

APPENDIX E

PLAN FORMULATION

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E INTRODUCTION

This plan formulation appendix is a supplement to Section 3 of the main report. The primary contents of this appendix are a large table with details of initial evaluation and screening of management measures. This table is too large to include in the main report.



Figure E-1. Overview of plan formulation steps.

E.1 Management Measures and Screening

Table E-1 shows the management measures considered and the results of screening. A management measure had to meet at least one project objective and not violate any of the project constraints for the measure to be retained. A management measure also had to meet three additional criteria: be acceptable, not create significant adverse environmental effects, and not be cost prohibitive. Acceptability considers whether a management measure (feature or action) is workable and viable. It considers state and local entities and the public, and compatibility with existing laws, regulations, and policies.

Twelve of the 98 measures were assigned an “N” (no) for one or more of the four criteria, and were eliminated from further analysis. One measure was initially screened but the decision was reversed and the measure was retained. Seventy-four measures were retained for further analysis and potential inclusion in project alternatives. Eleven measures had too much uncertainty to make a clear decision to retain or eliminate. These 11 measures were tentatively kept until additional information was developed. Results of screening decisions for each of the 98 management measures are shown in **Table E-1**. This table shades each “Y” green, each “?” yellow, and each “N” red in the columns for the four criteria.

Additional notes to help understand this table:

- ASR stands for Aquifer Storage and Recovery;
- GWP stands for Grassy Waters Preserve;
- J.W. Corbett WMA for J.W. Corbett Wildlife Management Area;
- ITID stands for Indian Trail Improvement District;
- SIRWCD stands for South Indian River Water Control District;
- FWC stands for Florida Fish and Wildlife Conservation Commission;
- C-18W Reservoir, Mecca Reservoir, and reservoir at the Mecca site are the same feature.

Table E-1. Results of screening management measures.

Unique ID	Measure Name	Measure Type	Purpose & Notes	Obj 1: Restore Wet & Dry Season Flow	Obj 2: Restore Estuary	Obj 3: Increase Spatial Extent	Obj 4: Restore Connections	Obj 5: Restore Species Abundance & Diversity	Constraint: Do Not Reduce Flood Protection	Constraint: Do Not Reduce Water Supply	Constraint: Do Not Reduce Water Quality	Acceptable (by state & local entities)?	Meet an objective & avoid constraints	Not create sig adverse env effects	Not cost prohibitive	Management Measure Screening Result
1.1.c	Increase Conveyance of M Canal	Pump Station/ Conveyance	Control 2 pump station improvements already done by City of West Palm Beach; M Canal Improvements to include muck removal, selective widening/removal of bottlenecks. Improve connectivity with historic river headwater (increase flow capability from 165 cfs to 300 cfs) to offset discharges to G-161 is to offset water discharged from G-161 to the river at the appropriate ratio to not impact water supply) operationally, must be connected with G-161. Improve M Canal to accommodate increased flows from Control 2 pump station.	Y	N	N	N	N	Y	Y	Y	Y	Y	?	?	Retained.
1.12.a	ASR at L8 Shallow Storage	Storage	ASR on Flow-way 1/2: Couple ASR with ITID impoundment. Requires connection to C-18W basin in Flow-way2. Provide storage of L-8 basin water between Flow-ways 1 and 2. ASR would increase storage of ITID impoundment, for dry season deliveries along a modified M-O canal to Mecca Reservoir.	N	N	Y	N	N	Y	?	Y	?	Y	Y	Y	Retained.
1.13.a	PC-10 Pump Station	Pump station/conveyance	Small (25 cfs) pump station at PC-10 ditch berm. Capture dry season discharges before they move east to SIRWCD structure/deliver to G-92 via C-18 Canal (requires engineering review regarding availability. SIRWCD would have to approve location and operational criteria.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	Y	Retained. May consider once a TSP is identified. Management measure provides limited benefits. Benefits are extremely localized.

