

**APPENDIX A PART 1: 2018: L-29 CANAL AND G-3273 CONSTRAINT RELAXATION  
INCLUDING THE NORTHERN DETENTION AREA (REVISED OPERATIONAL  
STRATEGY INCREMENT 2)**

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## TABLE OF CONTENTS

1.0 INTRODUCTION .....	3
2.0 INCREMENTAL UPDATES TO INCREMENT 1.1 AND 1.2 (INCREMENT 2).....	6
2.1 OPERATIONAL CHANGES TO ADDRESS USFWS BIOLOGICAL OPINION.....	9
3.0 WATER QUALITY.....	10
4.0 OPERATIONAL STRATEGY FOR INCREMENT 2 FIELD TEST.....	10
4.1 S-333 AND S-356 OPERATIONAL STRATEGY.....	29
4.2 REVISED CONDITIONS OF THE OPERATIONAL STRATEGY .....	29
4.3 UNVARYING CONDITIONS OF THE OPERATIONAL STRATEGY .....	30
5.0 INCREMENT 2 OPERATIONAL STRATEGY CONDITIONS.....	33
5.1 CONDITION 1. YEAR-ROUND WHEN WCA-3A STAGE IS BELOW THE INCREMENT 1 AND 2 ACTION LINE (FIGURE 1) (S-333 HAS PRIORITY; S-356 USE IS SECONDARY TO S-333 BUT S-356 CAN AND SHOULD BE USED SUBJECT TO L-29 STAGE LIMITATIONS):.....	33
5.2 CONDITION 2. YEAR-ROUND WHEN STAGE AT G-3273 IS ABOVE 6.6 FEET, NGVD * AND THE WCA-3A STAGE IS BELOW THE INCREMENT 1 AND 2 ACTION LINE (FIGURE 1) (S-356 HAS LIMITED PRIORITY OVER S-333):.....	34
5.3 CONDITION 3. WHEN WCA-3A STAGE IS ABOVE THE INCREMENT 1 AND 2 ACTION LINE (FIGURE 1) DURING S-12A SEASONAL CLOSURE WINDOW FROM 01 OCTOBER (OR INITIAL S-12A CLOSURE DATE) THROUGH 14 JULY *(S-333 HAS PRIORITY; S-356 USE IS SECONDARY TO S-333 BUT S-356 CAN AND SHOULD BE USED SUBJECT TO L-29 STAGE LIMITATIONS): .....	36
5.4 CONDITION 4. WHEN WCA-3A STAGE IS ABOVE THE INCREMENT 1 AND 2 ACTION LINE (FIGURE 1) FROM 15 JULY THROUGH START OF S-12A SEASONAL CLOSURE WINDOW ON 30 SEPTEMBER (OR INITIAL S-12A CLOSURE DATE) (S-333 HAS PRIORITY; S-356 USE IS SECONDARY TO S-333 BUT S-356 CAN AND SHOULD BE USED SUBJECT TO L-29 STAGE LIMITATIONS AND NO USE OF S-334): .....	39
5.5 PRE-STORM, STORM/POST-STORM OPERATIONS .....	41
5.6 OPERATIONAL FLEXIBILITY (CONDITIONS 1, 2, 3 AND 4): .....	41
5.7 ADDITIONAL OPERATIONAL FLEXIBILITY, FOR EXTREME HIGH WATER LEVELS IN WCA-3A: (WCA-3A STAGE IS ABOVE THE EXTREME HIGH WATER ACTIN LINE OR SFWMD POSITION ANALYSIS SHOWS A 10 PERCENT PROBABILITY OF WCA-3A, 3-STATION AVERAGE EXCEEDING 12.7 FEET NGVD) .....	41
5.8 OPERATIONAL FLEXIBILITY GUIDANCE .....	42
5.9 WATER SUPPLY OPERATIONS .....	43
5.10 HYDRAULIC TESTING FOR DETENTION AREAS.....	44

5.11 OPERATIONAL STRATEGY FOR 8.5 SQUARE MILE AREA ..... 44

## 1.0 INTRODUCTION

The current U.S. Army Corps of Engineers, Jacksonville District (USACE) Water Control Plan (WCP) governing operations within the Modified Water Deliveries (MWD) Project area is the 2012 WCP. The areas addressed in this plan include the Water Conservation Areas (WCA), Everglades National Park (ENP), and ENP South Dade Conveyance System (SDCS). The 2012 WCP, which provides the operational guidance for the 2012 Everglades Restoration Transition Plan (ERTP), modified the WCA-3A Regulation Schedule (Figure 1) from the 2002/2006 Interim Operational Plan (IOP) for Protection of the Cape Sable Seaside Sparrow (CSSS), including lowering of the top zone (Zone A) of the WCA- 3A Regulation Schedule, expansion of Zone E1 and removal of the CSSS seasonal closure of S-12C. The 2012 WCP changes were expected to reduce the need for S-334 releases from WCA-3A to the SDCS during 2012 WCP Table 7-5, Column 2 operations. In order to achieve the MWD project goal of increasing stages in Northeast Shark River Slough (NESRS), modifications to the Central & Southern Florida Project were necessary. Specifically, construction of additional water management features included within the MWD and C-111 South Dade projects were necessary to provide seepage control along the eastern boundary of ENP, flood mitigation to the 8.5 Square Mile Area (SMA) and to maintain existing levels of flood protection to other adjacent agricultural areas. Since not all flood mitigation and seepage management features envisioned in the MWD and C-111 South Dade Projects are currently constructed, operational limitations of canals within 8.5 SMA, ongoing construction efforts, and remaining needed infrastructure all currently limit flowing additional water into NESRS. Additionally, during the construction timeframe a 2016 US Fish and Wildlife Service (USFWS) Biological Opinion (BO) imposed new constraints on the S-12A, S-12B, S-343A, S-343B and S-344 structures and specified a timeline for a relaxation of the 2012 WCP constraints in the L-29 Canal. The net effect of the BO constraints are to direct additional water away from the western sub-population of the CSSS. Instead, these waters are sent to the NESRS, where they are needed for effective restoration of long-hydroperiod sloughs. As such, the previously-established MWD incremental field test approach schedule was adjusted and the scope expanded to included an additional revised Operational Strategy (Increment 1.1 and 1.2) responsive to both the terms and conditions of the BO as construction features were completed and incorporating new information from the 2016 Temporary Emergency Deviation within the Corps' continued efforts to expediently proceed with future incremental relaxations of the 2012 WCP constraints.

