNDARY

**Disclaimer:** GIS data are provided on an "as is" basis. The County Specifically disclaims any warranty, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular use. The entire risk as to quality and performance is with the requestor. In no event will the County or its staff be liable for any direct, indirect, incidental, special, consequential, or other damages, including loss of profit, arising out of the use of this data even if the County has been advised of the possibility of such damages. The requestor acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update.



Osceola County Planning Department  
 GIS Section  
 Drainage Basin Data provided by St Johns River Water Management District