APPENDIX H

COMBINED OPERATIONAL PLAN

HYDRAULICS & HYDROLOGY

ANNEX 3
BASELINE AND ALTERNATIVE MODELING ASSUMPTIONS

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H-3 BASELINE AND ALTERNATIVE MODELING ASSUMPTIONS

H-3.1 ALTERNATIVE Q+ PLAN FORMULATION OUTCOMES (FRAMEWORK FOR MODELING ASSUMPTIONS)

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

Region	Management Measures	Alternative A (No Action)	Alternative Q +	Adaptive Mgmt Operations (not modeled)	Additional Modeling Notes
WCA-3A	S-356	Operating Range from 5.5 to 5.8 feet, NGVD (under Condition 1 & 2 as defined in Increment 1.1 and 1.2)	Operating Range from 5.5 to 5.8 feet, NGVD S-356 has priority over S-333 except when WCA-3A is above the extreme high water action line (EHWL). Refer to supplemental documentation for EHWL operational criteria.		For ALT Q, modeling limitations and assumptions will be further described for the EHWL. Modeling intent will be represent the water management operational criteria to the greatest degree possible.
	S-12A/S-12B	Closed 1 Oct-14 July (with Exit Strategy)[1] Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)[1] Conditional operations in accordance with the BO with with limited cultural access releases.		
	S-344	Closed 1 Oct-14 July	~~Closed 1 Oct-14 July~~ Based on SRQ4, No seasonal closures and S-344 open when WCA3A in Zone A.		Removal of S-344 seasonal closures was not modeled in Round 3 Alternative Q.
	S-343A / S-343B	Closed 1 Oct-14 July	Closed 1 Oct-14 July		
	Increment 1 Action Line	10.0 feet to 10.75 feet, NGVD	No Action Line		
	Incremental Testing Extreme High Water (EHW) Action Line	No EHW Action Line (consistent with Increment 1.1 and 1.2)	COP EHWL 11.0-12.0 ft NGVD. Refer to supplemental documentation for EHWL operational criteria. There are three conditions when WCA-3A three gage average is above the extreme high water line which will trigger a thorough evaluation of the C&SF system conditions and authorize the use of available capacity along the L-31N and C-111 canals to provide additional discharge capacity from WCA-3A.		Due to the limited number (2-3 events) and relatively short duration of simulated events with WCA-3A stages above the EHWL with Round 2, and given the EHWL operational criteria recognition that each exceedance event may not require use of the full operational flexibility afforded by the EHWL criteria, the EHWL criteria are not represented within the RSM-GL.
	WCA-3A Regulation Schedule (Below Zone A)	2012 WCP (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west	ERDO, as informed by Alternative O (Tamiami Trail Flow Formula) ALT Q removes regulation schedule except for Zone A.	SRS low water conditions. Refer to Uncertainty #12b (Tamiami Trail Flow Formula and Drought) in the COP AMMP and COP Water Control Plan for complete details. WQ- Refer to Uncertainty #16b (Water Quality in NESRS) in the COP AMMP and COP Water Control Plan for complete details.	
WCA-3A/3B	S-335	Supplemental deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay L-30 maximum elevation between 6.5 to 7.5 feet, NGVD (6.5-7.0 in Condition 1 &2; 7.0-7.5 in Condition 3&4)	L-30 maximum elevation of 6.5 to 7.5 feet, NGVD S-335 used to support Taylor Slough supplemental flows (ERDO, as informed by Alternative O). S335TW limit of 6.1 feet NGVD, as informed by Alternative O, to facilitate Taylor Slough and S356 flows. Operational strategy will include additional input from Eco-subteam anaylsis (e.g. additional monitoring locations in WCA3B and Pennsuco Wetlands), not included for modeling.		ALTO and ALT Q assumptions for TS supplemental flows, based on iModel ERDO: S335_2 (5.8/5.3) - 400 cfs Aug1-Feb14 S335_3 (6.0/5.5) - 400 cfs Aug1-Feb14 S335_2 and S335_3 - turn off when S176HW >= 4.7 feet NGVD Further refinement of the operational criteria was completed for development of the COP WCP, while maintaining consistency with the model assumed triggers indicated above. Specifically, the low trigger operations at S-335 was limited to 200 cfs, and criteria were identified for TS supplemental deliveries from WCA 3A; adjusted criteria were not modeled.
NESRS	L-29	Up to 7.8 feet, NGVD	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr) L-29 will be operated up to 8.5 ft (duration above 8.3 ft NGVD) for 90 day per calendar year, with the opportunity to increase based on real time monitoring of the US41 Subbase (interim until TTNS construction) and 8.5 SMA flood mitgation criteria. Further details to be developed thru the Operational subteam.	L-29 will be operated up to 8.5 ft (duration above 8.3 ft NGVD) for 90 day per calendar year, with the opportunity to increase based on real time monitoring of the US41 Subbase (interim until TTNS construction) and 8.5 SMA flood mitgation criteria. Details were developed thru the Operational subteam. Refer to COP Water Control Plan for complete details.	Model 8.5 ft, NGVD for Oct thru Jan; and use 8.25 ft, NGVD for the remainder of year. Removal of the FDOT constraint will be evaluated through a sensitivity run following completion of the Alternative Q modeling.
	G-3273	Relax constraint (previously 6.8 feet, NGVD)	Remove use as an operational constraint for inflows to NESRS		
	S-333	Operated per WCA-3A Regulation Schedule, including priority to NESRS. Additional increase governed by L-29 stage. All available capacity as needed. (1350 cfs)	All available capacity as needed. (1350 cfs) S-356 has priority over S-333 except when WCA3A is above the EHWL, subject to the L-29 FDOT constraint		For ALT Q, modeling limitations and assumptions will be further described for the EHWL. Modeling intent will be represent the water management operational criteria to the greatest degree possible.
	S-333N	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions: A. When the average stages at gauges WCA 3A-62 and WCA 3A-63 exceed elevation 11.6 ft. NGVD for 72 hours. Discharges from the existing S-356 Pump Station shall have priority over the S-333N Gated Spillway discharges. B. S-333N is closed when the L-29 Canal stage limits the operations of the S-356 Pump Station, or when the average of the WCA 3A-62 and WCA 3A-63 gauges recedes below an elevation of 11.0 ft. NGVD. C. During operations of S-333N Gated Spillway, the following operations shall take place: i. There shall be no use of S-334 Gated Spillway to divert WCA-3A regulatory releases to the L-31N Canal; and ii. The S-356 Pump Station will have priority over the S-333N Gated Spillway and the S-356 Pump Station will be operated up to its full available capacity prior to opening G-211 Gated Culvert, and as the water levels recede in WCA-3, the G-211 Gated Culvert will be closed before the pumping at the S-356 Pump Station is reduced.	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions. Same as Alt O except S-333N has priority over S-356 when above the EHWL. Refer to supplemental documentation for EHWL operational criteria.		
	Rainfall Plan	1985 Rainfall Plan as modified in 2012 Water Control Plan (WCP) Operational intent is to maximize discharge capacity from S-333 to NESRS prior to utilization of the S-12s, subject to conditions below. When S-12s capacity is required the structure should be opened from east to west. S-12s/S-333 pre-emptive/proactive releases to better manage high stages in WCA-3A. S-12s and/or S-333 release up to projected WCA 3A inflow based upon system water management operations and/or rainfall to create storage in WCA-3A for expected inflow. Regulatory component of the Rainfall Plan determined by multiplying the distance (in feet) the WCA-3A water level is above Zone E/E1 by 2,500 cfs from 1 January through 30 June and by 5,000 cfs from 1 July through 31 December.	ERDO, as informed by Alternative O (Tamiami Trail Flow Formula)	SRS low water conditions. Refer to Uncertainty #12b (Tamiami Trail Flow Formula and Drought) in the COP AMMP and COP Water Control Plan for complete details. WQ- Refer to Uncertainty #16b (Water Quality in NESRS) in the COP AMMP and COP Water Control Plan for complete details.	For Alternative O, target RDO perfomance as identified in iModel "Round2 Base" scenario. Currently modeled as the sum of S333, S12D and S12C from iModel adjusted to account for anticipated regulatory flows. Development of a specific operating protocol / rainfall formula (as required for the COP System Operating Manual) will be pursued for Round 3. An overview of the modeling path forward will be provided at te COP PDT meeting on 02 April 2019.
	C-111 SD North Detention Area	Begin use of C-111SD NDA and remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)		Modeled NDA average bottom elevation set at 6.5 feet, NGVD. Internal L-318 levee is not resolved in the RSM-GL. Note for Alternatives O and Q: Pumped inflows to NDA are not constrained within the storage capacity limits for the NDA, but inflows are stopped prior to overtopping the eastern emergency overflow weirs (~3.5 feet NDA depth).

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

Region	Management Measures	Alternative A (No Action)	Alternative Q +	Adaptive Mgmt Operations (not modeled)	Additional Modeling Notes
SDCS	C-111 SD South Detention Area	Begin use of C-111SD SDA and remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)		Modeled SDA average bottom elevation set at 6.0 feet, NGVD. Internal L-321 levee is not resolved in the RSM-GL. Note for Alternatives O and Q: Pumped inflows to SDA are not constrained within the storage capacity limits for the SDA, but inflows are stopped prior to overtopping the eastern emergency overflow weirs (~3.5 feet SDA depth).
	S-178	Open (southerly flow only)	Open (southerly flow only)		RSM-GL special code includes current SFWMD standing order. No reverse flow is modeled.
	S-332B West	Maintain local flood risk management and conditional use during Column 2 operations, lower canal elevations with constrained operations to facilitate construction. Operating Range from 4.2 to 4.8 feet, NGVD Year Round Operational Ranges: Total operating range from 4.0 to 4.8 feet, NGVD to reflect the operational flexibility within the 4.2/4.8 range and the effect of limited (8 weeks) supplemental water supply the bottom (small) flow range extends below 4.2 feet, NGVD Individual operating ranges: 3. top range 4.3 to 4.7 feet, NGVD 2. middle range 4.2 to 4.4 feet, NGVD 1. bottom range 4.1 to 4.3 feet, NGVD for S-332BN, S-332B, and S-332C bottom range 4.0 to 4.2 feet, NGVD for S-332D S-194 and S-196 range of lowered from 4.2/4.8 to 4.2/4.6 during CSSS Nesting Period (15 Feb to 31 Jul) to reduce the use of S-332BN, S-332BW, S-332C, and S-332D. S194 and S-196 range of 4.2/4.8 from (Aug to 14 Feb) Discharge of up to about 200 cfs at S-176 to assist in maintain the L-31N during the 01 Aug to 14 Feb period during which agricultural fields are prepared planted and grow. Model as two structures with the following capacity fraction of the total capacity: 30% for CSSS discharges using 4.7/4.5 feet, NGVD (30% approx. = 200 cfs / 630 cfs design capacity); 70% for standard discharges using 4.75/5.0 ft, NGVD Notes: Seasonal pumping limits remain unchanged for S-332D.	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total; 2. middle range 175 cfs, increase 250 cfs total; 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD for S-332BN/BW/C; bottom range of 3.8-4.0 feet, NGVD for S-332D (priority for Taylor Slough); Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD for S-332BN/BW/C/D; Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD; S-332D unchanging at 3.8-4.0 Notes: Seasonal Capacity limits remain unchanged for S-332D.	Operational sub-team coordinated further review of supplemental deliveries to Taylor Slough to determine if additional benefits can be achieved. Refer to COP Water Control Plan for complete details.	Increment 1.1/1.2 operational flexibility to use one pump at S-332BW/ S-332BN and S-332C and up to two pumps at S-332D at a range of 3.8-4.2 ft NGVD to assist with CSSS habitat and nesting targets is not modeled for the No Action Alternative. The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range; the operation range for S332B, S332C, and S332D should be the same, with the limits delineated from the lowest to highest elevation of the operation range of S332B, S332C, and S332D identified in the modeling. The objective of changing where water will be sent will be handled by specifying a ramp up and ramp down sequence for the S332B, S332C, and S332D pump based on the water conditions and time of the year.
	S-332B North	Same as S-332B West	Same as S-332B West	Operational sub-team coordinated further review of supplemental deliveries to Taylor Slough to determine if additional benefits can be achieved. Refer to COP Water Control Plan for complete details.	
	S-332C	Same as S-332B West	S-332B West + 0.2 feet for all ranges. Operational criteria adjustment is informed by ERDO evaluation during Round 2 modeling, indicating that prioritizing use of S332B over S-332C would improve performance. S-332C operational criteria lowered by 0.1 feet from Alt O levels for all ranges based on PDT input following Round 2 evaluations. The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range; the operation range for S332B, S332C, and S332D should be the same, with the limits delineated from the lowest to highest elevation of the operation range of S332B, S332C, and S332D identified in the modeling. The objective of changing where water will be sent will be handled by specifying a ramp up and ramp down sequence for the S332B, S332C, and S332D pump based on the water conditions and time of the year. Further details to be developed thru the Operational subteam.	Operational sub-team coordinated further review of supplemental deliveries to Taylor Slough to determine if additional benefits can be achieved. Refer to COP Water Control Plan for complete details.	
	S-332D	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul) Pumping at S332D will use the following flow ranges: 3. top range 250 cfs increase 500 cfs total with 75 cfs sent through S332DX1 2. middle range 125 increase 250 cfs total with no flow sent through S332DX1 1. bottom range 125 cfs increase 125 cfs total (2) with no flow through S332DX1	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (~~Dec to~~ Jan) 250 cfs (Feb to 14 Jul) Seasonal restrictions were further considered with FWS after completion of Alternative Q modeling. ALT Q+ removes the seasonal pumping capacity restriction for S-332D during the month of December (included in RSM-GL Round 3 sensitivity simulation SRQ4, which additionally removed S-332D seasonal pumping capacity restrictions during January through 14 July).		Alternative Q model assumptions include S-332D limitations to 325 cfs during December.
	L-31N Structure Priority	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B (refer to S-332C note above) 3) S-332C (refer to S-332C note above) 4) S-194/S-196 (open at top of range) 5) S-176 Further details to be developed thru the Operational subteam. Refer to COP WCP for complete documentation.	The prioritization for the S332s will be considered as part of the ongoing ESA consultation for the CSSS.	
	S-332DX1	Supplemental Use for S-332D: S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. S-332DX1 is operated per Increment 1.1 and 1.2: 1. Operated to direct up to 75 cfs to the Southern Detention Area when S-332D is discharging more than 250 cfs 2.Assume routing 75 cfs through S332DX1 will allow the flows at S332D to be conservatively increased during the CSSS calendar based flow limits: a) 375 cfs from 01 December – 31 January (CSSS operational constraint 325 cfs); b) 325 cfs from 01 February – 14 July (CSSS operational constraint : 250 cfs)	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage < 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 10 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14		
	S-331/S-173	Full use under Column 2 discharges Increment 1.1/1.2: Level 1. When LPG2 > 6.5 feet, NGVD then S-331 HW will be maintained between 3.5 and 4.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet, NGVD. Level 2. When 6.0 <= LPG2 < 6.5 feet, NGVD then S-331 HW will be maintained between 4.5 and 4.0 feet, NGVD. Level 3. When 5.5 < =LPG2 < 6.0 feet, NGVD then S-331 HW will be maintained between 5.0 and 4.5 feet, NGVD. Level 4. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0). Modeled assuming S-331 HW maintained between 5.0-5.5 feet, NGVD Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay. It is the expectation that supplemental deliveries will not cause prolonged pumping with two or more units at S-331. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0) when pumping at S-331 and above 4.8 feet, NGVD when siphoning at S-331. There is no stage requirement when water supply deliveries are being made through G-211.	Operational Range of 4.5 to 5.0 feet (14Feb-31Jul) and 4.3 to 4.6 (1Aug-1Jan) with transition, NGVD. S-331 Operations available to help with 8.5 SMA flood mitigation. When G-3273 > 7.5 feet NGVD and LPG2 is projected to exceed 6.7 feet NGVD for more than the maximum 8.5 SMA flood mitigation criteria, S-331 HW will be lowered to 2.8 to 3.5 feet NGVD until LPG2 can be maintained between 6.2 and 6.6 feet NGVD. Further details to be developed thru the Operational subteam, and not included in modeling. Refer to COP WCP for complete documentation.		For the no action alternative, Level 1 criteria for S-331 HW use 6.5 ft NGVD -- 6.6 feet is prescribed in the Increment 1.1/1.2 operational strategy until LPG-2 falls below 6.5. Alternative O and Q, S-331 modeling notes: 1. Proposed criteria (originating from MWD Increment 2 criteria) including the "Ability to adjust up to 0.5 feet with the development of a trigger stage" (either up or down) will not be explicitly modeled with Round 2 or Round 3 COP. 2. Up to maximum pump capacity (575 cfs) will always be available at S-357 in the model (i.e. no pump limitations due to maintenance), other than if the NDA stage exceeds 10.0 feet NGVD (refer to NDA operational criteria). Therefore, the secondary criteria (originating from MWD Increment 2 criteria) for "if the required capacity at S-357 is unavailable" is not coded into the RSM-GL.

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES					
Region	Management Measures	Alternative A (No Action)	Alternative Q +	Adaptive Mgmt Operations (not modeled)	Additional Modeling Notes
	G-737*	As per SFWMD C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.		
	S-197	S-197 modeling criteria (refer to Table 2B/Table 3B in the Increment 1.1/1.2 Operational Strategy): Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully (2400 cfs). Level 2: If S-18C HW > 3.1 ft NGVD OR S-177 HW > 4.2: S-197 flows 1600 cfs Level 1: If S-18C HW > 2.8 ft NGVD OR S-177 HW > 4.1: a) In Condition 1: S-197 flows 800 cfs b) In Conditions 2, 3 or 4: S-197 flows 500 cfs Level 4 (low volume releases): S-197 flows are determined based on S-18C HW with respect to historical monthly median S-18C HW (Table 2B/3B). Operations to increase frequency while reducing flows (no net change); added EHW Condition flow criteria. Not intended to be opened greater than 400 cfs when S-18C HW is below 2.8 feet (floor of 1.8 feet, NGVD), NGVD or when S-177 HW is below 4.1 feet, NGVD.	Only use S-18C to trigger opening of S-197. ~~(a)~~ Level 1. When S-18C HW > 2.7 ft NGVD, open S-197 up to 200 cfs; close when S-18C HW < 2.5 ft NGVD. Flow may be adjusted from 0 to 200 cfs within the range. ~~(b)~~ Level 2. When S-18C HW > 2.9 ft NGVD, operate S197 up to 800 cfs; reduce to 200cfs when S-18C HW < 2.4 ft NGVD. ~~(c)~~ Level 3. When S-18CHW > 3.3 ft, operate S197 up to 2400 cfs; reduce to 800 cfs when S-18C HW < 2.4 ft. Operating intent is to transition down to lower flows holding S-18C < 2.4 ft NGVD. When S-331 is operating below S-331 normal operating range to assist in providing drainage to 8.5SMA then up to 200cfs can be routed to S-197 as long as S-18C HW > 2.3 ft. Priority would be to utilize available capacity at S-332B/C/D, S-199, S-200 prior to opening S-197. Operational details were developed thru the Operational subteam. Make consistent with S-176.		S-197 modeling criteria for the No Action Alternative Level 3T (Modeling artifacts- transitional ops to Level 3): If S-18C HW > 2.75 ft NGVD OR S-177 HW > 4.0: a) In Condition 1: S-197 flows 0 cfs-800 cfs. b) In Conditions 2, 3 or 4: S-197 flows from 0-500 cfs. Alternative O modeling assumptions: - transition from 0-200 cfs between 2.5 and 2.6 - transition from 200-800 cfs between 2.8 and 3.1 - transition from 800-2400 cfs between 3.1 and 3.3 Alternative Q modeling assumptions: Modeling limitations and assumptions will be further described for the S-197 criteria. Modeling intent will be to represent the water management operational criteria to the greatest degree possible.
	S-176	Operating Range from 4.75 to 5.0 feet, NGVD. S-176 discharges up to 200 cfs to Manatee Bay from 01 August – 14 February, conditional on S-176 HW stage above 4.5 ft, NGVD	Operating Range from 4.5 to 5.0 feet, NGVD; + 200 cfs to meet CSSS criteria (reduce use of S-332B/C/D); Additional discharges may be used anytime of the year, with limits designed to diminish likelihood of triggering a Level 2 or Level 3 opening at S-197. When S-331 is operating below S-331 normal operating range to assist in providing drainage to 8.5SMA then up to 200cfs can be routed to S-197 as long as S-18C HW > 2.3 ft. Flow from S-331 resulting in operation of S-332B, S-332C, and S-332D within 0.2 feet of the top of the range should result in use of available capacity at S-199 and S-200, and then, if needed, releases of up to 200 at S-197. Priority would be to utilize available capacity at S-332B/C/D, S-199, S-200 prior to opening S-197.		Due to limited capability to effectively represent these CSSS-informed operational criteria for Alternative Q, these operations are conceptually represented with a 50 cfs delivery when S-176 stages are between 4.3-4.5 feet, NGVD) during the CSSS nesting window. S-331 operations identified in Alternative Q to assist in providing drainage to 8.5 SMA were not modeled in the RSMGL due to the limited spatial resolution of the 8.5 SMA features within RSM-GL. These operations were eveluated with the MD-RSM and used to assess flood risk management performance.
	S-177	Operating Range from 3.6 to 4.2 feet, NGVD with high rainfall adjustments. S-177 discharges up to 200 cfs to Manatee Bay from 01 August – 14 February, conditional on S-177 HW stage above 3.2 ft, NGVD	Operating Range from 3.6 to 4.2 feet, NGVD + 200 cfs to meet CSSS criteria (reduce use of S-332B/C/D); Additional discharges may be used anytime of the year, with limits designed to diminish likelihood of triggering a Level 2 or Level 3 opening at S-197. If the rainfall over the past 14 days exceeds 5.5 inches or if significant rainfall is forecasted, then S-177 may be opened to lower S-177 HW to 3.3 feet NGVD.		Due to limited capability to effectively represent these CSSS-informed operational criteria, these operations are conceptually represented with a 100 cfs delivery when S-176 stages are between 3.2-4.0 feet, NGVD during the CSSS nesting window.
	S-18C	Operating Ranges: 2.3 to 2.6 feet, NGVD (Column 1) 2.0 to 2.25 feet, NGVD (Column 2 during Condition 3)	Operating Range of 2.3 to 2.6 feet, NGVD		
	S-199	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet NGVD (10 cm depth)		For Alternative O and Alternative Q, the S-199 and S-200 should be operated to full capacity prior to opening S-177, unless CSSS downstream stage constraints are exceeded.
	S-200	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)		For Alternative O and Alternative Q, the S-199 and S-200 should be operated to full capacity prior to opening S-177, unless CSSS downstream stage constraints are exceeded.
Taylor Slough	S-328	Deliveries to Taylor Slough up to 250 cfs (500 cfs capacity) when S-332D is pumping. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).	Open up to 250 cfs when flows through S-332D are greater than 250 cfs. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).		
Biscayne Bay	S-338	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational range from 5.5 to 5.8 feet, NGVD (tied to S-356)	Within the CSSS nesting period the operational range is between 4.9 feet to 5.3 feet, NGVD. The rest of the year the operational range is 5.5 to 5.8 feet, NGVD. Include refinement of operational criteria for coastal divide structures to opportunistically provide improved timing and spatial distribution of flows to Biscayne Bay, based on PDT evaluations of Round 2, Sensitivity Run #4 (Applied to Alternative O). Responsive to recommendations from the COP Ecological subteam to ensure COP operations maintain the "do no harm" standard for Biscayne Bay while aiming to prioritize spatial location of inflows to the South Bay. Specifically, decrease S-338 open by 0.1 feet (from 5.8 to 5.7, close remains 5.5). S-31 operated for water supply only. Further details to be developed thru the Operational subteam, and not included in modeling. Refer to COP WCP for complete documentation.		Revisit opportunities to tie into downstream benefits and CSSS flexible ops under Round 3 modeling, based on review of Round 2 sensitivity run #4. Open/close operational triggers were defined for Round 2 SR4 were retained for Alternative Q: 01JAN: 4.7/4.1 (open/close) 14FEB: 4.7/4.1 15FEB: 4.65/4.1 31JUL: 4.65/4.1 01AUG: 4.7/4.1 31DEC: 4.7/4.1 S-31 model assumptions: Water Supply only.
	S-194/S-196	Discharge to tide to supplement S-332s, flexibility to the 2012 WCP to Meet Sparrow RPA Targets Seasonal Operating Ranges from 4.2 to 4.8 feet, NGVD	Within the CSSS nesting period the operational range is 4.2 to 4.7 feet, NGVD. The rest of the year the operational range is 4.2 to 4.8 feet, NGVD. Include refinement of operational criteria for coastal divide structures to opportunistically provide improved timing and spatial distribution of flows to Biscayne Bay, based on PDT evaluations of Round 2, Sensitivity Run #4 (Applied to Alternative O). Responsive to recommendations from the COP Ecological subteam to ensure COP operations maintain the "do no harm" standard for Biscayne Bay while aiming to prioritize spatial location of inflows to the South Bay. Specifically, decrease S-194 and S-196 open/close by 0.1 feet in rulecurves (refer to modeler notes for Round 2 SR4 and Alternative Q levels). S-31 operated for water supply only. Further details to be developed thru the Operational subteam, and not included in modeling. Refer to COP WCP for complete documentation.		Revisit opportunities to tie into downstream benefits and CSSS flexible ops under Round 3 modeling, based on review of Round 2 sensitivity run #4. Open/close operational triggers were defined for Round 2 SR4 were retained for Alternative Q: 01JAN: 4.7/4.1 (open/close) 14FEB: 4.7/4.1 15FEB: 4.65/4.1 31JUL: 4.65/4.1 01AUG: 4.7/4.1 31DEC: 4.7/4.1 S-31 model assumptions: Water Supply only.

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

Region	Management Measures	Alternative A (No Action)	Alternative Q +	Adaptive Mgmt Operations (not modeled)	Additional Modeling Notes
Taylor Slough	SUPPLEMENTAL FLOWS TO TAYLOR SLOUGH	Water supply up to 250 cfs with constraints for a maximum of 8 weeks (November to December) -Supplemental flows to Taylor Slough from WCA-3A when WCA-3A is 1.0 ft above the floor (up to 250 cfs) -Supplemental Flows are delivered using the S-151/S-337/S-335/G-211/S-331 path for conditions when S-176 headwater stage is between 3.9-4.3 feet NGVD (refined from original ECB19 release range of 4.1-4.3 to better simulate operational intent)	Timing of Supplemental Flows as informed by Alternative O. See S-335 section for further information. Similar to operational criteria from MWD Increment 2, supplemental water deliveries of up to 300 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide flow to Taylor Slough and/or to slow recession in eastern ENP along the west side of the C-111 Northern Detention Area (NDA) and C-111 Southern Detention Area (SDA). Maximum supplemental flow limit increased from 250 cfs to 300 cfs based on operational experience gained by water managers during the MWD Increment 2 field test. Further details to be developed thru the Operational subteam. Operational strategy will include additional input from Eco-subteam anaylsis (e.g. additional monitoring locations in WCA3B and Pennsuco Wetlands), not included for modeling.	Operational strategy will include additional input from Eco-subteam anaylsis (e.g. additional monitoring locations in WCA3B and Pennsuco Wetlands), not included for modeling.	For Alternative O/Q, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the Round 2 modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD Increment 2, supplemental water deliveries of up to 250 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
WCA-3A/NESRS	S-334	Column 2 Under Condition 3 (Above Action Line)	Only used for Regulatory releases when WCA-3A is above the EHWL. Refer to supplemental documentation for EHWL operational criteria. There are three conditions when WCA-3A three gage average is above the extreme high water line which will trigger a thorough evaluation of the C&SF system conditions and authorize the use of available capacity along the L-31N and C-111 canals to provide additional discharge capacity from WCA-3A. Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints.		No Action Alternative and all ALTs use the S-151/S-337/S-335 for regional Water Supply deliveries from WCA-3A to Service Area 3 (S-334 is not modeled for water supply deliveries, although this path may be used for real-time operations when conditions permit). For COP Round 3 modeling of Alternative Q (unchanged from Round 1/2 modeling assumptions), S-334 would only be available for regulatory releases when WCA-3A stage exceeds the EHW line and when downstream capacity is available within the SDCS. The "short-term availability in accordance with FDOT constraints was not modeled for the Round 1 and Round 2 alternatives. Based on evaluation of the Round 2 results (Alternative O), simulated L-29 Canal stages exceeded 8.5 feet NGVD for only 5 days during October 1999. Based on the limited frequency of occurence, more detailed modeling is not warranted for Round 3.
n Structures for Modeling *considered during the development of alternatives)*	S-357	S-357 discharges into C-111SD NDA. Dependency on S-331 to provide 8.5 SMA flood mitigation, with S-357 as secondary. The following operations maintain consistency with Increment 1.1 and 1.2 following assumed operation of the C-111 South Dade NDA: • Level 1: If LPG-2 > 7.0 ft, NGVD: S-357 operated at 3.5-4.0 ft, NGVD • Level 2: If 6.0 <= LPG-2 < 7.0 ft, NGVD: S-357 operated at 4.0-5.0 ft, NGVD • Level 3: If 5.5 <= LPG-2 < 6.0 ft, NGVD: S-357 operated at 5.0-5.5 ft, NGVD • Level 4: If LPG-2 < 5.5 ft, NGVD: S-357 operated at 5.5-6.0 ft, NGVD • Max capacity limited to 500 cfs (match FDEP ops permit issued to USACE)	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 3. When G-3273 > 7.5 feet NGVD and LPG2 is projected to exceed 6.7 feet NGVD for more than the maximum 8.5 SMA flood mitigation criteria, S-357 HW will be lowered to 2.3 to 3.0 feet NGVD until LPG2 can be maintained between 6.2 and 6.6 feet NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD). Further details to be developed thru the Operational subteam, and not included for modeling. Refer to COP WCP for complete documentation.		Modeling notes for Alternative O/Q: 1. Different from the COP 2019 ECB assumptions, S-357 criteria are referenced to Angel's well stages, and not LPG-2 for conditions 1a, 1b, and 1c. Criteria 1d and 1e also add a check with interior 8.5 SMA stages at LPG-2 and 1e further adds a duration check. 2. Criteria #2 (LPG-2 > 7.0) should supersede criteria 1d and 1e if this threshold is exceeded (i.e. no dependency on Angel's stage). 3. "may be lowered by 0.5 feet increments if the flood mitigation criteria is not being met" will not be represented in the Round 2 modeling (evaluations will justify changes for Round 3). 4. Conditions for " WCA-3A discharges through S-333 structure to NESRS will be incrementally reduced" will not be represented in the Round 2 modeling (evaluations will justify changes for Round 3). Concurrent with COP Round 3 modeling, 8.5 SMA flood mitigation criteria for real-time operations will be refined based on MD-RSM simulated hydroperiod response to rainfall indicated within the 1983 base condition. Due to the limited years evaluated with the MD-RSM, the 8.5 SMA flood mitigation criteria will also leverage the real-time criteria established within the MWD Increment 2 field test monitoring plan to inform development of the COP Project Operating Manual.
	S-357N	100 cfs	The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range, as needed to maintain 8.5 SMA flood mitigation criteria: operating range 3.0 to 5.0 ft NGVD during wet conditions and 4.0 to 6.0 ft during dry conditions. Operational criteria will continue to be refined through continued implementation of the MWD Increment 2 field test. With limited operational experience for S-357N, the modeling assumptions are based on information provided by the COP water management sub-team, as developed during limited initial operations during the 2018 wet season: Operated between 5.5-5.6 feet NGVD from 1 December to 30 April, and between 5.0-5.1 feet NGVD for the remainder of the year. Limited to 100 cfs during normal operations with the ability to utilize up to 325 cfs design discharge capacity to assist 8.5 SMA flood mitigation. Further details to be developed thru the Operational subteam.		For Round 1 and Round 2 modeling: S-357N capacity limited to 100 cfs for RSM-GL to avoid over-drainage of adjacent ENP (testing protocols only defined in Increment 1.1 and 1.2). S-357N modeled as a 27' wide weir with crest at 5.0 feet NGVD. Operated between 5.5-5.6 feet NGVD from 1 December to 30 April, and between 5.0-5.1 feet NGVD for the remainder of the year.
	G-211	5.5 feet to 6.0 feet, NGVD during normal operations. Column 2 range of 5.3 feet to 5.7 feet, NGVD used during WCA-3A deliveries to SDCS (Condition 3 only).	5.5 feet to 6.0 feet, NGVD during normal operations.		
	S-148	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5 Additional clarification of the seasonal operating criteria needs to be developed for the COP WCP, not included in modeling.		SFWMD Operations Note: When S-338 is releasing water and during wet season or wet condition S-148 range needs to be lowered to 4.0/3.0 to effectively pass through all of the S-338 release when S-338 is releasing more than 100 cfs. These operation are not modeled. Additional clarification of the seasonal operating criteria need to be developed for WCP.
	S-179 (C-103)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season: 3.1-3.9 (If rainfall is high in wet season, 0.5 ft lowered ops range for S-179 and 0.5 ft lowered maintenance level for C-103; If rainfall is medium or low in wet season, no adjustments); Dry season: 2.5-3.0 (No adjustments in dry season)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.		SFWMD Operations Note: Releases from L-31N to tide through the C-103 are not modeled directly but are represent somewhat by the adjustment of operations due to rainfall. Operation range from 2.5 to 2.0 feet NGVD required to achieve needed capacity while maintaining drainage (effectively pass through the releases).
	S-165 (C-102)	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season : 4.2-4.7 (If rainfall is high in wet season, 1 ft lowered ops range for S-165 and 1 ft lowered maintenance level for C-102); If rainfall is medium in wet season, 0.3 ft lowered ops range and 0.3 ft lowered maintenenace level for C-102; If rainfall is low in wet season, no adjustments); Dry season: 3.2-3.8 (If rainfall is high in dry season, 0.2 ft lowered ops range for S-165 and 0.2 ft lowered maintenance level for C-103; If rainfall is medium or low in dry season, no adjustments).	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.		Releases from L-31N to tide through the C-102 are not modelled directly but are represent somewhat by the adjustment of operations due to rainfall. Operation range from 3.0 to 2.5 feet NGVD required to achieve needed capacity while maintaining drainage (effectively pass through the releases).
	S-167 (C-103)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)		

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

Region	Management Measures	Alternative A (No Action)	Alternative Q +	Adaptive Mgmt Operations (not modeled)	Additional Modeling Notes
Add-O (these structures were not	S-355 A/B	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.		
	S-12C/D	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	ERDO, as informed by Alternative O (Tamiami Trail Flow formula)		
	S-151	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). 300 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge. These deliveries will be conducted in coordination with ENP and USACE to provide flow to Taylor Slough and/or to slow recession in eastern ENP along the west side of the C-111 Northern Detention Area (NDA) and C-111 Southern Detention Area (SDA).		For Alternative O/Q, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD Increment 2, supplemental water deliveries from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
	S-337	Water Supply. WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	Water Supply. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.		For Alternative O/Q, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD Increment 2, supplemental water deliveries of up to 250 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
	S-152	Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.	Per DPM phase 2: WQ Constraints represented in model by using: Operational window limited to Sept 1 -- May 31; and may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 ft, NGVD. Closed in WCA-3B site 71 stage exceeds 8.5 ft, NGVD Priority over S-151 to deliver water to WCA-3B.		Modeled S-152 structure design capacity of (2/3 * 400 cfs) with 0.5 feet of head differential - SFWMD developed rating curve based on observed data. Details of L-67C gap and canal backfill treatments are not modeled.
	WCA-3A Floor for Water Supply	7.5 feet, NGVD, measured at S-333 Headwater	use monitoring gauge at 3-69W in addition to S333HW to help indicate the need for Lake Okeechobee in-kind releases. If stages in WCA 3A fall below 7.5 feet, NGVD at 3-69W, OR fall below 7.0 feet, NGVD at S-333HW.		During low water conditions, it is difficult to draw water from the interior of the WCAs. The regulation schedules for Water Conservation Areas Nos. 1, 2A, and 3A include minimum canal water levels (14.0 feet, 10.5 feet, and 7.5 feet, respectively) below which water releases from the WCAs must be preceded by an equivalent volume of inflow (excerpt from 2012 Water Control Plan).