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1.14.a	C-51 Storage Reservoir	Storage	Phase II, Deepwater storage in L-8 basin. Provide storage of L-8 basin water between Flow-ways 1 and 2 at Moss Area.	Y	N	N	N	N	Y	Y	?	N	Y	Y	?	Initially screened out for acceptability, but the initial decision was reversed and the measure was retained. Risks include potential conflict with water supply, and restoration strategies state program objectives, complex negotiations regarding use of water will be required. Based on previous cost for L-8 reservoir cost could be prohibitive, difficulty in determining/valuing below ground storage.
1.16.a	Flow-way1 Water Quality Feature	Water Quality	Allow treatment of L-8 water moving through Flow-way1, or finding a way to move cleaner water (i.e. CWMA western runoff, C-51 Reservoir operations, Pump Station/gravity into L-8 Tieback Canal, Control 2 Pump Station).	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Screened out. Does not meet project goals and objectives by itself. Consider WQ with focused array.
1.18.a	Shallow L-8 Storage	Storage	Shallow storage reservoir in L-8 basin to capture water. US Sugar parcel land next to L-8 Canal. Shallow storage reservoir in L-8 basin to capture and treat water. US Sugar parcel land next to L-8 Canal. Note: Acquiring large parcels of land is not the most appealing option to the project sponsor.	Y	N	N	N	Y	Y	Y	Y	?	Y	Y	Y	Retained.
1.18.a.i	Shallow L-8 Storage Features	Pump Station / Conveyance Canal	Inflow pump station, conveyance canal, outflow structure for shallow L-8 Storage.	Y	N	N	N	Y	Y	Y	Y	?	Y	Y	Y	Retained.

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1.2	G-161 Water Control Structure	Control structure/Conveyance	Connect GWP (historical headwater) with C-18 Canal and Loxahatchee Slough. Provide flows to Loxahatchee River.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.3.a	Northlake Blvd Bridge/Weir	Conveyance Connectivity	Improve connectivity with historic river headwater, bridge to restore flows to the north as part of restoring the GWP flow-way and allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.3.a.i	Northlake Blvd Bridge/Weir: 38 cfs (avg. annual)	Operational	Associated with supplemental flow through G-161. Improve connectivity with historic river headwater, bridge to restore flows to the north as part of restoring the GWP flow-way and allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.3.a.ii	Northlake Blvd Bridge/Weir: 28 cfs (avg. annual)(25% reduction)	Operational	Associated with supplemental flow through G-161. Improve connectivity with historic river headwater, bridge to restore flows to the north as part of restoring the GWP flow-way and allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.3.a.iii	Northlake Blvd Bridge/Weir: 19 cfs (avg. annual)(50% reduction)	Operational	Associated with supplemental flow through G-161. Improve connectivity with historic river headwater, bridge to restore flows to the north as part of restoring the GWP flow-way and allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.

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1.3.a.iv	Northlake Blvd Bridge/Weir: 5 cfs (avg. annual)(90 % reduction)	Operational	Associated with supplemental flow through G-161. Improve connectivity with historic river headwater, bridge to restore flows to the north as part of restoring the GWP flow-way and allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.4.a	G-160 Water Control Structure	Control Structure	In C-18E Canal, upstream of C-18W Canal. Provides hydroperiod improvements to Loxahatchee Slough (through ability to raise stages in C-18W Canal upstream of the structure). Allows for some flows to Loxahatchee River.	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
1.5.a	ITID connection to M Canal	Connection	Small pump station (<100 cfs) used to connect ITID to M Canal, requires inter-local agreement (West Palm Beach, ITID), deliveries for environmental water supply to GWP and Loxahatchee River (M Canal connection).	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
1.6.a	GWP Scrapedown	Natural Area Restoration	GWP eutrophic willow area scrape-down (760 acres with 1'-1.5' storage) 759.12 acres of degraded eutrophic lands with accumulated nutrient rich muck and unnatural plants in NW portions of Grassy Waters can be restored to open marsh areas by reestablishing wetland grade and more natural soil conditions (cost \$33,000 per acre based on works already done in adjacent areas). This would allow for both wetland restoration/habitat improvements, reestablish wetland connectivity and increased storage.	Y	N	Y	N	Y	Y	Y	Y	?	Y	Y	?	Retained. Note that cost of scrape down can be costly, ~ \$25M to gain 1,138 acre-feet (as compared to storage on Mecca which is ~ \$80 million for 7200 acre-feet. Habitat gain is inherent to this alternative as well.

