

## Hydrology & Hydraulics Bureau and Interagency Modeling Center

### Regional Simulation Model Basins (RSMBN) Lake Okeechobee Watershed Project Future Without Project Baseline (FWOP) Table of Assumptions

Feature	
<b>Climate</b>	<ul style="list-style-type: none"> <li>• The climatic period of record is from 1965 to 2005.</li> <li>• Rainfall estimates have been revised and updated for 1965-2005.</li> <li>• Revised evapotranspiration methods have been used for 1965-2005.</li> </ul>
<b>Topography</b>	<p>The Topography dataset for RSM was uses the following datasets:</p> <ul style="list-style-type: none"> <li>• South Florida Digital Elevation Model, USACE, 2004;</li> <li>• High Accuracy Elevation Data, US Geological Survey 2007;</li> <li>• Loxahatchee River LiDAR Study, Dewberry and Davis, 2004;</li> <li>• St. Lucie North Fork LiDAR, Dewberry and Davis, 2007;</li> <li>• Palm Beach County LiDAR Survey, Dewberry and Davis, 2004; and</li> <li>• Stormwater Treatment Area stage-storage-area relationships based on G. Goforth spreadsheets.</li> </ul>
<b>Land Use</b>	<ul style="list-style-type: none"> <li>• Lake Okeechobee Service Area (LOSA) Basins were updated using consumptive use permit information as of 2/21/2012, as reflected in the LOSA Ledger produced by the Water Use Bureau.</li> <li>• C-43 Groundwater irrigated basins – Permitted as of 2010, the dataset was updated using land use, aerial imagery and 2010 consumptive use permit information.</li> <li>• Dominant land use in EAA is sugar cane other land uses consist of shrub land, wet land, ridge and slough, and sawgrass.</li> </ul>
<b>LOSA Basins</b>	<ul style="list-style-type: none"> <li>• Lower Istokpoga, North Lake Shore and Northeast Lake Shore demands and runoff estimated using the AFSIRS model and assumed permitted land use (see land use assumptions row).</li> </ul>
<b>Lake Okeechobee</b>	<ul style="list-style-type: none"> <li>• Lake Okeechobee Regulation Schedule 2008 (LORS 2008)                             <ul style="list-style-type: none"> <li>○ Central Everglades (CEPP) optimized release guidance in order to improve selected performance within LOK, the northern estuaries and LOSA while meeting environmental targets in the Glades.</li> <li>○ Lake Okeechobee can send flood releases south through the Miami Canal and North New River Canal to the A1/A2 FEB when the LOK stage is above the bottom of Zone D and the FEB depth is below 2' (EAA basin runoff used to limit conveyance capacity: 1,550 cfs for Miami Canal and 1,350 cfs for North New River Canal).</li> <li>○ Lake Okeechobee can send flood releases south to help meet water-quality based flow targets at STA-3/4, STA-2N, and STA-2S when the LOK stage is above the bottom of the Baseflow Zone (EAA basin runoff used to limit conveyance capacity: 1,550 cfs for Miami Canal and 1,350 cfs for North New River Canal).</li> </ul> </li> </ul>