[1]S-12A and/or S-12B will be conditionally opened during October under the following conditions.

1. WCA-3A stage on 30 Sep is greater than 10.5 feet, NGVD; or
2. WCA-3A stage is projected to rise above 10.75 feet, NGVD (IOP Zone A) during October, based on consideration of projected inflows and direct rainfall.
3. S-12A and/or S-12B will be conditionally closed when the WCA-3A stage falls below 10.25 feet, NGVD, OR on 01 November, whichever comes first.

S-12B will be conditionally opened during November under the following conditions.

1. WCA-3A stage on 31 Oct is greater than 11.0 feet, NGVD; or
2. WCA-3A stage is projected to rise above 11.25 feet, NGVD during November, based on consideration of projected inflows and direct rainfall.
3. S-12B will be closed when the WCA-3A stage falls below 10.75 feet, NGVD, OR on 01 December, whichever comes first.

Year-Round Operational Criteria:
S-12A Year-round: To provide access to cultural areas, when Rainfall Plan results in S-12 target flows, S-12A up to 100 cfs release.

S-12A Cultural Access Release: S-12A up to 100 cfs release available when Rainfall Plan results in S-12 target flows. From 01 October through 14 July, the Tribe and USACE must request informal consultation with FWS to avoid impacts on CSSS-A. During this time, the duration of this release will not exceed five consecutive days. S-12A up to 100 cfs release may only occur when WCA-3A 3-gage average (WCA-3AVG - Sites 63, 64, 65) is greater than 8.4 feet, NGVD. During S-12A up to 100 cfs release, data such as but not limited to NP-205 and area rainfall will be monitored with NP-205 increase or anticipated increase above 5.7 feet, NGVD resulting in closing of S-12A.

S-12A/B/C/D Headwater greater than 11.0 feet, NGVD: May be opened an amount only enough to stop overtopping of gates. The USACE will assess the feasibility of leaving the gates closed and allowing overtopping.

H-3.2 EXISTING CONDITIONS BASELINE 2019 ASSUMPTIONS

Hydrology and Hydraulics Bureau & Interagency Modeling Center

Regional Simulation Model Glades-LECSA (RSMGL)
Combined Operational Plan (COP)
Existing Condition Baseline 2019
Table of Assumptions

DRAFT

Summary:

Existing Condition. The existing condition is intended to represent conditions assumed in place at the time of implementation of the COP Water Control Plan in 2019. This base condition will include the following: (1) MWD Increment 1.1 and 1.2 (operational changes required under the July 2016 ERTP BO and in response to new information gained during the 2016 Temporary Emergency Deviation); (2) existing C&SF project infrastructure and Regulation Schedules (including 2008 Lake Okeechobee Regulation Schedule); (3) MWD Tamiami Trail Modifications 1-Mile Bridge and Raised Roadway; (4) Tamiami Trail Next Steps 2.6 Mile Western Bridge; (5) full construction of C-111 South Dade to include Contracts 8, 8A and 9; (6) 8.5 SMA project features to include C-358 and S-357N; (7) Miami-Dade Limestone Products Association (MD-LPA) 5-mile Seepage Reduction wall (partially-penetrating) along L-31 North; (8) current permitted operations for the SFWMD C-111 Spreader Canal project components (includes G-737 and S-199/S-200 at expanded 300 cfs each); (9) the expanded capacity at S-333 completed by the South Florida Water Management District (SFWMD) component of the Central Everglades Planning Project (CEPP), with operations as prescribed by the July 2018 permit issued by FDEP to SFWMD; (10) plug installed at junction of the old Tamiami Trail Roadway and ENP Shark Valley Tram Road, south of WCA 3A; and (11) operation of the Decomp Physical Model S-152 structure per the 2017 Environmental Assessment. Refer to COP Scope for further information. The assumptions table was derived starting from the RSM-GL Existing Condition Baseline and Future Without Project Baseline assumptions developed for the Western Everglades Restoration Project (WERP), dated March 2018.

Feature	
Meteorological Data	• Rainfall file used: rain_v3.0_beta_tin_14_05.bin • Reference Evapotranspiration (RET) file used: RET_48_05_MULTIQUAD_v1.0.bin (ARCADIS, 2008)
Topography	• Same as calibration topographic data set except where reservoirs are introduced (STA1-E, C4 Impoundment and C-111 reservoirs). • United States Geological Survey (USGS) High-Accuracy Elevation Data Collection (HAEDC) for the Water Conservation Areas (1, 2A, 2B, 3A, and 3B), the Big Cypress National Preserve and Everglades National Park.

Feature	
	monitoring location EVER4 for the protection of the CSS Critical Habitat Unit 3.
Water Conservation Area 1 (Arthur R. Marshall Loxahatchee National Wildlife Refuge)	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow. • Structure S10E connecting LNWR to the northeastern portion of WCA-2A is no longer considered part of the simulated regional system
Water Conservation Area 2A & 2B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 10.5 ft in WCA-2A, defined as when WCA2-U1 marsh gauge falls below 10.5 ft or L38 canal stage falls below 10.0 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow.
Water Conservation Area 3A & 3B	• Everglades Restoration Transition Plan (ERTP) regulation schedule for WCA-3A, as per SFWMM modeled alternative 9E1 (USACE, 2012) with the following updates: ○ Priority use of S-333 for WCA-3A Rainfall Plan deliveries, followed by S-12D, S-12C, S-12B, S-12A ○ S-12 A&B gate overtopping if headwater stage > 11.0 ft, NGVD, simulated as a weir. ○ Updated S-12 effective rating curves based on historical observations compared to 3A-28 (Site 65) gauge. ○ Inflows to ENP per Increment 1.1 and 1.2 including seasonal closures for S-12A, S-12B, S-343A/B, and S-344 from 01 October through 14 July; the WCA-3A high-water exit strategy during October and November (per the 2016 ERTP Biological Opinion) is included in the model. • Include S-152 operations (design capacity 750 cfs) per Decomp Physical Model, Phase 2 [assumes September 1 through May 31 operations of S-152] with flow limitation based on actual performance of S-152. ○ Modeled structure design capacity of 400 cfs with 0.5 feet of head, consistent with observed operations during 2016-2017 emergency deviations (flow may exceed 400 cfs with higher head differential) ○ Operational window limited to September 1 through May 31, consistent with historical water quality data evaluated in the 2017 DPM Phase 2 Environmental Assessment

Feature	
	• US Army Corps of Engineers (USACE) Digital Elevation Model (DEM) interim version 2017 for BCNP and Western Basins for areas not covered by HAEDC.
Tidal Data	• Tidal data from two primary (Naples and Virginia Key) and five secondary NOAA stations (Flamingo, Everglades, Palm Beach, Delray Beach and Hollywood Beach) were used to generate a historic record to be used as sea level boundary conditions for the entire simulation period.
Land Use and Land Cover	• Land Use and Land Cover Classification for the Lower East Coast urban areas (east of the Lower East Coast Flood Protection Levee) use 2008-2009 Land Use coverage as prepared by the SFWMD, consumptive use permits as of 2011 were used to update the land use in areas where it did not reflect the permit information. • Land Use and Land Cover Classification for the natural areas (west of the Lower East Coast Flood Protection Levee) is the same as the Calibration Land Use and Land Cover Classification for that area, 2008-2009. • Land Use and Land Cover Classification for the Feeder Basins, C-139 Annex, Seminole Tribe of Florida (STOF) and Miccosukee Tribe of Florida (MTOF) Reservations, 2012-2014 Land Use coverage as prepared by the SFWMD. • Modified at locations where reservoirs are introduced (STA1-E, Site 1 Impoundment, Broward WPAs, C4 Impoundment, Lakebelt Lakes and C-111 Reservoirs).
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing 2001 planted acreage. • The 2-in-10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. • AFSIRS modeled 2-in-10 demands equaled 2,659 MGM. Type of crop and water thru G409 were used to set seasonal distribution of demand, then all demands increased to Compact level. • 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. • LOWSM applies to this agreement.
Water Control Districts (WCDs)	• Water Control Districts in Palm Beach and Broward Counties and in the Western Basins assumed.
Lake Belt Lakes	• Based on the permitted 2020 Lake Belt Lakes coverage obtained from USACE.
CERP Projects	• 2nd Generation CERP – C-111 Spreader Canal Project includes the Frog Pond Detention Area, which is modeled as an above ground impoundment with the S200 A, B and C pumps as inflow structures. In addition, the Aerojet canal is modeled with the inflow pumps S199 A, B and C. S199 and S200 design capacities expanded to 300 cfs each. The S199 and S200 pumps are turned off based on the stage at the remote

Feature	
	○ May be operated when L-67A Canal stage at S-151 headwater exceeds 9.3 feet NGVD (surrogate for DPM Phase 2 water quality constraints, as recommended by SFWMD) ○ Closed if WCA-3B Site 71 stage exceeds 8.5 feet NGVD ○ Flows in the model are jumped to a cell east of L67C since actual canal infilling and levee degrading are not modeled. • Includes regulatory releases to tide through LEC canals. Documented in Water Control Plan (USACE, April 2012) • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A, defined as when 3-69W marsh gauge falls below 7.5 ft or CA3 canal stage falls below 7.0 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow.
Western Basins	• C139 Annex flows routed to L-28 • L-28 weir, located immediately south of I-75, prevents northerly flow from the L-28 Canal towards the S-140 pump station • L-28 Tie-back Levee gaps modeled as a combined weir • Jetport runway modeled as no-flow boundary with 2 transverse culverts modeled as weirs.
Everglades Construction Project Stormwater Treatment Areas	• STA-1E: 5,132 acres total treatment area. • A uniform bottom elevation equal to the spatial average over the extent of STA-1E is assumed. • Note: STA-1W, STA-2, STA-3/4, STA-5, and STA-6 are not simulated within the RSM-GL (refer to WERP RSM-BN assumptions).
Everglades National Park	• Water deliveries to Everglades National Park are based upon Everglades Restoration Transition Plan (ERTP), with the WCA-3A Regulation Schedule including the lowered Zone A (compared to IOP) and extended Zones D and E1. ○ Priority use of S-333 for WCA-3A Rainfall Plan deliveries, followed by S-12D, S-12C, S-12B, S-12A ○ S-12 A&B gate overtopping if headwater stage > 11.0 ft, NGVD, simulated as a weir. ○ Updated S-12 effective rating curves based on historical observations compared to 3A-28 (Site 65) gauge. ○ Inflows to ENP per Increment 1.1 and 1.2 including seasonal closures for S-12A, S-12B, S-343A/B, and S-344 from 01 October through 14 July. • L-29 constraint for operation of S-333, 355A, 355B and 356 assumed to be consistent with Increment 1.1 and 1.2 (up to 7.8 feet NGVD) operational strategy.

Feature	
	• S-333 capacity increased to 2,500 cfs (per SFWMD expedited construction of this CEPP component), with Emergency Limited Operations of the additional 1150 cfs spillway (S-333N) to provide high water relief in WCA 3 during the following conditions (prescribed by Special Condition #19 of the 30 July 2018 FDEP permit issued to SFWMD): ○ When the average stages at gauges WCA 3A-62 and WCA 3A-63 exceed elevation 11.6 ft. NGVD for 72 hours, the Permittee may operate the S-333N Gated Spillway subject to the L-29 Canal stage constraint. Discharges from the existing S-356 Pump Station shall have priority over the S-333N Gated Spillway discharges. ○ The Permittee shall cease operations of the S-333N Gated Spillway when the L-29 Canal stage limits the ○ operations of the S-356 Pump Station, or when the average of the WCA 3A-62 and WCA 3A-63 gauges recedes below an elevation of 11.0 ft. NGVD. ○ During operations of S-333N Gated Spillway, the following operations shall take place: (i) There shall be no use of S-334 Gated Spillway to divert WCA-3A regulatory releases to the L-31N Canal; (ii) The S-356 Pump Station will have priority over the S-333N Gated Spillway. • G-3273 constraint for operation of S-333 assumed to be consistent with Increment 1.1 and 1.2 operational strategy (constraint is removed, subject to FDOT and 8.5 SMA constraints). • The one mile Tamiami Trail Bridge as per the 2008 Tamiami Trail Limited Reevaluation Report is modeled as a one mile weir. Located east of the L67 extension and west of the S334 structure. • Western 2.6 mile Tamiami Trail Bridge, modeled as a 2.6 mile long weir, and is located east of Osceola Camp and west of Frog City. • Tamiami Trail culverts east of the L67 Extension are simulated where the bridges are not located. • Explicit simulation of Old Tamiami Trail Borrow Canal, with Tram Road east-west culvert and approximations of gap and bridge features. • Simulation of blocking of the Old Tamiami Trail Borrow Canal between S-12C and S-12 B (at the junction with the Shark Valley Tram Road), along with the blocking of culverts under Shark Valley Tram Road. • 5.5 miles remain of the L-67 Extension Levee. • S-355A & S-355B are operated per Increment 1.1 and 1.2. • S-356 is operated per Increment 1.1 and 1.2. • S-334 is operated per Increment 1.1 and 1.2. • Full construction of C-111 project reservoirs consistent with the 2009 as-built information from USACE plus addition of contract 8,

Feature	

	contract 8A, and contract 9 features. A uniform bottom elevation equal to the spatial average over the extent of each reservoir is assumed.
	• S-332D seasonal pumping limits per the 2016 ERTP Biological Opinion: no constraint from 15 July – 30 November; 325 cfs from 01 December – 31 January; 250 cfs from 01 February – 14 July
	• S-332DX1 is operated per Increment 1.1 and 1.2.
	  ○ Operated to direct up to 75 cfs to the Southern Detention Area when S-332D is discharging more than 250 cfs (at least three pumps operating)
	  ○ Assume routing 100 cfs through S332DX1 will allow the flows at S332D to be conservatively increased during the CSSS calendar based flow limits: 375 cfs from 01 December – 31 January; 325 cfs from 01 February – 14 July
	• 8.5 SMA seepage canal is explicitly modeled. 8.5 SMA project feature as per federally authorized Alternative 6D of the MWD/8.5 SMA Project (USACE, 2000 GRR); operations per the Increment 1.1 and 1.2 operational strategy. 8.5 SMA detention cell modeled as part of the C-111 Northern Detention Area (NDA), with S-357 operated up to 500 cfs following completion of NDA. Dependency on S-331 to provide 8.5 SMA flood mitigation, with S-357 as secondary. The following operations maintain consistency with Increment 1.1 and 1.2 following assumed operation of the C-111 South Dade NDA:
	  ○ If LPG-2 < 5.5 feet, NGVD: S-357 operated at 5.5-6.0 feet, NGVD;
	  ○ If 5.5 <= LPG-2 < 6.0 feet, NGVD: S-357 operated at 5.0-5.5 feet, NGVD;
	  ○ If 6.0 <= LPG-2 < 7.0 feet, NGVD: S-357 operated at 4.0-5.0 feet, NGVD
	  ○ If LPG-2 > 7.0 feet, NGVD: S-357 operated at 3.5-4.0 feet, NGVD
	  ○ NDA tailwater stage constraint of 8.6 feet NGVD for S-357 and 8.5 feet for S-332B North (NDA inflows from S-357 have priority over NDA inflows from S-332B North)
	• An additional length of seepage canal (C-358 Richmond Drive Seepage Collection Canal) is assumed in the model to allow water to be collected for S357 operation, and includes operation of S-357N consistent with the Increment 1.1 and 1.2 operational strategy.
	  ○ S-357N capacity limited to 100 cfs for RSM-GL to avoid over-drainage of adjacent ENP (testing protocols only defined in Increment 1.1 and 1.2).
	  ○ S-357N modeled as a 27' wide weir with crest at 5.0 feet NGVD. Operated between 5.5-5.6 feet NGVD from 1 December to 30 April, and between 5.0-5.1 feet NGVD for the remainder of the year.

Feature	
	• Partial depth, approximately 5 mile long seepage reduction barrier south of Tamiami Trail (along L-31N), representative of the seepage reduction barrier installed by the Miami-Dade Limestone Product Association. • Supplemental flows to Taylor Slough from WCA-3A (up to 250 cfs), per Increment 1.1 and 1.2. ○ Limited to 8 weeks per year when WCA-3A stages are below the historical median (for simplified model representation, Supplemental Flows are delivered using the S-151/S-337/S-335/G-211/S-331 path during November and December only, when S-176 headwater stage is between 4.1-4.3 feet NGVD and subject to tailwater constraints at these structures)
Other Natural Areas	• Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay
Public and Industrial Water Supply	• Public Water Supply pumpage for the Lower East Coast was updated using 2010 consumptive use permit information as documented in the C-51 Reservoir Feasibility Study; permits under 0.1 MGD were not included • Seminole Big Cypress Reservation Public Water Supply groundwater volumes as reported for 2016 • Residential Self Supported (RSS) pumpage are based on 2030 projections of residential population from the SFWMD Water Supply Bureau. • Industrial pumpage is also based on 2030 projections of industrial use from the Water Supply Bureau. • Irrigation demands for the six irrigation land-use types are calculated internally by the model. • Seminole Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.
Irrigation	• Lower East Coasts Irrigation demands for the six irrigation land-use types are calculated internally by the model using AFSIRS. • Feeder Canal Basins – Land use as described above used for AFSIRS calculation distributed over permitted groundwater facilities.
Canal Operations	• C&SF system and operating rules in effect per Increment 1.1 and 1.2 operational strategy • Includes operations to meet control elevations in the primary coastal canals for the prevention of saltwater intrusion • Includes existing secondary drainage/water supply system • C-4 Flood Mitigation Project • Western C-4, S-380 structure retained open • C-11 Water Quality Treatment Critical Project (S-381 and S-9A) • S-25B and S-26 backflow pumps are not modeled since they are used very rarely during high tide conditions and the model uses a long-term average daily tidal boundary

Feature	
	• Northwest Dade Lake Belt area assumes that the conditions caused by currently permitted mining exist and that the effects of any future mining are fully mitigated by industry • ACME Basin A flood control discharges are sent to C-51, west of the S-155A structure, to be pumped into STA-1E. ACME Basin B flood control discharges are sent to STA-1E through the S-319 structure • Releases from WCA-3A to ENP and the South Dade Conveyance System (SDCS) will follow the Increment 1.1 and Increment 1.2 operational strategy ○ Structures S-343A, S-343B, S-344 are closed Oct. 1 to July 14; include extended closures for S-12A and S-12B (Oct. 1 to July 14); the WCA-3A high-water exit strategy during October and November (per the 2016 ERTP Biological Opinion) is included in the model (i.e. S-12A/B conditionally open in October depending on WCA-3A average stage; S-12B conditionally open in November dependent on WCA-3A average stage). ○ Regulatory releases from WCA-3A to the SDCS (Column 2) are only permitted when the WCA-3A stage is above the Increment 1 Action Line during the S-12A seasonal closure window (during operations Condition 3) • South Dade Conveyance System operations follow Increment 1.1 and 1.2 ○ Ramp-up operations for S332s ○ S-332B/C/D operating range is 4.2 to 4.8 following completion of the C-111 NDA ○ Priority for L-31N Canal structure operations: S-332D; S-332B/C; S-194/S-196; S-176 • S-176 discharges up to 200 cfs to Manatee Bay from 01 August – 14 February, conditional on S-176 HW stage above 4.5 ft, NGVD • S-177 discharges up to 200 cfs to Manatee Bay from 01 August – 14 February, conditional on S-177 HW stage above 3.2 ft, NGVD • Updated canal water supply maintenance levels: L-31S Canal (S-331 to S-176) ○ Maintenance level : 3.5 ft, NGVD (Not 4.0 ft) ○ Reserve level : 3.0 ft, NGVD (Not 3.5 ft) • Updated canal water supply maintenance levels: C-111 canal (S-176 to S-177) ○ Maintenance level : 2.5 ft (Not 3.0 ft) ○ Reserve level : 2.0 ft (Not 2.4 ft)
Canal Configuration	• Canal configuration same as calibration, with the following exceptions: ○ Only 5.5 miles remain of the L-67 Extension Canal. ○ Additional canals included in the model for WERP: ○ Northern WERP Area, 74 miles ○ Tamiami Trail Borrow Canal, 32 miles

Feature	
	▪ Additional structures: 40 Tamiami Bridges, modeled as weirs ○ Loop Road, 23 miles ▪ Additional structures: 96 Loop Road Culverts, modeled as 17 weirs (multiple culverts aggregated into one weir within each grid cell)
Pre-storm drawdown	• Limited to high rainfall events only and applies for LEC canals (based on 2-week moving average of rainfall) and associated structures ○ Palm Beach County: ▪ C51 canal and coastal structures (S155, S41, S40) ○ Broward County: ▪ Hillsboro canal and coastal structure (G56) ▪ C-14 Canal and structure (S37B) ▪ C-14E and coastal structure (S37A) ▪ North Fork Middle River/L35A/C-13 and coastal structure (S36) ▪ North New River and coastal structures (G54, G123) ▪ C-11 Canal and structure (S13S/S13P) ○ Miami-Dade County: ▪ C-9 Canal and coastal structure (S29) ▪ C-8 Canal and coastal structure (S28) ▪ C-7 Canal and coastal structure (S27) ▪ C-6 Canal and coastal structure (S26) ▪ C-2/C-4 Canal and coastal structure (S25B, S22, G93) ▪ C-5/Comfort canal and coastal structure (S25) ▪ C-100B canal and coastal structure (S21) ▪ C-102 canal and coastal structure (S165) ▪ C-103S canal and coastal structure (S167) ▪ C-103N/S179 u/s canal and structure (S179) ▪ C-111 canal and structure (S177) • Pre-storm drawdown for named storms are not captured in the model
Seasonal drawdown	Coastal structures S21A on C-102 per SFWMD structure book: • High Range Operation (May 1 to October 15th) ○ Open/Close: 2.2/ 1.8 • Intermediate Range Operation (January 1 to April 30th) ○ Open/Close: 1.8/ 1.4 • Low Range Operation (October 16th to December 31th) ○ Open/Close: 1.4/ 1.0 Coastal structures S20F on C-103 per SFWMD structure book: • High Range Operation (May 1 to October 15th) ○ Open/Close: 2.2/ 1.8 • Intermediate Range Operation (January 1 to April 30th) ○ Open/Close: 1.7/ 1.3

Feature	
	• Low Range Operation (October 16th to December 31th) ○ Open/Close: 1.4/ 1.0

Canal Configuration	• Canal configuration same as calibration except only 5.5 miles remain of the L-67 Extension Canal
	• Old Tamiami Trail Borrow Canal added (WERP RSM-GL updates)
	• Additional canals simulated in Western Areas (WERP RSM-GL updates)
	  ○ Lard-Can, Wingate and South Boundary Canals
	  ○ Tamiami Trail Borrow Canal, west to SR29
	  • 40 Tamiami Bridges modeled as 40 weirs
	  ○ Loop Road
	• 96 Loop Road Culverts modeled as 17 weirs (aggregated with average of 6 culverts each)

Lower East Coast Service Area Water Shortage Management	• Lower east coast water restriction zones and trigger cell locations are equivalent to SFWMM ECB implementation. An attempt was made to tie trigger cells with associated groundwater level gages to the extent possible. The Lower East Coast Subregional (LECsR) model is the source of this data. • Periods where the Lower East Coast is under water restriction due to low Lake Okeechobee stages were extracted from the corresponding Western Everglades Restoration Project WERP RSM-BN ECB simulation.

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 northern boundary of the RSMGL model were provided from either the South Florida Water Management Model (SFWMM) or the RSM Basins Model (RSMBN). The SFWMM (ECB1.3 CEPP) was the source of the northern boundary groundwater/surface water flows, while the WERP Existing Condition Baseline RSM-BN (svn revision 13413) was the source of the northern boundary structural flows. Additional boundary conditions included for WERP:
  - Okaloacoochee flows
  - Stage boundary conditions along Deer Fence Canal
  - Stage boundary conditions along L2/L3 canal

H-3.3 EXISTING CONDITIONS BASELINE ASSUMPTIONS -MDRSM

H-3.3.1 BASELINE CONDITION COMPONENTS – MDRSM SIMULATIONS

Regional Model Component	COP ECB 2019	1983 Base	1994 C-111 GRR
COP Modeling Tool(s)	RSM-GL (boundary condition from MD-RSM) and MD-RSM (from RSM-GL)	MD-RSM only; boundary conditions from CSOP SFWMM	MD-RSM only; boundary conditions from CSOP SFWMM
Operations Base	ERTP (2012 WCP), with MWD Increment 1.2	Sourced from CSOP Reference Review	Sourced from CSOP Reference Review
FWS Biological Opinion	CSSS Ops Constraints (2016): S-343A/B; S-344; S-12A/B; S-332D	N/A	N/A
LEC Water Supply	WS Maintenance Levels: 3.5 ft NGVD for L-31S; 2.5 ft C-111; 1.8 for S-18C HW	Retain ECB 2019 Criteria	Retain ECB 2019 Criteria
Lake Okeechobee * **	2008 LORS	Interim Regulation Schedule (1978)	"Run 25" Schedule
WCA-1 **	current schedule (implemented in 1996)	1975 - 1995 Regulation Schedule	1975 - 1995 Regulation Schedule
WCA-2A **	current schedule (implemented in 1989)	current schedule (per MWD 1992 GDM assumptions)	current schedule (per MWD 1992 GDM assumptions)
Water Deliveries into ENP NESRS	yes, in accord with WCA-3A Regulation Schedule and MWD Increment 1.2	no (base is prior to Experimental Deliveries Program)	yes, Modified Rain-Driven Plan (1992 MWD GDM default)
8.5 SMA GRR features	yes (includes perimeter levee, C-357, and C-358 and S-357N per 2012 EA); S-357 discharges to C-111SD NDA via 8.5 SMA Detention Cell internal flowway	no 8.5 SMA flood mitigation features; 8.5 SMA water levels are managed with S-331 pump	as defined in 1992 MWD GDM (includes perimeter levee and original C-357, with S-357 discharging into L-31N)
G-3273 constraint	no (per MWD Increment 1.2)	no	no (8.5 SMA flood mitigation project assumed complete)
STAs * **	1E, 1W (RS expansion); 2, 5/6 (B/C expansion); 3/4; A-1 FEB	none (STAs were initially operated from 1995-2004)	none (STAs were initially operated from 1995-2004)
Pre-storm drawdown	3 days (Pam Beach, Broward, and Dade County control structures)	not defined in CSOP documentation; retain ECB 2019 criteria	not defined in CSOP documentation; retain ECB 2019 criteria
Seasonal drawdown	applied for coastal structures S-21A (C-102) and S-20F (C103) per SFWMD	not defined in CSOP documentation; retain ECB 2019 criteria	not defined in CSOP documentation; retain ECB 2019 criteria

WCA-3A & WCA-3B Components	COP ECB 2019	1983 Base	1994 C-111 GRR
WCA-3A	current schedule (2012 ERTP), with MWD Increment 1.2 closures	1983 Regulation Schedule (9.5-10.5 ft NGVD; no transition)	Modified Rain-Driven Plan (1992 MWD GDM default)
Zone E1 included on WCA-3A schedule	yes	no	no
WCA-3A High Water Exit Strategy	yes (MWD Increment 1.2)	no	no
L-29 Constraint	7.8 feet NGVD	no L-29 constraint (S-333 and S-334 only used for WS)	9.5 feet NGVD (8.5 SMA flood mitigation assumed complete)
S-345s (1992 MWD GDM)	no	no	3@500 cfs capacity each (Modified Rain-Driven Plan ops)
S-349s (1992 MWD GDM)	no	no	L-67A control structure used to convey water supply only
S-152 (USACE DPM design test)	capacity 400 cfs at 0.5 ft head; operated SEP-MAY when S-151 HW > 9.3 ft NGVD, per WQ constraints; closed if WCA-3B Site 71 or SRS-1 > 8.5 ft NGVD	no	no
S-12s	East to West priority after S-333; Increment 1.2 CSSS ops; 3A schedule	Open if above schedule; SRS Minimum Delivery Schedule	45% target distribution for WSS (ops per WCA-3A schedule)
S-333	First priority for SRS RF Plan, subject to L-29 constraint ; 1350 cfs capacity for normal ops; 2500 cfs for WCA-3A high water (FDEP permit)	WS only; 1350 cfs capacity	55% target distribution for NESRS, subject to L-29 constraint 1350 cfs capacity
S-343/S-344	MWD Increment 1.2 CSSS constraints	WCA-3A schedule (constructed in 1986, but authorized prior to 1983)	WCA-3A schedule (constructed in 1986)
WCA-3B	no regulation schedule; inflows discontinued if Site 71 stage > 8.5 ft NGVD	no regulation schedule; inflows discontinued if Site 71 stage > 8.5 ft NGVD	no regulation schedule; inflows discontinued if Site 71 stage > 8.5 ft NGVD
S-355s	open when positive head gradient south, subject to L-29 constraint	no (MWD construction completed in 1998)	55% target distribution for NESRS, subject to L-29 constraint
S-334	WS; FC used in Increment 1.2 Condition 3 only, subject to SDCS capacity	WS only; no "Column 2" releases	WS only; no "Column 2" releases
S-151	WS; FC per Increment 1.2 in Condition 3 (WCA-3A > Action Line)	WS; FC per WCA-3A regulation schedule	WS; FC per WCA-3A regulation schedule
S-337	WS; FC per Increment 1.2 in Condition 3 (WCA-3A > Action Line)	WS only; no "Column 2" releases	WS only; no "Column 2" releases
S-335	WS; Condition 1 & 2: 6.5-7.0 ft NGVD; Condition 3&4: 7.0-7.5 ft NGVD	WS only (optimum stage 6.0 ft NGVD); FC if gates overtopped at 7.0 ft NGVD	WS; FC with 6.0 ft NGVD open trigger; 5.0 ft NGVD TW stage constraint

ENP Component	COP ECB 2019	1983 Base	1994 C-111 GRR
Eastern Tamiami Trail Bridges	MWD 1.0-mile east bridge; DOI TTNS 2.6 mile west bridge	no bridges in-place;19 sets of culverts (55 total culverts)	no bridges in-place;19 sets of culverts (55 total culverts)
MD-LPA Seepage Reduction Wall	5.0 miles total length (35-foot depth; completed April 2016)	no	no
L67 Extension Levee and Canal	5.5 miles remain	9.5 miles remain (completed in 1967)	0 miles remain (complete removal per MWD 1992 GDM)
Old Tamiami Trail Borrow Canal Plug	yes (located between S-12B and S-12C)	no	no
Taylor Slough Min. Delivery Schedule	no	yes	yes
S-332 and S-205	S-332 closed (decommissioned under C-111SD Contract 9); replaced by S-205weir	165 cfs; Taylor Slough Min. Del. Schedule	165 cfs; Taylor Slough Min. Del. Schedule
S-175	closed (removed under C-111SD Contract 9)	FC 4.5-5.2 ft NGVD	FC 4.5-5.0 ft NGVD
Taylor Slough Supplemental Flows	WCA-3A up to 250 cfs in NOV-DEC (limited to 8 weeks, depends on S-176 HW)	no	no
ENP Panhandle	minimum deliveries via S-18C	minimum deliveries via S-18C	minimum deliveries via S-18C

L-31N and North C-111 Components	COP ECB 2019	1983 Base	1994 C-111 GRR
S-357	yes, discharges to C-111SD NDA; capacity 575 cfs; Increment 1.2 ops; FC operational range 3.5-6.0 ft NGVD, depending on LPG-2 stage	no	533 cfs to L-31N Canal, upstream of G-211 FC operational range 4.5-5.7 ft NGVD
S-357N	100 cfs; 5.5-5.6 ft NGVD from DEC-APR, 5.0-5.1 from MAY-NOV	no	no
S-356	500 cfs (5.5-5.8 ft NGVD); Condition 1&2 only (125 cfs assured capacity); FC operations not limited to seepage	no	950 cfs; 5.5-6.0 ft NGVD; FC operations not limited to seepage
S-336	WS; FC subject to downstream capacity (includes SFWMD C-4 impoundment)	WS; FC subject to downstream capacity FC (S-331 HW > 5.3; TW < 4.0)	WS only
G-211 (flows south)	WS; FC 5.5-6.0 ft NGVD, or 5.3-5.7 Condition 3; TW const 5.3 at S-331 HW	no (G-211 completed in 1991)	WS; FC open when G-211 HW stage > 5.5 ft NGVD
S-338	WS; FC (5.5-5.8 ft NGVD for all Conditions 1-4)	WS; FC 4.8-5.2 ft NGVD	WS; FC 5.5-6.0 ft NGVD
S-331 / S-173	4.0-5.0 ft NGVD based on LPG-2 stage; 3.5-4.0 used if LPG-2 > 6.6 ft NGVD	WS only	WS only

S-194	WS; FC 4.2-4.8 ft NGVD, independent of CSSS nesting season	WS only	WS only
S-196	WS; FC 4.2-4.8 ft NGVD, independent of CSSS nesting season	WS only	WS only