The G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy (Increment 1), was initiated on October 15, 2015 followed by an updated version of Increment 1 (Increment 1.1 and 1.2) initiated on February 27, 2017. Increment 2, formally titled, *2018 L-29 Canal and G-3273 Constraint Relaxations, Including Northern Detention Area (NDA) Revised Operational Strategy*, is the second and final in a series of incremental field test efforts, the results from which will be assimilated into a revision to the 2012 WCP. This update will be integrated within the System Operating Manual (SOM) and will help fulfill the April 2005 Comprehensive Everglades Restoration Plan (CERP) Programmatic Regulation requirement for creating a System Operating Manual. The final modification (a chapter within the SOM) will be referred to throughout this document as the Combined Operational Plan (COP). The incremental approach to develop the COP will 1) allow interim benefits towards restoration of the natural systems, 2) reduce uncertainty of operating the components of the MWD and C-111 South Dade projects, and 3) provide information to complete the COP efficiently.

Increment 1 included relaxing the G-3273 stage constraint on the delivery of water to ENP's NESRS. The duration for Increment 1 was planned for one to two years, until completion of critical components of the MWD and C-111 South Dade projects needed to operate the NDA. Increment 1 was initiated at the earliest opportunity following completion of the National Environmental Policy Act (NEPA) process and when the stage at G-3273 exceeded 6.8 feet, National Geodetic Vertical Datum of 1929 (NGVD)<sup>1</sup>. Prior to Increment 1, the delivery of a net inflow of water to NESRS through S-333 was discontinued (S-333 zero or S-334 must match S-333) when the stage at G-3273 exceeded 6.8 feet, NGVD. Relaxation of G-3273 constraint and operation of S-356 under Increment 1 increased water deliveries to NESRS. As a result, under normal operating conditions, reliance on S-334 releases to the SDCS (Column 2 mode of operations) to assist with lowering of stages in WCA-3A was decreased due to: 1) the increased availability of S-333 to discharge directly into NESRS, and 2) inclusion of new field test criteria restricting when S-334 was used to pass S-333 flows during Column 2 operations (Table 1). The Increment 1 monitoring plan anticipated the potential need for incremental modifications to the operational strategy (within the covered NEPA Environmental Assessment (EA) scope) as a result of the ongoing field test monitoring and technical assessments, with potential updates to be coordinated with the Project Delivery Team (PDT) during regularly scheduled interagency meetings planned to occur four times per year.

During implementation of Increment 1 the USACE proceeded with pre-storm drawdown and flood control operations due to very strong El Niño conditions experienced in the WCAs during the 2015-2016 dry season. The pre-storm drawdown and flood control operations were conducted in accordance with the 2012 WCP, independent of Increment 1. Upon Florida Department of Environmental Protection (FDEP) issuance of an emergency final order (EFO) February 11, 2016 authorizing the South Florida Water Management District (SFWMD) and USACE immediate action to deviate from permitted water management practices to move significant volumes of flood water out of WCA-3A to ENP through Shark River Slough and at the request of SFWMD, on February 15, 2016 the USACE initiated a temporary emergency deviation to the Increment 1 stage maximum operating limit of 7.5 feet, NGVD in the L-29 Canal for purposes of providing high water relief in WCA-3A (hereafter referred to as the 2016 Temporary Emergency Deviation). Upon review of monitoring data associated with Increment 1 and the 2016 Temporary Emergency Deviation, it became apparent that modifications were necessary to the Increment 1 Operational Strategy to maintain the Congressionally authorized flood mitigation requirements within the 8.5 SMA and to facilitate completion of the C-111 South Dade Project's ongoing construction necessary for Increment 2 of the field test and COP. Based on consideration of this new information, the USACE modified Increment 1 to include additional operational flexibility within the revised operational strategy termed Increment 1.1 and 1.2 (or Increment 1 Plus) to operate the L-29 Canal to a maximum of 7.8 feet, NGVD, subject to downstream constraints. Increment 1.1 of the operational strategy, which was implemented on February 21, 2017, maintained the L-29 Canal stage maximum operating limit of 7.5 feet, NGVD. Increment 1.2 will increase the L-29 Canal stage maximum operating limit up to 7.8 feet, NGVD when the necessary construction components are completed and all Real Estate agreements are in place. The Increment 1.1 and 1.2 operational strategy also addressed the mandated terms and conditions of the USFWS July 22, 2016 ERTF BO, which included expanded closure periods for S-12A, S-12B, S-343A, S-343B,

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<sup>1</sup> All elevations in this document are in feet in relation to the National Geodetic Vertical Datum of 1929 (NGVD) unless otherwise stated.

and S-344 as mandated by the Reasonable and Prudent Alternative (RPA) identified within the BO.