Feature	
	<ul style="list-style-type: none"> <li>○ Includes Lake Okeechobee regulatory releases to tide via L8/C51 canals.</li> <li>○ Releases via S-77 can be diverted into C43 Reservoir</li> <li>• Lake Okeechobee Water Shortage Management (LOWSM) Plan.</li> <li>• Interim Action Plan (IAP) for Lake Okeechobee (under which backpumping to the lake at S-2 and S-3 is to be minimized).</li> <li>• “Temporary” forward pumps as follows:               <ul style="list-style-type: none"> <li>○ S354 – 400 cfs</li> <li>○ S351 – 600 cfs</li> <li>○ S352 – 400 cfs</li> <li>○ All pumps reduce to the above capacities when Lake Okeechobee stage falls below 10.2 ft and turn off when stages recover to greater than 11.2 ft</li> </ul> </li> <li>• No reduction in EAA runoff associated with the implementation of Best Management Practices (BMPs); No BMP makeup water deliveries to the WCAs</li> <li>• Backpumping of 298 Districts and 715 Farms into lake minimized</li> </ul>
<b>Northern Lake Okeechobee Watershed Inflows</b>	<ul style="list-style-type: none"> <li>• Headwaters Revitalization schedule for Kissimmee Chain of Lakes using the UKISS model.</li> <li>• Kissimmee River Restoration complete.</li> <li>• Fisheating Creek, Istokpoga &amp; Taylor Creek / Nubbin Slough Basin Inflows calculated from historical runoff estimates.</li> </ul>
<b>Caloosahatchee River Basin</b>	<ul style="list-style-type: none"> <li>• Caloosahatchee River Basin irrigation demands and runoff estimated using the AFSIRS model and assumed permitted land use as of February 2012. (see land use assumptions row)</li> <li>• Public water supply daily intake from the river is included in the analysis.</li> <li>• Maximum reservoir height of 41.7 ft NGVD with a 9,379-acre footprint in Western C43 basin with a 175,800 acre-feet effective storage.</li> <li>• Proposed reservoir meets estuary demands while C-43 basin supplemental demands for surface water irrigation are met by Lake Okeechobee.</li> </ul>
<b>St. Lucie Canal Basin</b>	<ul style="list-style-type: none"> <li>• St. Lucie Canal Basin demands estimated using the AFSIRS model and assumed permitted land use as of February 2012 (see land use assumptions row).</li> <li>• Excess C-44 basin runoff is allowed to backflow into the Lake if lake stage is below 14.5 ft before being pumped into the C-44 reservoir.</li> <li>• Basin demands include the Florida Power &amp; Light reservoir at Indiantown.</li> <li>• Indian River Lagoon South Project features               <ul style="list-style-type: none"> <li>○ Ten-mile Creek Reservoir and STA: 7,078 acre-feet storage capacity at 10.79 maximum depth on 820 acre footprint; receives excess water from North Folk Basin;</li> <li>○ C-44 reservoir: 50,246 acre-feet storage capacity at 5.18 feet maximum depth on 12,125 acre footprint; C44 reservoir releases water back to Lake Okeechobee when Lake stages are below the bottom of the Baseflow Zone.</li> <li>○ C-23/C-24 reservoir: 92,094 acre-feet storage capacity at 13.27 maximum depth on 8,675 acre footprint;</li> </ul> </li> </ul>