Lower C-111 Component	COP ECB 2019	1983 Base	1994 C-111 GRR
S-176	WS; FC 4.75-5.0 ft NGVD (C-111SD construction complete); up to 200 cfs to Manatee Bay from 01AUG-14FEB, if S-176HW > 4.5 ft NGVD	WS; FC 5.3-5.7 ft NGVD	WS; FC 5.5-5.7 ft NGVD
S-177	WS; FC 3.6-4.2 ft NGVD up to 200 cfs to Manatee Bay from 01AUG-14FEB, if S-177HW > 3.2 ft NGVD; high-rainfall adjustments included (S-176HW to 3.3 ft NGVD if 14-d RF > 5.5")	WS; FC 4.3-5.2 ft NGVD high-rainfall adjustments included (S-176HW to 3.3 ft NGVD if 14-d RF > 5.5")	WS; FC 3.9-4.5 ft NGVD high-rainfall adjustments included (S-176HW to 3.3 ft NGVD if 14-d RF > 5.5")
S-332E and Eastern Spreader Canal	no	no	50 cfs, 4 mile spreader canal North of S-18C; FC 2.0-2.2 ft NGVD
C-111 Connector Canal and Culvert	no	no	connects lower C-111 to S-332; flap-gate culvert
S-200 (C-111SC operated by SFWMD)	FC 3.0-4.0 ft NGVD with seasonal variability; closed if R-3110 > 4.95 ft NGVD up to 300 cfs (SFWMD expansion from 225 cfs scheduled in 2018)	no	no
S-199 (C-111SC operated by SFWMD)	FC 3.0-4.0 ft NGVD with seasonal variability; closed if EVER4 > 2.36 ft NGVD up to 300 cfs (SFWMD expansion from 225 cfs scheduled in 2018)	no	no
S-178	always open, southerly flow only (consistent with SFWMD Standing Order)	FC 4.5-5.0 (gates overtop at 5.0 ft NGVD); refer to SFWMD structure manual	FC 4.5-5.0 (gates overtop at 5.0 ft NGVD); refer to SFWMD structure manual
S-18C	WS; FC 2.3-2.6, or 2.0-2.25 Condition 3	WS; FC 1.6-2.4 ft NGVD	WS; FC 2.0-2.4 ft NGVD
C-110	10 canal plugs installed with SFWMD completion of C-111 Spreader Canal	no backfill	complete backfill per 1994 C-111 GRR (effectively same as 2019 ECB)
S-197	FC based on S-177 and S-18C HW stage (Level 1: 800 cfs in Condition 1, else 500 cfs; Level 2: 1600 cfs; Level 3: 2400 cfs); low-volume flows per S-18C HW	FC based on S-177 and S-18C HW stage (Level 1: 3 of 13 culverts; Level 2: 7 of 13 culverts; Level 3: all 13 culverts, 2400 cfs) (to mimic plug removal)	FC based on S-177 and S-18C HW stage (Level 1: 3 of 13 culverts; Level 2: 7 of 13 culverts; Level 3: all 13 culverts, 2400 cfs) (13 culverts complete 1994)

Detention Area Component	COP ECB 2019	1983 Base	1994 C-111 GRR
S-332A	no (removed from C-111SD with 2016 LRR)	no	300 cfs; FC 5.1-5.5 ft NGVD; Discharge directly to ENP (no NDA)
S-332B	575 cfs (250 cfs to C-111SD NDA, 325 cfs to C-111SD SDA); FC 4.2-4.8 ft NGVD with ramp-up pump operations	no (construction complete in 2000)	300 cfs; FC 5.1-5.5 ft NGVD
S-332C	575 cfs to C-111SD SDA; FC 4.2-4.8 ft NGVD with ramp-up pump operations	no (construction complete in 2003)	300 cfs; FC 5.1-5.5 ft NGVD
S-332D	575 cfs to C-111SD S-332D DA, CSSS constraints from DEC-14JUL FC 4.2-4.8 ft NGVD with ramp-up pump operations; priority ahead of S-332B&C	no (construction complete in 1996)	300 cfs, no CSSS cutbacks; discharge north to SDA (no S-332D DA); FC 5.1-5.5 ft NGVD
C-111SD North Detention Area (NDA)	1440 acres of retention storage, up to 8.5 ft NGVD stage (~2.5 ft depth); inflows from S-357 and S-332BN to NDA western flowway (640 acres)	no detention areas	no closed NDA, but single S-332D Tie-Back Eastern Levee, per 1994 GRR
C-111SD South Detention Area (SDA)	1310 acres of retention storage, up to 8.5 ft NGVD stage (~2.5 ft depth) inflows from S-332BW and S-332C to SDA western flowway (435 acres)	no detention areas	1310 acres of retention storage, up to 7.0 ft NGVD stage (~1.0 ft depth); inflows from S-332B, S-332C, and S-332D; no internal levee
C-111SD Detention Area Culverts	no (construction complete per 2016 C-111SD LRR and Contract 9)	no (no NDA or SDA detention areas)	yes, 24@36"-diameter culverts for SDA (riser crest elevation at 7.0 ft NGVD)
8.5 SMA tie-in levee	yes (includes 8.5 SMA Detention Cell interior flowway)	N/A (no detention areas)	no, GRR S-332D Tie-Back Levee terminates south of Rickmond Drive
C-111SD S-332D Detention Area	2220 acres of retention storage, including Cell 1 (inclusive of prior High Head Cell) at 360 acres; Cell 2 at 370 acres; and the Flowway Cell at 1490 acres	no detention areas	no S-332D Detention Area (S-332D discharges north to SDA)
S-332DX1	re-directs up to 75 cfs to SDA when S-332D > 250 cfs; closed 15JUL-NOV	no	no
S-328	up to 250 cfs to Taylor Slough when S-332D > 0 cfs (500 cfs capacity)	no	no
Frog Pond Detention Area (C-111SC)	516 acres of retention storage; inflows from S-200	no	no
G-737	open when positive head gradient south, subject to S-200 CSSS constraint	no	no (similar functionaility as C-111 Connector Canal from 1994 GRR)
Aerojet Canal Plugs (C-111SC)	weirs and canal plugs constructed by SFWMD, per CERP C-111SC PIR (2011)	no (canal remains in the model)	no (canal remains in the model)
S-174	no (decommissioned with C-111SD Contract 9)	WS per Taylor Slough Min. Del.; FC 5.1-5.5 ft NGVD	FC 5.1-5.5 ft NGVD
L-31W	10 earthen plugs constructed by SFWMD, per C-111SD Contract 9	conveyance to Taylor Slough from S-174 (no canal plugs)	backfilled upstream of S-332 to S-174 (S-332D discharges to SDA)

* = RSM-GL model input from upstream boundary conditions
** = MD-RSM model input from upstream boundary conditions

H-3.3.2 PLANNING CONDITIONS FOR BASE83 - FROM CSOP

Planning condition assumptions tables replicated in this section are sourced from the interagency CSOP coordination process, 2003-2005.

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CSOP Planning Conditions

BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
L-29 Constraint				No L-29 constraint **Ref 15** pg F-16
Lake Okeechobee	See Lake Okeechobee 1978 schedule at the end of document (additional ops as per Ref 15 pg F-1,F-2)			1978 regulation schedule (15.5-17.5) **Ref 15** pg F-1 and **Ref 21** plate 2
Regulation Schedule WCA-1	See WCA-1 1975-1995 schedule at the end of document (additional ops as per Ref 15 pg F-6)			1975-1995 regulation schedule (14.0-17.0) **Ref 15** pg F-6 Regulatory releases through S-10. Water supply releases through S-39.
Regulation Schedule WCA-2A	See WCA2A (11.0 – 13.0) schedule at end of document. (additional ops as per Ref 15 pg F-7)			1992 regulation schedule (11.0-13.0) **Ref 15** pg F-7
Regulation Schedule WCA-2B	When water in the area exceeds 11.0 ft NGVD, excess water is discharged to the North New River Canal through S-141.			**Ref 8** pg 27.
Regulation Schedule WCA-3A	See WCA3A 1983 schedule at end of document (additional ops as per Ref 15 pg F-9)			1992 regulation schedule (9.5-10.5) **Ref 15** pg F-9
Regulation Schedule WCA-3B	no regulation schedule			**Ref 8** pg 51
G-114	HW > 3.6	HW < 3.5	230 (575)	**Ref 17**. Uncontrolled structure. Weir crest elevation 3.5
G-119	FC: HW > 5.3 and C-4/C-2 < 4.0	otherwise closed	200 (NA)	**Ref 17** (1981 revision). Flood control releases and water supply. *A value of 5.3 is specified based on S338 using a value of 5.2 as FC "open" at S331 HW. There is no other documentation available.*
	WS: if S-22 or S-25B HW < 2.8			
G-211	N/A	N/A		Did not exist

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-12a			8000 (8000)*	Regulatory Release flow rates area computed: **Q = 1912. *(site65 – 9.0) + 1600.**
S-12b	Regulatory Releases Open if the WCA3A 3-station average is above schedule (Zone B). (See WCA3A schedule for 1983 at the end of this document) Minimum Deliveries Open if WCA3A 3-station average is below schedule (Zone A).Minimum deliveries are provided if there is adequate capacity based on head across S-12 Water delivery through the S-12s is the minimum delivery or structure capacity, whichever is lower: Q (capacity) = 167* (WCA3A – 6.9) $^{2.5}$ where WCA3A is the 3-station average stage for WCA3A in feet and Q is in cfs	Regulatory Releases Close if gage at 3-28/ Site 65 is less than 9.0 ft. Minimum Deliveries Close if 3-station average is less than 6.9 feet NGVD	8000 (8000)*	Minimum Delivery Schedule. **Ref 15** pg F-9 Table F-2 (& **Refs 9, 11, 16, 19**) Generally maintains minimum flow rates specified for each month. If 3-station average stage is above schedule, then allows maximum flow rate. If stage is below schedule, then maintain the minimum flows at each structure: January 358 cfs;February 162 cfs March 65 cfs; April 29 cfs May 28 cfs; June 84 cfs July 120 cfs; August 198 cfs Sept. 655 cfs; October 1090 cfs November 992 cfs December 520 cfs. Note: Historical data prior to start of experimental deliveries shows no pattern for flow distribution. ENP feels that past model runs should be used since they were utilized for past NEPA analysis and biological opinions. Consistent with most recent 8.5 SMA (2000 GRR) model runs, a flow distribution of 10% (S-12a), 20% (S-12b), 30% (S-12c), 40% (S-12 d) is assumed. * Modeling constraint: Observed discharge through the S-12 structure does not attain design capacity due to tailwater constraints.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
G-93	HW > 2.8	HW < 2.7	640 (1600)	**Ref 17**. This structure together with S-25B on the Tamiami Canal (C-4) is operated to maintain the optimum headwater elevation of 2.8 feet. Since this structure is manually operated, required releases are normally made by S-25B. During storm events, the gates will be opened.
S-118	HW > 5.4	HW < 3.5	860 (1700)	**Ref 16 & Ref 17.** **Ref 4**, pg 14
S-119	HW > 5.4	HW < 4.2	400 (900)	**Ref 16 & Ref 17.** **Ref 4**, pg 14
S-120	HW > 5.1	HW < 5.0	150 (380)	**Ref 17** FC only. Flood control releases are made through the manually operated control gate, while maintaining an upstream water surface elevation of 5.0 feet.
S-121	WS: S-119 HW < 4.2	FC: S-119 HW > 5.4	100 (100)	No specific criteria developed. This is RAE best guess based on **Ref 17.**
S-122	WS: S-123 HW < 1.6	FC: S-123 HW > 2.4	200 (200)	No specific criteria developed. This is RAE best guess based on **Ref 17.**
S-123	FC: HW> 2.4	HW < 1.6 or (HW-TW) < 0.3 (Salinity)	2300 (5000)	**Ref 16** (FC), **Ref 4** pg 13 and **Ref 17** (Salinity control)

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-12c			8000 (8000)*	
S-12d			8000 (8000)*	
S-14	never opened	always closed	500 (NA)	**Ref 17**: open when HW> 7.0, but *"never functioned as intended due to tailwater conditions which were higher than designed."*
S-142	FC: Open if the WCA3A 3-station average is above schedule. (See WCA3A schedule for 1983 at the end of this document)	S-34 TW > 6.0	500 (NA)	**Ref 17.** 1992 regulation schedule (9.5-10.5) **Ref 15** pg F-9
	G-54 HW < 3.5	G-54 HW > 4.5		**Ref 17.** Maintain an optimum stage at G-54, between elevation 3.5 and 4.5.
S-148	FC: HW > 5.5	FC: HW < 3.7	1500 (3750)	**Ref 16** **Ref 14** pg 26 and **Ref** 18 pg 2-2, Table 2-1. Design optimum (2.0) will be maintained for upstream reaches of coastal salinity control structures.
	WS: S-21HW < 2.0			
S-149	FC: HW > 6.2	FC: HW < 4.8	400 (1000)	**Ref 17**

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-151	Regulatory Releases Regulatory releases are made at capacity through S-151 when WCA3A is above its regulation schedule, unless the stage in WCA3B is high during the wet season. No regulatory releases are made during the wet season if WCA3B stage is 9.0 ft or higher. Regulatory releases vary linearly from 0 cfs when WCA3B stage is 9.0 feet to 50% of the discharge capacity when WCA3B stage is 8.8 ft. When WCA3B is below 8.8 ft, regulatory releases are made at capacity. See WCA3A 1983 schedule at end of document Water Supply When WCA3A is below 6.9 ft, the discharge will not exceed the S-340 discharge. When the minimum water deliveries at the S-12s are not met, the maximum discharge at S-151 is computed as: Q(S-151) = Q(S-151 capacity) * Q (S12 capacity)/ VOLENP Where VOLENP = minimum water delivery in cfs required for Shark River Slough by PL 91-282. Northwest Well field: discharge when the Dade-Broward Levee borrow canal is less than 2.75 ft. No discharge when the stage rises above 3.0 ft. C-6: Discharge through S-151 when the stage at S-19 falls below 0.2 feet. No discharge when the stage rises above 0.4 feet. C-2: Discharge through S-151 when the C-2 canal levels fall below 2.5 feet. ENP-South Dade County Conveyance System: water supply releases are required under any of the following: S-331 HW < 4.0 ft; S-331 TW < 3.5 ft S-177 HW < 2.5 ft; S-18c HW < 2.0 ft S-21 HW < 1.9 ft		1105 (NA)	**Ref 15** pg F-10 – F-12 If Stage 3A4 > 9.5 Qc =120*(stg3a4-9.5) + 1000 8.0< If Stage 3A4 < 9.5 Qc =667*(stg3a4-8.0) If Stage 3A4 < 8.0 Qc =0 Where Qc = S-151 capacity Water supply deliveries are made to satisfy demands in C-6 area, the L-31N borrow canal and C-111 areas, the Northwest Wellfield, and the C-2 Area. If discharge capacity is not adequate to satisfy all demands, the water supply deliveries are allocated so the deficits in each demand area are equal percentages of each area's demand

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-165	FC: HW > 5.9	FC: HW < 5.1	450 (1125)	**Ref 16, Ref 5** (pg 4)**, Ref 17** **Ref 14** (pg 26) and **Ref 18** pg 2-2 Design optimum will be maintained for upstream reaches of coastal salinity control structures. This gate is automatically controlled.
	WS: S-21AHW < 2.0	Salinity Control HW – TW < 0.2		
S-166	HW > 5.7	HW < 4.9	420 (1050)	**Ref 17 and Ref 6** (pg4)
S-167	FC: HW > 5.9	FC: HW < 5.1	330 (825)	**Ref 16, Ref 17, Ref 5** (pg 4), **Ref 6** (pg24) **Ref 17**, **Ref 14** pg 26: WS criteria are inferred from the minimum requirements at S-20F, with WS triggers at S-179 based on 1.5 feet below optimum of 3.5.
	WS: S-179 HW < 2.0	closed normally		
	WS: S-20F HW < 1.4 (dry season)			
	WS: S-20F HW < 2.2 (wet season)			
S-173	WS: S-174/S-176 HW < 4.0 C111 / S-177 HW < 3.0 L31W / S-175 HW< 3.0 C103 / S-167 HW < 4.0 C103 / S-179 HW < 2.0 C102 / S-165 HW < 4.0 S18C HW < 2.0 S-21A HW < 2.0 S-20F HW < 2.0	closed normally	100 (NA)	**Ref 16, Ref 14** (pg 26), **Ref 17.** Initiate water supply release when 1.5 feet below optimum. Note: S-173 gravity structure is triggered to release for downstream water supply before regional S-334 by 0.5 feet; WS triggers match S-331.
S-174	FC: HW > 5.5	FC: HW < 5.1	500 (850)	**Ref 16.** **Ref 18**. pg A-25, Table 2-1, Table A-8. Optimum L31W stage is 4.5 ft.
	WS: S-175 HW < 4.0	WS: S-175 HW > 4.7		
S-175	FC: HW > 5.2	FC: HW < 4.5	500 (500)	**Ref 12** (pg 39)**, Ref 14** (pg 26)**, Ref 16 and Ref 17.** Optimum HW stage is 4.5 feet.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-176	FC: HW > 5.7	FC: HW < 5.3	630 (1100)	**Ref 13, 14, and 16.** Used to provide water supply downstream. Optimum downstream stage (S-177) is 4.5 feet. When S-177 HW 1.5 feet below optimum, open for WS. Note: water supply releases from local source S-176 are triggered to initiate 0.5 feet prior to regional S-334 and S-331.
	WS: S-177 HW < 3.0 feet.			
S-177	FC: HW > 5.2	FC: HW < 4.3	1400 (2900)	**Ref 12, 14, and 16.** Used to provide water supply downstream. Optimum downstream stage (S-18c) is 2.0 feet. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
	WS: S-18c HW < 2.0			
S-178	HW > 4.5	HW < 4.5	510 (***1275***)	**Ref 17** Maintains upstream stage at 4.5 feet if possible. Stage > 5.0 feet overflows structure. (SPF is reported as 510 cfs although the design flow is 510 cfs and is reported as 40% of SPF.)
S-179	FC: HW > 3.9	FC: HW < 3.1	1920 (4800)	**Ref 16** and **Ref 6** (pg 37) for FC **Ref 17** for WS WS criteria are inferred from the minimum requirements at S-20F.
	WS: S-20F HW < 1.4 (dry season)			
	WS: S-20F HW < 2.2 (wet season)			

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-18c	FC: HW > 2.4	FC: HW < 1.6 WS: HW < 2.0	2100 (3200)	**Ref 1** (pg 3)**, Ref 10**: FC **Ref 17** for design capacity **Ref 16.** FC and WS: Minimum **Ref 11, Ref 18** pg 2-8, and **Ref 15** pg F-19. Minimum Water Deliveries: January 25 cfs February 11 cfs March 5 cfs April 2 cfs May 2 cfs June 6 cfs July 8 cfs August 14 cfs September 45cfs October 75 cfs November 68 cfs December 36 cfs. **Ref 14** pg 26 and **Ref 18** pg 2-2. Design optimum (2.0) will be maintained for upstream reaches of coastal salinity control structures. **Ref 15** pg F-19. S-18C discharge capacity (cfs): Q = (3069 * S-18C HW) – 6038 Where S-18C HW is in feet
S-194	WS: S-165 HW < 4.0 WS: S-21A HW < 2.0	normally closed	190 (NA)	**Ref 5** pg 4, and **Ref 16**. Water supply only. Open when downstream is 1.5 feet below the optimum. Optimum at S165 is 5.5 feet; optimum at S-21A is 2.0. **Ref 14** pg 26 and **Ref 18** pg 2-2. Design optimum (2.0) will be maintained for upstream reaches of coastal salinity control structures.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-195	FC: HW > 5.9	FC: HW < 5.1	180 (450)	**Ref 17.** Maintains optimum upstream. This optimum was specified as 5.5 feet. Rules adapted from S-165 since none were specified. **Ref 5** (pg 42)
S-196	WS: S-167 HW < 4.0 WS: S-179 HW < 2.0 WS: S-20F HW < 1.4 (dry season) WS: S-20F HW < 2.2 (wet season)	Normally Closed	200 (500)	**Ref 16**. Water supply only. **Ref 14** pg 26 and **Ref 18** pg 2-2. Water supply releases initiate at 1.5 feet below optimum. Optimum C-103 stages are 5.5 upstream of S-167, 3.5 upstream of S-179, and 2.0 upstream of S-20F. Design optimum will be maintained for upstream reaches of coastal salinity control structures. Stage at S-20F varies based on season (**Ref 17**.) WS criteria are inferred from the minimum requirements at S-20F.
S-197	FC: S-18C TW > 1.9 (open 3 culverts) If the S-18C TW rises above 2.1 feet with the culverts fully open, then the plug will be either partially or fully removed within 24 hours insofar as practicable and necessary to prevent TW at S-18C from exceeding elevation 2.1 feet.	FC: S-18C TW < 1.6 (close 3 culverts)	555 (1388)	Based on personal communication with Cal Neidrauer, only 3 culverts existed prior to 1990. Therefore, logically under BASE83, the maximum amount of flow should be what could pass in 3 culverts. Presently, the design flow of 2400 cfs is for 13 culverts. **Ref 10**. Plug removal flood control operations prior to addition of 10 culverts in 1990.
S-20	HW > 2.4	HW < 1.8	450 (750)	**Ref 17**. Wet Period
	HW > 1.4	HW < 1.0		**Ref 17**. Dry Period

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
		(HW - TW) < 0.3 (salinity control)		**Ref 17**
S-20f	FC: HW > 2.4	FC: HW < 1.6	2900 (4900)	**Ref 6** (pg 4), **Ref 16 and 17.**
		(HW - TW) < 0.3 (salinity control)		
S-20g	HW > 2.2	HW < 1.8	900 (1700)	**Ref 17**. High Range (Apr 30 – Oct 15)
	HW > 1.8	HW < 1.4		**Ref 17**. Intermediate Range *(only in 1994 revision of reference) (Dec 30 to Apr 30)*
	HW > 1.4	HW < 1.0		**Ref 17**. Low Range (Oct 15 to Dec 30).
		(HW - TW) < 0.2 (salinity control)		**Ref 17.**
S-21	FC: HW > 2.4	FC: HW < 1.5	2560 (4300)	**Ref 16**. Optimum level is 2.0 feet **Ref 3** pg 11.
		(HW - TW) < 0.2 (salinity control)		**Ref 17**
S-21a	FC: HW > 2.4	FC: HW < 1.6	1330 (2500)	**Ref 16**. Optimum level is 2.0 feet
		(HW - TW) < 0.2 (salinity control)		**Ref 17**
S-22	FC: HW > 3.0	FC: HW < 1.8	1915 (1915)	**Ref 16, Ref 2** (pg 27)
		(HW - TW) < 0.3 (salinity control)		**Ref 17**
S-25	HW > 2.2	HW < 1.8	*100**	**Ref 17** HW optimum is 2.0 feet **Design flow is for 1-in-10 year flood.*
S-25a	S-25 HW < 1.5	S-25HW > 2.2	*30*	**Ref 17.** Salinity control only. ***Max Q is unknown***. The value for this 54" culvert is inferred by comparing to a 96" culvert (S-25).
S-25b	HW > 2.7	HW < 2.3	2000 (2000)	**Ref 16 and Ref 7** (plate 1)
		(HW - TW) < 0.3 (salinity control)		**Ref 17**
S-26	HW > 2.8	HW < 2.3	3470 (3470)	**Ref 17**. Normal Operations

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
	S-31TW > 4. and HW > 1.7	HW < 1.2 and S-31 TW > 4.0		**Ref 17**. Flood Operations. The S31TW stage indicates flood status.
		(HW - TW) < 0.3 (salinity control)		**Ref 17**
S-31	See documentation on S-151. In most cases discharge is computed: Q(Base) = 45. * (STAG3B – 3.0) + 117. where STAG3B = stage at gage 3-29. There are two conditions when S-31 discharges are not computed with the equation above: A) under a regulatory condition when the WCA3B stage is above 8.9 ft. during the dry season, the discharge is set to the S-151 discharge. B) under a water supply condition when S-151 discharges are being made to the Miami Canal, the discharge at S-31 is: Q = Q(Base) + Q(S-151 Miami canal water supply).		700 (NA)	**Ref 15.** pg F12-F13 Used in conjunction with S151 for water supply and regulatory releases.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-32	FC: HW > 6.0 WS: S-26 HW < 2.5 S-29 HW < 2.0	FC: S31 TW > 4.0 HW < 6.0	400 (NA)	**Ref 17** (1994 revision). *design discharge not provided (assumed based on maximum observed discharge of 380 cfs)
S-331	WS: S-174/S-176 HW < 4.0 C111 / S-177 HW < 3.0 L31W / S-175 HW< 3.0 C103 / S-167 HW < 4.0 C103 / S-179 HW < 2.0 C102 / S-165 HW < 4.0 S18C HW < 2.0 S-21A HW < 2.0 S-20F HW < 2.0	normally off	1160	**Ref 16, Ref 14** (pg 26), **Ref 17.** Initiate water supply release when 1.5 feet below optimum. Note: S-331 pump structure is triggered to release for downstream water supply before regional S-334 by 0.5 feet; WS triggers match S-173. Pump combinations can produce flow rates of 387, 773, 1160 cfs.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-332	Open to maintain optimum stage of 4.5 feet (Ref 14 pg 26) Minimum water deliveries to Taylor Slough: Open when HW > 1.5 feet	Minimum water deliveries to Taylor Slough: Close when HW < 1.5	165	**Ref 11**, **16,** and **Ref 15** pg F-18.Taylor Slough Minimum Water Deliveries: January 12 cfs February 6.7 cfs March 3 cfs April 3.1 cfs May 6 cfs June 112 cfs July 120 cfs August 48 cfs September 100 cfs October 126 cfs November 62 cfs December 12 cfs. **Ref 15** pg F-18. Water deliveries are made until the stage in the L-31W borrow canal falls to 1.5 feet or less, at which time deliveries are discontinued.
S-332a	Did not exist for BASE83			
S-332b				
S-332c				
S-332d				
S-332e				

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-333	Water Supply S-177 HW < 2.5 S-176 HW < 3.5 S-331 HW < 5.0 S-18c HW < 2.0	Water Supply S-334 HW > 6.0	1350 (NA)	**Ref 14** pg 26. L-29 optimum stage is 5.0 feet (water supply). **Ref 15** pg F-16 (water supply to South Dade only; no G3273 criteria). S-333 discharge capacity If STAGE > 9.5, Q = 1000. If 9.5 ≥ STAGE > 8.0, Q = 533.3 * (STAGE – 8.0) + 200. If 8.0 ≥ STAGE > 6.5, Q = 133.3 * (STAGE – 6.5) If 6.5 ≥ STAGE, Q = 0. Where STAGE = stage at gage 3-28 The discharge at S333 is the minimum of the structure capacity or the S334 Q + 125 cfs. If the S-333 capacity is the smaller of these two values, the S-334 discharge is reduced accordingly.
S-334	Water Supply S-177 HW < 2.5 S-176 HW < 3.5 S-331 HW < 5.0 S-18c HW < 2.0	Closed Unless: S-177 HW < 2.5 S-176 HW < 3.5 S-331 HW < 5.0 or S-18c HW < 2.0 If S-331 HW >5.0, S-334 remains closed (Ref 15 pg F-16)	1230 (NA)	**Ref 15** pg F-16 (water supply to South Dade only). **Ref 16** and **17**. Flows computed (**Ref 15**): If STAGE < 4.0, Q = 1000. If 5.0> STAGE ≥ 4.0, Q = -800 * (STAGE – 4.0) + 1000. If STAGE ≥ 5.0, Q = 0. Where STAGE = stage in the L31N borrow canal upstream of S331. The S334 discharge will not exceed what can be conveyed through S333. If S333 capacity is too low, then the flow at S334 is Q(S333) – 125.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-335	Water Supply: C-2 canal stage < 2.5 S-331 HW < 4.0 ft S-331 TW < 3.5 ft S-177 HW < 2.5 ft S-18c HW < 2.0ft S-21 HW < 1.9 ft S-25b HW < 2.0 S-22 HW < 2.0	HW < 5.0 Note: S-334 water supply releases to SDCS initiate when S-331 HW (L-31N stage) < 5.0	525 (NA)	**Ref 16**. Water Supply: Optimum stage is 6 feet **Refs 17.** During water supply operations, the headwater stage at S-335 is maintained between 5.0 and 6.0. Operated in conjunction with S-334. WS releases initiated if HW at coastal structures S-25b or S-22 below 2.0 **Ref 15** pg F-11. Water supply deliveries called for at S-151 for the C-2 Basin and ENP-SDCS are passed through S-337 and S-335; water supply triggers at S-335 are the same as C-2 and ENP-SDCS triggers for S-151. If S-335 HW < S-335 TW, no water supply deliveries to C-2 Basin; If S-335 HW > S-335 TW, required C-2 water supply deliveries are computed as follows: Demand (C-2)=900*(L-30 – L-31)$^{0.5}$ Where L-30 = L-30 borrow canal stage in feet, L-31 = L-31 borrow canal stage in feet, and Demand in cfs. When there is not adequate capacity at S-335 to pass all C-2 and ENP-SDCS demands, total capacity is split evenly between C-2 and ENP_SDCS demands.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
	Closed except for Water Supply	Closed except for water supply.		**Ref 16.** Water supply only. Flow rate when HW > 7.0 is $Q = CLH^{3/2}$, where C = weir coefficient L = 20 feet H = HW – (-4.2) feet
S-336	FC: S-331 HW > 5.3 AND C-4/C-2 < 4.0	normally closed	145 (NA)	**Ref 17** (1978 revision). Flood Operations.
	WS: S-22 HW < 2.8			**Ref 17** (1978 revision). Supplemental water deliveries to East Dade County. Note: Water supply triggers same as G-119.
	WS: S-25b HW < 2.8			
S-337	Water Supply: Used in conjunction with S-31 and S-151. See description of those structures. Passes S-151 water supply releases for Northwest wellfield, C-2, and ENP-SDCS Flow rate is defined by: Q(S-337) = 1125.06 * (HW – TW)**0.5		605 (NA)	**Ref 15** pg F-12 and **Ref 17**. Supplies water to the Northwest Wellfield, the ENP-South Dade County conveyance system and to C-2 area.
S-338	FC: S-331 HW > 5.2 (Closed if HW-TW<0.2)	FC: S-331 HW < 4.8	170 (425)	**Ref 16**. This refers to stages at the HW of S331. Under BASE83, there was no G-211 (originally). **Ref 14** pg 26 and Ref 18 pg 2-2. Optimum S-331 HW is 5.0 feet. Water supply releases initiate at 1.5 feet below optimum.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
	WS: S-148 < 3.5	normally closed		
S-339	The operation of these structures is coordinated to relieve high water conditions in northern WCA3A when the stage at gage 3-2 (Site 62) rises above its regulation schedule or to pass water supply deliveries required at S-151 and S-32. Most other conditions require the structures to be closed. The capacity of the structures is: Q(Capacity) = 2600. * (dH)**0.5, where dH = upstream stage – downstream stage, feet. Water supply discharges can be made when gage 3-2 is below schedule under the following conditions (inclusive): - there is structural capacity - S-8 discharges are being made from Lake Okeechobee - WCA3A stage is less than 8.5 ft. - Water supply deliveries are being made at S-151 - The Lake Okeechobee stage is greater than the stage in C-123 upstream of S-339. Under high water conditions (3-2 is above regulation), discharges can be made.		1100 (NA)	Regulation schedule for Gage 3-2 (1977) is included as an attachment to this document. **Ref 15** pg F-13 The flow rate is not related to SPF.
S-340			1100 (NA)	**Ref 15** pg F-13 The flow rate is not related to SPF.
S-343a	Open when WCA3A is above schedule (1983 schedule; see attachments).	Normally closed	195 (NA)	**Ref 15.** pg F-14 flow = 201. * (Site65 – 7.8) If Site65 < 7.8, close. **Ref 17 and Ref 15.** Combined flow through S-343a and S-343b must not exceed 400 cfs.

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BASE83				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-343b			195 (NA)	
S-344	Open when WCA3A is above schedule (1983 schedule; see below).	Normally closed	300 (NA)	**Ref 15** pg F-15 Flow Rages: If HW > 9.8, Q = 300 cfs If 8.5< HW < 9.8, Q = 238.7 * (HW – 8.5). If HW < 8.5, close This structure is made of two 6 feet diameter culverts.
S-345a	Did not exist			
S-345b	Did not exist			
S-345c	Did not exist			
S-346	Site 65 stage < 8.5 ft.	normally closed	165 (NA)	**Ref 15**: pg F-10. **Ref 17**
S-347		normally closed	165 (NA)	**Ref 17**
S-349a	Did not exist			
S-349b	Did not exist			
S-349c	Did not exist			
S-355a	Did not exist			
S-355b	Did not exist			
S-356	Did not exist			
S-357	Did not exist			
"WS" indicates a Water Supply Rule; "FC" indicates a Flood Control Rule.				