Following the implementation of Increment 1.1 and 1.2 in February 2017, high water levels were also observed in the WCAs during June 2017. This led to a request from the SFWMD for a temporary deviation to implement operational flexibilities to alleviate the extreme high water conditions in the WCAs. Operations under the 2017 Planned Temporary Deviation began on June 28, 2017 and may continue until water levels return to the Regulation Schedule. This temporarily disrupted the test operations under Increment 1.1 by making use of the S-12 structures prior to the operational window, as well as, use of other structures outside the defined operational strategy criteria. However, the deviation operations still provided valuable and insightful data that contribute to the development of this Increment 2.0 Operational Strategy and will continue to contribute to the development of COP. As required by the Monitoring Plan, this data is obtainable from the Corps' project website.

Increment 2, scheduled to begin by March 1, 2018, is the next incremental step in development of the COP. Increment 2 of the MWD Project is dependent on construction completion and operation of the C-111 South Dade NDA, in addition to completion of the requirements for transitioning to Increment 1.2, which include operability of the 8.5 SMA C-358 Canal and the necessary land acquisitions along the Tamiami Trail. In the event that the construction for S-357N remains incomplete (current schedule will complete S-357N by February 2018), the temporary C-358 bypass culverts installed during the 2016 Temporary Emergency Deviation will continue to be utilized to manage C-358 canal stages. Also, in the event remaining construction components of the C-111 South Dade Contract 8 are incomplete prior to March 1, 2018 and preclude operation of the NDA as required for full implementation of Increment 2, the operating criteria previously established under Increment 1.1 and 1.2 will govern for the following structures that are affected by the construction activity (L-29 Canal, including S-333, S-355A, S-355B, S-356; S-331; S-357; S-357N; L-31N Canal, including S-332BN, S-332BW, S-332C, S-332D, S-194, S-196, and S-176). Once construction of the NDA is verified as functionally complete, all operations developed under this Increment 2 Operational Strategy will be implemented.

The objectives of the Increment 2 field test are to:

- A. Improve hydrological conditions in NESRS through the relaxation of both the G-3273 stage constraint and L-29 Canal maximum operating limit to increase water deliveries from WCA-3A to NESRS, while maintaining other C&SF Project authorized purposes.
- B. Continue use of the S-356 pump station to manage higher canal stages in the L-31N Canal resulting from the relaxation of the G-3273 stage constraint and L-29 Canal maximum operating limit, in conjunction with increased flows through the S-333 structure (gated spillway) to NESRS via the L-29 Canal.
- C. Improve hydrological conditions in NESRS by maximizing the flexibility and efficiency of the existing infrastructure, including use of S-356, the completed 8.5 SMA project and completed C-111 South Dade project features to complement inflows to NESRS from WCA-3A.
- D. Improve hydrological conditions in Taylor Slough, Rocky Glades, and the eastern panhandle of ENP, including use of the completed 8.5 SMA project and completed C-111

South Dade project features to maintain a continuous hydraulic ridge that reduces groundwater seepage losses from eastern ENP between the 8.5 SMA and Taylor Slough.

- E. Gather and analyze infrastructure performance, ecologic, hydrologic and water quality data sufficient to support Increment 3 (COP), resulting in the following:
  - i. Data gathering sufficient to support water quality certification
  - ii. Refined operational criteria for the MWD and C-111 South Dade Projects
  - iii. Updates to the 2012 WCP (in the form of Volume 4, Chapter 7 of the System Operations Manual (SOM) in which COP will be a portion of the SOM contents).

A Supplemental EA for the “2018 L-29 Canal and G-3273 Constraint Relaxations, Including Northern Detention Area (NDA) Revised Operational Strategy, (Increment 2)” accompanies this operational strategy to provide documentation of the environmental effects resulting from the implementation of these changes to the Increment 1.1 and 1.2 Operational Strategy.

## 2.0 INCREMENTAL UPDATES TO INCREMENT 1.1 AND 1.2 (INCREMENT 2)

The combined duration of Increments 1, 1.1 and 1.2, and 2 are anticipated to extend three calendar years. Operational criteria not specified within the Increment 2 Operational Strategy will continue to be governed by the 2012 WCP. The Increment 2 Operational Strategy seeks to increase flow to NESRS while providing operational flexibility needed to:

- A. maintain operating limits in the L-29 Canal that ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334,
- B. support MWD to ENP Project construction for the installation of S-357N, if needed,
- C. facilitate the remaining Southern Detention Area (SDA) construction of C-111 South Dade Contract 8A and any remaining construction components of the NDA Contract 8,
- D. maintain the authorized flood mitigation for the 8.5 SMA,
- E. maintain pre-existing flood protection along the L-31N and C-111 Canals,
- F. provide supplemental flows to Taylor Slough to help facilitate the recovery of Florida Bay from the 2015 extreme hyper-salinity event, and
- G. provide operational flexibilities for prescribed extreme high water conditions in WCA-3A.

Broad restoration goals and objectives of the MWD Project include improved timing, location and quantities of water deliveries to ENP. Operational constraints as defined for Increment 2 are as follows:

- A. L-29 Canal maximum operating limit of 8.5 feet, NGVD to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334. All inflows to the L-29 Canal shall also be discontinued in advance of certain stage and weather events as previously coordinated with the Florida Department of Transportation (FDOT) and prescribed in the 2008 Tamiami Trail Limited Re-evaluation Report for the final operating plan with the maximum L-29 Canal limit up to 8.5 feet, NGVD (section 6.3).
- B. Maintain the authorized purposes of the C&SF Project modified to include:
  - i. MWD Project

- ii. C-111 South Dade Project
  - iii. CERP
- C. No reduction in current flood protection or mitigation.
- D. Maintain the current multi-species objectives of the 2012 WCP and comply with the requirements of the applicable BO from USFWS, to include the ERTTP and the CERP C-111 Spreader Canal Western Project.