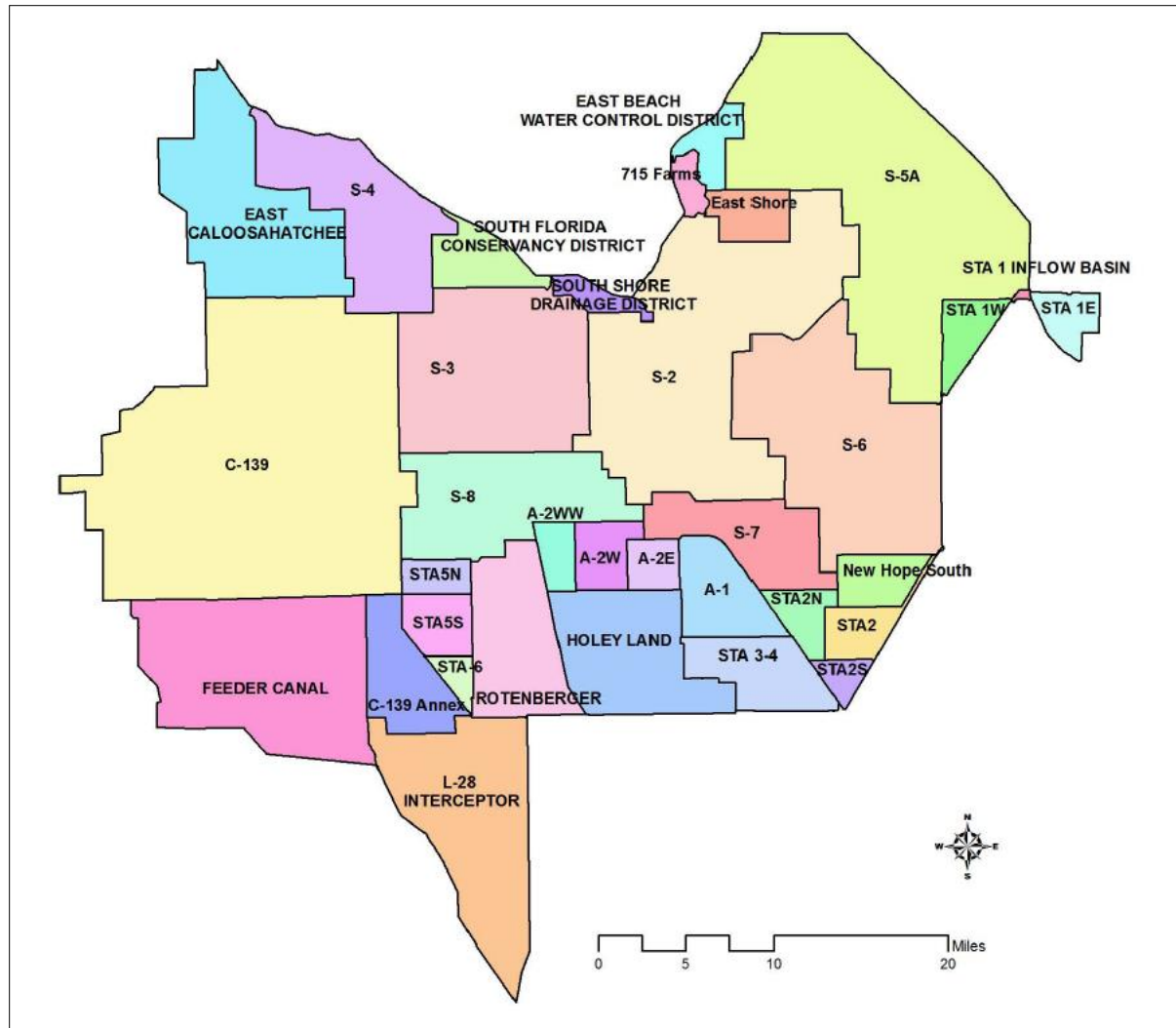
Feature	
	<ul style="list-style-type: none"> <li>○ C-23/C-24 STA: 3,852 acre-feet storage capacity at 1.5 maximum depth on 2,568 acre footprint;</li> <li>○ All proposed reservoirs meet estuary demands.</li> <li>○ IRL operations assumed are consistent with the March 2010 St. Lucie River Water Reservation Rule update.</li> <li>● Excess C23 basin water not needed to meet estuary demands can be diverted to the C44 reservoir if capacity exists.</li> <li>● C44 reservoir can discharge to C44 canal and backflow to Lake Okeechobee when the lake is below the baseflow zone.</li> </ul>
<b>Seminole Brighton Reservation</b>	<ul style="list-style-type: none"> <li>● Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage.</li> <li>● The 2-in-10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons per month). AFSIRS modeled 2-in-10 demands equaled 2,383 MGM.</li> <li>● While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are preserved.</li> <li>● LOWSM applies to this agreement.</li> </ul>
<b>Seminole Big Cypress Reservation</b>	<ul style="list-style-type: none"> <li>● Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage.</li> <li>● The 2-in-10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM.</li> <li>● AFSIRS modeled 2-in-10 demands equaled 2,659 MGM.</li> <li>● While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved.</li> <li>● LOWSM applies to this agreement.</li> </ul>
<b>Everglades Agricultural Area</b>	<ul style="list-style-type: none"> <li>● Model water-body components as shown in Figure 1.</li> <li>● Simulated runoff from the North New River – Hillsboro basin apportioned based on the relative size of contributing basins via S7 route vs. S6 route.</li> <li>● G-341 routes water from S-5A Basin to Hillsboro Basin.</li> <li>● RSMBN ECB EAA runoff and irrigation demand compared to SFWMM ECB simulated runoff and demand from 1965-2005 for reasonability.</li> </ul>
<b>Everglades Construction Project Stormwater Treatment Areas</b>	<ul style="list-style-type: none"> <li>● STAs are simulated as single waterbodies</li> <li>● STA-1E: 6,546 acres total area</li> <li>● STA-1W: 7,488 acres total area</li> <li>● S-5A Basin runoff is to be treated in STA-1W first and when conveyance capacities are exceeded, rerouted to STA-1E</li> <li>● STA-2: cells 1,2 &amp; 3: 7,681 acres total area</li> <li>● STA-2N: cells 4,5 &amp; 6; refers to Comp B-North; 6,531 acres total area</li> </ul>

