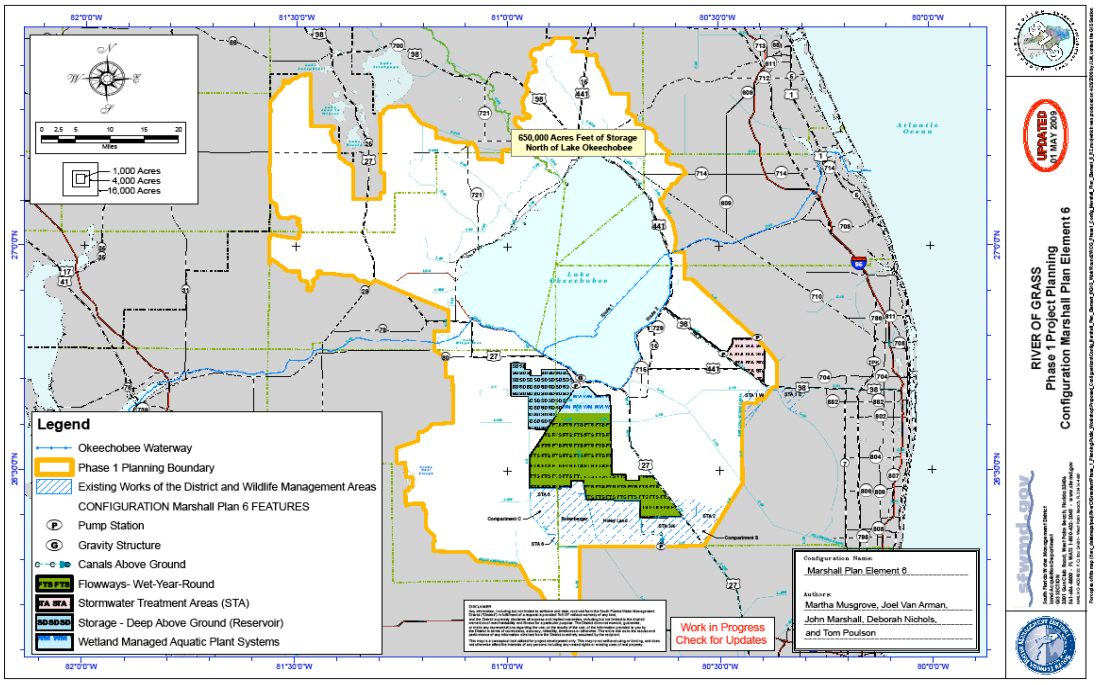
Marshall Plan Element 6 (MP6)

John R. Marshall, Martha Musgrove, Joel VanArman, Tom Poulson, Deborah Nichols

Establish a flowway to increase spatial extent of wetlands, treatment of water and a connection between Lake Okeechobee and Water Conservation Area-3A (WCA-3A) maximizing the use of gravity flow. Configuration includes significant storage north and south of Lake Okeechobee to assist in reaching a 95% decrease to damaging estuaries discharges and a 90% dry season demand deliveries to the Everglades. For the S-5A Basin a small flowway and additional treatment capacity is included for water to be delivered to the A.R.M. Loxahatchee National Wildlife Refuge.



Major Components:

- North Deep Storage – 650,000 acre-feet
- South Deep Storage – 589,000 acre-feet
- South Shallow Storage – 436,140 acre-feet
- East Shallow Storage - 4,984 acre-feet
- East Stormwater Treatment Area (STA) - 14,000 net acres of treatment area

General Description of How Water Flows Through System/Operational Intent: The northern storage is to take water from either the Kissimmee River or Lake Okeechobee for storage until it is needed by the Lake or the Everglades.

Water flows out of Lake Okeechobee through a gravity structure into a spreader canal along the north side of the forested wetland. If the stages are high enough in Lake Okeechobee, there will be gravity flow through the forested wetland and into the flowway. If Lake Okeechobee levels are low the pump station on the south storage area

will lift the water into the reservoir for either storage or development of energy to allow the water to flow through the forested wetland and flowway.

Water that flows through the flowway will be released at the headwater pump station of STA-5/6 at a maximum flow of 2,000 cubic feet per second (cfs). The flowway will also have a discharge point of a pump station into WCA-3A if the water quality is met or into the North New River for treatment by STA-2 and STA-3/4 if the water quality is not being met.

Water in the S-5A Basin will flow into the flowway along the West Palm Beach Canal and be delivered into a new Stormwater Treatment Area prior to discharge into the A.R.M. Loxahatchee National Wildlife Refuge (WCA-1).

Total Acreage Identified:

- 48,750 acres north of Lake Okeechobee
- 157,550 acres south of Lake Okeechobee
- 17,565 acres east of Lake Okeechobee

Of the total acreage identified 39,584 acres is in public ownership and the remaining 184,281 acres would need to be acquired.

Hydrologic Performance: This configuration provides the desired 95% (overall result of four (4) months total in Lake-triggered high discharges during the 41-year period of record) reduction in Lake-triggered high discharges to the Northern Estuaries. Received a 91% standard score for Everglades demand target delivered and a 89% standard score for dry season Everglades demand target.

Water Quality Performance: This configuration requires approximately an additional 3,900 acres of Stormwater Treatment Area. This configuration was evaluated such that the flowways never went dry. Based on the assumption that flowways can not reduce phosphorous concentrations below 25 parts per billion (ppb), discharges from flowways will need to be routed through an STA prior to discharge to the Everglades.

Environmental / Ecological Advantages or Benefits: This configuration provides significant environmental benefits through the forested wetlands and flowway which will provide extensive wetland habitat. In addition, significant environmental benefits are achieved through reduction in the discharges to the estuaries.

Environmental / Ecological Impacts or Concerns: Maintaining flowways in a wet condition will likely improve water quality benefits but will impact the amount of water available for Lake Okeechobee or for deliveries to the Everglades. With such a large acreage needed for storage north of Lake Okeechobee, chances are high that existing wetlands and/or threatened or endangered species will be impacted by the configuration footprint.

Increased Spatial Extent of Shallow Storage/Treatment (≤ 4 feet water depth): 138,715 total acres. Results of relative landscape viability comparisons between the

alternative configurations (based on maintenance of minimum depths) indicate that this configuration fell in the high range.

Economic / Recreational Advantages or Benefits: The forested wetland and flowways will provide significant additional recreation opportunities for outdoor activities such as boating, fishing, duck hunting and bird watching.

Economic / Recreational Impacts or Concerns: Results of relative sugarcane production comparison between alternative configurations indicated that this configuration fell in the medium to low range.

Major Infrastructure Impacts: The configuration will require significant re-routing of the agricultural rail lines, roadways, and power transmission mains, removal of airports, modifications to existing urban areas, and development of bridges for water crossing on Route 80. Pump stations, control structures and additional canals will need to be constructed to offset impacts to local 298 drainage districts. .

Operation and Maintenance (O&M) Considerations (if any): Vegetation management, particularly removal of exotic species will be a major consideration for this configuration, given the high amount of vegetated flowway area proposed. This configuration contains a substantial amount of embankment (≤ 9 feet height) that will have to be maintained.

Uncertainty Concerns: Hydraulic uncertainties related to flowways. There are many different resistance coefficients available for wetlands, however, until a wetland with this particular vegetation is constructed, the actual amount of gravity flow versus pumped flow remains unknown. Uncertainty of the level of water quality performance achieved through the use of unmanaged flowway systems and level of water quality performance from forested wetlands.