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1.7.a	Change GWTA Storage Connectivity	Conveyance	Grassy Waters Triangle Area (GWTA) storage hydro-logic connectivity. Portions of the lands within the triangle area is at higher elevations separating the G-161 flow way areas from the Grassy Waters Flow-way which flows north connecting to Loxahatchee Slough. Excavation of a linear conveyance slough just south of the railroad line would allow for connection of the two flow-ways.	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
1.8.a	PGA Blvd Bridge Improvements	Conveyance, Operational Modifications	PGA Blvd bridge is planned for construction by FDOT to allow for higher elevations in the Loxahatchee Slough by operations of the G-160 and G-161 structures. (Approximately 100 feet wide allowing for flows to the north and includes wildlife crossings).	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
1.9.a	Moss Property Restoration: Relocate ITID Discharge	Control Structure	Relocate ITID Discharge from impoundment and Cypress Grove drainage and irrigation canal to eastern boundary. Keeps ITID and CG 'whole', allows relocation of Moss canals to assist in restoration and connectivity. This concept takes water from ITID to Moss, relocates discharges and could be acceptable if associated with approved restoration plan by FWC, but FWC could object (relocation of ITID discharge might not be acceptable to FWC).	N	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.
1.9.b	Moss Property Restoration: Reconnect J.W. Corbett WMA	Natural Area Restoration	Connect J.W. Corbett WMA to Moss (via culvert under ITID Canal or other means that do not impact ITID drainage. Fill existing ITID Discharge Canal and Cypress Grove Canal. Facilitates restoration of the property and eliminates 'severing' from J.W. Corbett WMA.	N	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.

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1.9.c	Moss Property Restoration: Construct Weirs	Control Structure	Allows overflow of ITID stormwater to facility hydroperiod enhancement on Moss on west and south ITID impoundment berms (connect ITID impoundment to Moss).	N	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.
1.9.d	Moss Property Restoration: Discharge to L-8 Canal	Control Structure	In compliance with proposed stage elevations to support hydroperiod restoration as determined in the development of a restoration plan from Moss Property (install or improve a series of culverts at L-8). RISK: requires coordination and agreement and easements with FPL to facilitate restoration, may require berm to separate FPL from Moss.	N	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.
2.1.a	C-18W Storage Reservoir	Storage	7,200 acre - feet above ground reservoir 4.5' depth.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.1.b	C-18W Storage Reservoir	Storage	9,500 acre - feet above ground reservoir 6' depth.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.1.c	C-18W Storage Reservoir	Storage	12,700 acre - feet above ground reservoir 8' depth.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.1.d	C-18W Storage Reservoir	Storage	16,700 acre - feet above ground reservoir 10.5' depth.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.10.a.i	Natural Storage at C-18W: Scrape-down	Scrape-down	Scrape down ground to match natural surrounding area elevation and increase natural storage to facilitate sheetflow.	Y	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.

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2.10.a.i	Natural Storage at C-18W Canal: Backfill	Natural Area Restoration	Backfill C-18W Canal (west of SR 710) to facilitate sheetflow. Filling C-18W Canal could compromise flood control for private property, if property is proposed to be acquired to effect the measures, then cost could increase substantially.	Y	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained.
2.10.a.ii	Natural Storage at C-18W: ASR Supplement	Storage	ASR adjacent to C-18 Canal (south of G-160 and PGA Park) to maximize use of clean water into ASR storage during wet season, and pull out during dry season. In dry season, water may not be available to send to the NW Fork, ASR proposed to offset flow deficit.	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	?	Screened out. Determined in subsequent engineering meetings that ASR would not be feasible without a storage reservoir or a large canal in the vicinity.
2.14.a	Riverbend Park Pump Station	Pump Station/ Conveyance	Approximately 40 cfs pump to Riverbend Park. Make use of dynamic storage in the wetlands of the park. Limited storage capability in RB however direct connection to NW Fork, timing of the pump operations needs to coordinates to not compete with MFL and water supply demands.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	Y	Retained. May consider only once a TSP is identified. Management measure provides limited benefits. Benefits are extremely localized. RE constraints.
2.2.a.i	C-18W Storage Reservoir: ASR Supplement	Storage	ASR Wells (8 mgd, 40 cfs pumped 120 days). Various flow capability - the wells placed in combination with C-18W, along north side of M-O canal to capture excess J.W. Corbett WMA water or north of GWP or a mixture. Quantity of ASR will be driven by the design limitations on the reservoir with respect to storage needed and delivery of dry season flows to the NW Fork.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	?	Retained.