<b>Feature</b>	
	<ul style="list-style-type: none"> <li>• STA-2S: cells 7 &amp; 8; refers to Comp B-South; 3,570 acres total area</li> <li>• STA-3/4: 17,126 acres total area</li> <li>• STA-5N: includes cells 1 &amp; 2: 5,081 acres total area</li> <li>• STA-5S: includes cells 3, 4 &amp; 5; uses footprint of Compartment C: 8,469 acres total area</li> <li>• STA-6: expanded with phase 2: 3,054 acres total area</li> <li>• Assumed operations of STAs:               <ul style="list-style-type: none"> <li>○ 0.5 ft minimum depth below which supply from external sources is triggered;</li> <li>○ 4 ft maximum depth above which inflows are discontinued; and</li> <li>○ Inflow targets established for STA-3/4, STA-2N and STA-2S based on DMSTA simulation; met from local basin runoff, LOK flood releases and available FEB storage.</li> </ul> </li> <li>• A 29,617-acre Flow Equalization Basin (FEB) is located north of STA-3/4 and Holeyland. The total footprint represents the original 15,853-acre A-1 footprint plus the additional 13,764-acre A-2 footprint operated as follows:               <ul style="list-style-type: none"> <li>○ Assumed average topography of 9.63 ft NGVD. FEB inflows are from excess EAA basin runoff above the established inflow targets at STA-3/4, STA-2N, and STA-2S, and from LOK flood releases south;</li> <li>○ FEB outflows are used to help meet established inflow targets at STA-3/4, STA-2N, and STA-2S if EAA basin runoff and LOK flood releases are not sufficient;</li> <li>○ 0.5 ft minimum depth below which no releases are allowed;</li> <li>○ 3.8 ft maximum depth above which inflows are discontinued;</li> <li>○ No supplemental water supply provided to FEB;</li> <li>○ Assumed inlet pump from STA-3/4 supply canal with capacity equal to combined capacity of G-372 and G-370 structures; and</li> <li>○ Outflow weirs, with similar discharge characteristics as STA-3/4 outlet structure, discharging into lower Miami and lower North New River canals.</li> </ul> </li> </ul>
<b>Holey Land Wildlife Management Area</b>	<ul style="list-style-type: none"> <li>• S200A inflow structure operated to send lower Miami canal water into Holey Land.</li> <li>• G-372HL inflow structure for fire protection used for keeping the water table from going lower than half a foot below land surface elevation.</li> <li>• Operations are per the Holey Land Wildlife Management Area Draft Project Operations Manual (SFWMD, October 2015)</li> </ul>
<b>Rotenberger Wildlife Management Area</b>	<ul style="list-style-type: none"> <li>• Operational Schedule as defined in the Operation Plan for Rotenberger WMA. (SFWMD, March 2010)</li> </ul>

<b>Feature</b>	
<b>Public Water Supply and Irrigation</b>	<ul style="list-style-type: none"> <li>Regional water supply demands to maintain Lower East Coast canals as simulated from Central Everglades RSMGL FWO (simulated for CEPP in 2012).</li> </ul>
<b>Western Basins</b>	<ul style="list-style-type: none"> <li>C139 RSM basin is being modeled. Period is 1965-2005.</li> <li>C139 basin runoff is modeled as follows: G136 flows is routed to Miami Canal; G342A-D flows routed to STA5N; G508 flows routed to STA5S; G406 flows routed to STA6.</li> <li>C139 basin demand is met primarily by local groundwater.</li> <li>Restored C139 Annex flows routed to L28.</li> </ul>
<b>Water Shortage Rules</b>	<ul style="list-style-type: none"> <li>Reflects the existing water shortage policies as in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC, including Lake Okeechobee Water Shortage Management (LOWSM) Plan.</li> </ul>