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H-3.3.3 PLANNING CONDITIONS FOR 1994GRR - FROM CSOP

Planning condition assumptions tables replicated in this section are sourced from the interagency CSOP coordination process, 2003-2005.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
L-29 Constraint				Ref 21 pg 67-68. Indian Camp mitigation plans. Assume MWD GDM features in place. L-29 constraint is 9.5 feet based on maximum stages in the L-29 borrow canal expected to reach 9.5 feet as a result of the project.
Lake Okeechobee	See Lake Okeechobee "Run 25" schedule at the end of the document.			**Ref 28.** pg 8. Run 25 was implemented 1992-2000.
Regulation Schedule WCA-1	See WCA-1 1975-1995 schedule at the end of document.			There is no discussion of the regulation schedule used in the 1994 GRR, therefore use the schedule that was in effect in 1994. 1975-1995 regulation schedule (14.0-17.0)
Regulation Schedule WCA-2A	See WCA2A (11.0 – 13.0) schedule at end of document.			There is no discussion of the regulation schedule used in the 1994 GRR, therefore use the schedule that was in effect in 1994. 1994 regulation schedule (11.0-13.0)
Regulation Schedule WCA-2B	When water in the area exceeds 11.0 ft NGVD, excess water is discharged to the North New River Canal through S-141.			There is no discussion of the regulation schedule used in the 1994 GRR, therefore use the schedule that was in effect in 1994. **Ref 8** pg 27.
Regulation Schedule WCA-3A	Modified Rain-driven plan. 1994 C-111 GRR assumes MWD as existing condition (Ref 18 pg 2-9)			**Ref 21** pg 59-61, pg 35-36, plate 16, and fig 10
Regulation Schedule WCA-3B	no regulation schedule			

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
G-114	HW > 3.6	HW < 3.5	230 (575)	**Ref 17**.Uncontrolledstructure. Weir crest elevation 3.5
G-119	FC: HW>5.3 and the junction of C-4/C-2 < 4.0	otherwise closed	200 (NA)	**Ref 17** (1994 revision). Make flood releases when downstream conditions will not be aggravated.
	WS: S-22 or S-25B < 2.0			**Ref 17** (1994 revision). Make water supply deliveries during dry period. Note: 1993 revision for G-119 maintains 2.8 optimum as in Base 83; 1994 revision for S-336 lowered optimum levels to 2.0, as presently indicated in 2004 reference 17.
	Water Supply: L31N / S-176 HW < 4.0 C111 / S-177 HW < 3.0 L31W / S-175 HW< 3.0 C103 / S-167 HW < 4.0 C103 / S-179 HW < 2.0 C102 / S-165 HW < 4.0 S18C HW < 2.0			**Ref 18.** pg 8-7: S331 is used as a water supply structure. Note: This requires G-211 to also be operated as a water supply structure with the same water supply triggers.
G-211	FC: S-356 HW in L-31N > 5.5	FC: S-356 HW in L-31N < 5.5	1100 (NA)	**Ref 18** pg 7-17. "During flood conditions, all excess water that reaches the L-31N borrow canal north of S-331 is returned northward to NESRS via pump station S-356." Note: Refer to S-356 operations under 1994 C-111 GRR Planning Condition tables. Flood control operations at S-356 initiate when L-31N HW > 5.5. **Ref 17**. Normal conditions No document gives a maximum flow. 1100 cfs has been recorded
G-93	HW > 2.8	HW < 2.7	640 (1600)	**Ref 17** Maintains optimum HW of 2.8 feet.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-118	HW > 4.9	HW < 3.5	860 (1700)	**Ref 17**
S-119	Normal: HW > 5.4 Wet: HW>4.6	Normal: HW < 4.2 Wet: HW<4.0	400 (900)	**Ref 17**
S-120	HW > 5.1	HW<5.0	150 (380)	**Ref 17** FC only. Flood control releases are made through the manually operated control gate, while maintaining an upstream water surface elevation of 5.0 feet.
S-121	WS: S-119 HW < 4.2	FC: S-119 HW > 5.4	100 (100)	No specific criteria developed. This is RAE best guess based on **Ref 17**.
S-122	WS: S-123 HW < 1.6	FC: S-123 HW > 2.4	200 (200)	No specific criteria developed. This is RAE best guess based on **Ref 17**.
S-123	Dry: HW> 3.5 Wet: HW > 2.4	Dry: HW < 2.5 Wet: HW < 1.6 Salinity Control: Close when HW-TW < 0.3 feet	2300 (5000)	**Ref 17**
S-12a **S-12b**	Modified rain driven plan Rainfall Component + Regulatory Component = Computed flow to SRS (Ref 15 pg F-28) S12 structures discharge 45% of computed flow or structure capacity (Ref 15 pg F-31), whichever is less	If WCA 3A stage is in Zone A, If WCA 3A stage is below Zone A, Close if 3-station average Is less than 6.9 feet (Ref 15 pg F-31)	8000 (8000)	**Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) Note: 8000 cfs design discharge exceeds maximum discharge through these structures; equations for structure capacity in **Ref 15** pg F-31. Minimum delivery to SRS (PL-91-292) replaced by Modified Rain-Driven Plan

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-12c				
S-12d				
S-14	never open	always closed	500 (NA)	**Ref 17**: open when HW> 7.0, but *"never functioned as intended due to tailwater conditions which were higher than designed."*
S-142	FC: Open if the WCA3A 3-station average is above schedule. (See WCA3A schedule for 1983 at the end of this document)	S-34 TW > 6.0	500 (NA)	**Ref 17.** 1992 regulation schedule (9.5-10.5) **Ref 15** pg F-9
	G-54 HW < 3.5	G-54 HW > 4.5		**Ref 17.** Maintain an optimum stage at G-54, between elevation 3.5 and 4.5.
S-148	HW > 5.2	HW < 3.7	1500 (3750)	**Ref 17**: maintains optimum stage of 5.0 ft in C-1
	WS: S-21 HW < 2.0			**Ref 14** pg 26 and **Ref 18** pg 2-2, Table 2-1. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
S-149	HW > 6.2	HW < 4.8	400 (1000)	**Ref 17**: maintains optimum stage of 5.5 ft in C-1

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-151	Modified Rain Driven Plan Regulatory Releases When WCA3A stage is in Zone A, B, or C: (a) Dry season: S-151 discharges at capacity (b) Wet season: S-151 discharges based on WCA3B stage, as follows If WCA3B < 8.8, Q = Qc If 8.8 < WCA3B < 9.0, Q = Qc*(9.0-WCA3B)*2.5 If WCA3B > 9, Q = 0.0 Water Supply (WCA3A stage below Zone C): When WCA3A is below 6.9 ft, the discharge will not exceed the S-340 discharge.(a) Northwest Well field: discharge when the Dade-Broward Levee borrow canal is less than 2.75 ft. No discharge when the stage rises above 3.0 ft.(b) C-6: Discharge through S-151 when the stage at S-19 falls below 0.2 feet. No discharge when the stage rises above 0.4 feet. (c) C-2: Discharge through S-151 when the C-2 canal levels fall below 2.5 feet. (d) ENP-South Dade County Conveyance System: water supply releases are required under any of the following: S-331 HW < 4.0 ft S-331 TW < 3.5 ft S-177 HW < 2.5 ft S-18c HW < 2.0 ft S-21 HW < 1.9 ft If discharge capacity is not adequate to satisfy all demands, the water supply deliveries are allocated so the deficits in each demand area are equal percentages of each area's demand		1105 (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) Regulatory Releases: **Ref 15** pg F-32 Water Supply Releases: **Ref 15** pg F-10 – F-12, pg F-27: water supply triggers same as Base 83 if not modified under MRD plan. Water supply deliveries are made to satisfy demands in C-6 area, the L-31N borrow canal and C-111 areas, the Northwest Wellfield, and the C-2 Area. If Stage 3A4 > 9.5 Qc =120*(stg3a4-9.5) + 1000 8.0< If Stage 3A4 < 9.5 Qc =667*(stg3a4-8.0) If Stage 3A4 < 8.0 Qc =0 Where Qc = S-151 capacity
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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-165	HW > 5.9 WS: S-21A HW < 2.0	HW < 5.1	450 (1125)	**Ref 17**. maintains optimum upstream stage in C-102 **Ref 14** pg 26 and **Ref 18** pg 2-2, Table 2-1. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
		Salinity Control: HW-TW < 0.2		
S-166	HW > 5.7	HW < 4.9	420 (1050)	**Ref 17**: maintains optimum upstream stage in C-103N
S-167	HW > 5.9 WS: S-179 HW < 2.0 S20F HW < 1.4 (dry season) S20F HW < 2.2 (wet season)	HW < 5.1	330 (825)	**Ref 17**: maintains optimum upstream stage in C-103 **Ref 17**, **Ref 14** pg 26, and **Ref 18** pg 2-2, Table 2-1. Water supply triggers initiate at 1.5 feet below optimum. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
S-173	Water Supply: L31N / S-176 HW < 4.0 C111 / S-177 HW < 3.0 L31W / S-175 HW< 3.0 C103 / S-167 HW < 4.0 C103 / S-179 HW < 2.0 C102 / S-165 HW < 4.0 S18C HW < 2.0 S-21A HW < 2.0 S-20F HW < 2.0	closed normally	100 (NA)	**Ref 17**, **Ref 14** pg 26, and **Ref 18** pg 2-2, Table 2-1. Water supply triggers initiate at 1.5 feet below optimum. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
		Closed during flood events		**Ref 18** pg 3-3. During a flood event S-173 will be a divide structure

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-174	FC: HW > 5.5	FC: HW < 5.1	500 (850)	**Ref 18** pg 5-5. In the 1994 C-111 GRR, all canals and structures are evaluated based on maintaining design optimum canal stages under flood conditions. Design operating criteria are described in section 2.2 (Table 2-1). Optimum L-31N stage is 5.5 feet between S-331 and S-176. **Ref 18**. Table A-5. Optimum L-31N stage at S-174 (as used in C-111 GRR modeling) is 5.3 feet.
	WS: S-175 HW < 4.0	WS: S-175 HW > 4.7		Optimum L31W stage is 4.5 ft, **Ref 18**. pg A-25, Table 2-1, Table A-8
S-175	FC: HW > 5.0	FC: HW < 4.5	500 (500)	Optimum L31W stage is 4.5 ft, **Ref 18**. pg A-25, table A-8 and table A-5, Table 2-1. Note: FC triggers for S-175 set above optimum and higher than S-332 to provide additional water to Taylor Slough
S-176	FC: HW > 5.7	FC: HW < 5.5	630 (1100)	**Ref 18** pg A-25. FC criteria: structure passes the design flood. Intent of 1994 C-111 GRR is to utilize pump stations to direct water westward towards ENP and Taylor Slough. Flood control triggers for S-176 are therefore set above triggers used for S-332 A,B,C, and D.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
	WS: S-177 HW < 3.0	WS: S-177 HW > 3.0		Helps to maintain downstream stages. **Ref 18**. pg A-25. Water supply delivery initiates at 1.5 feet below optimum of 4.5 feet.
S-177	FC: HW > 4.5	FC: HW < 3.9	1400 (2900)	**Ref 18** pg 5-5. In the 1994 C-111 GRR, all canals and structures are evaluated based on maintaining design optimum canal stages under flood conditions. Design operating criteria are described in section 2.2 (Table 2-1). Optimum C-111 stage is 4.5 feet between S-176 and S-177. **Ref 17**. Open/close criteria 0.6 feet apart under normal operations.
	WS: S18C HW < 2.0	WS: S18C HW >2.0		**Ref 18**. pg A-25,Table 2-1,and Table A-8 Ref 14 pg 26 Water supply deliveries at 1.5 feet below optimum for S-177. Optimum stage maintained for coastal structure S-18C.
S-178	HW > 4.5	HW < 4.5	510 (***1275***)	**Ref 18**, pg A-26: Maintains upstream stage during low flow conditions. Restricts discharge during flood events to prevent damages downstream. **Ref 17**. specifies the optimum upstream as 4.5 feet. A stage of 5.0 feet will overtop the structure. (SPF is reported as 510 cfs although the design flow is 510 cfs and is reported as 40% of SPF.)

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-179	High setting: HW > 3.9	High setting: HW < 3.1	1920 (4800)	**Ref 17**: Low setting is used during growing season (Oct 15 – Apr 30) if water table raises into root zone. High setting is used otherwise.
	Low setting: HW > 3.1	Low setting: HW < 2.7		
S-18c	FC: HW > 2.4	FC: HW < 2.0	2100 (3200)	**Ref 18**., tables A-8 and A-22. Optimum stage is 2.0 feet. **Ref 18**., pg A-26: Maintains a "desirable" freshwater head to prevent salt intrusion into C-111. **Ref 18**. pg 2-8: Maintains the stage between 2.0 and 2.4 feet while maintaining the minimum monthly delivery schedule: January 25 cfs February 10.2 cfs March 5.2 cfs April 1.8 cfs May 1.8 cfs June 5.5 cfs July 8.6 cfs August 14 cfs September 43.7 cfs October 77.8 cfs November 66 cfs December 37.5 cfs. Note: Preferred minimum delivery pathway for Eastern Panhandle of ENP is through S-332E. Open triggers for S-18C are set above open triggers for S-332E in this table.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-194	WS: S-165 HW < 4.0 S-21A HW < 2.0		190 (NA)	**Ref 18** pg A-26. Open for water supply and closed for flood control. **Ref 17**. Critical stage at S-165 is 4.0. Ref 17, Ref14 pg 26, and Ref 18 pg 2-2, Table 2-1. Water supply triggers initiate at 1.5 feet below optimum. Design optimum will be maintained for upstream reaches of coastal salinity control structures.
S-195	FC: HW > 5.9	FC: HW < 5.1	180 (450)	**Ref 17**. Maintains optimum upstream of 5.5 feet for C102N. Rules adapted from S-165 since none were specified.
S-196	WS: S-167 HW < 4.0 or S-179 HW < 2.0 or S-20F HW < 1.4 / 2.2 (dry/wet season)		200 (500)	**Ref 18** pg A-26. Closed during floods. Normally open for water supply. **Ref 17**. Water supply criteria **Ref 14** pg 26 and **Ref 18** pg 2-2. Water supply releases initiate at 1.5 feet below optimum. Design optimum will be maintained for upstream reaches of coastal salinity control structures.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-197	If S-177 HW > 4.10 after S-177 gates open full or S-18C HW > 2.8, Open 3 culverts; If S-177 HW > 4.20 for 24 hours or S-18C HW > 3.10, Open 7 culverts; If S-177 HW > 4.30 or S-18C HW > 3.30, Open 13 culverts	Normally closed Closing begins after the following conditions have been met: (1)When headwater canal stage (stage upstream of the structure) at S-176 has declined below 5.2 ft NGVD and headwater stage at S-177 has declined below 4.2 ft NGVD. (2) Position of the storm has moved away from the basin. (3) Once conditions 1 and 2 above have been met, only the number of S-197 culverts required to match the residual discharge volume flowing through S-176 will remain open. This will prevent unnecessary over-drainage of the panhandle region by restricting the amount discharged through S-197 to equal the amount of inflow from the upper basin. All culverts will be closed once the S-177 headwater stage declines below 4.1 ft NGVD and the above conditions are satisfied.	2400 (6000)	**Ref 18**, pg A-26. Maintains optimum in C111. However, no document specifies what this "optimum" is! Normally closed **Ref 18** pg A-26. S-197 releases water only during major floods under established guidelines **Ref 10** and 17. FC guidelines have not changed since 10 additional culverts were added in 1990.
S-20	HW > 2.4	HW < 1.8	450 (750)	**Ref 17**. Wet Period/ High Range
	HW > 1.4	HW < 1.0		**Ref 17**. Dry Period/Low Range

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
		(HW - TW) < 0.3 (salinity control)		**Ref 17**.
S-20f	HW > 2.2	HW < 1.8	2900 (4900)	**Ref 17**: High Range
	HW > 1.7	HW < 1.3		**Ref 17**: Intermediate Range
	HW > 1.4	HW < 1.0		**Ref 17**: Low Range
		(HW - TW) < 0.3 (salinity control)		
S-20g	HW > 2.2	HW < 1.8	900 (1700)	**Ref 17**. High Range
	HW > 1.8	HW < 1.4		**Ref 17** Intermediate Range
	HW > 1.4	HW < 1.0		**Ref 17** Low Range
		(HW - TW) < 0.2 (salinity control)		
S-21	HW > 2.4	HW < 1.5	2560 (4300)	**Ref 17**. High range
	HW > 2.0	HW < 1.0		**Ref 17**. Low range
		(HW - TW) < 0.2 (salinity control)		**Ref 17**.
S-21a	HW > 2.2	HW < 1.8	1330 (2500)	**Ref 17**. High Range
	HW > 1.8	HW < 1.4		**Ref 17**. Intermediate Range
	HW > 1.4	HW < 1.0		**Ref 17**. Low Range
		(HW – TW) < 0.2		**Ref 17**. Salinity Control
S-22	HW > 3.5	HW < 2.5	1915 (1915)	**Ref 17**. Maintain optimum upstream stage of 2.9 feet
		(HW - TW) < 0.3		**Ref 17**. Salinity Control
S-25	HW > 2.2	HW < 1.8	*100**	**Ref 17**. maintains C-5 optimum upstream stage of 2.0 feet ** Design flow is for the 1-in-10 year flood.*
		(HW- TW) < 0.2		**Ref 17**. Salinity control

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-25a	S-25 HW < 1.5	S-25HW > 2.2	*30*	**Ref 17**. Salinity control only. ***Max Q is unknown***. The value for this 54" culvert is inferred by comparing to a 96" culvert (S-25). Closing criteria is not specified.
S-25b	HW > 3.0	HW < 2.0	2000 (2000)	**Ref 17**. Low flow periods
	HW > 2.0	HW < 1.0		**Ref 17**. High flow periods (when stage at junction of C-4 and C-2 > 4.0)
		(HW-TW) < 0.3		**Ref 17**. Salinity Control
S-26	HW > 2.8	HW < 2.3	3470 (3470)	**Ref 17**. Normal Operations
	HW > 1.7	HW < 1.2		**Ref 17**. Flood Operations (when S-31TW > 4.0)
		(HW - TW) < 0.3		**Ref 17**. Salinity Control
S-31	FC: WCA 3A in Zone A HW > 9.0 WS: S-26 HW < 2.5 S-29 HW < 2.0 S-27 HW < 1.5	FC: WCA 3A < Zone A HW < 9.0	700 (NA)	**Ref 17.** Combined discharge of S-31 and S-337 shall be equal to or less than the discharge from S-151. WS to maintain optimum stage of 2.5 at S-26 and other coastal structures in northern Dade county. **Ref. 15**. S-151 releases for C-6 water supply are passed through S-31.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-32	FC: HW > 6.0 WS: S-26 HW < 2.5 S-29 HW < 2.0	FC: HW < 6.0	400*(NA)	**Ref 17.** *design discharge not provided (assumed based on maximum observed discharge of 380 cfs)
S-331	Water Supply: L31N / S-176 HW < 4.0 C111 / S-177 HW < 3.0 L31W / S-175 HW< 3.0 C103 / S-167 HW < 4.0 C103 / S-179 HW < 2.0 C102 / S-165 HW < 4.0 S-21A HW < 2.0 S-20F HW < 2.0 S18C HW < 2.0 (Ref 17)	normally off	1160	**Ref 17**: operated in water supply mode. **Ref 18**, pg 8-7: Used for water supply to the ENP South Dade Conveyance canal system when water levels drop 1.5 feet below optimum in downstream reaches (table A-8) Ref 14 pg 26, Ref 18 pg 2-3: optimum stages
		FC: S-356 HW in L-31N> 5.5 (S-356 pump trigger) Downstream close criteria: S-176 HW > 5.5 or S-331 TW > 6.0		**Ref 18**, pg 3-3. During a flood event S-331 will be a divide structure (closed). Ref 21 pg 69. Under flood conditions, S-356 is used to regulate the L-31N reach upstream of S-331. Refer to S-356 operations in this table. **Ref 18** pg 8-7. The pump will not continue to be used to prevent flood impacts in the 8.5 SMA. **Ref 29** pg 15

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-332	HW > 4.6 Minimum Deliveries: HW > 1.5	HW < 4.5 Minimum Deliveries: HW < 1.5	165	**Ref 18**. pg 5-44 and 7-6. Connected to C-111 via a new East-West connector canal. A flap gate controlled culvert will allow water to only flow westward. Plate A-8 indicates structure discharge of 165 cfs. **Ref 18.** pg 2-5. S-332 will remain in service and will maintain the minimum water deliveries schedule when water is available. Minimum Water Deliveries: January 12 cfs February 6.7 cfs March 3 cfs April 3.1 cfs May 6 cfs June 112 cfs July 120 cfs August 48 cfs September 100 cfs October 126 cfs November 62 cfs December 12 cfs. **Ref 18**. Table 2-1, Table A-8. Optimum L-31W stage is 4.5 feet. **Ref 15** pg F-18. Water deliveries are made until the stage in the L-31W borrow canal falls to 1.5 feet or less, at which time deliveries are discontinued. Assumed no change from Base 83 for minimum deliveries.
S-332A	HW > 5.5	HW < 5.1	300	**Ref 18**. Tables A-5 and A-8. Optimum L-31N stage between S-331 and S-176 is 5.5 feet. Optimum L-31N stage at S-174 (as used in C-111 GRR modeling) is 5.3 feet.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
				S-332 A,B,C, and D triggers match S-174 triggers.
S-332B	HW > 5.5	HW < 5.1	300	**Ref 18**. Tables A-5 and A-8.
S-332C	HW > 5.5	HW < 5.1	300	**Ref 18**. Tables A-5 and A-8.
S-332D	HW > 5.5	HW < 5.1	300	**Ref 18**. Tables A-5 and A-8. Note: S-332D triggers match S-174 triggers.
S-332E	HW > 2.0	HW < 2.0	50	**Ref 18** pg 7-2, Table 2-1, and Table A-5. Optimum stage is 2.0 feet. S-18C opens when C-111 stage above 2.4 feet. S-332E is operated in conjunction with S-18C. By opening S-332E at a lower stage, overland flow is promoted per the intent of the 1994 C-111 GRR. Note: Preferred minimum delivery pathway for Eastern Panhandle of ENP is through S-332E. Open triggers for S-18C are set above open triggers for S-332E in this table.
S-332B-D retention /detention area outflows	Need Equation Optimum hw 7.0 ft) 0.5 ft head drop through culvert plate in riser set at 7.0 ft	HW < 7.0		**Ref 18**. Table A-19, plate A-8, and pg A-23 Culverts sized to pass 50% of max pumping capacity of S-332B, C and D with 0.5-ft head difference. 17.3 cfs per culvert; Design hw/tw 8.3 / 7.8 varies Optimum hw 7.0 ft; spillway sized to pass 50% of max pump capacity

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-333	Water Supply: Discharges for water supply occur if there is excess capacity at S-333 above that required for rain-driven deliveries to ENP (Ref 15 pg F-31) S-331 HW < 5.0 S-176 HW < 3.5 S-177 HW < 2.5 S-18C < 2.0 (same as S-334) S-22 HW < 2.0, S-25B < 2.0 and Discharges are passed through S-334 assuming a 125 cfs loss between S-333 and S-334	S-334 HW > 6.0	1350 (NA)	**Ref 15** pg F-27: water supply triggers same as Base 83 if not modified under MRD plan. Base 83 triggers on pg F-16. **Ref 17** (1994 revision) Water Supply to maintain appropriate stages at S-331, S-25B, and S-22, without S334 HW exceeding 6.0 feet. Water supply triggers for S-25B and S-22 are set to match triggers used at S-336 and G-119. Design optimum (**Ref 17**) will be maintained for upstream reaches of coastal salinity control structures.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
	Modified Rain Driven 55/45 split If WCA3A is in Zone A, S333 discharges at capacity. When WCA3A is below Zone A, and the discharge capacity at S-355 is not adequate to pass the full 55% of the total rain-driven delivery to SRS, S-333 will discharge enough to make up the difference, if there is adequate capacity	L-29 stage (S-333 TW) > 9.5 ft (L-29 constraint) If the headwater stage at S-176 exceeds 5.0 ft., NGVD for more than 24 hours or the S-331 headwater stage exceeds its target level for more than 24 hours, discharges at S-333 will be reduced, if necessary, to avoid causing water levels in the L-29 borrow canal from exceeding 7.25 ft., NGVD until stages at S-331 and S-176 have been maintained at the appropriate levels for 24 hours.		Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 15** pg F-31 S-333 structure capacity: If 3A28 > 9.5, Qc = 1000.0 If 8.0 < 3A28 < 9.5, Qc = 533.3*(3A28 - 8.0)+200.0 If 6.5 < 3A28 < 8.0, Qc = 133.3*(3A28 – 6.5) If 3A28 < 6.5, Qc = 0 Where Qc = S-333 discharge capacity in cfs and 3A28 = stage at gage 3-28 in feet Note: G-3273 criteria for S-333 closure (**Ref 17**) do not apply because 8.5 SMA mitigation is assumed completed in the C-111 GRR (**Ref 18** pg 3-2)

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-334	Water Supply: S-331 HW < 5.0 S-176 HW < 3.5 S-177 HW < 2.5 S-18C < 2.0	TW > 5.0	1230 (NA)	**Ref 17**. Operated in conjunction with S-335 to make supplemental water deliveries to South and East Dade County. Maintains HW between 5 and 6 feet. **Ref 1**5 pg F-27: water supply triggers same as Base 83 if not modified under MRD plan. **Ref 15** pg F-16. S-333 discharge capacity: S-334 = S333-125 If s-331 HW < 4 Q=1000 cfs; If 4 < S-331HW <5 Q= -800*(S-331hw-4)+1000
S-335	Water Supply: C-2 canal stage < 2.5 S-331 HW < 4.0 ft S-331 TW < 3.5 ft S-177 HW < 2.5 ft S-18c HW < 2.0ft S-21 HW < 1.9 ft S-25b HW < 2.0 S-22 HW < 2.0	HW < 5.0	525 (NA)	**Ref 15** pg F-27: water supply triggers same as Base 83 if not modified under MRD plan. **Ref 17**. Operated in conjunction with S-334 to make supplemental water deliveries to South and East Dade County. Such releases are initiated from either or both these structures whenever the canal stages in L-31N are one foot below optimum or when the headwater stage at S-25B or S-22 falls below 2.0 during dry periods. Maintains HW between 5 and 6 feet.
	FC: S-335 HW > 6.0	L-30 stage (S-335 HW) < 6.0 Close if downstream capacity not available: S-335 TW > 5.0		**Ref 17**. When not making supplemental deliveries, operates with S-32A to maintain an optimum level of 6.0 feet in L-30 canal. **Ref** 31.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-336	FC: if S-331 is in flood mode AND Junction of C-4 andC-2 < 4.0 (closed except for WS since S-331 is a divide)	normally closed	145 (NA)	**Ref 17** (1994 revision). Flood Operations.
	WS: S-25b HW < 2.0 S-22 HW < 2.0			**Ref 17** (1994 revision). Supplemental water deliveries to East Dade County Note: 1993 revision for G-119 maintains 2.8 optimum as in Base 83; 1994 revision for S-336 lowered optimum levels to 2.0, as presently indicated in 2004 reference 17.
S-337	Used in conjunction with S-31 and S-151. See description of those structures. Passes S-151 water supply releases for Northwest wellfield, C-2, and ENP-SDCS Flow rate is defined by: Q(S-337) = 1125.06 * (HW – TW)**0.5		605 (NA)	Water Supply **Ref 15** pg F-12 and **Ref 17**. Supplies water to the Northwest Wellfield, the ENP-South Dade County conveyance system and to C-2 area.
S-338	FC: HW > 6.0 (Closed if HW-TW<0.2)	FC: HW < 5.5	170 (425)	**Ref 17**. Structure provides flood control releases from the area between Krome Avenue and L-31N and north of S-331. Note: S-338 operated to be consistent with L-31N flood control triggers used by S-356. S-356 starts pumping when HW stage in L-31N > 5.5 and reaches maximum pumping at L-31N stage > 6.0. Higher S-338 triggers set S-356 as the preferred path for flood control discharges.
	WS: S-148 < 3.5			**Ref 17**

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-339	FC: Gage 3-2 above regulation schedule WS: Gage 3-2 below regulation schedule and all the following are met: (a) there is structural capacity (b) S-8 discharges are being made from LO to WCA-3A (c) WCA-3A < 8.5 feet (d) WS deliveries are being made at S-151 (e) LO stage > S-339 HW		1100 (NA)	**Ref 15** pg F-13. Q = minimum of S-339 structure capacity or downstream C-123 capacity. S-339 and S-340 structure capacities: $Q = 2600 * (HW-TW)^{0.5}$ (cfs) C-123 capacity downstream of S-339: If DEL < 0.13 feet, Q = 0 If 0.13 < DEL < 0.8, Q = 2553 * (DEL – 0.13) If DEL > 0.8, Q = 0.40 * S-8Q Where DEL = S-339 TW – S-340 HW in feet and S-8Q = S-8 discharge in cfs **Ref 17.** Design flow Rate. Regulation schedule for Gage 3-2 (1977) is included as an attachment to this document.
S-340	FC: Gage 3-2 above regulation schedule WS: same as triggers used for S-339		1100 (NA)	**Ref 15** pg F-13. Q = minimum of S-340 structure capacity or S-339 discharge. **Ref 17.** Design flow rate Regulation schedule for Gage 3-2 (1977) is included as an attachment to this document.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S343a	Modified Rain-Driven Plan Open when 3-station average WCA3A stage is in Zone A, B, or C If 3A28 > 9.8, Q = 400 If 7.8 < 3A28 < 9.8, Q = 201 * (3A28 – 7.8) If 3A28 < 7.8, Q = 0.0 Where Q = total discharge through S-343A and S-343B and 3A28 = stage at gage 3-28 in feet	Close if 3-station average is in Zone D or E OR if Loop Road Gauge 1 > 8.4	195 (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 15** pg F-31 **Ref 17**. Limit flows to keep Loop Rd 1 Gauge below 8.5.
S343b	Open when 3-station average WCA3A stage is in Zone A, B, or C	Close if 3-station average is in Zone D or E OR if Loop Road Gauge 1 > 8.4	195 (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 17.** Limit flows to keep Loop Rd 1 Gauge below 8.5.
S-344	Open when 3-station average WCA3A stage is in Zone A, B, or C If S-344 hw > 9.8, Q = 300 cfs If 8.5 < S-344 hw < 9.8, Q= 238.7*(S-344hw-8.5) If S-344 hw < 8.5, Q = 0.0	Normally closed	300 (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 15** pg F-15 **Ref 17**. Design flow rate.

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-345a	3-station average is 0.5 feet below Zone C of WCA3A schedule or when 3-station average enters Zone D.	Close gradually as described in the comments.	1500 (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 15** pg F-30 **Ref 21** pg 61. Flow rate varies linearly from 0 to 500 cfs (each) when stage exceeds Zones B or C. When closing, the flow rate decreases in the same manner.
S-345b				
S-345c				
S-346	Removed with L-67 extension			
S-347	Removed with L-67 extension			
S-349A	Open for water supply to SDCS.	Normally closed	1250* each (NA)	**Ref 21** pg 62. Controls flow from theWCA3A through the S-345s into L67A borrow canal. *Discharge at low head.
S-349B				
S-349C				

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1994 C-111 GRR Recommended Plan Operation Criteria				
Structure	**Open/ On**	**Closed/ Off**	**Design Flow Rate (SPF), cfs**	**Notes/comments**
S-355A	Open whenever gradient allows for southerly flow.	When there is no head difference or a reverse flow across the structure.	1000* each (NA)	Modified Rain-Driven Plan: **Ref 21** pg 59-61, Plate 16 (WCA 3A regulation schedule), and Figure 10 (WCA 3A structure operations) **Ref 21**. The discharges will be adjusted weekly to pass 55% of the total computed water delivery to Shark River Slough. Discharges are made up to capacity or delivery target, whichever is less. *Discharge at 0.3 ft of head difference.
S-355B				
S-356	L-31N HW > 5.5 Discharge linearly varied to maximum at L-31N HW 6.0	L-31N HW < 5.5	950(NA)	**Ref 21** pg 69
S-357	On when interior water levels in 8.5 SMA (S-357 HW) > 5.7ft	Off 4.5	533(NA)	**Ref 22**: Drains the 8.5 SMA seepage canal. **Ref 21** pg 69 and Table 52.
"WS" indicates a Water Supply Rule; "FC" indicates a Flood Control Rule, "spf" indicates standard project flood discharge rate.				

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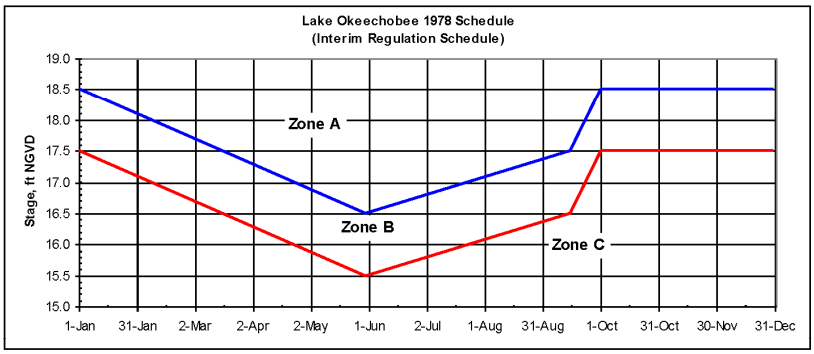
H-3.3.4 REFERENCES AND APPENDIX FOR CSOP PLANNING CONDITIONS

Planning condition assumptions tables replicated in the previous sections H-3.3.2 and H-3.3.3 are sourced from the interagency CSOP coordination process, 2003-2005. The figures within this reference document were compiled in support of the suite of CSOP planning conditions, including others not utilized for COP.



Lake Okeechobee 1978 Schedule Interim Regulation Schedule		
Date	Zone B	Zone C
January 1	18.5	17.5
May 31	16.5	15.5
September 15	17.5	16.5
October 1	18.5	17.5
December 31	18.5	17.5

Lake Okeechobee 1978 Schedule (Interim Regulation Schedule)	
Zone	Operation
A	Pump Maximum Practicable to Conservation Areas for regulation after removal of local runoff.
B	Same as 'A', but releases through various outlets may be modified to minimize damages or obtain additional benefits.
C	No regulatory discharge.