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2.2.a.ii	C-18W Storage Reservoir: ASR Supplement	Storage	5 wells @ 8 cfs ea. = 9,500 ac-ft. Various flow capability - Wells placed in combination with C-18W, along north side of M-O canal to capture excess J.W. Corbett WMA water or north of GWP or a mixture. Quantity of ASR will be driven by the design limitations on the reservoir with respect to storage needed and delivery of dry season flows to the NW Fork.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	?	Retained.
2.2.a.iii	C-18W Storage Reservoir: ASR Supplement	Storage	8 wells @ 8 cfs ea. = 15,600 ac-ft. Various flow capability - Wells placed in combination with C-18W, along north side of M-O canal to capture excess J.W. Corbett WMA water or north of GWP or a mixture. Quantity of ASR will be driven by the design limitations on the reservoir with respect to storage needed and delivery of dry season flows to the NW Fork.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	?	Retained.
2.2.a.iv	C-18W Storage Reservoir: ASR Supplement	Storage	15 wells @ 8 cfs ea. = 28,500 ac-ft. - Various flow capability - Wells placed in combination with C-18W, along north side of M-O canal to capture excess J.W. Corbett WMA water or north of GWP or a mixture. Quantity of ASR will be driven by the design limitations on the reservoir with respect to storage needed and delivery of dry season flows to the NW Fork.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	?	Retained.
2.3.a	M-O Connection to Mecca via Canal	Connection	New Canal to Connect western M-O Canal with Mecca. Allows delivery of storage or ASR captured water to Mecca Reservoir and River. Easements are acquired, increases flexibility.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.

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2.3.a.i	M-O Connection to Mecca via Shallow Flow-way	Natural Area Restoration	Shallow wide flow-way connecting C-18 Reservoir and M-O Canals. 200 cfs delivery. Flowage easement relies upon agreement with private property owner, may be impacted by ability of development to acquire approval.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
2.3.b	Pump Station to move water from M-O to Mecca	Pump Station	Pump station (200 cfs) to move water from M-O to Mecca or C-18.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
2.4.a.i	Lucky Tract Seepage Barrier	Natural Area Restoration	Seepage barrier along natural storage to prevent water from groundwater seepage to northern areas. 3.0 miles long along southern margin.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	?	Retained.
2.4.a.ii	New Control Structure in C-18W	Control Structure	West of confluence with C-18 Canal. Increase in stage in western C-18 basin (east of weir) to reduce seepage into C-18 Canal from the Lucky Tract (north) and Lox. Slough/Sandhill (south) RISK: Design must accommodate flood control discharges for Caloosa and Wind in the Pines developments.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.5.a	C-18 Weir Pump Station	Control Structure/Pump Station	To provide water from east of weir to reservoir for storage. RISK - could reduce wet season flows to the river. Allows for additional water to be captured by C-18W reservoir, dependent upon water availability analysis.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
2.6.a	Relocate C-18 Weir	Control Structure Modification	Relocate C-18 Weir and Modify elevation west of Bee-line. Allows increased stages for Hungryland Slough, western J.W. Corbett WMA. Improves hydrological conditions. Cost of relocating the weir may not be efficient.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	?	Retained.