While record WCA-3A water levels were set for 30 consecutive days from mid-February to mid-March 2016 and record-high water stages in the WCAs during June - November 2017 created many water management challenges, the 2016 Temporary Emergency Deviation and 2017 Planned Temporary Deviation executed in response to these conditions provided valuable information on the responses within ENP and the SDCS system to raising of the L-29 Canal, including evaluation of operational limitations of the 8.5 SMA flood mitigation project. The information gathered during these events has been used to inform the operational strategy for Increment 2 and will be used for future development of the COP.

Increment 2 is intended to move towards the objectives (A through E, as defined in Section 1.0) described above while providing operational flexibility as listed in items A through G found above (Section 2.0). This operational strategy also specifies the conditions that will allow transition of Increment 1.1 or Increment 1.2 to Increment 2 (refer to Section 4.0). After completion of the MWD 8.5 SMA features and the C-111 South Dade Project NDA, these components can be operated to accommodate increased flow to NESRS while evaluating whether the operational criteria meet the field test objectives and constraints. Incremental changes will be maintained for time periods sufficient to maintain roadway subbase infrastructure along Tamiami Trail Highway based upon coordination with the Florida Department of Transportation (FDOT) regarding implementation of the “Contract between the United States of America and Florida Department of Transportation for Relocation, Rearrangement, or Alteration of Facilities Modified Water Deliveries to Everglades National Park Project. The Relocation Agreement was instrumental for FDOT approval of the MWD design for the Tamiami Trail Highway Modifications completed in 2013. Eventually operating criteria will be developed, evaluated and selected for COP, which will clearly maintain flood risk management while providing the natural system benefits that were used to justify the considerable Federal and State expenditures associated with these projects. The approved COP will be integrated into the SOM and comply with the NEPA.

There are three distinct modes of water management operations specified in the 2012 WCP: Column 1 Water Supply and no WCA-3A Regulatory Releases to the SDCS, Column 2 WCA-3A Regulatory Releases to the SDCS, and Water Supply. Since seasonal closures of the S-12A and S-12B remain in place to promote target hydrologic conditions within CSSS Sub-population A, these three modes were each retained for the Increment 1, Increment 1.1 and Increment 1.2, and Increment 2 to ensure a current level of flood mitigation is maintained throughout the testing operations. The Increment 2 operational strategy continues efforts under the MWD field tests to incrementally reduce reliance on Column 2 operations as stages in NESRS are incrementally increased subject to the L-29 Canal design high water constraints. As initially defined in the 2002 IOP Environmental Impact Statement (EIS) and 2006 IOP Supplemental EIS and retained through the 2012 WCP, Column 1 is the condition when regulatory releases from WCA-3A can be met by normal operation of the WCA-3A regulatory outlets (S-12s, S-333, S-344, S-343s, S-151).

Column 2 is the condition when regulatory releases from WCA-3A are made via S-333 to the L-29 Canal then via S-334 to the L-31N Canal and the SDCS to address the reduction of WCA-3A releases due to the CSSS sub-population A structure closure period (i.e. S-12A/B, S-343A/B and S-344). Column 2 operations generally require the increased use of pumping stations S-331, S-332B, S-332C, and S-332D. During Column 2 operations, the control stages along the L-31N and C-111 Canals are also lowered to help maintain the existing flood risk management along the SDCS and also to provide the necessary downstream gradient for the S-334 releases to reach S-332B, S-332C, and S-332D pump stations. Column 2 operations were established under IOP 2002 to mitigate for potential adverse effects on WCA-3A related to actions taken to protect CSSS Sub-population A within western ENP and the native vegetation of the western marl prairie, including the seasonal closure of the S-12A, S-12B, S-12C, S-343A, S-343B, and S-344 regulatory outlets under IOP. This pattern of release to SDCS to mitigate high water conditions in WCA-3A during the seasonal closure period replaced use of the S-12 A/B/C and S-343A/B structures for this purpose. The S-12 and S-343A/B structures were used until USFWS declared a Jeopardy Opinion for the endangered CSSS first in 1999. One of the questions that these field tests should help answer is what are the required seasonal operational canal ranges within the SDCS to best manage ENP water levels while maintaining flood protection to nearby private properties.

Eventually, the goal is to remove Column 2 flows under revised operations for COP. Until the incremental field tests are complete, reference to Column 2 flows will be retained within Increment 2, although it is expected that use of S-333/S-334 discharges to SDCS for mitigation of the S-12 A and B closures will be reduced with the increase of the L-29 constraint raised up to 8.5 feet, NGVD from 7.5/7.8 feet, NGVD. Consistent with the previous increments of the MWD field tests, this operational strategy specifies further reduced reliance on this S-333 and S-334 route during normal operations (Condition 3) through the inclusion of prescribed criteria which preclude the use of Column 2 when the L-29 Canal is operated above 7.8 feet NGVD. Inflows to the SDCS from S-331 local drainage will also be reduced under Increment 2, since the 8.5 SMA flood mitigation requirements are shifted to an increased reliance on S-357 given full operability of the NDA and a reduced dependency of the 8.5 SMA on S-331. Under conditions 1, 2, 3, and 4 (Sections 5.1 through 5.5 of this document) the operational strategy also includes criteria for limited use of S-334 to expedite lowering of the L-29 Canal stage if the design high water criteria of 8.5 feet NGVD is temporarily exceeded (in accordance with the operational criteria defined in Table 1), with the requirement for concurrent closure of L-29 Canal inflows from S-333, S-355A/B, and S-356. The primary use S-333/S-334 discharges will be based on extreme high water events within WCA-3A, as defined in Section 5.7

Increment 2 assumes that the necessary flood mitigation and seepage management features envisioned in the MWD and C-111 South Dade projects have been constructed and are fully operational. In the event that construction of the S-357N structure (8.5 SMA) remains incomplete due to delays (current schedule will complete S-357N by February 2018), the previously installed temporary bypass culverts will continue to be used. Based on the current schedule projections that S-357N construction will not be completed until February 2018, the Increment 2 Operational Strategy retains the Increment 1.1 defined start of testing protocol for S-357N operating criteria following completion of the C-358 seepage collection canal and associated S-357N, and the operational criteria which result from the Increment 2 field test will be subsequently incorporated into the COP.

