

**South Creek
Basin Master Plan Update
Central County Model (D_ccm)**

Book 1 of 3

Basin Summary

July 2001

**South Creek Basin
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List of Exhibits

(Found at the end of the report.)

- EXHIBIT 1. Basin Locator Map
- EXHIBIT 2. Basin Map
- EXHIBIT 3. 100-Year Floodplain & FPLOS Deficiencies
- EXHIBIT 4. Subbasin/Node-Reach Map

SECTION 1. INTRODUCTION

1.01 Purpose

The South Creek Basin Master Plan Update (BMPU) was prepared to (1) characterize the existing hydrologic/hydraulic network; (2) identify existing Flood Protection Level of Service (FPLOS) deficiencies; (3) evaluate existing/baseline Pollutant Loads; and (4) delineate the existing 100-year/24-hour floodplain to guide future planning and development.

1.02 Abbreviations

BMP	- Basin Master Plan
BMPU	- Basin Master Plan Update
CIP	- Capital Improvements Program
DRI	- Development of Regional Impact
EMC	- Event Mean Concentration
FAC	- Florida Administrative Code
FDEP	- Florida Department of Environmental Protection
FDOT	- Florida Department of Transportation
FEMA	- Federal Emergency Management Agency
FPLOS	- Flood Protection Level of Service
ICW	- Intercoastal Waterway
LOS	- Level of Service
NPDES	- National Pollutant Discharge Elimination System
PLRG	- Pollutant Load Reduction Goal
SBNEP	- Sarasota Bay National Estuary Program
SWFWMD	- Southwest Florida Water Management District
TMDL	- Total Maximum Daily Load
WMM	- Watershed Management Model
WQLOS	- Water Quality Level of Service

1.03 Description of Study Area

The South Creek drainage basin is located in the central portion of coastal Sarasota County as shown in Exhibit 1. The basin is approximately 12,622 acres in size and is bordered by State Road 72 and Phillippi Creek to the north, Catfish Creek, North Creek and U.S. 41 to the west, Cow Pen Slough to the east and Fox Creek to the south. Interstate 75 intersects the basin from north to south. The following subdivisions are located in the South Creek watershed: Sunrise Golf Club and residential community, Orange Acres Mobile Home Park (MHP), Wildwood Acres, Arbor Acres MHP, Rivendell, Sorrento East, Turtle Rock, Silver Oak and Serenoa. A map of the basin is shown in Exhibit 2. The basin drains from north to south through the Oscar Scherer State Park where it ultimately discharges into Drymond Bay.

The area east of Interstate 75 consists mainly undeveloped and agriculture lands with a new subdivision (Serenoa) being constructed in the mid-1990s. The area west of Interstate 75 in the northwest portion of the basin consists of several existing developments which include the Orange Acres MHP, the Sarasota Memorial Hospital Care Center East, Sunrise Plaza, Wildwood Acres, and the Sunrise Golf Club and residential community. The Palmer Ranch Development of Regional Impact (DRI) is located immediately to the south and is currently in the process of being developed. Recent Palmer Ranch subdivisions include Turtle Rock and Silver Oaks both of which are located partially within the South Creek basin. The southwestern area, located between the U.S. 41 Bridge and the Seminole Gulf railroad track, consists of the existing Sorrento East subdivision as well as a newer subdivision currently under construction called Rivendell.

The South Creek Basin ultimately discharges into Drymond Bay. According to Chapter 62-302.600 of the Florida Administrative Code (FAC) and County Ordinance 72-37, South Creek is categorized as Class III surface waters. This designation is assigned to "waters used for recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife".

SECTION 2. BACKGROUND

2.01 Historic Perspective

The historical South Creek extends from Drymond Bay east and north to the easterly extension of Bay Street. Subsequent drainage works for agriculture and mosquito control deepened this historical creek and extended it northward to connect and drain large low-lying areas. It is interesting to note that much of the area now located in the Palmer Ranch DRI and to the north appears to have historically drained to North Creek via 2 railroad trestle bridges. During the severe rainfall events of June, 1992 and July, 1995, flood flows found this historical flow path when the South Creek basin overflowed to the North Creek basin. Additional agricultural and mosquito control drainage works connected low-lying areas east of I-75 to South Creek.