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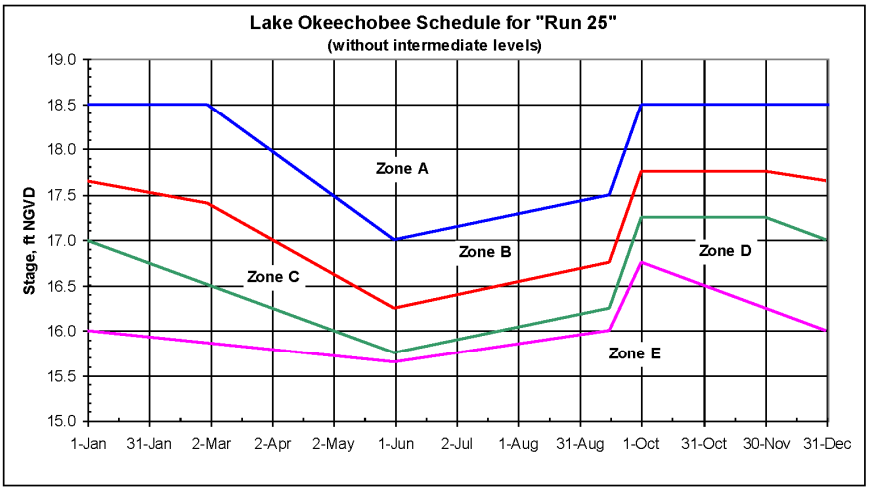

"Run 25" Schedule for Water Conservation Area 3A

Date	ZONE B	ZONE C	ZONE D	ZONE E
	Elevation, feet			
January 1	18.50	17.65	17.00	16.00
March 1	18.50	17.40		
June 1	17.00	16.25	15.75	15.65
September 15	17.50	16.75	16.25	16.00
October 1	18.50	17.75	17.25	16.75
December 1		17.75	17.25	
December 31	18.50	17.65	17.00	16.00

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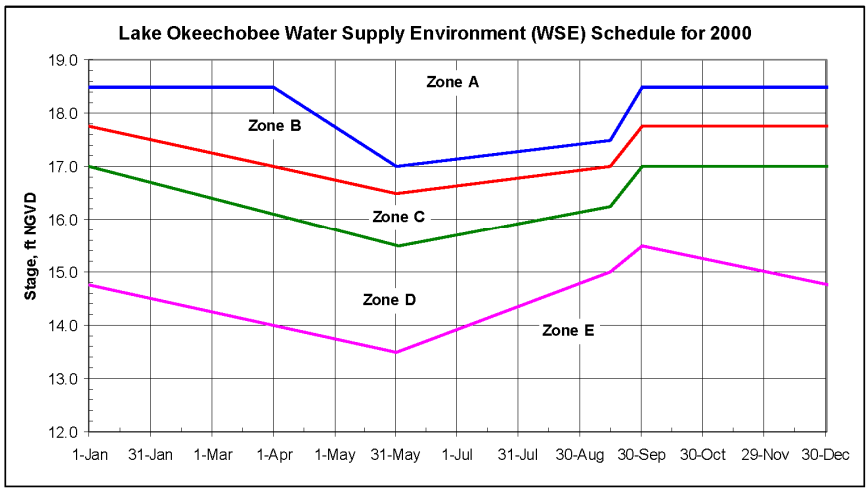

DRAFT June 23, 2004 DRAFT 4

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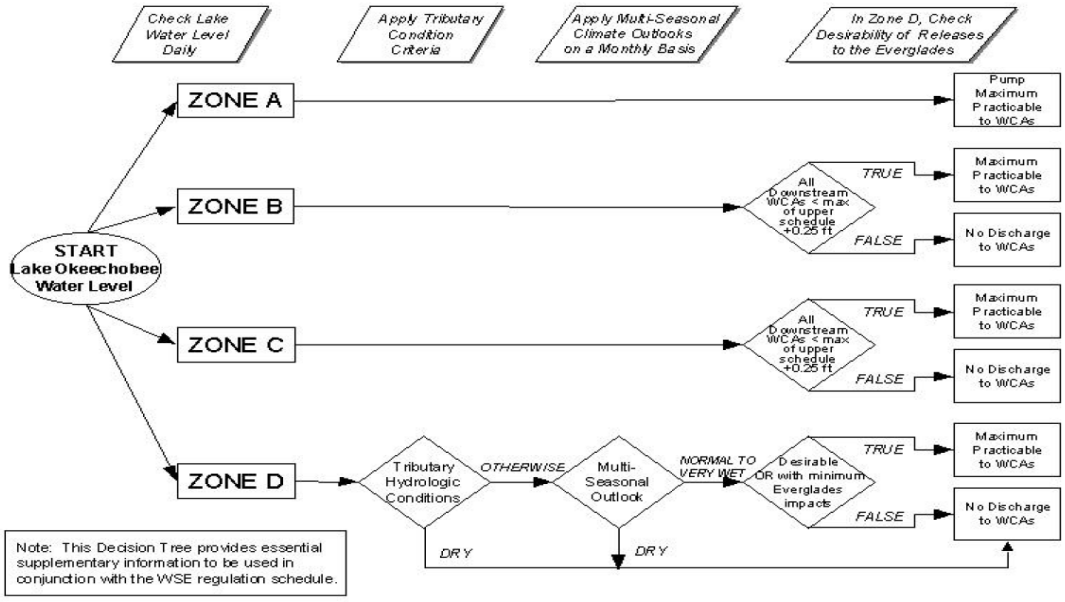
WSE Operational Guidelines Decision Tree

Part 1: Define Lake Okeechobee Discharges to the Water Conservation Areas



DRAFT June 23, 2004 DRAFT 6

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Water Supply Environment (WSE) Schedule for Water Conservation 3A, 2000							
ZONE B		ZONE C		ZONE D		ZONE E	
Date	Elevation, feet	Date	Elevation, feet	Date	Elevation, feet	Date	Elevation, feet
January 1, 2000	18.50	January 1, 2000	17.75	January 1, 2000	17.00	January 1, 2000	14.75
April 1, 2000	18.50	April 1, 2000	17.00				
June 1, 2000	17.00	June 1, 2000	16.50	June 2, 2000	15.50	June 1, 2000	13.50
September 15, 2000	17.50	September 15, 2000	17.00	September 15, 2000	16.25	September 15, 2000	15.00
October 1, 2000	18.50	October 1, 2000	17.75	October 1, 2000	17.00	October 1, 2000	15.50
December 31, 2000	18.50	December 31, 2000	17.75	December 31, 2000	17.00	December 31, 2000	14.75

Water Supply Environment (WSE) Schedule for Water Conservation 3A, 2000	
Zone	**Release through outlets into agricutural canals to WCAs** (1,2)
A	Pump maximum practicable
B	maximum practicable releases (3)
C	maximum practicable releases (3)
D	As needed to minimize adverse impacts to the littoral zone while not adversely impacting the everglades. (3, 5)
E	No Regulatory discharge.

Notes:

1 Subject to first removal of runoff from downstream basins.

2. Guidelines for wet, dry and normal conditions are base on a) selected climatic indices and tropical forecasts and b) projected inflow conditions. Releases are subject to the guidelines in the WSE operational Decision Tree, parts 1 and 2.

3. Releases through various outlets may be modified to minimize damages or obtain additions benefits. Consultation with Everglades and estuarine biologist is encouraged to minimize adverse effectes to downstream ecosystems.

4. Pulse releases are maded to minimize adverse impacts to the estuaries.

5. Only when the WCAs are below their respective schedules.

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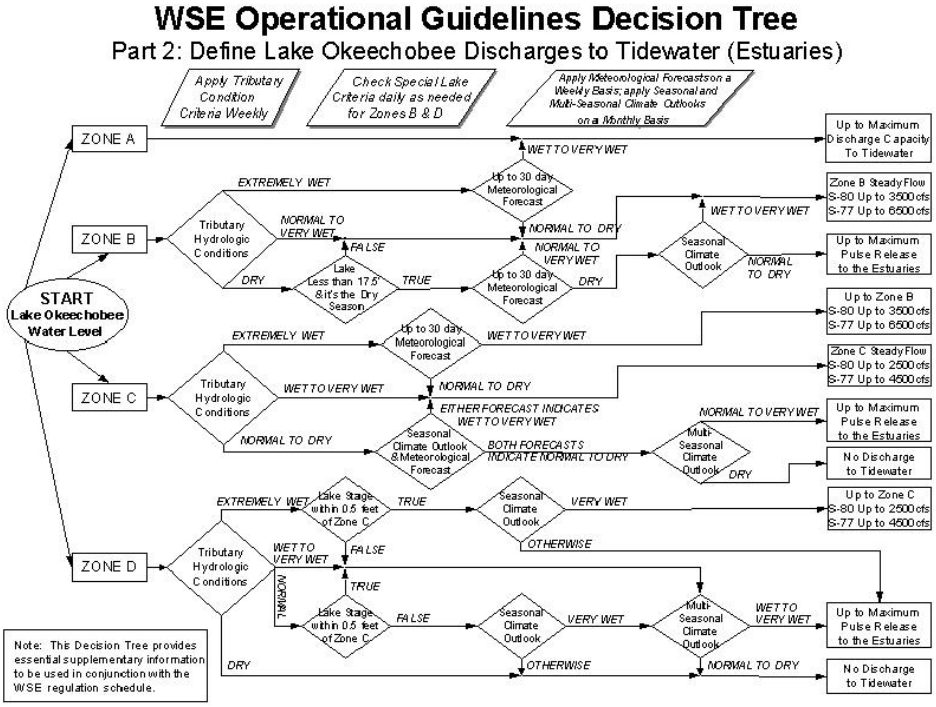
WSE Operational Guidelines Decision Tree
Part 2: Define Lake Okeechobee Discharges to Tidewater (Estuaries)
Apply Tributary Condition Criteria Weekly
Check Special Lake Criteria daily as needed for Zones B & D
Apply Meteorological Forecasts on a Weekly Basis; apply Seasonal and Multi-Seasonal Climate Outlooks on a Monthly Basis
START Lake Okeechobee Water Level
ZONE A
ZONE B
ZONE C
ZONE D
Tributary Hydrologic Conditions
EXTREMELY WET
NORMAL TO VERY WET
DRY
WET TO VERY WET
NORMAL TO DRY
Up to 30 day Meteorological Forecast
Lake Less than 17.5' & it's the Dry Season
FALSE
TRUE
Seasonal Climate Outlook
NORMAL TO DRY
Seasonal Climate Outlook & Meteorological Forecast
EITHER FORECAST INDICATES WET TO VERY WET
BOTH FORECASTS INDICATE NORMAL TO DRY
Multi-Seasonal Climate Outlook
NORMAL TO VERY WET
Lake Stage within 0.5 feet of Zone C
VERY WET
OTHERWISE
Up to Maximum Discharge Capacity To Tidewater
Zone B Steady Flow S-80 Up to 3500 cfs S-77 Up to 6500 cfs
Up to Maximum Pulse Release to the Estuaries
Up to Zone B S-80 Up to 3500 cfs S-77 Up to 6500 cfs
Zone C Steady Flow S-80 Up to 2500 cfs S-77 Up to 4500 cfs
No Discharge to Tidewater
Up to Zone C S-80 Up to 2500 cfs S-77 Up to 4500 cfs
Note: This Decision Tree provides essential supplementary information to be used in conjunction with the WSE regulation schedule.
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WCA 1 Schedule 1975 - 1995	
A	Up to maximum at S-10 (and S-39 when agreed)
B	Up to maximum based on 30-day forecast. If stage exceeds Zone B, elevation 14 is foregone for year.
C	Stage allowed to rise in this zone if elevation 14.0 or below obtained for 30-days.
D	Water Supply Only

WCA 1 Schedule 1996 - present	
A1	Up to maximum at S-10 (and S-39 when agreed). Water supply releases as needed.
A2	S-10 releases based on Corps forecasts. Water supply releases as needed. If Lake Okeechobee stage is above WCA-1 stage for or no more than one foot below WCA-1 stage, then water supply releases from WCA-1 must be preceded by an equivalent volume of inflow.
B	Water supply as needed. If Lake Okeechobee stage is above one foot below WCA-1 stage, then water supply releases must be preceded by an equivalent volume of inflow.
C	No net releases from WCA-1. Supply releases must be preceded by an equal volume of inflow.

WCA 1 Schedule		
Dates	Use Gage	Conditions
1 Jan - 30 Jun	1-8 canal	All
	1-8 canal	Except as noted below
1 Jul - 31 Dec	Ave. 1-7, 1-8T, 1-9	During rising stages when canal stage exceeds the average.

Notes:

1. When operating near zone limits, 30-day forecast needed to determin the discharge rate.
2. No releases permited when 1-8 Canal gage reading falls below elevation 11.0, unless water is supplied from other source.

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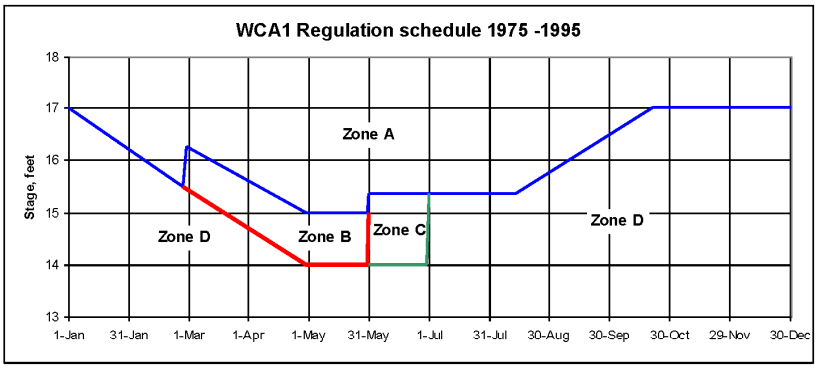

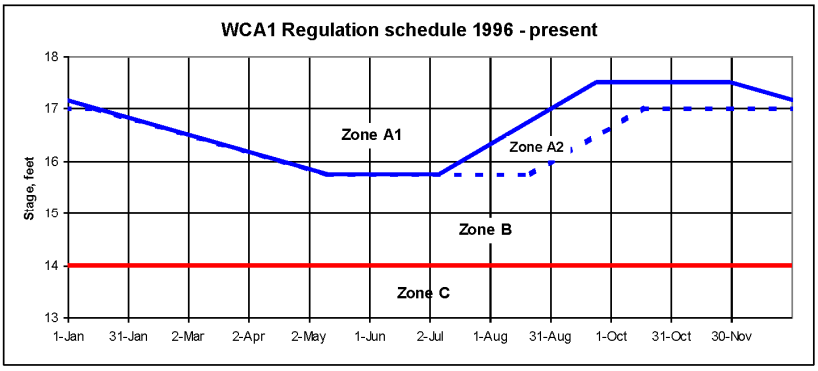

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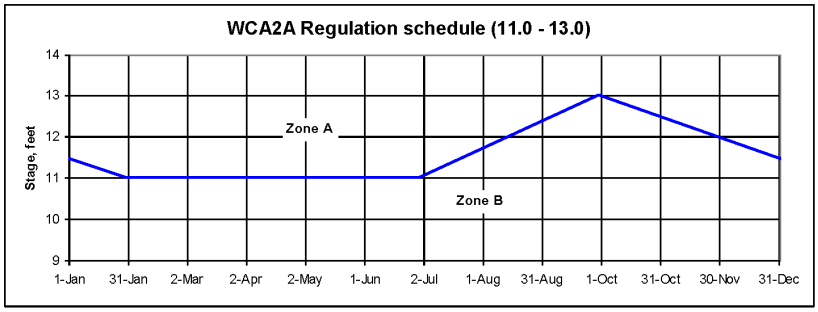

Water Conservation Area 2A	
Zone	**Releases**
A	Up to maximum capacity at S-11; maximum capacity at S-144, S-145, and S-146; Maximum practicable at S-143 and S-38 when requested by the Corps of Engineers,but not to exceed 11.0 feet, NGVD, in pool 2B. L-35B and L38 borrow canals should not be drawdown below 10.5 feet, NGVD.
B	Water Supply. L-35B and L-38 borrow canal should not be drawdown below 10.5 feet, NGVD, unless water supplied from another source

Water Conservation Area 2A		
Date	**Conditions**	**Use Gage**
1 Jan - 31 Jan	If 2-17 stage recedes to 11.5 feet, NGVD switch to S-11B headwater gage.	2-17
1 Feb - 30 Jun	All conditions	S-11B
1 Jul - 31 Dec	All conditions	2-17

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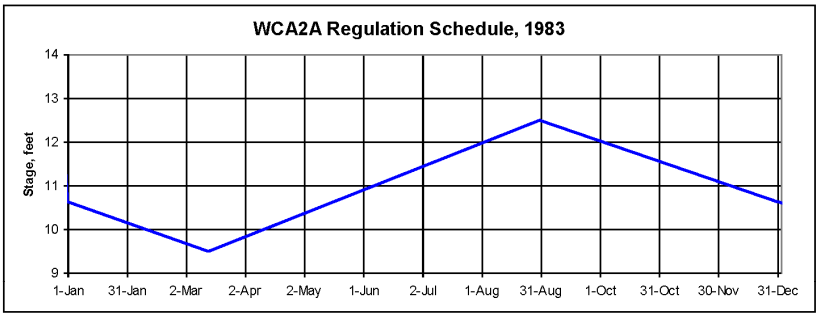


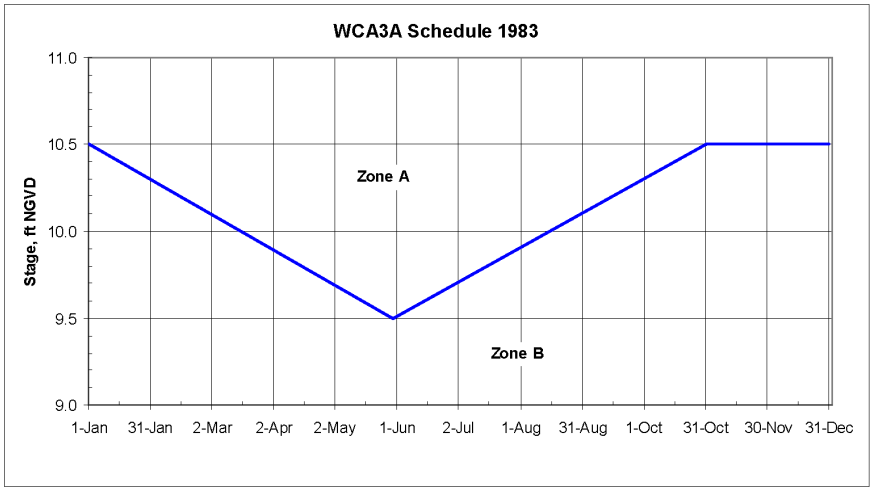
DRAFT June 23, 2004 DRAFT 10

WCA-3A Schedule, circa 1983

When the 3-station (Site 63, Site 64, and Site 65) average is above schedule, release up to the maximum capacity at the S-12's. The maximum practicable capacity at S-151 and S-31 will be released when requested by the Corps of Engineers in emergency situations.

At other times, releases will be made to supply project demands and ENP water supply when agreed to between the Corps and SFWMD.

WCA-3A Schedule, 1983	
Date	**Elevation, feet**
January 1	10.50
May 31	9.50
November 1	10.50
December 31	10.50

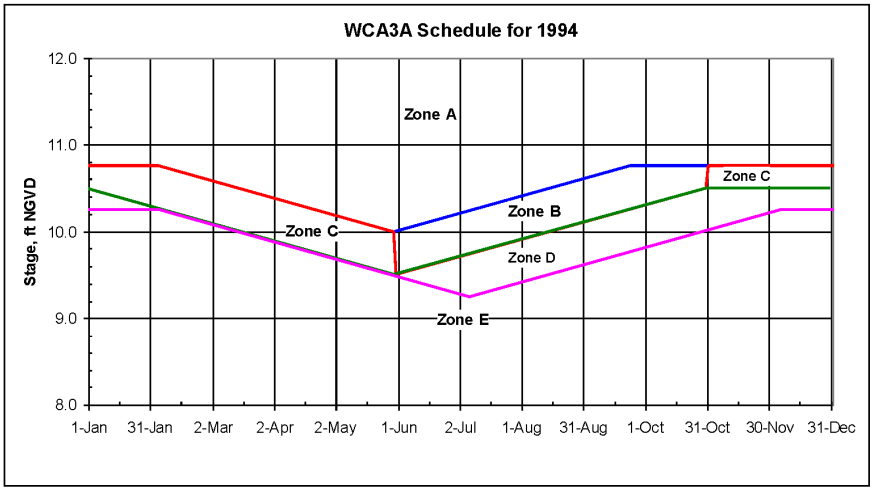


DRAFT June 23, 2004 DRAFT 12

WCA-3A Schedule, circa 1994

When the 3-station (Site 63, Site 64, and Site 65) average is above schedule, release up to the maximum capacity at the S-12's. The maximum practicable capacity at S-151 and S-31 will be released when requested by the Corps of Engineers in emergency situations.

At other times, releases will be made to supply project demands and ENP water supply when agreed to between the Corps and SFWMD.



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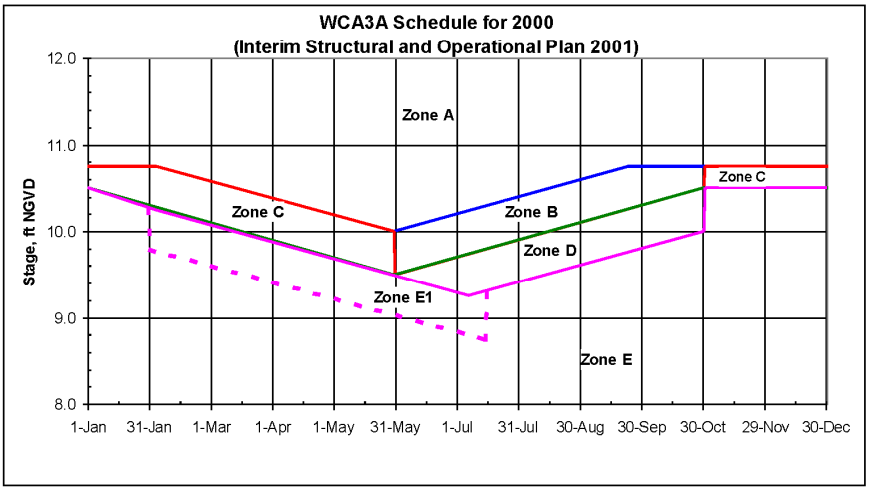

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Interim Regulation Schedule for the Water Conservation 3A, Interim Structural and Operational Plan 2001 (ISOP)									
ZONE B		ZONE C		ZONE D		ZONE E		ZONE E1	
Date	Elevation, feet	Date	Elevation, feet	Date	Elevation, feet	Date	Elevation, feet	Date	Elevation, feet
January 1, 2000	10.75	January 1, 2000	10.75	January 1, 2000	10.50	January 1, 2000	10.50	January 1, 2000	
February 4, 2000	10.75	February 4, 2000	10.75			February 4, 2000	10.25	January 31, 2000	10.25
May 31, 2000	10.00	May 31, 2000	10.00	May 31, 2000	9.50			February 1, 2000	9.80
September 24, 2000	10.75	June 1, 2000	9.50			July 7, 2000	9.25	July 15, 2000	8.75
								July 16, 2000	9.30
		October 31, 2000	10.50	October 31, 2000	10.50	October 31, 2000	10.00	October 31, 2000	
		November 1, 2000	10.75			November 1, 2000	10.50	November 1, 2000	
December 31, 2000	10.75	December 31, 2000	10.75	December 31, 2000	10.50	December 31, 2000	10.50	December 31, 2000	

Interim Regulation Schedule for the Water Conservation 3A Interim Structural and Operational Plan 2001 (ISOP)	
Zone	**Description**
A	Flood Releases
B	Upper Transition, Wet Season
C	Upper Transition, Dry Season
D	Lower Transition
E	Rainfall Formula
E1	Make maximum practicable releases at S-142, S-151, S-31, S-337, S-335, S-333, S-355 A&B, and S-334 when permitted by downstream conditions. If the headwater at S-333 falls below 8.25 ft-NGVD, use Zone E rules.
Note: The L-67A borrow canal stage should not be drawn down below 7.5 ft-NGVD unless wate is supplied form another source.	

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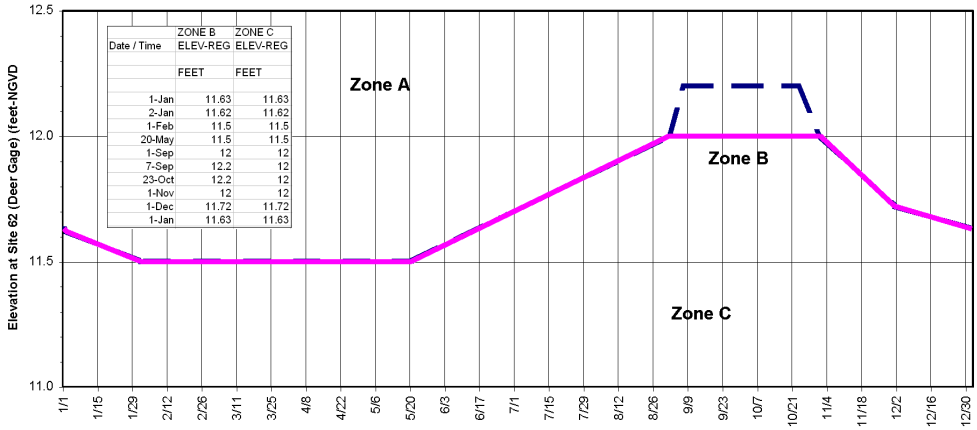
Structure S-339 and S-340



Date / Time	ZONE B ELEV-REG FEET	ZONE C ELEV-REG FEET
1-Jan	11.63	11.63
2-Jan	11.62	11.62
1-Feb	11.5	11.5
20-May	11.5	11.5
1-Sep	12	12
7-Sep	12.2	12
23-Oct	12.2	12
1-Nov	12	12
1-Dec	11.72	11.72
1-Jan	11.63	11.63

STRUCTURE OPERATION

ZONE	S-340	S-339
A	OPEN AFTER 7 DAYS IN ZONE	OPEN IF S-8 PUMPING OF 15,000 AC-FT OR MORE EXPECTED NEST 14 DAYS AND S-340 IS OPEN.
B	OPEN AFTER 30 TO 14 DAYS AS THE ELEVATION VARIES FROM 12.0 TO 12.2 RESPECTIVELY	
C	CLOSE AFTER 0.25 FEET BELOW SCHEDULE UNLESS TRANSFERRING WATER FORM S-8 TO DADE COUNTY OR ENP.	

- CONSECUTIVE DAYS IN ZONES A AND B ARE ADDITIVE.

CENTAL AND SOUTHERN FLORIDA

CANAL 123 STRUCTURES 339 AND S40 OPERATIONS SCHEDULE
SCALES AS SHOWN
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
DATED SEPT. 1977

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1. Central and Southern Florida Project, Letter Report Control Structure 197 in Canal 111, September 1967.
2. Coastal Areas South of St. Lucie Canal, Supplement 14, Detailed Design Memorandum, Part V, Oct1, 1954.
3. Coastal Areas South of St. Lucie Canal, Supplement 31, Detailed Design Memorandum, Part V
4. Coastal Areas South of St. Lucie Canal, Supplement 36, Detailed Design Memorandum, Part V
5. Coastal Areas South of St. Lucie Canal, Supplement 39, Detailed Design Memorandum, Part V, Nov 19, 1964.
6. Coastal Areas South of St. Lucie Canal, Supplement 40, Detailed Design Memorandum, Part V
7. Coastal Areas South of St. Lucie Canal, Supplement 46, Detailed Design Memorandum, Part V
8. "An Atlas of Surface Water Management Basins in the Everglades: The Water Conservation Areas and Everglades National Park", Richard M. Cooper and Joanne Roy, Technical Memorandum, SFWMD, September 1991.
9. Neidrauer, C.J. and Cooper, R. M., 1989. A Two-Year Field Test of the Rainfall Plan: A Management Plan for Water Deliveries to Everglades National park. SFWMD tech. Pub. 89-3.
10. Permit Application for S-197 by SFWMD submitted to Department of Environmental Protection, May 1990.
11. PL 91-282
12. South Dade Conveyance System, Supplement 37, General Design Memorandum, Part V, September 1963.
13. Letter to Central and southern Florida Flood Control District, West Palm Beach, from Joe Kaperski, Chief of Engineering, USACE, in part V, Supp 37.
14. South Dade Conveyance System, Supplement 52, General Design Memorandum, Part V, June 1973.
15. Central and Southern Florida Project, Supplement 54, General Design Memorandum, Modified Water Deliveries to Everglades National Park, Appendix F, June 1992.
16. "1983 Base" ~ktarbot/docs/MWD/83base.doc (Ken Tarboten) (see appendix 1 below).
17. "South Florida Water Management District Structure Descriptions", Volumes I and II, 1994 Revision.
18. Central and Southern Florida Project, Final Integrated GRR and EIS, Canal 111 (C-111) South Dade County, Florida, May 1994.
19. Value Engineering Study for Conveyance and Seepage Features, Modified Water Deliveries to Everglades National Park, USACE-Jacksonville, January 2001
20. Final EIS: Interim Operational Plan. Table ES-1: Alternative 7R Operations.
21. Central and Southern Florida Project for Flood Control and Other Purposes. Part I Agricultural and Conservation Areas, Supplement 54. General Design Memorandum and Environmental Impact Statement, Modified Water Deliveries to Everglades National Park, June 1992.
22. Central and Southern Florida Project Modified Water Deliveries to Everglades National Park, Florida, 8.5 Square Mile Area, GRR and FSEIS, July 2000.
23. Excel spreadsheet "triggers_KAT21.xls"
24. "IOP Implementation Issue – S-356 Operations", Letter to Agency Managers (ENP, SFWMD, USACE, USFWS, FDEP) dated May 7, 2003.
25. "Preliminary Evaluation of the Lake Okeechobee Regulation Schedule", Technical Publication 88-5, SFWMD, May 1988.
26. "Comparison of the Initial 2000BASE run with Restudy 95BSR dated July '99", presentation to the Interagency Modeling Center, July 1, 2003. Cal Neidrauer, SFWMD.
27. "Hydrology of WCA 1/ Lox NWR", Susan Bullock (Sylvester), Jacksonville District Corps of Engineers, Internal document.
28. "Lake Okeechobee Regulations Schedule, Appendix A", December 1994.
29. Monitoring and Operating Plan for C-111 Interim Construction Project. Permit # 131654749 submitted to FDEP by SFWMD. Final Draft, Revision 3. May 16, 1990.
30. Environmental Assessment and Finding of No Significant Impact. Test Iteration 7. Experimental Program of Water Deliveries to Everglades National Park. October 1995.

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31. L-30 Canal – Basis for Water Control Operation. Prepared by SFWMD – Water Control Operations Section & USACE – Water Management and Meteorology Section. March 27, 2003.
32. Central and Southern Florida Project, Final Integrated GRR Supplement and EA, Canal 111 (C-111) South Dade County, Florida, January 2002.

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Appendix 1

1983 Base

(Source: ~ktarbot/docs/MWD/83base.doc Last revised: 8/4/99)

Definition

The 83 Base represents the authorized canal levels and operations prior to the Experimental Water Deliveries program. It represents what the USACE would revert to should Test 7 be stopped.

In order to define *what* the authorized canal levels and operations *were* at the inception of the Experimental Water Deliveries program, an interagency team (referred to as the Interim Measures Team or IMT) met at the U.S. Army Corps of Engineers offices in Jacksonville (Nov 5 and 6, 1998) and went through the relevant design memoranda to determine and document the authorized canal levels and operations circa 1983. Table 1 represents the documentation of the 1983 Base by this team. References to the relevant authorizing documents are given wherever possible, with official letters prior to 1969 being regarded as authorizing documents. In Table 1 open and close elevations are given for structures authorized to be used for flood control purposes. Deliveries for water supply begin when canal levels downstream drop to 1.5 feet below the authorized optimum canal stage.

No Action Assumptions

.In order for the 1983 Base to be a "no action alternative" that could be reverted to should Test 7 be stopped, operations and conditions that would be reverted to as part of the 1983 Base needed to be defined. In general the current operations, demands and land use would apply outside of the region who's water control was altered as part of the Experimental Water Deliveries Program. Specifically the following would apply for the 1983 base:
1. EAA Best Management Practices (BMP) Replacement Water Rule would continue according to current operations (as represented in the 1995 Base).
2. Lake Okeechobee Supply Side management would continue according to current operations (as represented in the 1995 Base).
3. Land use would remain as it currently is.
4. Current public water supply demands would apply. (as represented in the 1995 Base).

Simulation of the 83 Base (83BSSTA)

For purposes of modeling the 83 Base in the South Florida Water Management Model (SFWMM v3.7) as part of the Modified Water Deliveries project, several assumptions were made in order to make the comparison of the 83 Base simulation with the other simulated alternatives meaningful.

These assumptions are as follows:

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Table 1. Base 1983: Canal levels and operations for the Experimental Water Deliveries Program area, as authorized prior to the Experimental Water Deliveries Program (all stages given in feet above sea level).

Canal	Structure	Operational Criteria				Reference
		Flood Control (FC)		Water Supply (WS)	Other Criteria	
		Open	Close	Optimum Stage		
L-28	S-344				According to Pre-EWD WCA-3A Regulation Schedule (9.5' to 10.5') Limited to a maximum of 135 cfs	P9 SFWMD 89-3 ref 9
	S-343 A & B				According to Pre-EWD WCA-3A Regulation Schedule (9.5' to 10.5') Limited to a maximum of 390 cfs	P9 SFWMD 89-3 ref 9
	S-12 A-D				Minimum Water Delivery Schedule (in 1000 ac-ft per month) J F M A M J J A S O N D Total 22 9 4 1.7 1.7 5 7.4 12.2 39 67 59 32 260	PL 91-282 and P23 SFWMD 89-3
	S-333				Water Supply to South Dade Only	Flood control not mentioned in any of GDM's/DDM's
	S-334				Water Supply to South Dade Only	
L-30	S-335	If HW above 7.0 ft, flood control release according to $Q=CLH^{3/2}$		6.0	Water supply structure. Top of closed gates is 1 ft above optimum, hence overtopping in case of stages > 1 ft above optimum.	
L-31N	G-211				Remove for modeling purposes. Operationally would be set open if reverting to BASE83	
	S-173/ S-331			5.0	Water supply to South Dade only.	Part V Supp 52 p26 ref 13
	S-176	5.7	5.3	5.5		FC: Part V Supp 37 ltr ref 12a WS: Part V Supp 52 p 26 ref 13
	S-174	5.5	5.1	5.5		Part V Supp 37 letters ref 12a

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- Estimated 1995 land use (as represented in the 1995 Base for both the Restudy and Lower East Coast Water Supply Plan) would be used.
- Public water supply demands would be the same as those used in the SFWMMv3.7, 1995 Base simulation for the Lower East Coast Water Supply Plan (LEC95).
- Storm Water Treatment Areas (STA's) would be included, hence the acronym 83BSSTA.
- The S12's would be operated according to the Minimum Delivery Schedule.
- The Zone-A/Zone-E regulation schedule (9.5/10.5 ft) would be used in WCA-3A.
- Other Water Conservation Areas would be operated according to current schedules (not rain driven).
- Lake Okeechobee would be operated according to the Water Supply Environment (WSE) schedule (SFWMD, 1998).
- Tidal structures are operated according to Table 2 to be more consistent with current system operations outside of Experimental Water Deliveries water control area.