Information obtained from the previous incremental field tests (e.g. achieving objectives while maintaining constraints, unanticipated results, etc.) has been used to support development of Increment 2 to include, but not be limited to, proposing water management operating criteria to increase the maximum stage allowed in the L-29 Canal (e.g., raise L-29 constraint from elevation 7.5 to 7.8 feet, NGVD to an elevation up to 8.5 feet, NGVD). Similar to Increment 1 and Increment 1.1 and 1.2, the Increment 2 Operational Strategy and the modifications to the 2012 WCP will be supported by appropriate NEPA. Information obtained from all field test increments will be used to support development of the COP. It is anticipated that incremental updates to the Increment 2 may occur as information is gained during field testing, if appropriate, prior to the development of the COP.

## **2.1 OPERATIONAL CHANGES TO ADDRESS USFWS BIOLOGICAL OPINION**

In 2016 in accordance with the Endangered Species Act, the USACE completed consultation with the USFWS to assess effects of the USACE water management operations in the southern part of the Everglades on the endangered CSSS and other listed species. During this consultation, the USFWS determined that current conditions within the sparrow's habitat threaten its survival. The USACE responsibility is to manage its water management system in compliance with the Endangered Species Act, while the USFWS responsibility is to protect and enhance species and their habitats, which includes the endangered CSSS. The USACE coordinated closely with the USFWS to determine what measures the USACE can take within its given authorities to improve the sparrow's habitat and ensure the USACE is able to operate its water management system in compliance with the Endangered Species Act, while also meeting the needs of the multiple congressionally-authorized purposes of the C&SF project.

The BO is a document that states the opinion of the USFWS as to whether a federal action is likely to jeopardize the continued existence of listed species. The USFWS issued the new BO for the ERTTP on July 22, 2016 determining that continued operation of the ERTTP would jeopardize the endangered CSSS by reducing its likelihood of survival and recovery. The BO recommended operational modifications and an expedited schedule for ongoing restoration initiatives in the southern Everglades to aid in improving suitable nesting habitat for CSSS. For the CSSS, the BO presents a recommendation for a RPA, with numerous elements, to the USACE proposed ERTTP action. Main elements of the RPA are: habitat performance targets; actions to move water east; surveys and studies; and adaptive management. The RPA further specifies that the USACE shall proceed as scheduled for completing NEPA analysis on Increment 2 and, as allowable by law, raising L-29 canal levels from 7.8 feet, NGVD up to 8.5 feet, NGVD prior to March 1, 2018 and implementation of COP in 2019. Additional terms of the BO will affect the operation of S-12A, S-12B, S-333, S-332B, S-332C and S-332D. Upon conclusion of each NEPA analysis, the USACE will continue to promptly adjust water management operations accordingly. The USACE is taking specific actions to comply with the USFWS terms and conditions specified in the BO and to implement the RPA.

Successful recovery of CSSS requires continued collaborative efforts among federal, tribal and state partnering agencies. The USACE, within its authorities, will continue to work with the USFWS to find other helpful initiatives which could be enacted by partners and stakeholders to aid in this important effort.

Based on evaluation of the regional modeling conducted in support of the ERTTP 2016 Endangered Species Act (ESA) consultation, the components from the BO modeling which require modifications to the 2012 WCP were previously included in the operational criteria governing Increment 1.1 and 1.2, consistent with the requirements of the RPA, and these components remain unaltered within the Increment 2.0 Operational Strategy. Annex 1 of the Increment 1.1 and 1.2 Operational Strategy provides criteria that must be adhered to during operations to remain in compliance with the 2016 USFWS ERTTP BO. The intent of this criteria remains applicable to the Increment 2.0 Operational Strategy. The modeling assumptions for the BO analysis which describe the SDCS operations under Component II were adjusted within the Increment 1.1 and 1.2 operational strategy to provide sufficient flexibility for the USACE and SFWMD water managers to achieve the intended performance from the RPA Proposed Operational Condition. The Increment 2 operational criteria are displayed in Table 1.

### **3.0 WATER QUALITY**

Water deliveries into the ENP Shark River Slough are subject to the water quality criterion for total phosphorus (TP) contained in Appendix A of the 1991 Settlement Agreement (Appendix A). Appendix A compliance is currently assessed by comparing the Long Term Limit (LTL) against the 12-month flow-weighted mean (FWM) TP concentration in parts-per-billion (ppb). This is calculated using the measured flows from the S-12A, S-12B, S-12C, S-12D, S-333 and S-334 structures that distribute flows from WCA-3A into Shark River Slough.