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2.7.a	Beeline Bridge	Connection	New bridge in Beeline highway to allow water to flow from Hungryland to Loxahatchee slough. RISK: Potential issue with CSX railroad that runs parallel to highway.	Y	N	Y	Y	Y	Y	Y	Y	?	Y	Y	?	Retained. With concerns with railroad.
2.8.a	Beeline Culverts	Conveyance	Install culverts under Beeline (north of Pratt-Whitney). Allows connectivity between east and west Hungryland Slough. RISK - needs review of # and location of culverts under FEC Railroad. Not cost prohibitive if done with proposed Beeline improvements.	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	?	Retained.
2.9.a	Backfill Interior Canals in J.W. Corbett WMA	Natural Area Restoration	Backfill interior canals in J.W. Corbett WMA and maximize water levels.	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1	Restore Nine Gems (Palmar East) Properties	Natural Area Restoration	Increase wetland upland mosaic/increase connectivity to Cypress Creek Head Waters. Increase groundwater levels and restore wetland function to improve base flow to NW Fork.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.a.i	Construct Southern and Western Berm Along Nine Gems	Berm	Construct berm along Southern and Western boundaries of Nine Gems. Allow ground water levels and wetlands to be restored without impacting adjacent parcels.	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.a.iii	Backfill N/S Drainage Ditches in Nine Gems.	Natural Area Restoration	To restore sheet flow. Restores more natural hydropattern to Cypress Creek, reduces competition for Nine Gems water. Requires acquisition of easements from HSLCD.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.1.b	Remove drainage pipes along the northern Nine Gems boundary	Natural Area Restoration	Allows recovery of wetland stages within the Nine Gems property. Assume 20 pipes, shallow excavation for removal. Must be done in conjunction with improvements to HSLCD Berm.	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.b.i	Improve HSLCD Berm Along Northern Nine Gems Boundary	Improve Berm	Prevent rehydrated wetlands from overtopping berm. Allow wetland restoration and maintenance of natural groundwater table. Approximately 23,000 feet long. Berm elevation should be to 20' NGVD on the east to offset expected wetland elevations.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.c	Nine Gems: Fill Southern HSLCD Canal	Connection	Allows sheet flow from Culpepper to Nine Gems. Reduces ponding in northern Culpepper. Improves wetland function.	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.c.i	Nine Gems: Reroute Thomas Farms Drainage & Pump Station	Conveyance/ Pump Station	Reroute Thomas Farms (pepper farm) drainage to North HSLCD Ditch (new canal). Relocation, offsets, drainage impacts of filling the ditch in MM 3.1.c. Pump station needed.	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.c.ii	Nine Gems: Degrade Access Road	Connection	Fill and degrade access road (also acquire rights from HSLD). Facilitates sheet flow from Culpepper to Nine Gems.	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.1.c.iii	Nine Gems: HSLCD Canal Improvements	Conveyance	Generic improvement of HSLCD Canal on North Side of Nine Gems. Relocation, facilitates additional flow from new drainage ditch and pump station, ensures existing level of service.	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.1.c.iv	Nine-Gems: In-line Culverts	Connection/ Conveyance	Located in the canal in the south and west of Nine Gems. Connects Culpepper and Pal-Mar to Nine Gems. Maintains drainage for Thomas Farms.	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.10	Saltwater Attenuation Structure	Control Structure	Construct at approximate RM 6.2 (Florida Power and Light) easement between Camp Tanah Keeta and JDSP boat ramp. Structure would dynamically respond to mean high tidal encroachment into proposed tidal forested wetland sections located upstream of RM 6.2 Structure would utilized floating activated gates that would throttle upward movement. Structure could be controversial.	Y	N	Y	N	Y	Y	Y	Y	?	Y	Y	Y	Retained. Consider only once TSP is selected with climate change and sea level rise analysis.
3.11	V-Notch for Navigation	Control Structure	By river mile 6.2 install weirs on either side of FPL right of way that have floatation devices, v-notch for navigation, to maintain pool upstream of 6.2. Keep freshwater in as opposed to saltwater out. 1b (for salinity improvement) Use of these types of structures, particularly in Wild & Scenic, is controversial.	Y	N	N	N	N	Y	Y	Y	?	Y	Y	Y	Retained. Consider only once TSP is selected with climate change and sea level rise analysis.
3.12	Replace A1A Oyster Bar	Oyster Replacement	(Circa 1961). Follow permit criteria to ensure that navigability is not impacted. Complements potential of oyster bed location further downstream when freshwater flows are being increased Objective 1b (for salinity improvement). Reduces soil pore salinity levels in flood plain portions.	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Retained. Consider only once TSP is selected with climate change and sea level rise analysis.