The following assumptions in the 83 Base are also common to the 95 Base simulation:

- There are constraints at Tamiami Trail
- L67 extension is still in place
- C111 project not in place

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Canal	Structure	Operational Criteria				Reference
		Flood Control (FC)		Water Supply (WS)	Other Criteria	
		Open	Close	Optimum Stage		
C-1	S-338	5.2 in L-31N @ S-331HW	4.8 in L-31N @ S-331HW	5.0		Part V Supp 52 p26 ref 13
	S-148	5.5	3.7	5.0		Part V Supp 52 p26 ref 13
	S-21	2.4	1.5	2.0		Part V Supp 31 p11 ref 3
C-102	S-194				Water supply to South Dade only	Part V Supp 39 p4 ref 5
	S-165	5.9	5.1	5.5		Part V Supp 39 p4 ref 5
	S-21A	2.4	1.6	2.0		Part V Supp 37 p36 ref 12
C-103	S-196				Water supply to South Dade only	Part V Supp 39 p4 ref 5
	S-167	5.9	5.1	5.5		Part V Supp 40 p4 ref 6
	S-179	3.9	3.1	3.5		Part V Supp 40 p4 ref 6
	S-20F	2.4	1.6			Part V Supp 40 p4 ref 6

References for Table 1:

1. Central and Southern Florida Project, Letter Report Control Structure 197 in Canal 111, September 1967.
2. Coastal Areas South of St Lucie Canal, Supplement 14, Detailed Design Memorandum, Part V, Oct 1, 1954.
3. Coastal Areas South of St Lucie Canal, Supplement 31, Detailed Design Memorandum, Part V.
4. Coastal Areas South of St Lucie Canal, Supplement 36, Detailed Design Memorandum Part V.
5. Coastal Areas South of St Lucie Canal, Supplement 39, Detailed Design Memorandum, Part V, Nov 19, 1964.
6. Coastal Areas South of St Lucie Canal, Supplement 40, Detailed Design Memorandum Part V.
7. Coastal Areas South of St Lucie Canal, Supplement 46, Detailed Design Memorandum Part V.
8. Flood Control for South Dade, General Design Memorandum Supplement 37 Part V.
9. Neidrauer, C.J. and Cooper, R.M., 1989. A Two-Year Field Test of the Rainfall Plan: A Management Plan for Water Deliveries to Everglades National Park. SFWMD tech. Pub. 89-3
10. Permit Application for S-197 by SFWMD submitted to Department of Environmental Protection, May 1990.
11. PL 91-282
12. South Dade Conveyance System, Supplement 37, General Design Memorandum, Part V, September 1963.
12a. Letter to Central and Southern Florida Flood Control District, West Palm Beach, from Joe Kaperski, Chief of Engineering, USACE, in Part V, Supp. 37.
13. South Dade Conveyance System, Supplement 52, General Design Memorandum, Part V, June 1973.

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Canal	Structure	Operational Criteria				Reference
		Flood Control (FC)		Water Supply (WS)	Other Criteria	
		Open	Close	Optimum Stage		
L-31W	S-332				Taylor Slough Minimum Water Delivery Schedule J F M A M J J A S O N D Total cfs 12 6.7 3 3.1 6 112 120 48 100 126 62 12 Kaf 0.7 0.4 0.2 0.2 0.4 6.7 7.4 2.9 6 7.7 3.7 0.7 37	PL 91-282 *(Kaf = thousand acre-feet)*
	S-175	5.2	4.5	4.5		FC: Part V Supp 37 p39 ref 12 WS: Part V Supp 52 p26 ref 13
C-111	S-177	5.2	4.3	4.5		FC: Part V Supp 37 p39 ref 12 WS: Part V Supp 52 p26 ref 13
	S-18c	2.4	1.6	2.0	Minimum Water Delivery Schedule (in 1000 ac-ft per month) J F M A M J J A S O N D Total 1.5 0.6 0.3 0.1 0.1 0.3 0.5 0.9 2.7 4.6 4.1 2.2 18	FC:Ltr Report Sept 1967 ref 1 WS: PL 91-282. ref 11
	S-197		1.9		Open 3 gates if S-177 open & S-177>4.1 or S-18C>2.8, Open 7 gates if S-177>4.2 or S-18C>3.1, Open 13 gates S-177>4.3 or S-18C>3.3, Close when all following conditions are met: 1) S-176<5.2 and S-177<4.2, 2) Storm moved away from basin, and 3) after 1 and 2 are met, keep the number of S-197 culverts open necessary only to match residual flow through S-176. All culverts closed if S-177<4.1 after all conditions satisfied. In SFWMM flow is limited to keep stage above the gate closed levels.	Permit application. ref 10
C-4	S-25B	2.7	2.3	2.5		Part V Supp 46 p9b,10 ref 7
C-2	S-22	3.0	1.8			Part V Supp 14 p27 ref 2
C-100	S-118	5.4	3.5			Part V Supp 36 p14 ref 4
	S-119	5.4	4.2			Part V Supp 36 p14 ref 4
	S-123	2.4	1.6			Part V Supp 36 p13 ref 4

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Table 2. Canal levels and operations used in SFWMMv3.7 simulation of the 83 Base (83BSSTA) that are different from those in extracted from the design memoranda detailed in Table 1 (all stages given in feet above sea level).

Canal	Structure	Flood Control		Other Criteria
		Open	Close	
C-4	S-25B	3.5	3.0	
C-2	S-22			Release water when stage > 3.0
C-100	S-123			Release water when stage > 3.0
C-1	S-21			Release water when stage > 2.0
C-102	S-21A			Release water when stage > 1.8
C-103	S-20F			Release water when stage > 1.5 in dry season, > 1.8 in wet season

H-3.4 ROUND 2 AND ROUND 3 MODELING FORMULATION - RSMGL

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:
WCA-3A	S-356	Operating Range from 5.5 to 5.8 feet, NGVD (under Condition 1 & 2 as defined in Increment 1.1 and 1.2)	Operating Range from 5.5 to 5.8 feet, NGVD Intent is that S-356 is the last structure to close if L-29 constraint may be exceeded.	Operating Range from 5.5 to 5.8 feet, NGVD Conditional Priority (under all Conditions 1-4 as defined in Increment 2)	Operating Range from 5.5 to 5.8 feet, NGVD S-356 has priority over S-333 except when WCA-3A is above the extreme high water action line (EHWL). Refer to supplemental documentation for EHWL operational criteria.	S-333 has priority over S-356 when WCA-3A stages exceed the EHW line ALTO and ALTQ regional modeling (RSMGL) limit the S356 flow to the total daily levee seepage inflow into the canal.
	S-12A/S-12B	Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases.	
	S-344	Closed 1 Oct-14 July	Closed 1 Oct-14 July	Closed 1 Oct-14 July	Closed 1 Oct-14 July	ALTO and ALTQ regional modeling (RSMGL) limit the S344 max flow to 50cfs based on iModel information
	S-343A / S-343B	Closed 1 Oct-14 July	Closed 1 Oct-14 July	Closed 1 Oct-14 July	Closed 1 Oct-14 July	ALTO and ALTQ regional modeling (RSMGL) limit the S343A and S343B max flow to 50cfs based on iModel information
	Increment 1 Action Line	10.0 feet to 10.75 feet, NGVD	No Action Line	10.0 feet to 10.75 feet, NGVD	No Action Line	
	Incremental Testing Extreme High Water (EHW) Action Line	No EHW Action Line (consistent with Increment 1.1 and 1.2)	No EHW Action Line	Increment 2 EHW Action Line	COP EHWL 11.0-12.0 ft NGVD. Refer to supplemental documentation for EHWL operational criteria, distributed to COP PDT (April 2019). There are three conditions when WCA-3A three gage average is above the extreme high water line which will trigger a thorough evaluation of the C&SF system conditions and authorize the use of available capacity along the L-31N and C-111 canals to provide additional discharge capacity from WCA-3A.	When WCA-3A stages exceed the EHW line: - S-333 has priority over S-356 - S-334 has priority over S-356 but can discharge only if capacity exists in the SDCS Due to the limited number (2-3 events) and relatively short duration of simulated events with WCA-3A stages above the EHWL with Round 2, and given the EHWL operational criteria recognition that each exceedance event may not require use of the full operational flexibility afforded by the EHWL criteria, the EHWL criteria are not represented within the RSM-GL.
	WCA-3A Regulation Schedule (Below Zone A)	2012 WCP (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west	ERDO, as informed by iModel ALT O removes regulation schedule except for Zone A.	2012 WCP with implementation of ERDO: Environmental and Regulatory components of the Rainfall Plan with an improved environmental flow formula - 9.25 (bottom Zone D) to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west With changes to the 2012 WCP:	ERDO, as informed by Alternative O (Tamiami Trail Flow Formula) ALT Q removes regulation schedule except for Zone A.	
WCA-3A/3B	S-335	Supplemental deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay L-30 maximum elevation between 6.5 to 7.5 feet, NGVD (6.5-7.0 in Condition 1 &2; 7.0-7.5 in Condition 3&4)	L-30 maximum elevation of 6.5 to 7.5 feet, NGVD S-335 used to support Taylor Slough supplemental flows (ERDO, as informed by iModel). S335TW limit of 6.1 feet NGVD, as informed by iModel, to facilitate Taylor Slough and S356 flows.	L-30 maximum elevation of 7.0 to 7.5 feet, NGVD S335TW limit of 6.0 feet NGVD May be used to support Taylor Slough supplemental flows (ERDO, as informed by iModel)	L-30 maximum elevation of 6.5 to 7.5 feet, NGVD S-335 used to support Taylor Slough supplemental flows (ERDO, as informed by Alternative O). S335TW limit of 6.1 feet NGVD, as informed by Alternative O, to facilitate Taylor Slough and S356 flows.	ALTO and ALT Q assumptions for TS supplemental flows, refined based on iModel results for ERDO: S335_2 (5.8/5.3) - 400 cfs Aug1-Feb14 S335_3 (6.0/5.5) - 400 cfs Aug1-Feb14 S335_2 and S335_3 - turn off when S176HW >= 4.7 feet NGVD Further refinement of the operational criteria will likely be necessary for development of the COP Project Operating Manual, while maintaining consistency with the model assumed triggers indicated above.
NESRS	L-29	Up to 7.8 feet, NGVD	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)	Model 8.5 ft, NGVD for Oct thru Jan; and use 8.25 ft, NGVD for the remainder of year. Removal of the FDOT constraint will be evaluated through a sensitivity run following completion of the Alternative Q modeling.
	G-3273	Relax constraint (previously 6.8 feet, NGVD)	Remove use as an operational constraint for inflows to NESRS	Remove use as an operational constraint for inflows to NESRS	Remove use as an operational constraint for inflows to NESRS	
	S-333	Operated per WCA-3A Regulation Schedule, including priority to NESRS. Additional increase governed by L-29 stage. All available capacity as needed. (1350 cfs)	All available capacity as needed. (1350 cfs) S-356 is prioritized over S-333 up to the full capacity, so S-356 operations can continue if S-333 is reduced due to the L-29 constraint.	Conditional priority to S-333 and S-356 (under all Conditions 1-4 as defined in Increment 2 operations). Tailwater constraint revised according to L-29 increased stage criteria. Structure capacity 1350 cfs	All available capacity as needed. (1350 cfs) S-356 has priority over S-333 except when WCA3A is above the EHWL, subject to the L-29 FDOT constraint	S-333 has priority over S-356 when WCA-3A stages exceed the EHW line
	S-333N	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions: A. When the average stages at gauges WCA 3A-62 and WCA 3A-63 exceed elevation 11.6 ft. NGVD for 72 hours. Discharges from the existing S-356 Pump Station shall have priority over the S-333N Gated Spillway discharges. B. S-333N is closed when the L-29 Canal stage limits the operations of the S-356 Pump Station, or when the average of the WCA 3A-62 and WCA 3A-63 gauges recedes below an elevation of 11.0 ft. NGVD. C. During operations of S-333N Gated Spillway, the following operations shall take place: i. There shall be no use of S-334 Gated Spillway to divert WCA-3A regulatory releases to the L-31N Canal; and ii. The S-356 Pump Station will have priority over the S-333N Gated Spillway and the S-356 Pump Station will be operated up to its full available capacity prior to opening G-211 Gated Culvert, and as the water levels recede in WCA-3, the G-211 Gated Culvert will be closed before the pumping at the S-356 Pump Station is reduced.	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions: A. When the average stages at gauges WCA 3A-62 and WCA 3A-63 exceed elevation 11.6 ft. NGVD for 72 hours. Discharges from the existing S-356 Pump Station shall have priority over the S-333N Gated Spillway discharges. B. S-333N is closed when the L-29 Canal stage limits the operations of the S-356 Pump Station, or when the average of the WCA 3A-62 and WCA 3A-63 gauges recedes below an elevation of 11.0 ft. NGVD. C. During operations of S-333N Gated Spillway, the following operations shall take place: i. There shall be no use of S-334 Gated Spillway to divert WCA-3A regulatory releases to the L-31N Canal; and ii. The S-356 Pump Station will have priority over the S-333N Gated Spillway and the S-356 Pump Station will be operated up to its full available capacity prior to opening G-211 Gated Culvert, and as the water levels recede in WCA-3, the G-211 Gated Culvert will be closed before the pumping at the S-356 Pump Station is reduced.	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions: A. When the average stages at gauges WCA 3A-62 and WCA 3A-63 exceed elevation 11.6 ft. NGVD for 72 hours. Discharges from the existing S-356 Pump Station shall have priority over the S-333N Gated Spillway discharges. B. S-333N is closed when the L-29 Canal stage limits the operations of the S-356 Pump Station, or when the average of the WCA 3A-62 and WCA 3A-63 gauges recedes below an elevation of 11.0 ft. NGVD. C. During operations of S-333N Gated Spillway, the following operations shall take place: i. There shall be no use of S-334 Gated Spillway to divert WCA-3A regulatory releases to the L-31N Canal; and ii. The S-356 Pump Station will have priority over the S-333N Gated Spillway and the S-356 Pump Station will be operated up to its full available capacity prior to opening G-211 Gated Culvert, and as the water levels recede in WCA-3, the G-211 Gated Culvert will be closed before the pumping at the S-356 Pump Station is reduced.	Structure capacity 1150 cfs (Consistent with SFWMD Permit July 2019) Per FDEP permit (July 2019), S-333N is only operated under Emergency Limited Operations for WCA-3 High Water Relief under the following conditions. Same as Alt O. Refer to supplemental documentation for EHWL operational criteria.	

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	**Management Measures**	**Alternative A (No Action)**	**Alternative O**	**Alternative N2**	**Alternative Q**	**Additional Detail and Modeling Notes for Round 2 and Round 3:**
	Rainfall Plan	1985 Rainfall Plan as modified in 2012 Water Control Plan (WCP) Operational intent is to maximize discharge capacity from S-333 to NESRS prior to utilization of the S-12s, subject to conditions below. When S-12s capacity is required the structure should be opened from east to west. S-12s/S-333 pre-emptive/proactive releases to better manage high stages in WCA-3A. S-12s and/or S-333 release up to projected WCA 3A inflow based upon system water management operations and/or rainfall to create storage in WCA-3A for expected inflow. Regulatory component of the Rainfall Plan determined by multiplying the distance (in feet) the WCA-3A water level is above Zone E/E1 by 2,500 cfs from 1 January through 30 June and by 5,000 cfs from 1 July through 31 December.	ERDO, as informed by the iModel	ERDO, as informed by the iModel	ERDO, as informed by Alternative O (Tamiami Trail Flow Formula)	For Alternative O, target RDO perfomance as identified in iModel "Round2 Base" scenario. Currently modeled as the sum of S333, S12D and S12C from iModel adjusted to account for anticipated regulatory flows. Development of a specific operating protocol / rainfall formula (as required for the COP System Operating Manual) will be pursued for Round 3. An overview of the modeling path forward will be provided at the COP PDT meeting on 02 April 2019.
SDCS	**C-111 SD North Detention Area**	Begin use of C-111SD NDA and remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	Modeled NDA average bottom elevation set at 6.5 feet, NGVD. Internal L-318 levee is not resolved in the RSM-GL. Note for Alternatives O and Q: Pumped inflows to NDA are not constrained within the storage capacity limits for the NDA, but inflows are stopped prior to overtopping the eastern emergency overflow weirs (~3.5 feet NDA depth).
	C-111 SD South Detention Area	Begin use of C-111SD SDA and remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	Modeled SDA average bottom elevation set at 6.0 feet, NGVD. Internal L-321 levee is not resolved in the RSM-GL. Note for Alternatives O and Q: Pumped inflows to SDA are not constrained within the storage capacity limits for the SDA, but inflows are stopped prior to overtopping the eastern emergency overflow weirs (~3.5 feet SDA depth).
	S-178	Open (southerly flow only)	Open (southerly flow only)	Open (southerly flow only)	Open (southerly flow only)	RSM-GL special code includes current SFWMD standing order. No reverse flow is modeled.
	S-332B West	Maintain local flood risk management and conditional use during Column 2 operations, lower canal elevations with constrained operations to facilitate construction. Operating Range from 4.2 to 4.8 feet, NGVD Year Round Operational Ranges: Total operating range from 4.0 to 4.8 feet, NGVD to reflect the operational flexibility within the 4.2/4.8 range and the effect of limited (8 weeks) supplemental water supply the bottom (small) flow range extends below 4.2 feet, NGVD Individual operating ranges: 3. top range 4.3 to 4.7 feet, NGVD 2. middle range 4.2 to 4.4 feet, NGVD 1. bottom range 4.1 to 4.3 feet, NGVD for S-332BN, S-332B, and S-332C bottom range 4.0 to 4.2 feet, NGVD for S-332D S-194 and S-196 range of lowered from 4.2/4.8 to 4.2/4.6 during CSSS Nesting Period (15 Feb to 31 Jul) to reduce the use of S-332BN, S-332BW, S-332C, and S-332D. S194 and S-196 range of 4.2/4.8 from (Aug to 14 Feb) Discharge of up to about 200 cfs at S-176 to assist in maintain the L-31N during the 01 Aug to 14 Feb period during which agricultural fields are prepared planted and grow. Model as two structures with the following capacity fraction of the total capacity: 30% for CSSS discharges using 4.7/4.5 feet, NGVD (30% approx. = 200 cfs / 630 cfs design capacity); 70% for standard discharges using 4.75/5.0 ft, NGVD Notes: Seasonal pumping limits remain unchanged for S-332D.	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total; 2. middle range 175 cfs, increase 250 cfs total; 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD for S-332BN/BW/C; bottom range of 3.8-4.0 feet, NGVD for S-332D (priority for Taylor Slough); Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD for S-332BN/BW/C/D; Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD; S-332D unchanging at 3.8-4.0 Notes: Seasonal Capacity limits remain unchanged for S-332D.	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332B1 4.7/4.5 (125 cfs); S332B2 5.0/4.7 (125 cfs);	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total; 2. middle range 175 cfs, increase 250 cfs total; 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD for S-332BN/BW/C; bottom range of 3.8-4.0 feet, NGVD for S-332D (priority for Taylor Slough); Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD for S-332BN/BW/C/D; Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD; S-332D unchanging at 3.8-4.0 Notes: Seasonal Capacity limits remain unchanged for S-332D.	Increment 1.1/1.2 operational flexibility to use one pump at S-332BW/ S-332BN and S-332C and up to two pumps at S-332D at a range of 3.8-4.2 ft NGVD to assist with CSSS habitat and nesting targets is not modeled for the No Action Alternative. The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range; the operation range for S332B, S332C, and S332D should be the same, with the limits delineated from the lowest to highest elevation of the operation range of S332B, S332C, and S332D identified in the modeling. The objective of changing where water will be sent will be handled by specifying a ramp up and ramp down sequence for the S332B, S332C, and S332D pump based on the water conditions and time of the year.
	S-332B North	Same as S-332B West	Same as S-332B West	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332BN1 4.7/4.5 (125 cfs); S332BN2 5.0/4.7 (125 cfs);	Same as S-332B West	

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:
	S-332C	Same as S-332B West	S-332B West + 0.3 feet for all ranges. Operational criteria adjustment is informed by ERDO evaluation during Round 2 modeling, indicating that prioritizing use of S332B over S-332C would improve performance.	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332C1 4.7/4.5 (250 cfs); S332C2 5.0/4.7 (250 cfs);	S-332B West + 0.2 feet for all ranges. Operational criteria adjustment is informed by ERDO evaluation during Round 2 modeling, indicating that prioritizing use of S332B over S-332C would improve performance. S-332C operational criteria lowered by 0.1 feet from Alt O levels for all ranges based on PDT input following Round 2 evaluations. The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range; the operation range for S332B, S332C, and S332D should be the same, with the limits delineated from the lowest to highest elevation of the operation range of S332B, S332C, and S332D identified in the modeling. The objective of changing where water will be sent will be handled by specifying a ramp up and ramp down sequence for the S332B, S332C, and S332D pump based on the water conditions and time of the year.	
	S-332D	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul) Pumping at S332D will use the following flow ranges: 3. top range 250 cfs increase 500 cfs total with 75 cfs sent through S332DX1 2. middle range 125 increase 250 cfs total with no flow sent through S332DX1 1. bottom range 125 cfs increase 125 cfs total (2) with no flow through S332DX1	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)	Calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul) S332D1 4.4/4.25 (250 cfs); S332D2 4.7/4.4 (250 cfs).	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)	
	L-31N Structure Priority	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B (refer to S-332C note above) 3) S-332C (refer to S-332C note above) 4) S-194/S-196 (open at top of range) 5) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B (refer to S-332C note above) 3) S-332C (refer to S-332C note above) 4) S-194/S-196 (open at top of range) 5) S-176	
	S-332DX1	Supplemental Use for S-332D: S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. S-332DX1 is operated per increment 1.1 and 1.2: 1. Operated to direct up to 75 cfs to the Southern Detention Area when S-332D is discharging more than 250 cfs 2.Assume routing 75 cfs through S332DX1 will allow the flows at S332D to be conservatively increased during the CSSS calendar based flow limits: a) 375 cfs from 01 December – 31 January (CSSS operational constraint 325 cfs); b) 325 cfs from 01 February – 14 July (CSSS operational constraint : 250 cfs)	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage < 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 10 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage < 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 125 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage < 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 10 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14	
	S-331/S-173	Full use under Column 2 discharges Increment 1.1/1.2: Level 1. When LPG2 > 6.5 feet, NGVD then S-331 HW will be maintained between 3.5 and 4.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet, NGVD. Level 2. When 6.0 <= LPG2 < 6.5 feet, NGVD then S-331 HW will be maintained between 4.5 and 4.0 feet, NGVD. Level 3. When 5.5 < =LPG2 < 6.0 feet, NGVD then S-331 HW will be maintained between 5.0 and 4.5 feet, NGVD. Level 4. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0). Modeled assuming S-331 HW maintained between 5.0-5.5 feet, NGVD Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay. It is the expectation that supplemental deliveries will not cause prolonged pumping with two or more units at S-331. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0) when pumping at S-331 and above 4.8 feet, NGVD when siphoning at S-331. There is no stage requirement when water supply deliveries are being made through G-211.	Operational Range of 4.5 to 5.0 feet (14Feb-31Jul) and 4.3 to 4.6 (1Aug-1Jan) with transition, NGVD. S-331 Operations are not dependent on stages within the 8.5 SMA.	Operational Range 4.75 to 5.25 feet, NGVD (0.25 ft lower than Inc 2 and Alt N) with the ability to adjust up to 0.5 feet with the development of a trigger stage. 1. When LPG2 ≥ 7.0 feet, NGVD then S-331 HW may be maintained between 4.5 to 5.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet, NGVD. If the required capacity at S-357 is unavailable the operational range of S-331 may be lowered using the following criteria: -When LPG2 > 7.0 feet, NGVD then S-331 HW will be maintained between 3.5 and 4.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet NGVD. -When LPG2 < 7.0 feet, NGVD then S-331 HW will be maintained between 4.0 and 4.5 feet, NGVD until the stage at LPG2 falls below 6.5 feet NGVD.	Operational Range of 4.5 to 5.0 feet (14Feb-31Jul) and 4.3 to 4.6 (1Aug-1Jan) with transition, NGVD. S-331 Operations available to help with 8.5 SMA flood mitigation. When G-3273 > 7.5 feet NGVD and LPG2 is projected to exceed 6.7 feet NGVD for more than the maximum 8.5 SMA flood mitigation criteria, S-331 HW will be lowered to 2.8 to 3.5 feet NGVD until LPG2 can be maintained between 6.2 and 6.6 feet NGVD. This operation was not modeled in the RSMGL.	For the no action alternative, Level 1 criteria for S-331 HW use 6.5 ft NGVD -- 6.6 feet is prescribed in the Increment 1.1/1.2 operational strategy until LPG-2 falls below 6.5. Alternative O and Q, S-331 modeling notes: 1. Proposed criteria (originating from MWD increment 2 criteria) including the "Ability to adjust up to 0.5 feet with the development of a trigger stage" (either up or down) will not be explicitly modeled with Round 2 or Round 3 COP. 2. Up to maximum pump capacity (575 cfs) will always be available at S-357 in the model (i.e. no pump limitations due to maintenance), other than if the NDA stage exceeds 10.0 feet NGVD (refer to NDA operational criteria). Therefore, the secondary criteria (originating from MWD increment 2 criteria) for "If the required capacity at S-357 is unavailable" is not coded into the RSM-GL.
	G-737*	As per SFWMD C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	**Management Measures**	**Alternative A (No Action)**	**Alternative O**	**Alternative N2**	**Alternative Q**	**Additional Detail and Modeling Notes for Round 2 and Round 3:**
WCA-3A/3B	S-197	S-197 modeling criteria (refer to Table 28/Table 38 in the Increment 1.1/1.2 Operational Strategy): Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully (2400 cfs). Level 2: If S-18C HW > 3.1 ft NGVD OR S-177 HW > 4.2: S-197 flows 1600 cfs Level 1: If S-18C HW > 2.8 ft NGVD OR S-177 HW > 4.1: a) In Condition 1: S-197 flows 800 cfs b) In Conditions 2, 3 or 4: S-197 flows 500 cfs Level 4 (low volume releases): S-197 flows are determined based on S-18C HW with respect to historical monthly median S-18C HW (Table 28/38). Operations to increase frequency while reducing flows (no net change); added EHW Condition flow criteria. Not intended to be opened greater than 400 cfs when S-18C HW is below 2.8 feet (floor of 1.8 feet, NGVD), NGVD or when S-177 HW is below 4.1 feet, NGVD.	Only use S-18C to trigger opening of S-197 When S-18C > 2.6 ft, open S-197 up to 200 cfs When S-18C > 2.8 ft, operate S197 up to 800 cfs When S-18C > 3.3 ft, operate S197 up to 2400 cfs	2012 WCP with level 1 limited to 400 cfs (Alt N criteria), with additional full open criteria remove level 2 and retain level 3 Level 1: If S-18C HW > 2.6 ft NGVD OR S-177 HW > 4.1: S-197 flows 400 cfs Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully (2400 cfs).	Only use S-18C to trigger opening of S-197. (a) When S-18C HW > 2.6 ft NGVD, open S-197 up to 200 cfs; close when S-18C HW < 2.5 ft NGVD. Flow may be adjusted from 0 to 200 cfs within the range. (b) When S-18C HW > 3.1 ft NGVD, operate S197 up to 800 cfs; reduce to 200cfs when S-18C HW < 2.8 ft NGVD. (c) When S-18CHW > 3.3 ft, operate S197 up to 2400 cfs; reduce to 800 cfs when S-18C HW < 3.1 ft. Operating intent is to transition down to lower flows holding S-18C < 2.5 ft NGVD. When S-331 is operating below S-331 normal operating range to assist in providing drainage to 8.5SMA then up to 200cfs can be routed to S-197 as long as S-18C HW > 2.3 ft. Priority would be to utilize available capacity at S-332B/C/D, S-199, S-200 prior to opening S-197. This operation was not modeled in the RSMGL.	S-197 modeling criteria for the No Action Alternative Level 3T (Modeling artifacts- transitional ops to Level 3): If S-18C HW > 2.75 ft NGVD OR S-177 HW > 4.0: a) In Condition 1: S-197 flows 0 cfs-800 cfs. b) In Conditions 2, 3 or 4: S-197 flows from 0-500 cfs. ALTO and ALTQ modeling assumptions: - transition from 0-200 cfs between 2.5 and 2.6 - transition from 200-800 cfs between 2.8 and 3.1 - transition from 800-2400 cfs between 3.1 and 3.3 ALTQ: When the WCA3A 3-gage average exceeds 12.3 ft, S-197 discharges at full capacity
	S-356 S-12A/S-12B S-344 S-343A / S-343B Increment 1 Action Line	Operating Range from 5.5 to 5.8 feet, NGVD (under Condition 1 & 2 as defined in Increment 1.1 and 1.2) Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases. Closed 1 Oct-14 July Closed 1 Oct-14 July 10.0 feet to 10.75 feet, NGVD	Operating Range from 5.5 to 5.8 feet, NGVD Intent is that S-356 is the last structure to close if L-29 constraint may be exceeded. Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases. Closed 1 Oct-14 July Closed 1 Oct-14 July No Action Line	Operating Range from 5.5 to 5.8 feet, NGVD Conditional Priority (under all Conditions 1-4 as defined in Increment 2) Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases. Closed 1 Oct-14 July Closed 1 Oct-14 July 10.0 feet to 10.75 feet, NGVD	Operating Range from 5.5 to 5.8 feet, NGVD S-356 has priority over S-333 except when WCA-3A is above the extreme high water action line (EHWL). Refer to supplemental documentation for EHWL operational criteria. Closed 1 Oct-14 July (with Exit Strategy)[7] Conditional operations in accordance with the BO with with limited cultural access releases. Closed 1 Oct-14 July Closed 1 Oct-14 July No Action Line	S-333 has priority over S-356 when WCA-3A stages exceed the EHW line ALTO and ALTQ regional modeling (RSMGL) limit the S356 flow to the total daily levee seepage inflow into the canal. ALTO and ALTQ regional modeling (RSMGL) limit the S344 max flow to 50cfs based on iModel information ALTO and ALTQ regional modeling (RSMGL) limit the S343A and S343B max flow to 50cfs based on iModel information
	Incremental Testing Extreme High Water (EHW) Action Line WCA-3A Regulation Schedule (Below Zone A)	No EHW Action Line (consistent with Increment 1.1 and 1.2) 2012 WCP	No EHW Action Line ERDO, as informed by iModel ALT O removes regulation schedule except for Zone A.	Increment 2 EHW Action Line 2012 WCP with implementation of ERDO:	COP EHWL 11.0-12.0 ft NGVD. Refer to supplemental documentation for EHWL operational criteria, distributed to COP PDT (April 2019). There are three conditions when WCA-3A three gage average is above the extreme high water line which will trigger a thorough evaluation of the C&SF system conditions and authorize the use of available capacity along the L-31N and C-111 canals to provide additional discharge capacity from WCA-3A. ERDO, as informed by Alternative O (Tamiami Trail Flow Formula) ALT Q removes regulation schedule except for Zone A.	When WCA-3A stages exceed the EHW line: - S-333 has priority over S-356 - S-334 has priority over S-356 but can discharge only if capacity exists in the SDCS Due to the limited number (2-3 events) and relatively short duration of simulated events with WCA-3A stages above the EHWL with Round 2, and given the EHWL operational criteria recognition that each exceedance event may not require use of the full operational flexibility afforded by the EHWL criteria, the EHWL criteria are not represented within the RSM-GL.
		(Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west		Environmental and Regulatory components of the Rainfall Plan with an improved environmental flow formula - 9.25 (bottom Zone D) to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west		
	S-335	Supplemental deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay L-30 maximum elevation between 6.5 to 7.5 feet, NGVD (6.5-7.0 in Condition 1 &2; 7.0-7.5 in Condition 3&4)	L-30 maximum elevation of 6.5 to 7.5 feet, NGVD S-335 used to support Taylor Slough supplemental flows (ERDO, as informed by iModel). S335TW limit of 6.1 feet NGVD, as informed by iModel, to facilitate Taylor Slough and S356 flows.	With changes to the 2012 WCP: L-30 maximum elevation of 7.0 to 7.5 feet, NGVD S335TW limit of 6.0 feet NGVD May be used to support Taylor Slough supplemental flows(ERDO, as informed by iModel)	L-30 maximum elevation of 6.5 to 7.5 feet, NGVD S-335 used to support Taylor Slough supplemental flows (ERDO, as informed by Alternative O). S335TW limit of 6.1 feet NGVD, as informed by Alternative O, to facilitate Taylor Slough and S356 flows.	ALTO and ALT Q assumptions for TS supplemental flows, refined based on iModel results for ERDO: S335_2 (5.8/5.3) - 400 cfs Aug1-Feb14 S335_3 (6.0/5.5) - 400 cfs Aug1-Feb14 S335_2 and S335_3 - turn off when S176HW >= 4.7 feet NGVD Further refinement of the operational criteria will likely be necessary for development of the COP Project Operating Manual, while maintaining consistency with the model assumed triggers indicated above.
	L-29 G-3273	Up to 7.8 feet, NGVD Relax constraint (previously 6.8 feet, NGVD)	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr) Remove use as an operational constraint for inflows to NESRS	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr) Remove use as an operational constraint for inflows to NESRS	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr) Remove use as an operational constraint for inflows to NESRS	Model 8.5 ft, NGVD for Oct thru Jan; and use 8.25 ft, NGVD for the remainder of year. Removal of the FDOT constraint will be evaluated through a sensitivity run following completion of the Alternative Q modeling.