A Technical Oversight Committee (TOC) sub-team is evaluating the Appendix A Settlement Agreement compliance methodology to address additional flows and inflow points and the incorporation of S-356. Water quality compliance will be evaluated separately for the S-356 pump station in a manner prescribed in Appendix A Settlement Agreement. The proposed compliance period for the S-356 pump station is the same as the Appendix A Settlement Agreement compliance period of October 1 through September 30. Increment 1 operations began on October 15, 2015 when G-3273 rose above 6.8 feet, NGVD. Increment 1.1 and 1.2 operations commenced on February 27, 2017. Consistent with TOC coordination conducted for Increment 1, operating plan changes suggested by the water quality compliance analyses, if needed, would be implemented only after the completion of Increment 1.1 and 1.2 test period. For the complete duration of Increment 2, the USACE does not plan to impose operational constraints for water quality that could restrict or otherwise limit inflows to NESRS. Additional discussion on water quality is contained in the EA and the accompanying monitoring plan.

### **4.0 OPERATIONAL STRATEGY FOR INCREMENT 2 FIELD TEST**

Compared to the previous incremental field tests, Increment 2 provides more flexibility to 1) continue to deliver more water to NESRS, Florida Bay and Taylor Slough, 2) provide temporarily increased capacity to convey water to SDCS under Column 2 operations, and 3) flexibility to operate under extreme high water events in WCA-3A while adhering to the field test objectives and constraints. Independent of the MWD incremental field test, the Corps is also proposing to extend the operational window for the S-152 to provide increased water deliveries from WCA 3A to WCA 3B under the Decomp Physical Model field test, and if approved, these operations will proceed independently from the Increment 2 field test.

The Increment 2 Operational Strategy retains the required S-12A, S-12B, S-343A, S-344B and S-344 seasonal closure period of October 1 through July 14 to protect CSSS sub-population A within western ENP and the native vegetation of the western marl prairie, consistent with the RPA requirement from the 2016 USFWS, ERTF BO. However, under specified high-water conditions within WCA-3A (identified in Table 1), S-12A may remain open through October 31, and S-12B may remain open through November 30. The 2012 WCP, which includes the WCA-3A Regulation Schedule and the Rainfall Plan, will continue to govern water management operations during Increment 2, with the exception of operating criteria for S-12A, S-12B, S-328, S-151, S-331, S-333, S-334, S-335, S-337, S-338, S-343A, S-343B, S-344, S-355A, S-355B, S-356, S-357, S-357N, S-332B, S-332C, S-332D, S-194, S-196, S-176, S-177, and S-197 as contained in the below operational strategy for use during the field test.

To allow for adaptive management during under high water conditions similar to those experienced during 2016 and 2017, Section 5.7 “Additional Operational Flexibility, for Extreme High Water Levels in WCA-3A” applies to all structures as identified in Section 4.6 and Table 1, and may not be limited to the structures listed above.

Increment 2 will increase the current operating limit up to 8.5 feet, NGVD in the L-29 canal, while continuing to relax the G-3273 constraint for S-333 and utilizing S-356 for control of the seepage to the L-31N Canal. In addition, local gages (Angels and LPG-2) that trigger flood mitigation actions in the 8.5 SMA will be used. During Increment 2, the combined flows through S-333 and S-356 will be more than what would have been discharged through these features under Increment 1.1 and Increment 1.2 operations. S-173 releases and pumping with S-331 have previously been used to: 1) maintain target L-31N Canal stages; 2) provide flood mitigation to the 8.5 SMA eastern areas and assist S-357 in maintaining flood mitigation for the 8.5 SMA when S-357 operational capacity is limited; and 3) convey WCA-3A regulatory releases to the SDCS from S-334 during Column 2 operations. With Increment 2, the 8.5 SMA flood mitigation requirements are shifted to an increased reliance on S-357 given full operability of the NDA and a reduced dependency of the 8.5 SMA on S-331, and Column 2 operations are generally reduced. Under all conditions (1, 2, 3 and 4), the operational strategy also includes criteria for limited use of S-334 to expedite lowering of the L-29 Canal stage if the design high water criteria of 8.5 feet NGVD is temporarily exceeded (in accordance with the operational criteria defined in Table 1), with the requirement for concurrent closure of L-29 Canal inflows from S-333, S-355A/B, and S-356. In addition, Increment 2 water management operations will result in increased seepage to the L-31N Canal as the increased flow into NESRS will increase stages along the west side of L-31N. This increase is expected to be fully manageable with operation of the MWD and C-111 South Dade Projects, which will be interconnected. S-333, S-334, S-356, S-197, and S-357N will be operated, as well as S-332B, S-332C, S-332D, S-194, S-196, S-176 and S-177 as identified in Table 1. If available for use, S-355A and S-355B may also be utilized to discharge to the L-29 Canal as indicated in the 2012 WCP and other future associated permit requirements. However, since Increment 2 will be the initial opportunity to gain operational experience with the NDA, Increment 2 will continue to retain the additional water management operating criteria for S-197 (in addition to the S-197 operating criteria defined in the 2012 WCP) to provide flexibility to maintain flood risk management for Southeastern Miami-Dade County, if needed.

The G-3273 stage constraint and L-29 maximum operating limit on inflows to the L-29 Canal (from S-333, S-355A, S-355B, and/or S-356) will be modified under Increment 2, with system conditions regularly monitored by water managers and scientists. Adjustments within the operational strategy provided below will be made as needed for the duration of the field test consistent with the EA. Data will be analyzed during and after Increments 2 as described in the Monitoring and Analysis Appendices to the associated EA. During the development of the original Increment 1 Operational Strategy, the interagency operations sub-team identified a preliminary list of analyses to be conducted to inform future water management actions within the Increment 1 test and future field test operations. For the Increment 2 Monitoring Plan, these analyses were retained from Increment 1.1 and Increment 1.2.