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3.13	Backfill Palmar Ditches	Backfill and Scrape	Backfill ditches and scrape down berms to restore wetland function. Will potentially require acquisition of parcels not already in public ownership within Palmar. Examine potential to raise culverts in SR 711 (Beeline) to move water east. Requires downstream components to implement this MM. Allows additional connectivity with Palmar to Culpepper to Nine Gems to Cypress Creek.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained. May consider only once a TSP is identified due to RE constraints and minimal benefits.
3.14	Culverts under SR710	Conveyance	Install culverts under SR 710 (Beeline) north of SR 710 (Pratt-Whitney) east of Pratt, to facilitate moving water north across Indiantown road; may require acquisition of parcels in Palmar. Allows additional connectivity. Could be costly if not done in concert with road upgrades/improvements.	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	?	Retained. May consider only once a TSP is identified due to RE constraints and minimal benefits.
3.2	Restore Gulfstream Property (1,411 acre Citrus Groves Adjacent to I-95)	Natural Area Restoration	Increase wetland upland mosaic/increase connectivity to Cypress Creek Head Waters.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.a	Gulfstream West: Shallow Flow-way	Flow-way	Flow through marsh discharge structure between gulfstream and Shiloh Farms. Construct shallow flow-way on Gulfstream Property West of I-95/Turnpike to include accommodation for HSLCD Unit II Drainage.	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.a.i	Gulfstream West: Inflow Pump Station	Pump Station	To attenuate flows to Cypress Creek while providing for existing level of service for HLSCD drainage.	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.2.a.ii	Gulfstream West: Fill Existing HSLCD Drainage Ditch	Connection	Straighten southern end of Hobe (HSLCD) drainage ditch to the western side of the Gulfstream West property; continue to connect to Cypress Creek Canal. Allows construction of flow-way through Gulfstream West. Requires agreement with HSLCD, and potentially operation costs.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.a.iii	Gulfstream West: Southern Outflow Structure	Conveyance	Outflow structure allows discharge from flow through marsh to Cypress Creek.	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.b	Gulfstream West: Eastern Outflow Structure	Conveyance	Alternative outlet to east side of I-95 to facilitate groundwater and wetland conditions and maintain base flow to Moonshine Creek and NW Fork.	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.c	Gulfstream West: Re-route HSLDC Canal to Align with the Turnpike (relocation)	Conveyance	Allows existing canal to be filled to facilitate storage on gulfstream properties. Could be a workable solution, other alternatives may provide more benefits. Includes building a new bridge over the Becker Grove Ditch for access to culverts.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	?	Retained.
3.2.c.i	Gulfstream West: Sediment Trap	Control Structure/Conveyance	Construct sediment trap on realigned canal prior to discharge into Cypress Creek Canal. Slows flows released to Cypress Creek Canal and to Cypress Creek, reducing further channel incision.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.2.c.ii	Gulfstream West: Weir Structure	Control Structure/Conveyance	Provide weir structure to discharge from sediment trap to Cypress Creek Canal Completes HSLCD system. Provides control to HSLCD for mgmt. of their flows.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.2.d	Gulfstream West: Re-route HSLDC Canal to align to western side of Gulfstream West	Conveyance	Allows southern portion only of existing canal to be filled to facilitate storage on gulfstream properties.	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.3	Replace Cypress Creek Canal Outfall Weir	Control Structure	Replace Cypress Creek Canal Outfall Weir.	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.3.a	Raise Northern Berm on Ranch Colony Canal	Berm Improvements	For flood risk. This may be necessary depending upon strategies proposed for the Canal in order to ensure that there is not overflow to adjacent communities. Could include strategic increases in population (relocation).	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.4	Restore Culpepper Ranch Properties (1,280 acres)	Natural Area Restoration	Increase wetland upland mosaic/increase connectivity to Cypress Creek Head Waters.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.4.a	Automate Twin 84s	Operations	Automate operation of modified Control Structure on Twin 84" Culverts and southern Culpepper culverts. Increase storage elevation on Culpepper property, potential improvement to Ranch Colony Flood control. Will need concurrence from SFWMD Operations and developed operational guidelines.	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.4.b	Raise Berm West of Ranch Colony	Berm Improvements	For flood risk. Protects ranch colony from increase stage west, reduces peak flows in early wet season to allow Ranch Colony and Old Trail to discharge to Cypress Creek Canal, connected with putting control on Culpepper culverts; berm needed to protect RC when water levels are increased.	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.5	Sag Culverts to Connect Culpepper and Nine Gems	Culvert/Conveyance	Provide sag culverts to connect Culpepper with Nine Gems to encourage Sheet Flow; Memorandum of Agreement with HSLCD (temp construction); fill lateral ditches. Connectivity between Palmar and Palmar East/encourage sheet flow.	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Screened out. Determined in subsequent engineering meetings that hydrology would not favor sag culverts to connect Culpepper and Nine Gems.
3.6	Cypress Creek and Shiloh Farms Property Improvements	Natural Area Restoration	Habitat and hydrologic lift, tributary connectivity, restoration of wetlands (ditch fills, culvert control, remove exotics (Approximate total acres = 8,000).	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.6.a	Spreader Swale at Cypress Creek	Spreader Swale	Spreader swale at west end of cypress creek natural area. East of Mack Dairy road Spreader Swale.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.6.b	Pump Station at Cypress Creek	Pump Station	Pulls water from canal to redistribute to spreader swale at Cypress Creek.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.6.c	Slow Flow in Cypress Creek	Dam	Provide natural structural features (logs or rip rap) to slow flow and encourage sedimentation to offset scouring in Cypress Creek Tributary Channel. Allow sediment buildup to restore channel cross section, and allow floodplain inundation.	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.6.d	R&A Farms Flow Through Marsh	Flow-way	Reconnect southern prong of Cypress Creek with Lox - Reconstruct old creek/tributary channel.	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Retained.
3.7	Links Development Flow-way	Natural Area Restoration	Involves reconfiguration of an existing development to allow flow through slough in a golf course.	N	N	N	N	N	Y	Y	Y	N	Y	Y	N	Screened out for acceptability and cost prohibitive. Risks include potential conflict with private development, and O&M of golf course.
3.8.a	Reconnect Moonshine Creek	Control Structure	Connect HSLCD with Moonshine creek. Allows restored hydrology to Moonshine Creek Channel, reduces direct flow to Lox NW Fork via Hobe Grove Ditch.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.8.a.i	Clear Moonshine Creek	Flow-way	Moonshine creek flow through marsh. Proposes using already acquired ag land, need to ensure flood control and agreement with HSLCD.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.8.a.ii	Hobe Grove Ditch Weir	Control Structure	Moonshine Creek install weir at bottom of Hobe Grove Ditch to back up water to reduce flashiness and recharge groundwater. Remove exotics to promote a re-directed sheetflow. Allows restored hydrology to Moonshine Creek Channel, reduces direct flow to Lox NW Fork via Hobe Grove Ditch.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.8.b	Gulfstream East Restoration	Natural Area Restoration	Fill gulf stream ditch and regrade property to historic topography.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.