2.02 Existing Flooding

Following the severe rainfall events that occurred between June of 1992 and early 1998, public input has been received on several fronts. Residents of almost every community in the South Creek basin have expressed concerns relative to poor drainage primarily associated with the need for routine maintenance. Due to so many complaints following the 1990's events, SWFWMD set up a task force to work together to address flooding issues. The task team included representatives from Sarasota County, SWFWMD, South Creek and North Creek homeowners associations, and the Palmer Ranch. The task force worked with the Drainage Operations Division to resolve maintenance issues needed to improve drainage conditions in the basin.

The most significant public input occurred following the flood of July 1995 when the South Creek basin overflowed into the North Creek basin. The flooding in the adjacent North Creek basin was extensive and was determined to be caused by two profound impediments to flow. First, a major inlet at the intersection of Bay Street and Old Venice Road, in the North Creek basin became completely covered with debris, preventing drainage from the Bay Street and the surrounding area. This inlet has since been re-constructed to make it less susceptible to clogging. Secondly, Brazilian pepper growth in South Creek, south of the easterly extension of Bay Street in Oscar Scherer State Park had severely restricted the flow through a segment of the creek.

Areas that have historically been susceptible to flooding typically correspond to soils defined as either depressional or frequently flooded by the Sarasota County Soils Survey. Other than Wildwood Acres which is a rural, large lot subdivision, most development that has occurred in the South Creek Basin has occurred outside of these historical low-lying areas.

2.03 Prior Studies

The South Creek basin has been the subject of two previous authoritative studies. A list and brief descriptions of these previous studies is provided below:

1. July 1991 – South Creek Watershed Study
This privately initiated study was prepared by Smally, Wellford and Nalven, Inc. as part of the Palmer Ranch, Eastside Systems Analyses. This study was approved as the stormwater basis of review for the Palmer Ranch DRI by both Sarasota County and the Southwest Florida Regional Planning Council. It is still being utilized in that capacity. Much of the information as it relates to the Palmer Ranch properties was used in this Study Update, as applicable.
2. November 1997 – South Creek Basin Master Plan, Draft Final Report
In 1995 Sarasota County authorized Parsons Engineering Science, Inc. to conduct the South Creek Basin Master Plan. This study considered the entire basin in detail and utilized the Advanced Interconnected Pond Routing (AdICPR) version 2.11 by Streamline Technologies. Much of this information was utilized in this Study Update, as applicable.

2.04 Previous Improvements

The Palmer Ranch has constructed stormwater infrastructure improvements in association with their DRI. Specifically, these improvements include the installation of water level control structures, wetland/floodplain recreation, and drainage channel re-contouring to provide a more stable and maintainable system. At present, approximately 50% of the improvements have been constructed or are in the process of being constructed. Other recent works include the removal of excessive Brazilian pepper growth in Oscar Scherer State Park by the Park and general maintenance activities associated with ditch cleaning by Sarasota County.

SECTION 3. EXISTING CONDITIONS ASSESSMENT

3.01 Flood Protection Level of Service Objectives

The flood protection level of service (FPLOS) objectives applied to the South Creek Basin are based upon those adopted by the Sarasota County Comprehensive Plan. Table 3.01 presents the FPLOS standards for Sarasota County.

**Table 3.01-1
Acceptable Flooding Depths
Flood Plain Level of Service Criteria
South Creek Basin Master Plan Update**

	Rainfall Event Return Period			
	5-year	10-year	25-year	100-year
Structure	None	None	None	None
Roadways:				
Evacuation Route	None	None	None	None
Arterial	None	None	None	6 inches
Collector	None	None	6 inches	9 inches
Neighborhood	None	6 inches	9 inches	12 inches

To quantify the existing FPLOS deficiencies in the South Creek Basin, a detailed hydrodynamic computer model was first developed to predict flood elevations throughout the watershed. Version 2.2 of Interconnected Pond Routing (ICPR) software was used to model the watershed. For a complete discussion of the modeling methodology, please refer to the *Phillippi Creek Basin Master Plan Update*. Information from the Palmer Ranch Eastside Systems Analyses and the Parsons Engineering BMP was reviewed and incorporated into the updated model, as applicable. The recently completed improvements associated with the Palmer Ranch, Serenoa, Sarasota Memorial Hospital Care Center East Campus, Palmer Crossings, and the Rivendell subdivision were also incorporated into the analysis as an existing condition. Additional detail was also added for the Sunrise, Wildwood Acres, Orange Acres, The Arbors, and Sorrento East developments. Copies of the computer input as well as the node-reach diagram are available in digital format upon request from the Stormwater Utility.