The monitoring gages to be used for the analyses are listed in Table 5. The region containing the existing monitoring gages has been divided into four maps as shown on Figures 5, 6, 7 and 8. These analyses were developed to complement the overall monitoring plan (Appendix C of the 2017 EA) and will continue to be used under Increment 2 to assess and evaluate the achievement of several of the stated water management objectives from the monitoring plan, including to:

- A. ensure existing levels of flood protection are maintained within the northern L-31N Basin (between S-335 and S-331);
- B. ensure existing levels of flood mitigation are maintained within the protected portion of the 8.5 SMA;
- C. determine whether Increment 2 maintains flood protection in C-111 basin; and
- D. determine whether Increment 2 operational changes at S-197 ensure existing levels of flood protection are maintained within the C-111 Basin (south of S-176); the evaluation will include an assessment of the low level trigger criteria used for S-197 gate openings and their beneficial effects on Manatee Bay.

Information and operational criteria identified from the Increment 2 field test will be used to develop operations and monitoring criteria for the COP to operate the L-29 Canal up to a maximum of 8.5 feet NGVD, as outlined in the 2008 MWD Tamiami Trail Limited Re-evaluation Report and Final EIS.

Consistent with the coordination structure initially established for Increment 1, field test operations updates and action items will be discussed on a weekly basis between water managers from USACE and SFWMD, as well as ENP when needed, to provide collective interpretation of results and evaluate implementation of field test operations relative to the Increment 2 goals, objectives, and constraints. USACE, SFWMD, and ENP will meet monthly to discuss the collected data and the results of preliminary analyses, as well as system conditions and field test operations. Results from these weekly and monthly coordination meetings, including preliminary recommendations from water managers to incrementally modify the operational strategy (within the covered NEPA EA scope), will be further discussed with the PDT during regularly scheduled interagency meetings to occur four times per year. PDT meetings will also include updates from the water quality and ecological monitoring sub-teams. Additional meetings (e.g. WCA 3 Periodic Scientists Calls) and/or workshops may be conducted in support of the field test on an as-needed basis based upon ongoing or anticipated conditions within the WCAs, ENP, and/or the SDCS.

Additional details corresponding to the operational conditions, Conditions 5.1 through 5.4, are provided in Section 5.0. Table 1 is complementary to the Section 5.0.

**TABLE 1**

<b>Operational Component</b>	<b>Column 1: No WCA-3A Regulatory Releases to SDCS</b>	<b>Column 2: WCA-3A Releases to SDCS</b>
	<p>Operational criteria not specified in Table 1 will utilize 2012 WCP. If there is a perceived conflict between the criteria in this table compared to the criteria described in text of the body of the document or if there the table lacks clarity, then the criteria as described in the body of the text shall be consulted and shall control.</p> <p>The 2012 WCP, which includes the WCA-3A Regulation Schedule and the Rainfall Plan, will continue to govern water management operations during Increment 2, with the exception of operating criteria for S-12A, S-12B, S-328, S-151, S-331, S-333, S-334, S-335, S-337, S-338, S-343A, S-343B, S-344, S-355A, S-355B, S-356, S-357, S-357N, S-332B, S-332C, S-332D, S-194, S-196, S-176, S-177, and S-197 as contained in the below operational strategy for use during the field test</p> <p>The Flood Risk Management (FRM) and Environmental Restoration (ER) operational ranges prescribed below were developed from a combination of operational experience, modeling results, analysis of historical data, and the expected performance of existing and proposed features. These ranges are not the simple ON and OFF ranges used for pumps or the simple OPEN and CLOSE used for gates in C&amp;SF modeling analyses. For example secondary routes are often represented in a model by setting a higher On/Off or Open/Close range for the structure conveying water to this route. Modeling of this nature establishes how often the use of the secondary route is required but not necessarily the optimum use of the conveyance. The operation plan should allow use of the secondary route with clear objectives (e.g. send water to maintain base flow or level or both) and constraints (e.g. maximum flow and stages).</p> <p>When stages are above the FRM&amp;ER HIGH stage criteria, timely action (e.g. gate adjustment or pumping changes) will be made to lower the stage at a rate consistent with the existing conditions (e.g. height above the HIGH stage, rate of rise, recent basin rainfall, and expected inflows) and forecasted conditions.</p> <p>Within the range between the FRM&amp;ER HIGH and FRM&amp;ER LOW stage criteria, the operators have full discretion to adjust pumps or gates or a combination of both to achieve the stage deemed most appropriate for the current and expected conditions. Changes in pumps or pumping rate (number or RPM of pumps) can be implemented to rotate pumps or compensate for unavailable pumps. For basins with high rates of surface and groundwater interactions, compliance with the operation range should be based upon the daily average stage. For canal stages being maintained by pump stations, compliance with the operation range should allow the use of daily averages (0000 to 2400) with the lowest operating stage maintained above the low limit for each pump.</p> <p>When the canal stage falls below the FRM&amp;ER LOW stage criteria timely operational changes will be made to either raise the canal stage back to the operational range or transition into appropriate operational stages below the FRM&amp;ER LOW stage (e.g. water conservation)</p> <p>In this Table, the WCA-3A stage will refer to the WCA-3A 3-station average of gages Site 63, Site 64 and Site 65.</p>	