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3.8.c	Flow Through Marsh at Gulfstream East	Flow-way	Construct flow through marsh at Gulfstream East and connect to flow through marsh on west side of highway using existing drainage ditch (convert to swale).	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.9.a	Kitching Creek Hydration: Atlantic Ridge Flow-way	Flow-way	Could augment Kitching Creek by moving water from Bridge Road through private lands to eastern fork of Kitching creek. Culvert under bridge road and control structure to stop discharges down Jenkins Ditch. To restore the slough area at the eastern fork of Kitching Creek.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained. May consider only for TSP. Feature is too far east of the NW Fork. Benefits will not contribute to our target flows at the NW Fork.
3.9.b	Kitching Creek Hydration: Spreader Canal at Jenkins Ditch.	Control Structure	Western side of Jenkins Ditch. Existing 72 inch culverts to bring water into a spreader canal that is needed. Need to plug Jenkins canal. Two spreaders proposed. Must still maintain flood control.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.9.b.i	Kitching Creek Hydration: Weir at Jenkins Ditch	Control Structure	Increase ground water level within northern park, pushes water back into spreader to rehydrate west branch of Kitching Creek.	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained.
3.9.c	North Fork Ditch Control Structure	Control structure	North fork ditch drains over 2000 acres. Control structure would reduce flows out of North fork ditch to benefit wetland area while maintaining drainage Hobe Hills. Could provide GW improvement and hold back freshwater that is currently going to tide through the north fork (not NW fork).	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Retained. May consider only for TSP. Feature is too far east of the NW Fork. Benefits will not contribute to our target flows at the NW Fork.