**Notes:**

- The RSM is a robust and complex regional scale model. Due to the scale of the model, it is frequently necessary to implement abstractions of system infrastructure and operations that will, in general, mimic the intent and result of the desired project features while not matching the exact mechanism by which these results would be obtained in the real world. Additionally, it is sometimes necessary to work within established paradigms and foundations within the model code (e.g. use available input-driven options to represent more complex project operations).
- The boundary conditions along the eastern and southern boundaries of the RSMBN model were provided from either the South Florida Water Management Model (SFWMM) or the RSM Glades-LECSA Model (RSMGL). The SFWMM was the source of the eastern boundary groundwater/surface water flows, while the RSMGL was the source of the southern boundary structural flows.



**Water-Body Components:**

Miami Water-Body = S3 + S8 + A-2WW

NNR/HILLS Water-Body = S2 + S6 + S7 + New Hope South

WPB Water-Body = S-5A

FEB = A-2W + A-2E + A-1

Fig. 1 RSMBN Basin Definition within the EAA for LOWP FWOP

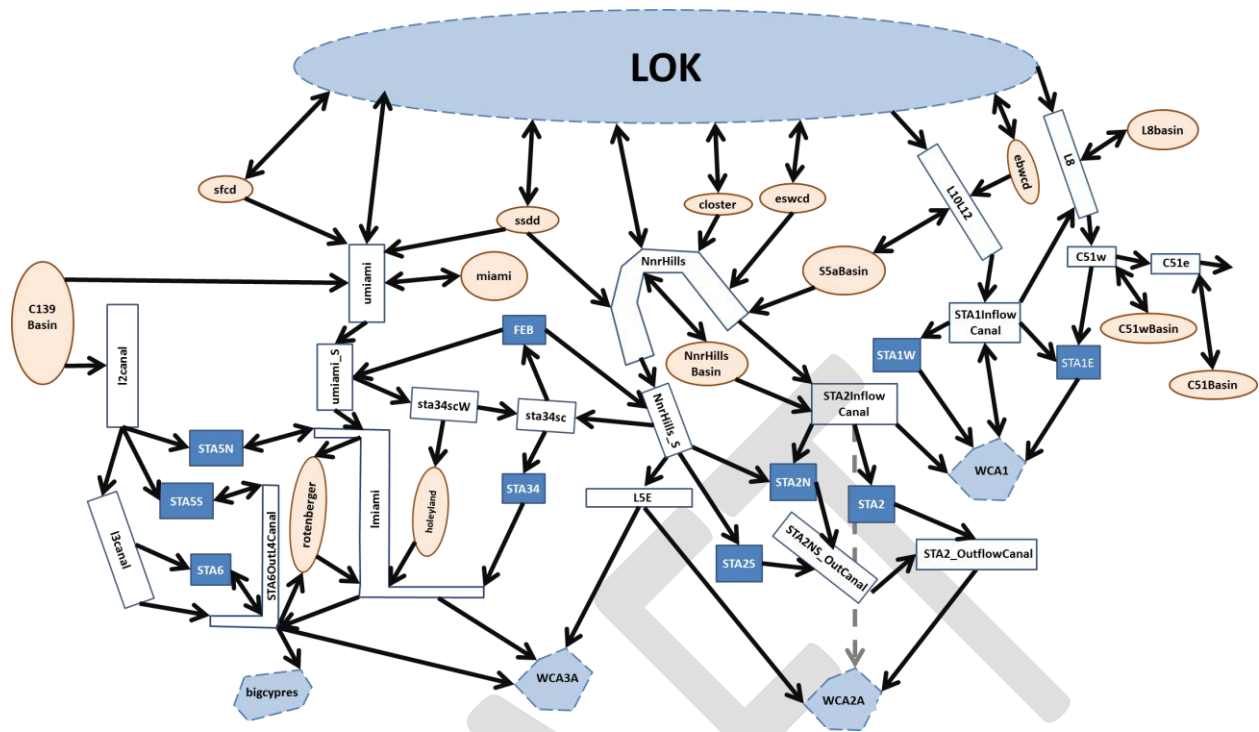


Fig. 2 RSMBN Link-Node Routing Diagram for LOWP FWOP