The computed flood elevations were then used to delineate the horizontal limits of the 100-year floodplain on Southwest Florida Water Management District (SWFWMD) 1-foot contour interval aerial maps. Structures and roadways which fell within the horizontal limits of the floodplain were inventoried as potential FPLOS deficiencies. Roadway FPLOS deficiencies were determined by comparing roadway spot elevations on the SWFWMD aerials to the computed flood levels. Finished floor elevations of structures horizontally located in the 100-year floodplain were field surveyed to determine those that constitute FPLOS deficiencies.

3.01.1 Results

The results of the existing conditions assessment indicate that no structure FPLOS deficiencies exist in the South Creek Basin. However, several local street segments are susceptible to flooding in excess of the FPLOS criteria. EXHIBIT 3 identifies the horizontal limits of the 100-year floodplain. The existing FPLOS deficiencies are also identified on the EXHIBIT 3 and inventoried in Table 3.01.1 below. The existing conditions analysis did confirm street flooding in the central portion of Sunrise, the southern portion of Orange Acre Mobile Home Park, Sorrento East, and the Arbors Mobile Home Park.

**Table 3.01.1
Flood Protection Level of Service Deficiencies
South Creek Basin Master Plan Update**

Public Street Location	Edge of Pavement Elevation	Node No.	10-Year	25-Year	100-Year
Sorrento East Subdivision					
1. DaVinci Drive (local)	6.94	80005	7.59	7.59	8.13
2. Ruebens Drive (local)	10.51	80018	11.67	11.98	12.27
3. North Rossetti Drive (local)	10.36	80012	11.06	11.46	11.84
4. Signorelli Drive (local)	10.18	80014	10.87	11.17	11.48
5. Signorelli Drive (local)	9.97	80013	10.76	11.07	11.46
6. Laurenchin Drive (local)	10.06	80013	10.76	11.07	11.46
Private Street Location					
Orange Acres MHP					
1. Shelly Lane (local)	30.63	80943	31.00	31.31	31.79
Sunrise					
1. Augusta Circle (local)	31.06	80929	30.86	31.55	32.52
2. Doral Court (local)	30.20	80928	30.23	30.75	31.45
3. Approach Road (collector)	26.29	80895	26.50	27.05	27.71
The Arbors MHP					
1. South entrance (local)	14.68	80125	16.53	16.56	16.72
2. Palm Air (local)	14.96	80127	16.45	16.51	16.72
3. Sun Air (local)	15.10	80127	16.45	16.51	16.72
4. Tropic Drive (local)	14.98	80127	16.45	16.51	16.72

(Shaded flood stages indicate street flood depths exceed LOS criteria)

3.02 Water Quality

Stormwater runoff pollution due to non-point sources for the South Creek basin was computed by Parson's Engineering Science, Inc. as part of the original Basin Master Plan Report. Parson's used the Watershed Management Model (WMM) developed by Camp Dresser & McKee (CDM) as part of the Sarasota County National Pollutant Discharge Elimination System (NPDES) program for stormwater discharges. The model uses a spreadsheet format to estimate annual non-point source loads from direct runoff based upon runoff volumes and event mean concentrations (EMCs). The EMC is defined as the total pollutant discharged during the storm divided by the total runoff volume.

3.02.1 Pollutant Loading Results

A summary of the model output for the conventional non-point source conventional pollutants, nutrients, and metals for existing conditions is listed in Table 3.02.1. The gross pollutant load reflects the total estimated amount of pollutant load that is generated in the basin. However, the gross pollutant load does not reflect the total amount of pollutant that actually is discharged from the basin because a portion of it is retained in the existing stormwater treatment facilities and wetlands. Net annual pollutant load, as presented in Table 3.02.1, is defined as the amount of estimated pollutant discharged into the final receiving waterbody. Net load calculations take into account the mitigating effect of non-structural stormwater management practices in the developed areas.