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:
Taylor Slough	S-328	Deliveries to Taylor Slough up to 250 cfs (500 cfs capacity) when S-332D is pumping. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).	Open up to 250 cfs when flows through S-332D are greater than 250 cfs. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).	Deliveries to Taylor Slough up to 250 cfs (500 cfs capacity) when S-332D is pumping. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).	Open up to 250 cfs when flows through S-332D are greater than 250 cfs. S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD (derived from SFWMD South Dade Investigation modeling).	
Biscayne Bay	S-338	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational range from 5.5 to 5.8 feet, NGVD (tied to S-356)	Operating Range from 5.5 to 5.8 feet, NGVD;	Operating Range from 5.5 to 5.8 feet, NGVD;	Operating Range from 5.5 to 5.7 feet, NGVD; Include refinement of operational criteria for coastal divide structures to opportunistically provide improved timing and spatial distribution of flows to Biscayne Bay, based on PDT evaluations of Round 2, Sensitivity Run #4 (Applied to Alternative O). Responsive to recommendations from the COP Ecological subteam to ensure COP operations maintain the "do no harm" standard for Biscayne Bay while aiming to prioritize spatial location of inflows to the South Bay.	Revisit opportunities to tie into downstream benefits and CSSS flexible ops under Round 3 modeling, based on review of Round 2 sensitivity run #4.
	S-194/S-196	Discharge to tide to supplement S-332s, flexibility to the 2012 WCP to Meet Sparrow RPA Targets Seasonal Operating Ranges from 4.2 to 4.8 feet, NGVD	Within the CSSS nesting period the operational range is 4.2 to 4.75 feet, NGVD. The rest of the year the operational range is 4.2 to 4.8 feet, NGVD.	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operating Range from 4.5 to 4.8 feet, NGVD	Within the CSSS nesting period the operational range is 4.1 to 4.65 feet, NGVD. The rest of the year the operational range is 4.1 to 4.7 feet, NGVD. Include refinement of operational criteria for coastal divide structures to opportunistically provide improved timing and spatial distribution of flows to Biscayne Bay, based on PDT evaluations of Round 2, Sensitivity Run #4 (Applied to Alternative O). Responsive to recommendations from the COP Ecological subteam to ensure COP operations maintain the "do no harm" standard for Biscayne Bay while aiming to prioritize spatial location of inflows to the South Bay.	Revisit opportunities to tie into downstream benefits and CSSS flexible ops under Round 3 modeling, based on review of Round 2 sensitivity run #4.
Taylor Slough	SUPPLEMENTAL FLOWS TO TAYLOR SLOUGH	Water supply up to 250 cfs with constraints for a maximum of 8 weeks (November to December) -Supplemental flows to Taylor Slough from WCA-3A when WCA-3A is 1.0 ft above the floor (up to 250 cfs) -Supplemental Flows are delivered using the S-151/S-337/S-335/G-211/S-331 path for conditions when S-176 headwater stage is between 3.9-4.3 feet NGVD (refined from original ECB19 release range of 4.1-4.3 to better simulate operational intent)	Timing of Supplemental Flows as Informed by ERDO See S-335 section for further information.	Timing of Supplemental Flows as Informed by ERDO See S335 section for further info	Timing of Supplemental Flows as Informed by Alternative O. See S-335 section for further information. Similar to operational criteria from MWD Increment 2, supplemental water deliveries of up to 300 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide flow to Taylor Slough and/or to slow recession in eastern ENP along the west side of the C-111 Northern Detention Area (NDA) and C-111 Southern Detention Area (SDA). Maximum supplemental flow limit increased from 250 cfs to 300 cfs based on operational experience gained by water managers during the MWD Increment 2 field test. Since the criteria for Taylor Slough deliveries was not prescribed by the COP Interagency PDT, these criteria were not represented within the RSM-GL).	Modeling assumptions for ALT O were refined during Round 2 modeling, consistent with intent of the COP Round 2 alternative formulation discussions. Supplemental flows are provided through operational triggers at S-335 from the L-30 Canal, with triggers Informed by IModel application using Taylor Slough stage targets from the COP Ecological sub-team. For Alternative O, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the Round 2 modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD Increment 2, supplemental water deliveries of up to 250 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
WCA-3A/NESRS	S-334	Column 2 Under Condition 3 (Above Action Line)	Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints. These criteria were not incorporated into the RSM-GL (refer to modeler notes).	S-334 Operated when conditions are defined at or above the EHW Action Line with priority order: S-332B/C/D, S-338, S-194, S-196, and (S-199 and S-200 MAX) S-197 (Increment 2) Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints. These criteria were not incorporated into the RSM-GL (refer to modeler notes).	Only used for Regulatory releases when WCA-3A is above the EHWL. Refer to supplemental documentation for EHWL operational criteria. There are three conditions when WCA-3A three gage average is above the extreme high water line which will trigger a thorough evaluation of the C&SF system conditions and authorize the use of available capacity along the L-31N and C-111 canals to provide additional discharge capacity from WCA-3A. Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints.	No Action Alternative and all ALTs use the S-151/S-337/S-335 for regional Water Supply deliveries from WCA-3A to Service Area 3 (S-334 is not modeled for water supply deliveries, although this path may be used for real-time operations when conditions permit). For COP Round 3 modeling of Alternative Q (unchanged from Round 1/2 modeling assumption for Alternatives N/N2 that included Increment 2 operational criteria), S-334 would only be available for regulatory releases when WCA-3A stage exceeds the EHW line and when downstream capacity is available within the SDCS. The "short-term availability in accordance with FDOT constraints was not modeled for the Round 1, Round 2, and Round 3 alternatives. Based on evaluation of the Round 2 results (Alternative O), simulated L-29 Canal stages exceeded 8.5 feet NGVD for only 5 days during October 1999. Based on the limited frequency of occurence, more detailed modeling is not warranted for Round 3.

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL						
		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:
Add-On Structures for Modeling *Flow structures were not modeled during the CEPP-period alternatives*	S-357	S-357 discharges into C-111SD NDA. Dependency on S-331 to provide 8.5 SMA flood mitigation, with S-357 as secondary. The following operations maintain consistency with Increment 1.1 and 1.2 following assumed operation of the C-111 South Dade NDA: • Level 1: If LPG-2 > 7.0 ft, NGVD: S-357 operated at 3.5-4.0 ft, NGVD • Level 2: if 6.0 <= LPG-2 < 7.0 ft, NGVD: S-357 operated at 4.0-5.0 ft, NGVD • Level 3: if 5.5 <= LPG-2 < 6.0 ft, NGVD: S-357 operated at 5.0-5.5 ft, NGVD • Level 4: if LPG-2 < 5.5 ft, NGVD: S-357 operated at 5.5-6.0 ft, NGVD • Max capacity limited to 500 cfs (match FDEP ops permit issued to USACE)	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).	same as ALTO Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 3. When G-3273 > 7.5 feet NGVD and LPG2 is projected to exceed 6.7 feet NGVD for more than the maximum 8.5 SMA flood mitigation criteria, S-357 HW will be lowered to 2.3 to 3.0 feet NGVD until LPG2 can be maintained between 6.2 and 6.6 feet NGVD. This operation was not modeled in the RSMGL. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).	Modeling notes for Alternative O: 1. Different from the COP 2019 ECB assumptions, S-357 criteria are referenced to Angel's well stages, and not LPG-2 for conditions 1a, 1b, and 1c. Criteria 1d and 1e also add a check with interior 8.5 SMA stages at LPG-2 and 1e further adds a duration check. 2. Criteria #2 (LPG-2 > 7.0) should supersede criteria 1d and 1e if this threshold is exceeded (i.e. no dependency on Angel's stage). 3. "may be lowered by 0.5 feet increments if the flood mitigation criteria is not being met" will not be represented in the Round 2 modeling (evaluations will justify changes for Round 3). 4. Conditions for " WCA-3A discharges through S-333 structure to NESRS will be incrementally reduced" will not be represented in the Round 2 modeling (evaluations will justify changes for Round 3). Concurrent with COP Round 3 modeling, 8.5 SMA flood mitigation criteria for real-time operations will be refined based on MD-RSM simulated hydroperiod response to rainfall indicated within the 1983 base condition. Due to the limited years evaluated with the MD-RSM, the 8.5 SMA flood mitigation criteria will also leverage the real-time criteria established within the MWD Increment 2 field test monitoring plan (Appendix C of the 2018 MWD Increment 2 EA)to inform development of the COP Project Operating Manual.
	S-357N	100 cfs	100 cfs	100 cfs	same as ALTO The COP Project Operating Manual will indicate that the water managers and operators have full operational flexibility with the operation range, as needed to maintain 8.5 SMA flood mitigation criteria: operating range 3.0 to 5.0 ft NGVD during wet conditions and 4.0 to 6.0 ft during dry conditions. Operational criteria will continue to be refined through continued implementation of the MWD Increment 2 field test. With limited operational experience for S-357N, the modeling assumptions are based on information provided by the COP water management sub-team, as developed during limited initial operations during the 2018 wet season: Operated between 5.5-5.6 feet NGVD from 1 December to 30 April, and between 5.0-5.1 feet NGVD for the remainder of the year. Limited to 100 cfs during normal operations with the ability to utilize up to 325 cfs design discharge capacity to assist 8.5 SMA flood mitigation.	For Round 1 and Round 2 modeling: S-357N capacity limited to 100 cfs for RSM-GL to avoid over-drainage of adjacent ENP (testing protocols only defined in Increment 1.1 and 1.2). S-357N modeled as a 27' wide weir with crest at 5.0 feet NGVD. Operated between 5.5-5.6 feet NGVD from 1 December to 30 April, and between 5.0-5.1 feet NGVD for the remainder of the year.
	G-211	5.5 feet to 6.0 feet, NGVD during normal operations. Column 2 range of 5.3 feet to 5.7 feet, NGVD used during WCA-3A deliveries to SDCS (Condition 3 only).	5.5 feet to 6.0 feet, NGVD during normal operations.	5.5 feet to 6.0 feet, NGVD during normal operations. Column 2 range of 5.3 feet to 5.7 feet, NGVD used during WCA-3A deliveries to SDCS (Condition 3 only).	5.5 feet to 6.0 feet, NGVD during normal operations.	
	S-148	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 5.0-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 5.0-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 5.0-3.7 Dry season: 5.2-4.5	SFWMD Operations Note: When S-338 is releasing water and during wet season or wet condition S-148 range needs to be lowered to 4.0/3.0 to effectively pass through all of the S-338 release when S-338 is releasing more than 100 cfs. These operation are not modeled. Additional clarification of the seasonal operating criteria need to be developed for the COP SOM.
	S-179 (C-103)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season: 3.1-3.9 (If rainfall is high in wet season, 0.5 ft lowered ops range for S-179 and 0.5 ft lowered maintenance level for C-103; If rainfall is medium or low in wet season, no adjustments); Dry season: 2.5-3.0 (No adjustments in dry season)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	SFWMD Operations Note: Releases from L-31N to tide through the C-103 are not modeled directly but are represent somewhat by the adjustment of operations due to rainfall. Operation range from 2.5 to 2.0 feet NGVD required to achieve needed capacity while maintaining drainage (effectively pass through the releases).
	S-165 (C-102)	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season : 4.2-4.7 (If rainfall is high in wet season, 1 ft lowered ops range for S-165 and 1 ft lowered maintenance level for C-102); If rainfall is medium in wet season, 0.3 ft lowered ops range and 0.3 ft lowered maintenenace level for C-102; If rainfall is low in wet season, no adjustments); Dry season: 3.2-3.8 (If rainfall is high in dry season, 0.2 ft lowered ops range for S-165 and 0.2 ft lowered maintenance level for C-103; If rainfall is medium or low in dry season, no adjustments).	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Releases from L-31N to tide through the C-102 are not modelled directly but are represent somewhat by the adjustment of operations due to rainfall. Operation range from 3.0 to 2.5 feet NGVD required to achieve needed capacity while maintaining drainage (effectively pass through the releases).
	S-167 (C-103)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL

		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:
	S-355 A/B	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	
	S-12C/D	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	ERDO, as informed by the iModel	ERDO, as informed by the iModel	ERDO, as informed by Alternative O (Tamiami Trail Flow formula)	
	S-151	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 > 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge explore operation further under ERDO, as informed by the iModel (including below zone A)	Water Supply. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD, consistent with 2012 WCP (unchanged by Increment 1.1/1.2). 300 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge. These deliveries will be conducted in coordination with ENP and USACE to provide flow to Taylor Slough and/or to slow recession in eastern ENP along the west side of the C-111 Northern Detention Area (NDA) and C-111 Southern Detention Area (SDA). Since the criteria for Taylor Slough deliveries was not prescribed by the COP Interagency PDT, these criteria were not represented within the RSM-GL).	For Alternative Q, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the Round 2 modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD increment 2, supplemental water deliveries from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
	S-337	Water Supply. WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	Water supply. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge.	WCA-3A Regulatory releases to SDCS during Condition 3. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	Water supply. 250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge. Since the criteria for Taylor Slough deliveries was not prescribed by the COP Interagency PDT, these criteria were not represented within the RSM-GL).	For Alternative Q, supplemental water deliveries from WCA-3A (via S-151 and S-337) were not included in the Round 2 modeling, pending development of specific Taylor Slough stage targets after evaluation of the Round 2 alternatives. Similar to operational criteria from MWD increment 2, supplemental water deliveries of up to 250 cfs from WCA-3A will be limited to conditions when WCA-3A is 0.5 feet above its floor elevation (water supply deliveries below the floor require in-kind inflows from upstream sources). These deliveries will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough.
	S-152	Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.	Per DPM phase 2: WQ Constraints represented in model by using: Operational window limited to Sept 1 -- May 31; and may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 ft, NGVD. Closed in WCA-3B site 71 stage exceeds 8.5 ft, NGVD Priority over S-151 to deliver water to WCA-3B.	Per DPM phase 2: WQ Constraints represented in model by using: Operational window limited to Sept 1 -- May 31; and may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 ft, NGVD. Closed in WCA-3B site 71 stage exceeds 8.5 ft, NGVD Priority over S-151 to deliver water to WCA-3B	Per DPM phase 2: WQ Constraints represented in model by using: Operational window limited to Sept 1 -- May 31; and may be operated when L-67A Canal stage at S-152 HW exceeds 9.6 ft, NGVD. Closed in WCA-3B site 71 stage exceeds 8.5 ft, NGVD Priority over S-151 to deliver water to WCA-3B.	Modeled S-152 structure design capacity of (2/3 * 400 cfs) with 0.5 feet of head differential - SFWMD developed rating curve based on observed data. Details of L-67C gap and canal backfill treatments are not modeled.
	WCA-3A Floor for Water Supply	7.5 feet, NGVD, measured at S-333 Headwater	7.5 feet, NGVD, measured at S-333 Headwater		In COP, Increased use of S-333 (updated flow formula, relaxed constraints, etc...) can cause a local drawdown at the S-333HW location creating a "false" need for upstream water. A similar trend was identified and addressed in planning for the Central Everglades Planning Project (CEPP). Proposed COP remedy for "false" need: Consider the CEPP operational change which relies on a more remote upstream gauge at 3-69W to help indicate the need for Lake Okeechobee in-kind releases. CEPP identified the floor as: If 3-69W >= 7.8', then floor is set to 7.5' If 3-69W <= 7.3' then floor is set to 7.0' linearly interpolated in between Additional sentivity runs will be conducted by SFWMD after completion of the COP Round 3 modeling, to determine whether additional adjustments to the Tamiami Trail Flow Formula are necessary to maintain existing water supply performance within southern Dade County.	During low water conditions, it is difficult to draw water from the interior of the WCAs. The regulation schedules for Water Conservation Areas Nos. 1, 2A, and 3A include minimum canal water levels (14.0 feet, 10.5 feet, and 7.5 feet, respectively) below which water releases from the WCAs must be preceded by an equivalent volume of inflow (excerpt from 2012 Water Control Plan).

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES FOR RSMGL						
		NO ACTION	ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE	
Region	Management Measures	Alternative A (No Action)	Alternative O	Alternative N2	Alternative Q	Additional Detail and Modeling Notes for Round 2 and Round 3:

[1]S-12A and/or S-12B will be conditionally opened during October under the following conditions.

1. WCA-3A stage on 30 Sep is greater than 10.5 feet, NGVD; or
2. WCA-3A stage is projected to rise above 10.75 feet, NGVD (IOP Zone A) during October, based on consideration of projected inflows and direct rainfall.
3. S-12A and/or S-12B will be conditionally closed when the WCA-3A stage falls below 10.25 feet, NGVD, OR on 01 November, whichever comes first.

S-12B will be conditionally opened during November under the following conditions.

1. WCA-3A stage on 31 Oct is greater than 11.0 feet, NGVD; or
2. WCA-3A stage is projected to rise above 11.25 feet, NGVD during November, based on consideration of projected inflows and direct rainfall.
3. S-12B will be closed when the WCA-3A stage falls below 10.75 feet, NGVD, OR on 01 December, whichever comes first.

Year-Round Operational Criteria:
S-12A Year-round: To provide access to cultural areas, when Rainfall Plan results in S-12 target flows, S-12A up to 100 cfs release.

S-12A Cultural Access Release: S-12A up to 100 cfs release available when Rainfall Plan results in S-12 target flows. From 01 October through 14 July, the Tribe and USACE must request informal consultation with FWS to avoid impacts on CSSS-A. During this time, the duration of this release will not exceed five consecutive days. S-12A up to 100 cfs release may only occur when WCA-3A 3-gage average (WCA-3AVG - Sites 63, 64, 65) is greater than 8.4 feet, NGVD. During S-12A up to 100 cfs release, data such as but not limited to NP-205 and area rainfall will be monitored with NP-205 increase or anticipated increase above 5.7 feet, NGVD resulting in closing of S-12A.

S-12A/B/C/D Headwater greater than 11.0 feet, NGVD: May be opened an amount only enough to stop overtopping of gates. The USACE will assess the feasibility of leaving the gates closed and allowing overtopping.

H-3.5 ROUND 2 AND ROUND 3 MODELING FORMULATION - MDRSM

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

Region	Management Measures	NO ACTION	FLOOD ASSESSMENT BASELINES		ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE
		Alternative A (No Action, ECB19RR)	83 BASE	94 GRR	Alternative O	Alternative N2	Alternative Q
	MDRSM	**Note: MDRSM is executed at a 15 minute timestep. This type of modeling fundamentally changes the way that operations are are implemented compared to daily timestep modeling like the RSMGL: decisions at each timestep involve openeing or closing gates at the prescribed / calibrated gate opening / closing rates and turning on/off pump units individually. As such, these operations are fundamentally different than daily timestep regional modeling criteria; gate openings are linearly pro-rating within the operation range and are much more likely to continue operation in order to stay within the desired operational range rather than triggering traditional on/off criteria at the daily time-step. Additionally, "priority" is not explicitly stated (e.g. S356 vs S333) since the model will respond to changing conditions with the day to allow or discontinue flow as associated stages changes.**					
WCA-3A	**S-356**	Operating Range from 5.5 to 5.8 feet, NGVD. 4 pump units each with capacity 125 cfs and with staggered on/off operations within the operating range 5.5 to 5.8 feet.	N/A	Operating Range from 5.5 to 5.8 feet, NGVD. 3 pump units each with capacity 31.7 cfs and with staggered on/off operations within the operating range 5.5 to 6.0 feet.	Operating Range from 5.5 to 5.8 feet, NGVD. 4 pump units each with capacity 125 cfs and with staggered on/off operations within the operating range 5.5 to 5.8 feet.	Operating Range from 5.5 to 5.8 feet, NGVD. 4 pump units each with capacity 125 cfs and with staggered on/off operations within the operating range 5.5 to 5.8 feet.	Operating Range from 5.5 to 5.8 feet, NGVD. 4 pump units each with capacity 125 cfs and with staggered on/off operations within the operating range 5.5 to 5.8 feet.
	S-12A/S-12B	Structure flows per ERTP WCA3A regulation schedule and rainfall plan including closure criteria. Not within model evaluation domain and affected by model boundary effects.	Structure flows per 1983 Minimum Delivery WCA3A regulation. Not within model evaluation domain and affected by model boundary effects.	Structure flows per 1992 Regulation schedule with flows through S12s targeting 45% of the desired Trail flows. Not within model evaluation domain and affected by model boundary effects.	Structure flows per Round 2 ERDO and WCA3A Regulation Schedule including closure criteria. Not within model evaluation domain and affected by model boundary effects.	Structure flows per Round 2 ERDO and WCA3A Regulation Schedule including closure criteria. Not within model evaluation domain and affected by model boundary effects.	Structure flows per Round 3 Tamiami Trail Flow Formula and WCA3A Regulation Schedule including closure criteria. Not within model evaluation domain and affected by model boundary effects.
	Increment 1 Action Line	10.0 feet to 10.75 feet, NGVD	N/A	N/A	No Action Line	10.0 feet to 10.75 feet, NGVD	No Action Line
	Incremental Testing Extreme High Water (EHW) Action Line	No EHW Action Line (consistent with Increment 1.1 and 1.2)	N/A	N/A	No EHW Action Line	Not Modeled in MDRSM (WCA stages do not reach trigger)	Not Modeled in MDRSM (WCA stages do not reach trigger)
	WCA-3A Regulation Schedule (Below Zone A)	2012 WCP (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west	1983 Plan (Minimum Delivery Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD)	1992 Plan (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - 55% East and 45% West Target Spatial Distribution	ERDO, as informed by iModel ALT O removes regulation schedule except for Zone A. - Priority to S-333 followed by S-12s from east to west	2012 WCP with implementation of ERDO: Environmental and Regulatory components of the Rainfall Plan with an improved environmental flow formula - 9.25 (bottom Zone D) to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west With changes to the 2012 WCP: Adjustments to Zone E1 (raise bottom May through July)	ERDO, as informed by Tamiami Trail Flow Formula ALT Q removes regulation schedule except for Zone A. - Priority to S-333 followed by S-12s from east to west
WCA-3A/3B	**S-335**	L30 operating range 4.5 to 5.0 feet for water supply, and for flood control dual operations conditions 1 and 2 in the range 7.0 to 7.5 feet. TW stage limit of 6.0 ft. NGVD No supplemental deliveries to Taylor Slough modeled.	Operated for water supply; flood control overtopping above 7.5 ft, NGVD	L30 operating range 4.3 to 6.0 feet for water supply, and for flood control in the range 5.5 to 6.0 feet, NGVD TW stage limit of 5.0 ft. NGVD	L30 operating range 4.5 to 5.0 feet for water supply, and for flood control as informed by iModel in the range 6.5 to 7.5 feet. TW stage limit of 6.0 ft. NGVD	L30 operating range 4.5 to 5.0 feet for water supply, and for flood control in the range 7.0 to 7.5 feet. TW stage limit of 6.0 ft. NGVD	L30 operating range 4.5 to 5.0 feet for water supply, and for flood control as informed by iModel in the range 6.5 to 7.5 feet. TW stage limit of 6.0 ft. NGVD
NESRS	**L-29**	Up to 7.8 feet, NGVD	Up to 9.7 feet, NGVD	Up to 9.5 feet, NGVD	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)	Up to 8.5 feet, NGVD with FDOT constraint (Oct-Jan: 8.5; 8.25 rest of yr)
	G-327 3	Not used as an operational constraint for inflows to NESRS	N/A	Not used as an operational constraint for inflows to NESRS	Not used as an operational constraint for inflows to NESRS	Not used as an operational constraint for inflows to NESRS	Not used as an operational constraint for inflows to NESRS
	S-333	Operated per WCA-3A ERTP Regulation Schedule and rainfall plan, including priority to NESRS. Additional increase governed by L-29 stage. Available capacity as needed. (1350 cfs)	Water Supply only.	Operations based on 1992 Regulation schedule with flows through S333 accounting for 55% of the Trail flows	Operated per WCA-3A ERTP Regulation Schedule Zone A only and iModel informed rainfall plan targets, including priority to NESRS. Additional increase governed by L-29 stage. Available capacity as needed. (1350 cfs)	Operated per WCA-3A ERTP Regulation Schedule and iModel informed rainfall plan targets, including priority to NESRS. Additional increase governed by L-29 stage. Available capacity as needed. (1350 cfs)	Operated per WCA-3A ERTP Regulation Schedule Zone A only and Tamiami Trail Flow Formula targets, including priority to NESRS. Additional increase governed by L-29 stage. Available capacity as needed. (1350 cfs)
	S-333N	Not Modeled (Boundary condition stages not high enough to trigger operation)	N/A	N/A	Not Modeled (Boundary condition stages not high enough to trigger operation)	Not Modeled (Boundary condition stages not high enough to trigger operation)	Not Modeled (Boundary condition stages not high enough to trigger operation)
	Rainfall Plan	1985 Rainfall Plan as modified in 2012 Water Control Plan (WCP) Operational intent is to maximize discharge capacity from S-333 to NESRS prior to utilization of the S-12s, subject to conditions below. When S-12s capacity is required the structure should be opened from east to west. Regulatory component of the Rainfall Plan determined by multiplying the distance (in feet) the WCA-3A water level is above Zone E/E1 by 2,500 cfs from 1 January through 30 June and by 5,000 cfs from 1 July through 31 December.	1983 Minimum Delivery Plan (Zone A 9.5 to 10.5 feet., NGVD)	1985 Rainfall Plan with 55% East /45% West Spatial Distribution (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD)	ERDO, as informed by the iModel	ERDO, as informed by the iModel	ERDO, as informed by Alternative O (Tamiami Trail Flow Formula)
SDCS	**C-111 SD North Detention Area**	Full as-built NDA footprint. Normal maximum TW stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	N/A	No NDA, but S-332D Tie-Back Eastern Levee No TW stage constraint	Full as-built NDA footprint. No TW stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	Full as-built NDA footprint. No TW stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	Full as-built NDA footprint. No TW stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)
	C-111 SD South Detention Area	Full as-built SDA footprint. Normal maximum TW stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	N/A	1310 acres with inflows from S332s, no internal levee No TW stage constraint	Full as-built SDA footprint. No TW stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	Full as-built SDA footprint. No TW stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	Full as-built SDA footprint. No TW stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)
	S-178	Operating range 2.5 to 5.0 feet. (Open)	Operating range 4.5 to 5.0 feet.	Operating range 4.5 to 5.0 feet.	Operating range 2.5 to 5.0 feet. (Open)	Operating range 2.5 to 5.0 feet. (Open)	Operating range 2.5 to 5.0 feet. (Open)

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

		NO ACTION	FLOOD ASSESSMENT BASELINES		ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE
Region	Management Measures	Alternative A (No Action, ECB19RR)	83 BASE	94 GRR	Alternative O	Alternative N2	Alternative Q
	S-332B West	Maintain local flood risk management and conditional use during Column 2 operations, lower canal elevations with constrained operations to facilitate construction. Operating Range from 4.2 to 4.7 feet, NGVD for pumps S332B1, S332B2 and S332B3 with tail water constraint of 8.5 feet for each pump. Year Round Operational Ranges: Individual operating ranges: 3. top range 4.3 to 4.7 feet, NGVD 2. middle range 4.2 to 4.4 feet, NGVD 1. bottom range 4.2 to 4.4 feet, NGVD	N/A	Operating Range from 4.2 to 4.7 feet, NGVD for pumps S332B1, S332B2 and S332B3.	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total; 2. middle range 175 cfs, increase 250 cfs total; 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD for S-332BN/BW/C; bottom range of 3.8-4.0 feet, NGVD for S-332D (priority for Taylor Slough); Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD for S-332BN/BW/C/D; Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD; S-332D unchanging at 3.8-4.0	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332B1 4.7/4.5 (1.25 cfs); S332B2 5.0/4.7 (1.25 cfs);	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total; 2. middle range 175 cfs, increase 250 cfs total; 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD for S-332BN/BW/C; bottom range of 3.8-4.0 feet, NGVD for S-332D (priority for Taylor Slough); Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD for S-332BN/BW/C/D; Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD; S-332D unchanging at 3.8-4.0
	S-332B North	Same as S-332B West	N/A	N/A	Same as S-332B West	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332BN1 4.7/4.5 (1.25 cfs); S332BN2 5.0/4.7 (1.25 cfs);	Same as S-332B West
	S-332C	Same as S-332B West	N/A	Same as S-332B West	S-332B West + 0.3 feet for all ranges.	Ramp-up operations consistent with previous 2012 WCP for 332 B & C modeling: S332C1 4.7/4.5 (.250 cfs); S332C2 5.0/4.7 (.250 cfs);	S-332B West + 0.2 feet for all ranges.
	S-332D	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul) Pumping at S332D will use the following flow ranges: 3. top range 250 cfs increase 500 cfs total with 75 cfs sent through S332DX1 2. middle range 125 increase 250 cfs total with no flow sent through S332DX1 1. bottom range 125 cfs increase 125 cfs total (2) with no flow through S332DX1	N/A	Same as S332B West except calendar based CSSS restrictions apply: 125 cfs (Dec to Jan) 75 cfs (Feb to 14 Jul)	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)	Calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul) S332D1 4.4/4.25 (.250 cfs); S332D2 4.7/4.4 (.250 cfs).	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)
	S-332DX1	Supplemental Use for S-332D: S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. S-332DX1 is operated per Increment 1.1 and 1.2: 1. Operated to direct up to 75 cfs to the Southern Detention Area when S-332D is discharging more than 250 cfs 2.Assume routing 75 cfs through S332DX1 will allow the flows at S332D to be conservatively increased during the CSSS calendar based flow limits: a) 375 cfs from 01 December – 31 January (CSSS operational constraint 325 cfs); b) 325 cfs from 01 February – 14 July (CSSS operational constraint : 250 cfs)	N/A	N/A	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage< 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 10 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage < 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 1.25 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14	Stage driven supplemental use to rehydrate C-111 SDA. S-332DX1 is assumed closed from July 15 through Nov. 30, when S-332D has no constraint in order to prioritize deliveries to Taylor Slough. When SDA water stage > 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage< 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 10 cfs until 7.5 ft, NGVD is reached. -S-332D CSSS constraints from No Action Alternative assumed for December through July 14
	S-331/S-173	Level 1. When LPG2 > 6.5 feet, 3 of the S331 pumps on and S331 Hw in the range 3.5 to 4.0 ft Level 2. When 6.0 <= LPG2 < 7.0 feet, NGVD then 2 pumps on and S331 Hw in the range 4.0 to 4.5 ft Level 3. When 5.5 < =LPG2 < 6.0 feet, NGVD then 1 pump on and S331 Hw in the range 4.5 to 5.0 ft	Water Supply only.	Water Supply only.	Operational Range of 4.5 to 5.0 feet (14Feb-31Jul) and 4.3 to 4.6 (1Aug-1Jan) with transition, NGVD. S-331 Operations are not dependent on stages within the 8.5 SMA.	Level 1. When LPG2 > 7.0 feet, 3 of the S331 pumps on and S331 Hw in the range 3.5 to 4.0 ft Level 2. When 6.5 <= LPG2 < 7.0 feet, NGVD then 2 pumps on and S331 Hw in the range 4.0 to 4.5 ft Level 3. When 5.5 < =LPG2 < 6.5 feet, NGVD then 1 pump on and S331 Hw in the range 4.75 to 5.25 ft	Operational Range of 4.5 to 5.0 feet (14Feb-31Jul) and 4.3 to 4.6 (1Aug-1Jan) with transition, NGVD. S-331 Operations are not dependent on stages within the 8.5 SMA. NOTE: In ALTQm, S331 allowed operate in the range 3.5 to 3.6 ft to assist S357 when all four S357 pumps active
	G-737*	G737 modeled as a weir with a crest elevation of 5.2 ft.	N/A	N/A	G737 modeled as a weir with a crest elevation of 5.2 ft.	G737 modeled as a weir with a crest elevation of 5.2 ft.	G737 modeled as a weir with a crest elevation of 5.2 ft.
	S-197	Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully all 3 gates Level 2: If S-18C HW > 3.1 ft NGVD OR S-177 HW > 4.2: S-197 flows through 2 gates Level 1: If S-18C HW > 2.8 ft NGVD OR S-177 HW > 4.1: S-197 flows through 1 gate	Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully all 3 gates Level 2: If S-18C HW > 3.1 ft NGVD OR S-177 HW > 4.2: S-197 flows through 2 gates Level 1: If S-18C HW > 2.8 ft NGVD OR S-177 HW > 4.1: S-197 flows through 1 gate	Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully all 3 gates Level 2: If S-18C HW > 3.1 ft NGVD OR S-177 HW > 4.2: S-197 flows through 2 gates Level 1: If S-18C HW > 2.8 ft NGVD OR S-177 HW > 4.1: S-197 flows through 1 gate	Only use S-18C to trigger opening of S-197 Level 3: If S-18C HW > 3.3 ft NGVD: S-197 is open fully all 3 gates Level 2: If S-18C HW > 2.8 ft NGVD: S-197 flows through 2 gates Level 1: If S-18C HW > 2.6 ft NGVD: S-197 flows through 1 gate	Level 3: If S-18C HW > 3.3 ft NGVD OR S-177 HW > 4.3: S-197 is open fully all 3 gates Level 1: If S-18C HW > 2.6 ft NGVD OR S-177 HW > 4.1: S-197 flows through 1 gate	Only use S-18C to trigger opening of S-197 Level 3: If S-18C HW > 3.3 ft NGVD: S-197 is open fully all 3 gates Level 2: If S-18C HW > 2.8 ft NGVD: S-197 flows through 2 gates Level 1: If S-18C HW > 2.6 ft NGVD: S-197 flows through 1 gate
	S-176	Operating Range from 4.75 to 5.5 feet, NGVD.	Operating Range from 5.3 to 5.7 feet, for FC. Water supply range 3.0-5.5 ft.	Operating Range from 5.5 to 5.7 feet, NGVD.	Operating Range from 4.7 to 5.0 feet, NGVD	Operating Range from 4.75 to 5.0 feet, NGVD	Operating Range from 4.7 to 5.0 feet, NGVD