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No ID assigned	Modification/automation of S-76 in L-8 Canal	Operational Changes	Provides WQ improvement by allowing ag. Lands to drain to Lake, and natural lands to L-8 Canal.	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Screened out. Does not meet project goals and objectives by itself. Consider WQ with focused array.
No ID assigned	Storage in Moss - Impoundment	Storage	Provide storage of L-8 basin water between Flow-ways 1 and 2 at Moss Area.	Y	N	N	N	N	Y	Y	Y	N	Y	Y	Y	Screened out. Flowage easement criteria does not allow use of Moss as stormwater treatment area or impoundment, restoration only, not acceptable to FWC.
No ID assigned	Dredge M Canal to allow more conveyance of L-8 basin waters.	Canal Dredge	Dredge M Canal to allow more conveyance of L-8 basin waters.	N	N	N	N	N	Y	Y	Y	Y	N	Y	?	Screened out. Dredging canal does not meet project objectives.
No ID assigned	Add Rock Ballast Along M Canal	Water Quality	Potentially limestone to help with treatment. Improve Water Quality in M Canal.	N	N	N	N	N	Y	Y	Y	Y	N	Y	?	Screened out. No project objective met by this measure, may be reconsidered if needed to avoid violating constraints. May be needed as part of deliveries to replace water in GWP released through G-161.

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No ID assigned	Apoxee Flow Equalization Basin	Storage	With inflow/outflow structures for storage (Use Apoxee [1400 acres/stressed wetland], 4-48" culverts to hydrate, used to hydrate AWT, have a pump station Apoxee to Control 4, would remove concerns on poor water quality water, essentially and stormwater treatment area for the Lakes). Water storage in Apoxee will serve as replacement for restoration flows diverted from GWP through G-161.	N	N	N	N	N	Y	Y	Y	Y	N	Y	?	Screened out. No project objective met by this measure, may be reconsidered if needed to avoid violating constraints.
No ID assigned	Capture M Canal Seepage	Seepage Management	Improve flows to GWP and river. Between control structure 2 and 3 to improve flows to GWP and river.	N	N	N	N	N	Y	Y	Y	Y	N	Y	?	Screened out. No project objective met by this measure, may be reconsidered if needed to avoid violating constraints.
No ID assigned	Operational changes in L-8 Canal northwest of G-541 and downstream of S-76	Storage	Raise stage and increase canal storage and retain water in J.W. Corbett WMA.	N	N	N	N	N	Y	Y	Y	Y	N	Y	?	Screened out. No project objective met by this measure, may be reconsidered if needed to avoid violating constraints.
No ID assigned	Moss Property as STA using C-51 Phase II	STA	Increase drainage and treatment.	N	N	N	N	N	Y	Y	Y	N	Y	Y	?	Screened out. Flowage easement criteria does not allow use of Moss as STA or impoundment, restoration only, not acceptable to FWC.