The non-point source pollutant load calculations are based strictly on land use configuration and the estimates have not been calibrated with actual sampling data. However, the results can be used to indicate the location of areas where runoff pollution control measures would be more effective.

**Table 3.02.1
Total Annual Pollutant Loads for Existing Conditions
South Creek Basin Master Plan Update**

Parameter	Gross Load lbs/year	Pollutant Removal		Net Load lbs/year
		lbs/year	%	
Biochemical Oxygen Demand	249,004	8,671	3.5	240,333
Chemical Oxygen Demand	1,750,913	65,089	3.7	1,685,824
Total Suspended Solids	5,715,673	323,517	5.7	5,392,156
Total Dissolved Solids	3,454,257	108,626	3.1	3,345,631
Total Phosphorus	7,397	455	6.2	6,942
Total Dissolved Phosphorus	3,097	282	9.1	2,815
Total Kjeldahl Nitrogen	31,102	1,122	3.6	29,980
NO ₂ + NO ₃ Nitrogen	10,295	260	2.5	10,035
Total Lead	1,351	193	14.3	1,158
Total Copper	714	86	12	628
Total Zinc	2,042	87	4.3	1,955
Total Cadmium	24	4	1.7	20

3.02.2 Water Quality Level of Service (WQLOS)

The Sarasota Bay National Estuary Program (SBNEP) established Pollutant Load Reduction Goals (PLRGs) of 7% for nitrogen and 27% for metals. Since these PLRGs are for the entire Sarasota/Little Sarasota/Drymond Bay watershed, they do not necessarily apply to just the South Creek basin. Any new development within the drainage basin is required to include stormwater treatment facilities to mitigate potential increases in pollutant loads as required by the Land Development Regulations. Any future capital improvement project to address FPLOS deficiencies will consider incorporating stormwater treatment components into its design.

SECTION 4. CONCLUSIONS AND RECOMMENDATIONS

4.01 Delineation of Existing Floodplain

As part of the South Creek Basin Master Plan, the limits of the 100-year riverine floodplain have been identified and mapped consistent with FEMA's designations as shown on Exhibit 3. It should be noted that the FEMA "AE" zones, identified in dark blue, correspond to areas in the 100-year floodplain typically associated with moving and/or deep water while FEMA "AH" zones, identified in light blue, correspond to areas of ponding, as defined by FEMA, where average depths are between 1 and 3 feet. Exhibit 3 identifies these two zones, reflecting these differing floodplain functions that are recognized by FEMA. Adoption of the South Creek Basin Master Plan will assure that these floodplain areas will be recognized and that the floodplain functions will be preserved when new development proposals are considered. In addition, the detailed stormwater model developed as part of the Basin Mater Plan Update provides a valuable tool to evaluate the effects of proposed land use changes.

It should be noted that the Palmer Ranch DRI area has an adopted stand-alone watershed model that has previously been approved by the Board of County Commissioners part of their Master Development Order. The Palmer Ranch is required to use this model to show no net increase in offsite flood stages (either upstream or downstream) prior to approval of any new developments on the Palmer Ranch. The area subject to this "no-rise" Development Order condition is identified on Exhibit 3, in yellow.

It is recommended that the South Creek model update be utilized as a basis of review to evaluate proposed development and drainage modifications so that potential adverse increases in off-site flood stages are adequately mitigated. In addition, it is recommended that finished floor elevations be set a minimum of 2 feet above the 100-year flood elevations computed by the South Creek flood study update, if such elevations are higher than the base flood elevations contained on the current Flood Insurance Rate Maps.