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

		NO ACTION	FLOOD ASSESSMENT BASELINES		ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE
Region	Management Measures	Alternative A (No Action, ECB19RR)	83 BASE	94 GRR	Alternative O	Alternative N2	Alternative Q
	S-177	Operating Range from 3.6 to 4.2 feet, NGVD (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.	Operating Range from 4.3 to 5.2 ft, NGVD for FC. Water supply range 2.0-4.3 ft. (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.	Operating Range from 4.5 to 3.9 ft, NGVD for FC. (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.	Operating Range from 3.6 to 4.2 feet, NGVD (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.	Operating Range from 3.6 to 4.2 feet, NGVD (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.	Operating Range from 3.6 to 4.2 feet, NGVD (different operations based on dry / wet season and high rainfall) Wet season : If rainfall is high in wet season, 1 ft lowered ops range; If rainfall is medium in wet season, 0.5 ft lowered ops range; If rainfall is low in wet season, no adjustments; Dry season: If rainfall is high in dry season, 0.5 ft lowered ops range; If rainfall is medium or low in dry season, no adjustments.
	S-18C	Operating Ranges: 2.3 to 2.6 feet, NGVD (Column 1) for FC 2.0 to 2.25 feet, NGVD (Column 2 during Condition 3) Special Assessor operations attempt to provide minimum delivery every month.	Operating Ranges: 1.8 to 2.4 feet, NGVD for FC	Operating Ranges: 2.0 to 2.4 feet, NGVD for FC	Operating Ranges: 2.3 to 2.6 feet, NGVD for FC Special Assessor operations attempt to provide minimum delivery every month.	Operating Ranges: 2.3 to 2.6 feet, NGVD (Column 1) for FC 2.0 to 2.25 feet, NGVD (Column 2 during Condition 3) Special Assessor operations attempt to provide minimum delivery every month.	Operating Ranges: 2.3 to 2.6 feet, NGVD for FC Special Assessor operations attempt to provide minimum delivery every month.
	S-199	FC Operating range from 3.0 to 4.0 feet NGVD, 4 pumps with staggered operations (within the operating range). Local TW limit of 8.0 feet plus a remote trigger for water levels at the Cape Sable Sparrow CSS3 gage during the nesting period (15 March to 30 June). 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)	N/A	N/A	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet NGVD (10 cm depth)
	S-200	FC Operating range from 3.0 to 4.0 feet NGVD, 4 pumps with staggered operations (within the operating range). Local TW limit of 8.5 feet plus a remote trigger for water levels at the Cape Sable Sparrow CSS2 gage during the nesting period (15 March to 30 June). 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station EVER4 > 4.35 feet, NGVD (10 cm depth)	N/A	N/A	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.35 feet, NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.35 feet, NGVD (10 cm depth)	As per SFWMD C-111 SC Western Project regulatory permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.35 feet, NGVD (10 cm depth)
Biscayne Bay Taylor Slough	S-328	S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD	N/A	N/A	S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD	S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD	S-328 is opened when headwater stage exceeds 5.7-5.8 feet NGVD
Biscayne Bay Taylor Slough	S-338	Operational range for FC from 5.5 to 5.8 feet, NGVD	Operational range for FC from 4.8 to 5.2 feet, NGVD	Operational range for FC from 5.5 to 5.8 feet, NGVD	Operational range for FC from 5.5 to 5.8 feet, NGVD	Operational range for FC from 5.5 to 5.8 feet, NGVD	Operational range for FC from 5.5 to 5.7 feet, NGVD
Biscayne Bay Taylor Slough	S-194/S-196	Operating Ranges from 4.2 to 4.8 feet, NGVD	FC Operating Ranges from 4.2 to 4.8 feet, NGVD in wet season and 4.2 to 4.6 feet, NGVD in the dry season for S194; S196 operates for WS only	S194 & S196 operate for WS only	Within the CSSS nesting period the operational range is 4.2 to 4.8 feet, NGVD. The rest of the year the operational range is 4.2 to 4.75 feet, NGVD.	FC Operating Ranges from 4.2 to 4.8 feet, NGVD	Within the CSSS nesting period the operational range is 4.1 to 4.7 feet, NGVD. The rest of the year the operational range is 4.1 to 4.65 feet, NGVD.
Biscayne Bay Taylor Slough	SUPPLEMENTAL FLOWS TO TAYLOR SLOUGH	Modeled as FC in MDRSM (see S335)	N/A	N/A	Modeled as FC in MDRSM (see S335)	Modeled as FC in MDRSM (see S335)	Modeled as FC in MDRSM (see S335)
WCA-3A/NESRS Taylor Slough	S-334	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.	Not operated as a simplifying assumption for MDRSM based on review of RSMGL frequency of operation. Water Supply provided via S337/S335.
New structures or modeling to be assumed for alternatives	S-357	S-357 discharges into C-111SD NDA. Dependency on S-331 to provide 8.5 SMA flood mitigation, with S-357 as secondary. The following operations maintain consistency with Increment 1.1 and 1.2 following assumed operation of the C-111 South Dade NDA: • Level 1: If LPG-2 > 7.0 ft, 4 pumps on, • Level 2: If 6.5 <= LPG-2 < 7.0 ft, 3 pumps on, • Level 3: If 6.0 <= LPG-2 < 6.5 ft, 2 pumps on, • Level 4: If 5.5 <= LPG-2 < 6.0 ft, 1 pump on, • Level 5: If LPG-2 < 5.5 ft, all pumps off • Max capacity limited to 500 cfs for the 4 pumps (match FDEP ops permit issued to USACE)	N/A	S-357 discharges into the L31N canal upstream of G211, where the flow is picked by S356 and is pumped into SRS • Level 1: If LPG-2 > 7.0 ft, 4 pumps on, • Level 2: If 6.5 <= LPG-2 < 7.0 ft, 3 pumps on, • Level 3: If 6.0 <= LPG-2 < 6.5 ft, 2 pumps on, • Level 4: If 5.5 <= LPG-2 < 6.0 ft, 1 pump on, • Level 5: If LPG-2 < 5.5 ft, all pumps off	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD. S-357 will be operated according to the below criteria (match Increment 2). 1a. Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD. 1b. 6.0 ≤ Angels < 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD. 1c. Angels ≥ 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD. 1d. Angels ≥ 6.7 feet, NGVD and LPG2 ≥ 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD. 1e. Angels ≥ 7.2 feet, NGVD, and LPG2 ≥ 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 2. LPG2 ≥ 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 < 6.4 feet, NGVD. 3. When G-327 3 > 7.5 feet NGVD and LPG2 is projected to exceed 6.7 feet NGVD for more than the maximum 8.5 SMA flood mitigation criteria, S-357 HW will be lowered to 2.3 to 3.0 feet NGVD until LPG2 can be maintained between 6.2 and 6.6 feet NGVD. Maximum capacity 575 cfs (match FDEP ops permit issued to SFWMD).
New structures or modeling to be assumed for alternatives	S-357N	S357N modeled as a weir with a crest elevation of 5 ft.	N/A	N/A	S357N modeled as a weir with a crest elevation of 4 ft.	S357N modeled as a weir with a crest elevation of 4 ft.	S357N modeled as a weir with a crest elevation of 4 ft.
New structures or modeling to be assumed for alternatives	G-211	Operating Range from 5.5 to 6.0 feet, NGVD: Column 2 range of 5.3 feet to 5.7 feet, NGVD used during WCA-3A deliveries to SDCS in conjection with S-335 and S-18C No supplemental deliveries to Taylor Slough modeled.	N/A	Operating Range from 5.5 to 6.0 feet, NGVD	Operating Range from 5.75 to 6.0 feet, NGVD to mimic RSMGL & control S331 HW	Operating Range from 5.5 to 6.0 feet, NGVD: Column 2 range of 5.3 feet to 5.7 feet, NGVD used during WCA-3A deliveries to SDCS in conjection with S-335 and S-18C	Operating Range from 5.75 to 6.0 feet, NGVD to mimic RSMGL & control S331 HW

COP DRAFT ALTERNATIVES WITH PDT COMMENTS AND MODELING NOTES

		NO ACTION	FLOOD ASSESSMENT BASELINES		ROUND 2 ALTERNATIVE		ROUND 3 ALTERNATIVE
Region	Management Measures	Alternative A (No Action, ECB19RR)	83 BASE	94 GRR	Alternative O	Alternative N2	Alternative Q
	S-148	Operating Range from 3.0 to 5.0 feet, NGVD: Wet season : 3.0-4.7 ft Dry Season : 3.7 to 5.0 ft	Operating Range from 3.0 to 5.0 feet, NGVD: Wet season : 3.0-4.7 ft Dry Season : 3.7 to 5.0 ft	Operating Range from 3.0 to 5.0 feet, NGVD: Wet season : 3.0-4.7 ft Dry Season : 3.7 to 5.0 ft	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5	Operating Range from 3.7 to 5.2 feet, NGVD: Wet season : 4.5-3.7 Dry season: 5.2-4.5
	S-179 (C-103)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season: 3.1-3.9 (If rainfall is high in wet season, 0.5 ft lowered ops range for S-179 and 0.5 ft lowered maintenance level for C-103; If rainfall is medium or low in wet season, no adjustments); Dry season: 2.5-3.0 (No adjustments in dry season)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.
	S-165 (C-102)	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Wet season : 4.2-4.7 (If rainfall is high in wet season, 1 ft lowered ops range for S-165 and 1 ft lowered maintenance level for C-102); If rainfall is medium in wet season, 0.3 ft lowered ops range and 0.3 ft lowered maintenance level for C-102; If rainfall is low in wet season, no adjustments); Dry season: 3.2-3.8 (If rainfall is high in dry season, 0.2 ft lowered ops range for S-165 and 0.2 ft lowered maintenance level for C-103; If rainfall is medium or low in dry season, no adjustments).	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.
	S-167 (C-103)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall) Wet season : 4.2-4.6 (If rainfall is high in wet season, 1 ft lowered ops range for S-167; If rainfall is medium in wet season, 0.3 ft lowered ops range; If rainfall is low in wet season, no adjustments); Dry season: 3.2-3.8 (If rainfall is high in dry season, 0.2 ft lowered ops range for S-167; If rainfall is medium or low in dry season, no adjustments).	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall): Refer to No Action Alternative for details.
	S-355 A/B	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.	Operating range 8.0-8.2 feet with TW limitation based on L29 constraint. Flow only allowed when positivie head gradient from WCA3B to L29.
	S-12C/D	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	ERDO, as informed by the IModel	ERDO, as informed by the IModel	ERDO, as informed by Alternative O (Tamiami Trail Flow formula)
	S-151	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.	Operating range 9.30 to 9.5 ft. WCA-3A Regulatory releases to WCA-3B when Site 71 < 8.5 feet, NGVD Provides Water Supply when S337 is operating.
	S-337	Modeled for Water Supply purposes only in MDRSM. No supplemental deliveires to Taylor Slough modeled.	Modeled for Water Supply purposes only in MDRSM.	Modeled for Water Supply purposes only in MDRSM.	Modeled for Water Supply purposes only in MDRSM.	Modeled for Water Supply purposes only in MDRSM.	Modeled for Water Supply purposes only in MDRSM.
	S-152	Operating range 9.30 to 9.40 ft. Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.3 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.	N/A	N/A	Operating range 9.30 to 9.40 ft. Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.3 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.	Operating range 9.30 to 9.40 ft. Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.3 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.	Operating range 9.30 to 9.40 ft. Per DECOMP Physical Model Phase 2: Water Quality constraints represented in the model by using: a) Operational window limited to September 1 through May 31; and b) may be operated when L-67A Canal stage at S-152 HW exceeds 9.3 feet, NGVD. Closed if WCA-3B Site 71 stage exceeds 8.5 feet, NGVD.
	WCA-3A Floor for Water Supply	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)	7.5 feet, NGVD, measured at S-333 Headwater; No effect on MDRSM simulation (assumed BC accounted for in RSMGL)

H-3.6 ROUND1 MODELING FORMULATION- RSMGL

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Region	Management Measures	Alternative A (No Action)	Alternative K	Alternative L	Alternative N
WCA-3A	S-356	Operating Range from 5.5 to 5.8 feet, NGVD (under Condition 1 & 2 as defined in Increment 1.1 and 1.2)	Operating Range from 5.5 to 5.8 feet, NGVD Conditional Priority (under all Conditions 1-4 as defined in Increment 2)	Operating Range from 5.5 to 5.8 feet, NGVD 1st priority: S-356 2nd priority: S-333	Operating Range from 5.5 to 5.8 feet, NGVD Conditional Priority (under all Conditions 1-4 as defined in Increment 2)
	S-12A/S-12B	Closed 1 Oct-14 July (with Exit Strategy)[1] Conditional operations in accordance with the BO with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)1 Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)1 Conditional operations in accordance with the BO with with limited cultural access releases.	Closed 1 Oct-14 July (with Exit Strategy)1 Conditional operations in accordance with the BO with with limited cultural access releases.
	S-344	Closed 1 Oct-14 July (with Exit Strategy)[1]	2012 WCP: Closed 1 Nov-14 Jul	Closed 1 Oct-14 July	Closed 1 Oct-14 July
	S-343A/S-343B	Closed 1 Oct-14 July (with Exit Strategy)[1]	Closed 1 Oct-14 July	Closed 1 Oct-14 July	Closed 1 Oct-14 July
	Increment 1 Action Line	10.0 feet to 10.75 feet, NGVD	10.0 feet to 10.75 feet NGVD	No Action Line	10.0 feet to 10.75 feet, NGVD
	Incremental Testing Extreme High Water (EHW) Action Line	No EHW Action Line	Increment 2 EHW Action Line	No EHW Action Line	Increment 2 EHW Action Line
	WCA-3A Regulation Schedule (Below Zone A)	2012 WCP (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west	2012 WCP with implementation of 2006 Rainfall Plan Environmental and Regulatory components of the Rainfall Plan with an improved environmental flow formula - 9.25 (bottom Zone D) to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west With changes to the 2012 WCP: Adjustments to Zone E1 (raise bottom May through July)	2012 WCP with implementation of 2006 Rainfall Plan (Environmental and Regulatory components of the Rainfall Plan) - 8.75 to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west	2012 WCP with implementation of 2006 Rainfall Plan: Environmental and Regulatory components of the Rainfall Plan with an improved environmental flow formula - 9.25 (bottom Zone D) to 10.5 feet, NGVD (Zone A 9.5 to 10.5 feet., NGVD) - Priority to S-333 followed by S-12s from east to west With changes to the 2012 WCP: Adjustments to Zone E1 (raise bottom May through July)
WCA-3A/3B	S-335	Supplemental deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay L-30 maximum elevation between 6.5 to 7.5 feet, NGVD (6.5-7.0 in Condition 1 &2; 7.0-7.5 in Condition 3&4)	Available for SD routing (May be used to send WCA-3A water to SDCS independent of S-356 operations) L-30 maximum elevation of 6.5 to 7.5 feet, NGVD	Water supply only (no WCA-3A Regulatory discharges to SDCS) and supplements to S-356 (different from 2012 WCP) for deliveries to NESRS L-30 maximum elevation of 6.5 to 7.5 feet, NGVD	Increment 1.1 and 1.2 (No Action); more than 250 cfs may be conveyed to meet other purposes. L-30 maximum elevation between 6.5 to 7.5 feet, NGVD
NESRS	L-29	Up to 7.8 feet, NGVD	Up to 8.5 feet, NGVD with FDOT constraint	Up to 8.5 feet, NGVD with FDOT constraint	Up to 8.5 feet, NGVD with FDOT constraint
	G-3273	Relax constraint (previously 6.8 feet, NGVD)	Use G-3272 stage to discontinue flows to L-29 and NESRS when above 7.4 feet, NGVD (may adjust constrain higher if 8.5 SMA mitigation can be maintained)	Remove use as an operational constraint for inflows to NESRS	Remove use as an operational constraint for inflows to NESRS
	S-333	Operated per WCA-3A Regulation Schedule, including priority to NESRS. Additional increase (total S-333 capacity of 2500 cfs) governed by L-29 stage.	All available capacity as needed subject to G-3273 constraints. *consideration of sub population E targets with equal weighting for WCA-3A and ENP.	All available capacity as needed. *consideration of sub population E targets S-356 is prioritized over S-333, so seepage management continues while S-333 is reduced if flooding concerns occur. This prioritization blocks use of Column 2 operations.	Conditional priority to S-333 and S-356 (under all Conditions 1-4 as defined in Increment 2 operations). Tailwater constraint revised according to L-29 increased stage criteria.
	Rainfall Plan	1985 Rainfall Plan as modified in 2012 Water Control Plan (WCP) Operational intent is to maximize discharge capacity from S-333 to NESRS prior to utilization of the S-12s, subject to conditions below. When S-12s capacity is required the structure should be opened from east to west. S-12s/S-333 pre-emptive/proactive releases to better manage high stages in WCA-3A. S-12s and/or S-333 release up to projected WCA 3A inflow based upon system water management operations and/or rainfall to create storage in WCA-3A for expected inflow. Regulatory component of the Rainfall Plan determined by multiplying the distance (in feet) the WCA-3A water level is above Zone E/E1 by 2,500 cfs from 1 January through 30 June and by 5,000 cfs from 1 July through 31 December.	2006 Rainfall Plan Revised flow formula which improves rainfall driven flow estimates based on the Natural Systems Model (NSM). Target flow distribution is 70/30 (east/west).	2006 Rainfall Plan Revised flow formula which improves rainfall driven flow estimates based on the Natural System s Model (NSM)	2006 Rainfall Plan Revised flow formula which improves rainfall driven flow estimates based on the Natural Systems Model (NSM). Target flow distribution is 70/30 (east/west).
	C-111 SD North Detention Area	Begin use of SD NDA remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 10.0 feet, NGVD (emergency overflow weir crest elevation)

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COP FINAL ALTERNATIVES

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Region	Management Measures	Alternative A (No Action)	Alternative K	Alternative L	Alternative N
SDCS	C-111 SD South Detention Area	Begin use of SD SDA remove construction constraints along SDCS. Normal maximum water stage limit of 8.5 ft. NGVD, or approximately 2.5 ft. maximum depth.	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)	No stage constraint; Operating Range up to 9.5 feet, NGVD (emergency overflow weir crest elevation)
	S-178	Open	Open	Open	Open
	S-332B West	Maintain local flood risk management and conditional use during Column 2 operations, lower canal elevations with constrained operations to facilitate construction. Operating Range from 4.2 to 4.8 feet, NGVD Year Round Operational Ranges: Total operating range from 4.0 to 4.8 feet, NGVD to reflect the operational flexiability within the 4.2/4.8 range and the effect of limited (8 weeeks) supplemental water supply the bottom (small) flow range extends below 4.2 feet, NGVD Individual operating ranges: 3. top range 4.3 to 4.7 feet, NGVD 2. middle range 4.2 to 4.4 feet, NGVD 1. bottom range 4.1 to 4.3 feet, NGVD for S-332BN, S-332B, and S-332C bottom range 4.0 to 4.2 feet, NGVD for S-332D S-194 and S-196 range of lowered from 4.2/4.8 to 4.2/4.6 during CSSS Nesting Period (15 Feb to 31 Jul) to reduce the use of S-332BN, S-332BW S-332C, and S-332D S194 and S-196 range of 4.2/4.8 from (Aug to 14 Feb) Discharge of up to about 200 cfs at S-176 to assist in maintain the L-31N during the 01 Aug to 14 Feb period during which agricultural fields are prepared planted and grow. Model as two structures with the following capacity fraction of the total capacity: 30% for CSSS discharges using 4.7/4.5 feet, NGVD (30% approx. = 200 cfs / 630 cfs design capacity) 70% for standard discharges using 4.75/5.0 feet, NGVD Notes 1. Seasonal pumping limits remain unchanged for S-332D.	Pumping will use 3 flow rate ranges: 3. top range 250 cfs, increase 500 cfs total 2. middle range 175 cfs, increase 250 cfs total 1. bottom range 75 cfs, increase 75 cfs total CSSS nesting period (Feb15 to July31) Total operating range from 4.0 to 4.8 feet, NGVD Individual operating ranges: 3. top range 4.6 to 4.8 feet, NGVD 2. middle range 4.4 to 4.6 feet, NGVD 1. bottom range 4.0 to 4.4 feet, NGVD Planting Season (Aug 01 to Dec 31) Total operating range from 3.8 to 4.4 feet, NGVD Individual operating ranges: 3. top range 4.2 to 4.4 feet, NGVD 2. middle range 4.0 to 4.2 feet, NGVD 1. bottom range 3.8 to 4.0 feet, NGVD Gradual Transition (Jan 01 to Feb 14) Total operating range from 3.8 to 4.8 feet, NGVD Individual operating ranges: 3. top range from 4.2 to 4.4 to 4.6- to 4.8 feet, NGVD 2. middle range from 4.0 to 4.2 to 4.4 to 4.6 feet, NGVD 1. bottom range from 3.8 to 4.0 to 4.0 to 4.4 feet, NGVD Seasonal Capacity limits remain the same	Minimize S-176 openings (intent is to keep S-176 closed as often as possible) Operating range of 4.7 to 4.9 feet, NGVD (open high, close low)	2012 WCP: Operating Ranges: 4.7 to 5.0 feet, NGVD (Coumn 1) 4.5 to 4.8 feet, NGVD (Column 2)
	S-332B North	Same as S-332B West	Same as S-332B West	Same as S-332B West	Same as S-332B West
	S-332C	Same as S-332B West	Same as S-332B West	Same as S-332B West	Same as S-332B West
	S-332D	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)	Minimize S-176 openings (intent is to keep S-176 closed as often as possible) Operating range floor of 4.65 to 4.85 feet, NGVD (open high, close low) Calendar based CSSS restrictions: 325 cfs (Dec to Jan) 250 cfs (Feb - 14 Jul)	Same as S332B West except calendar based CSSS restrictions apply: 325 cfs (Dec to Jan) 250 cfs (Feb to 14 Jul)
	L-31N Structure Priority	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-176 4) S-194/S-196 (open at top of range)	Priorities when under flood protection conditions vs water supply: 1) S-332D 2) S-332B/C 3) S-194/S-196 (open at top of range) 4) S-176
	S-332DX1	Supplemental Use for S-332D Pumping at S-332D will use the following flow ranges (1): 3. top range 250 cfs; total increase up to 500 cfs; 100 cfs flows through S-332DX1 2. middle range 125 cfs; total increase up to 250 cfs; no flow through S-332DX1 (2) 1. bottom range 125 cfs; total increase up to 125 cfs (2); no flow through S-332DX1 From 325 cfs to 375 cfs (Dec to Jan) which is from two diesel pumps (2*125=250) and one electric pump (75 cfs) to three diesel pumps From 250 cfs to 325 cfs (Feb - 14 Jul) which is from two diesel pumps (2*125=250) to two diesel pumps and one electric pump (75 cfs).	Stage driven supplemental use to rehydrate C-111 SDA When SDA water stage < 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage > 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 125 cfs until 7.5 ft, NGVD is reached.	Full open when S-332D pumps are on. No CSSS-D constraints.	Stage driven supplemental use to rehydrate C-111 SDA When SDA water stage < 7.5 feet, NGVD (weir elevation is at 8 feet, NGVD): -S-332DX1 is closed When SDA water stage > 7.5 feet, NGVD and more than 250 cfs flows through S-332D: -S-332DX1 is open to a maximum of 125 cfs until 7.5 ft, NGVD is reached.

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Region	Management Measures	Alternative A (No Action)	Alternative K	Alternative L	Alternative N
	S-331/S-173	Full use under Column 2 discharges 1. When LPG2 > 6.6 feet, NGVD then S-331 HW will be maintained between 3.5 and 4.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet, NGVD. 2. When 6.0 < LPG2 < 6.6 feet, NGVD then S-331 HW will be maintained between 4.5 and 4.0 feet, NGVD. 3. When 5.5 < LPG2 < 6.0 feet, NGVD then S-331 HW will be maintained between 5.0 and 4.5 feet, NGVD. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0). Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Taylor Slough, Florida Bay, and Manatee Bay. It is the expectation that supplemental deliveries will not cause prolonged pumping with two or more units at S-331. When LPG2 < 5.5 feet, NGVD then water manager may use any operation range as long as the bottom of the range is at or above 5.0 feet, NGVD (e.g. 5.5 to 6.0) when pumping at S-331 and above 4.8 feet, NGVD when siphoning at S-331. There is no stage requirement when water supply deliveries are being made through G-211.	Increment 2 + 0.5 ft to criteria as defined below: Operational Range 5.5 to 6.0 feet, NGVD. 1. When LPG2 ≥ 7.0 then S331 HW may be maintained between 5.0 to 5.5 until the stage at LPG2 falls below 6.5 feet, NGVD. If the required capacity at S-357 is unavailable the operational range of S-331 may be lowered using the following criterion: -When LPG2 > 7.0 then S331 HW will be maintained between 4.0 and 4.5 until the stage at LPG2 falls below 6.5 feet NGVD. -When LPG2 < 7.0 then S331 HW will be maintained between 4.5 and 5.0 until the stage at LPG2 falls below 6.5 feet NGVD.	Operational Range of 4.5 to 5.0 feet, NGVD	Increment 2.0 Operational Range 5.0 to 5.5 feet, NGVD with the ability to adjust up to 0.5 feet with the development of a trigger stage. 1. When LPG2 ≥ 7.0 feet, NGVD then S-331 HW may be maintained between 4.5 to 5.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet, NGVD. If the required capacity at S-357 is unavailable the operational range of S-331 may be lowered using the following criteria: -When LPG2 > 7.0 feet, NGVD then S-331 HW will be maintained between 3.5 and 4.0 feet, NGVD until the stage at LPG2 falls below 6.5 feet NGVD. -When LPG2 < 7.0 feet, NGVD then S-331 HW will be maintained between 4.0 and 4.5 feet, NGVD until the stage at LPG2 falls below 6.5 feet NGVD.
	G-737*	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110. Intent is to always be open when more than 1 pump (75 CFS) at S-200 are operating.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110. Intent is to always be open when more than 1 pump (75 CFS) at S-200 are operating.	As per C-111 SC Western Project regulatory permit May be opened when there is a positive (westward) head across the structure; upstream S-200 pump station operations adhere to the CSSS seasonal constraint at R3110. Intent is to always be open when more than 1 pump (75 CFS) at S-200 are operating.
	S-197	Operations to increase frequency while reducing flows (no net change); added EHW Condition flow criteria. Not intended to be opened greater than 400 cfs when S-18C HW is below 2.8 feet (floor of 1.8 feet, NGVD), NGVD or when S-177 HW is below 4.1 feet, NGVD.**	Simplified Increment 2.0: Operating Range from 2.4 to 2.8 feet, NGVD at S-18C, 300 cfs or S-177+100 cfs. Level 1 = 800 cfs, Level 2 and 3 same. Close when S-197 HW at 2.3 feet, NGVD (keep level 1, level 2 and 3 criteria using S-18C or S-177)	2012 WCP	Limit releases to 400 cfs Operational floor of 2.6 feet, NGVD (remove Level 2 and 3 criteria)
	S-176	Operating Range from 4.75 to 5.0 feet, NGVD	Operating Range from 4.5 to 5.0 feet, NGVD + 200 cfs to meet CSSS criteria + 400 cfs when releasing for EHW	2012 WCP Operating Range from 4.75 to 5.0 feet, NGVD	2012 WCP with Rainfall Adjustment Operating Range from 4.75 to 5.0 feet, NGVD
	S-177	Operating Range from 3.6 to 4.2 feet, NGVD	Increment 2: Operating Range from 3.6 to 4.2 feet, NGVD + 200 cfs when rainfall > 5.5 in over 14 days + 400 cfs when releasing for EHW	2012 WCP Operating Range from 3.6 to 4.2 feet, NGVD	2012 WCP with Rainfall Adjustment Operating Range from 3.6 to 4.2 feet, NGVD If the rainfall over the last 14 days exceeds 5.5 inches, then S-177 may be opened to lower S-177 HW down to 3.3 feet-NGVD.
	S-18C	Operating Ranges: 2.3 to 2.6 feet, NGVD (Column 1) 2.0 to 2.25 feet, NGVD (Column 2)	Operating Range of 2.2 to 2.4 feet, NGVD	2012 WCP Operating Range of 2.3 to 2.6 feet, NGVD	2012 WCP Operating Range from 2.3 to 2.6 feet, NGVD
	S-199	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet NGVD (10 cm depth)	Operating Range from 3.6 to 4.2 feet, NGVD. 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-199 will cease if stage at monitoring station EVER4 > 2.36 feet, NGVD (10 cm depth)
	S-200	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)	Operating Range from 3.6 to 4.2 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)	Per Regulatory Permit: Transition from January 1 to February 14*: 3.0 to 4.0 feet, NGVD February 15 to July 31: 3.3 to 4.0 feet, NGVD August 1 to December 31: 3.0 to 3.4 feet, NGVD 15 March to 30 June: Pumping at S-200 will cease if stage at monitoring station R3110 > 4.95 feet, NGVD (10 cm depth)

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Region	Management Measures	Alternative A (No Action)	Alternative K	Alternative L	Alternative N
Taylor Slough	S-328	Deliveries to Taylor Slough up to 250 cfs	Open when flows through S-332D are greater than 250 cfs	Full capacity (up to 500 cfs) when pumping at S-332D	Water supply up to 250 cfs with constraints for a maximum of 8 weeks
Biscayne Bay	S-338	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational range from 5.5 to 5.8 feet, NGVD (tied to S-356)	Within the CSSS nesting period the operational range is between 4.9 feet to 5.3 feet, NGVD. The rest of the year the operational range is 5.5 to 5.8 feet, NGVD	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational Range of 5.5 to 5.8 feet, NGVD	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational Range from 5.5 to 5.8 feet, NGVD
Biscayne Bay	S-194/S-196	Discharge to tide to supplement S-332s, flexibility to the 2012 WCP to Meet Sparrow RPA Targets Seasonal Operating Ranges from 4.2 to 4.8 feet, NGVD	Within the CSSS nesting period the operational range is 4.2 to 4.7 feet, NGVD. The rest of the year the operational range is 4.2 to 4.8 feet, NGVD.	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operational Range of 4.7 to 5.1 feet, NGVD	Use for excess water as needed to Biscayne Bay and Biscayne Bay Coastal Wetland Projects Operating Range from 4.2 to 4.8 feet, NGVD
Taylor Slough	SUPPLEMENTAL FLOWS TO TAYLOR SLOUGH	Water supply up to 250 cfs with constraints for a maximum of 8 weeks	Water Supply up to 250 CFS Maintain pumping at S-332D (250 cfs) and 75 cfs at S-332B and S-332C	Water Supply up to 250 CFS Maintain pumping at S-332D (250 cfs) and 75 cfs at S-332B and S-332C	Water supply up to 250 cfs with constraints for a maximum of 8 weeks
WCA-3A/NESRS	S-334	Column 2 Under Condition 3 (Above Action Line)	S-334 Operated when conditions are defined at or above the EHW Action Line with priority order: S-332B/C/D, S-338, S-194, S-196, and (S-199 and S-200 MAX) S-197 (Increment 2) Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints	No column 2 (use for water supply only) Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints. No EHW operations.	S-334 Operated when conditions are defined at or above the EHW Action Line with priority order: S-332B/C/D, S-338, S-194, S-196, and (S-199 and S-200 MAX) S-197 (Increment 2) Short-term availability in accordance with the FDOT constraints (L-29 > 8.5 feet., NGVD); stops at 8.3 feet, NGVD according to other downstream constraints
[illegible]	S-357	Operations Range of 5.0 feet to 6.0 feet, NGVD	Operational Range of Increment 2.0 + 0.5 feet as defined below: 4.0 feet up to 6.0 feet, NGVD	Operational Range of 5.7 to 6.2 feet, NGVD	Operational Range of Increment 2.0: 3.5 feet up to 6.0 feet, NGVD
[illegible]	S-357N	NA	100 cfs	100 cfs	100 cfs
[illegible]	G-211	5.5 feet to 6.0 feet, NGVD	5.5 feet to 6.0 feet, NGVD	5.5 feet to 6.0 feet, NGVD	5.5 feet to 6.0 feet, NGVD
[illegible]	S-148	Operating Range from 3.7 to 5.2 feet, NGVD	Normal Opeating Range from 4.0 to 5.0 feet, NGVD	Operating Range from 3.7 to 5.2 feet, NGVD	Operating Range from 3.7 to 5.2 feet, NGVD
[illegible]	S-179 (C-103)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall)	Regulatory Releases from 2.0 to 2.5 feet, NGVD Normal Operating Range from 3.1 to 3.9 feet, NGVD Low Operating Range from 2.7 to 3.1 feet, NGVD	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 2.5 to 3.9 feet, NGVD (different operations based on dry / wet season and high rainfall)
[illegible]	S-165 (C-102)	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall)	Regulatory Releases Operating Range from 2.0 to 3.0 feet, NGVD	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.7 feet, NGVD (different operations based on dry / wet season and high rainfall)
[illegible]	S-167 (C-103)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)	Operating Range from 3.2 to 4.6 feet, NGVD (different operations based on dry / wet season and high rainfall)

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Region	Management Measures	Alternative A (No Action)	Alternative K	Alternative L	Alternative N
Add-On Structures for Modeling *(these structures were not considered during the development of alternative*	S-355 A/B	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.	Follow the same constraints as S-333. Open whenever hydraulic gradient allows flow from WCA-3B to L-29 with low risk of backflow from L-29 to WCA-3B. A. Constraints on the Operation of S-355A and S-355B. The S-355A and S-355B water control structures will be operated to comply with the following constraints: i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in WCA-3B at S-355A/B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/B to L-29 Borrow Canal; ii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent the L-29 Canal stage from exceeding the L-29 Borrow Canal stage constraint as determined by the water control plan; iii. Discharges from S-355A or S-355B or a combination of both shall be limited as required to prevent impacts to the existing project purposes of the Central & Southern Florida (C&SF) Project including but not limited to flood damage reduction and water supply; and iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B. B. The S-355A and S-355B water control structures shall be closed if any of the four conditions above are not met, and when there is a potential for reverse flow (from L-29 Borrow Canal to WCA-3B) through the structures. The actual open and close levels of the structures will depend on the water conditions, forecasts, and other system constraints.
	S-12C/D	Release up to WCA-3A Regulation Schedule (Zone A maximum) plus Rainfall formula	Operations driven by the 2006 Rainfall Plan (S-333 and S-333N, subject to the L-29 criteria)	Operations driven by the 2006 Rainfall Plan (S-333 and S-333N, subject to the L-29 criteria)	Operations driven by the 2006 Rainfall Plan (S-333 and S-333N, subject to the L-29 criteria)
	S-151	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge
	S-337	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge	250 cfs for supplemental water supply to Taylor Slough and maintain the hydraulic ridge

[1]S-12A and/or S-12B will be conditionally opened during October under the following conditions.

1. WCA-3A stage on 30 Sep is greater than 10.5 feet, NGVD; or
2. WCA-3A stage is projected to rise above 10.75 feet, NGVD (IOP Zone A) during October, based on consideration of projected inflows and direct rainfall.
3. S-12A and/or S-12B will be conditionally closed when the WCA-3A stage falls below 10.25 feet, NGVD, OR on 01 November, whichever comes first.

S-12B will be conditionally opened during November under the following conditions.

1. WCA-3A stage on 31 Oct is greater than 11.0 feet, NGVD; or
2. WCA-3A stage is projected to rise above 11.25 feet, NGVD during November, based on consideration of projected inflows and direct rainfall.
3. S-12B will be closed when the WCA-3A stage falls below 10.75 feet, NGVD, OR on 01 December, whichever comes first.

Year-Round Operational Criteria:
S-12A Year-round: To provide access to cultural areas, when Rainfall Plan results in S-12 target flows, S-12A up to 100 cfs release.

S-12A Cultural Access Release: S-12A up to 100 cfs release available when Rainfall Plan results in S-12 target flows. From 01 October through 14 July, the Tribe and USACE must request informal consultation with FWS to avoid impacts on CSSS-A. During this time, the duration of this release will not exceed five consecutive days. S-12A up to 100 cfs release may only occur when WCA-3A 3-gage average (WCA-3AVG - Sites 63, 64, 65) is greater than 8.4 feet, NGVD. During S-12A up to 100 cfs release, data such as but not limited to NP-205 and area rainfall will be monitored with NP-205 increase or anticipated increase above 5.7 feet, NGVD resulting in closing of S-12A.

S-12A/B/C/D Headwater greater than 11.0 feet, NGVD: May be opened an amount only enough to stop overtopping of gates. The USACE will assess the feasibility of leaving the gates closed and allowing overtopping.

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