4.02 Preliminary Investigation of Existing FPLOS Deficiencies

As indicated previously in Section 3, several existing street FPLOS deficiencies exist in the South Creek Basin, primarily associated with local roads. A preliminary investigation of the cause and potential solutions for each is provided below:

Sunrise - As identified in Section 3.01.1, three private street segments were identified as existing FPLOS deficiencies in the Sunrise Development. Augusta Circle and Doral Court are local (neighborhood) streets. FPLOS deficiencies for these streets only occurs for the 100-year design storm and only at the end of these cul-de-sacs. Potential solutions to address the FPLOS deficiencies for these 2 private road segments would be to look at enlarging the recently replaced pipe or possibly holding more stormwater back upstream in the Sunrise Plaza development. The third street FPLOS deficiency is more significant in that it occurs on Approach Road. This is a private street that acts as a collector and provides the only means of ingress and egress for the entire west half of the Sunrise development. Further reduction in

flood depths on Approach Road may be achievable by enlarging an existing 18" RCP culvert that inter-connects the lakes corresponding to nodes 80895 to 80891.

On May 10, 2001, Manley Tate of the Sunrise Community hosted an informational meeting on the South Creek Basin Master Plan. Mr. Tate is a long time resident of Sunrise and has been particularly active in road and drainage related issues on behalf of Sunrise. Mr. Tate invited a representative cross section of residents from the Sunrise communities as well as representatives from the neighboring Sarasota Memorial Hospital (Dan McDaniel) and the Palmer Ranch (Jim Paulmann). Theresa Connor, Gary Downing, and Steve Suau were in attendance and gave a brief overview of the South Creek Basin. The flooding indicated by the model was confirmed. In fact, residents indicated that the depth of flooding might have even been more severe than currently predicted, during the floods of the 1990's. However, in recent years, stormwater improvements undertaken by Sarasota Memorial Hospital on the Care Center East campus and a pipe replacement undertaken by Sarasota County are believed to be responsible for the current reductions in flood stages predicted by the model.

Residents of Sunrise present at the meeting raised concerns relative to the build-out of Sunrise Plaza commercial development adjacent to Clark Road. This commercial development discharges south to and through the Sunrise residential area. Sunrise Plaza was master planned for stormwater in the early 1980's. Due to improvements in stormwater design techniques and changes in design criteria since that time, it is considered worthwhile to re-evaluate the effectiveness of the Sunrise Plaza stormwater system as part of an alternative evaluation for addressing the existing FPLOS deficiencies downstream in Sunrise. In addition, development services should be made aware of the existing FPLOS deficiencies and concerns downstream in Sunrise when evaluating future development proposals in Sunrise Plaza.

Orange Acres Mobile Home Park - As identified in Section 3.01.1, one local street segment has been identified as an existing FPLOS deficiencies in Orange Acres Mobile Home Park. However, this flooding occurs on Shelly Lane, which is a private street at the very south end of the Park. The FPLOS deficiency for this street only exists for the 100-year flood and because of its relatively isolated location, is not expected to inhibit ingress and egress. One potential way to reduce flood levels on this street would be to enlarge the existing 14" x 23" ERCP culvert that drains from node 80943 to 80940 (assuming that it would not result in an adverse off-site impact in flood stages).

The Arbors Mobile Home Park - As identified in Section 3.01.1, four local/neighborhood street segments were identified as existing FPLOS deficiencies in the Arbors Mobile Home Park. However, this flooding extends over all streets within this Park including both points of ingress and egress. The streets within the Arbors are considered private but the flooding seems to result from off-site drainage restrictions along Old Venice Road. Improving drainage along Old Venice Road and/or providing an additional westerly outfall to U.S. 41 are two potential solutions to reducing flood depths in the Arbors that should be investigated.

On May 16, 2001, Gordon Key, President of the Arbors homeowners association hosted an informational meeting on the South Creek Basin. Approximately 32 residents of the Arbors

MHP were in attendance. Theresa Connor and Steve Suau were in attendance and gave a brief presentation on behalf of Sarasota County. Residents of the Park confirmed the severe street flooding predicted by the South Creek model. Residents also indicated that they had attempted to address this flooding by proposing a westerly outfall to U.S. 41. However, the Florida Department of Transportation (FDOT) who has jurisdiction over drainage connections to U.S. 41 would not authorize the work. It appeared that the FDOT was concerned about potential impacts to flood levels that might occur in their road right-of-way. The South Creek model may provide the mechanism to demonstrate such a connection will or will not have an impact on flood levels in the U.S. 41 right-of-way.

Sorrento East Subdivision - As identified in Section 3.01.1, six local street segments were identified as existing FPLOS deficiencies in the Sorrento East Subdivision. These same public street FPLOS deficiencies were originally identified by Kimley-Horn and Associates, Inc. (KHA) in a report untitled *Stormwater Analysis for Palmer Ranch, Sorrento Tract*. They were also carried forward in the South Creek Basin Master Plan – Final Draft Report prepared by Parsons Engineering. The KHA report also recommended the following improvements to address these existing FPLOS deficiencies.

- Replace existing twin 27" x 36" CMPA culverts at Rubens Drive (east of DaVinci Drive) with twin 5' x 5' Box Culverts.
- Replace existing twin 27" x 42" ERCP culverts at Signoralli Drive (west of Matisse Circle) with twin 5' x 5' Box Culverts.
- Replace existing 24" CMP culvert at Signoralli Drive (east of Laurenchin Drive) with a 4' x 5' Box Culvert.
- Replace existing 22" x 36" CMPA culvert at Tiepolo Drive with a 38" x 60" ERCP.
- Replace existing 24" CMP at North Rosetti Drive with 38" x 60" ERCP.

It should be noted that these recommended pipe sizes would need to be subject to final design to assure proper value engineering. In addition, an abandoned wastewater effluent pond is strategically located with the Sorrento East subdivision such that its conversion to a stormwater pond may allow the reduction in the magnitude and scope of the structural pipe improvements recommended.

It is recommended that solutions to the existing FPLOS initially be explored with Drainage Operations to determine if any cost effective, simple fixes are applicable. If such is not the case, it may be necessary to contract with a Technical Advisor to perform a preliminary design report.

On May 28, 2001, Theresa Connor and Steve Suau, representing Sarasota County Stormwater met with representatives of the Sorrento East Homeowners Board for the purpose of sharing the results of the flood study update and flooding experiences of the residents. Street flooding in the Sorrento East subdivision as indicated by the flood study update was verified in terms of both location and depths. The alternatives to address to existing street flooding in terms of pipe enlargements and the flood storage enhancement of the former effluent pond were also discussed. The residents indicated that many of the metal storm pipes were rusted and in need of replacement. They also expressed an interest in the pond enhancement alternative.

4.03 Future Development/Regional Stormwater Facilities

Although the Basin Master Plan has identified existing FPLOS deficiencies, it also affords the opportunity to plan for the future. The Sarasota County Land Development Regulations encourage the use of regional stormwater facilities and a review of Exhibit 3 indicates 2 potential sites, both east of I-75. The northern site could be located about a mile south of Serenoa and north of the easterly extension of Central Sarasota County. The second site may have even greater potential and could be located approximately 2 to 2-1/2 miles south of Serenoa and north of the Venice Connector / I-75 interchange. The area of this second site is located in a large natural water attenuation area.

At this time Sarasota County has no formal process to develop or to provide incentives for regional stormwater facilities. In the meantime, such a proposal would need to be privately initiated.

4.04 Long Term Maintenance

As indicated in Section 2, maintenance of the South Creek drainage system or the lack thereof can have a significant impact on flooding, particularly at the southern end of the basin in Oscar Scherer Park. Specifically, the excessive growth of Brazilian peppers in the portion of South Creek located in the northern portion of the Park resulted in extremely high flood stages immediately upstream during the floods of 1992 and 1995. In fact, floodwaters rose upstream in South Creek to such a degree that they overflowed to the west, under the railroad trestle bridges and into the North Creek basin. Between this cross-basin overflow and a severe restriction downstream in North Creek, floodwaters covered almost the entire length of Pine Ranch East Boulevard and much of the eastern portion of Bay Street. However, following the clearing of the Brazilian pepper growth in 1996 by the Park, a similar rainfall event in November of 1997 resulted in flood stages that were 2.5 to 3 feet lower. The County and Oscar Scherer State Park continue to work on a Memorandum of Understanding (MOU) to facilitate maintenance of the South Creek conveyance system through the park instead of the County obtaining an easement in this area.

Since most of the South Creek basin is presently in a rural drainage condition, it is anticipated that the County will obtain easements on other areas of the drainage system as development occurs in the basin. This approach has been effective in the area encompassed by the Palmer Ranch DRI.