<p>WCA-3A Interim Regulation Schedule</p>	<p><i>WCA-3A Interim Regulation Schedule shown on Figure 7-5A, Figure 7-5B, and Figure 7-5C of the 2012 Water Control Plan. A revised Figure 7-5C is shown in Figure 2 for Increment 2 field test.</i></p> <p><b>When in Zone A</b> S-12s, S-333, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s open full, S-151 make discharges to the East Coast and ENP-SDCS as needed and make maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&amp;B and S-344, if non-nesting season (15 July through 30 September), make maximum allowable discharge if downstream conditions permit.</p> <p><b>When in Zone D</b> S-12s, S-333, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed. S-343A&amp;B and S-344 normally closed in this Zone unless water is needed for environmental reasons. Operational intent is to maximize discharge capacity from S-333 prior to utilization of the S-12s, subject to conditions below.</p> <p><b>When in Zone E</b> S-12s, S-333, S-151, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed. S-343A&amp;B and S-344 normally closed in this Zone unless water is needed for environmental reasons. The L-67A Borrow Canal stage (S-333 headwater) should not be drawn down below 7.5 feet, NGVD unless water is supplied from another source. Operational intent is to maximize discharge capacity from S-333 prior to utilization of the S-12s, subject to conditions below.</p> <p><b>When in Zone E1</b>, make up to maximum practicable releases at S-12C, S-12D, S-142, S-151, S-31, S-337, S-335, S-333, S-355 A/B, and S-334 when permitted by downstream conditions. S-12s, S-333, S-151, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. Revert to Zone E rules if the FWS has determined that nesting for the CSSS-A has ended, or if the headwater at S-333 falls below 8.25 feet, NGVD. In Zone E1 the goal is to use the available capacity to gradually lower WCA-3A to the bottom of Zone E1 and then keep WCA-3A near the bottom of Zone E1 with a focus of keeping WCA-3A near 9.0 feet, NGVD at the start of the wet season. The use of the capacity available in Zone E1 should consider the Snail Kite recession limits (about 0.33 feet per month).</p>	<p><i>WCA-3A Interim Regulation Schedule shown on Figure 7-5A, Figure 7-5B, and Figure 7-5C of the 2012 Water Control Plan. A revised Figure 7-5C is shown in Figure 2 for Increment 2 field test.</i></p> <p><b>When in Zone A</b> S-12s, S-333, S-343A&amp;B, and S-344 subject to conditions in Table 7-1 of the 2012 Everglades Restoration Transition Plan Water Control Plan (2012 ERTWP WCP), otherwise, S-12s open full, S-151 make discharges to the East Coast and ENP-SDCS as needed and make maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&amp;B and S-344, if non-nesting season (15 July through 30 September), make maximum allowable discharge if downstream conditions permit.</p> <p><b>When in Zone D</b> S-12s, S-333, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed and make up to maximum allowable discharge when WCA-3B stage (Site 71) is below 8.5 feet, NGVD. S-343A&amp;B and S-344 normally closed in this Zone unless water is needed for environmental reasons. Operational intent is to maximize discharge capacity from S-333 prior to utilization of the S-12s, subject to conditions below.</p> <p><b>When in Zone E</b> S-12s, S-333, S-151, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. S-333 make water supply discharges to the East Coast and ENP-SDCS as needed, discharge Rainfall Plan target flow for S-333 when permitted by downstream conditions. S-151 makes water supply discharges to the East Coast and ENP-SDCS as needed. S-343A&amp;B and S-344 normally closed in this Zone unless water is needed for environmental reasons. The L-67A Borrow Canal stage (S-333 headwater) should not be drawn down below 7.5 feet, NGVD unless water is supplied from another source. Operational intent is to maximize discharge capacity from S-333 prior to utilization of the S-12s, subject to conditions below.</p> <p><b>When in Zone E1</b>, make up to maximum practicable releases at S-12C, S-12D, S-142, S-151, S-31, S-337, S-335, S-333, S-355 A/B, and S-334 when permitted by downstream conditions. S-12s, S-333, S-151, S-343A&amp;B, and S-344 subject to conditions below, otherwise, S-12s discharge Rainfall Plan target flow for S-12s. Revert to Zone E rules if the FWS has determined that nesting for the CSSS-A has ended, or if the headwater at S-333 falls below 8.25 feet, NGVD. In Zone E1 the goal is to use the available capacity to gradually lower WCA-3A to the bottom of Zone E1 and then keep WCA-3A near the bottom of Zone E1 with a focus of keeping WCA-3A near 9.0 feet, NGVD at the start of the wet season. The use of the capacity available in Zone E1 should consider the Snail Kite recession limits (about 0.33 feet per month).</p>
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Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
Rainfall Plan	<p>Rainfall Plan located in Table 7-1 of the 2012 Water Control Plan. Operational intent is to maximize discharge capacity from S-333 prior to utilization of the S-12s, subject to conditions below. Rainfall Plan target distribution through S-333 may exceed 55% of the Rainfall Plan target. When S-12s capacity is required the structure should be opened from east to west.</p> <p>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.</p> <p>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.</p>	
Pre-Storm/Storm / and Storm Recovery Operations for the SDCS	Pre-Storm/Storm/and Storm Recovery Operations for the SDCS in Table 7-6 of the 2012 Water Control Plan.	
S-343A, S-343B, and S-344	Closed from 1 October through 14 July independent of WCA-3A levels.	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-12 A/B/C/D	<p>Seasonal Closure Criteria:                      S-12A closed from 01 October through 14 July with the following limited conditional opening;                      S-12B closed from 01 October through 14 July with the following limited conditional opening;</p> <p><b>S-12A and/or S-12B will be conditionally opened during October under the following conditions.</b></p> <ol style="list-style-type: none"> <li>1. WCA-3A stage on 30 Sep is greater than 10.5 feet, NGVD; or</li> <li>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.</li> <li>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.</li> </ol> <p><b>S-12B will be conditionally opened during November under the following conditions.</b></p> <ol style="list-style-type: none"> <li>1. WCA-3A stage on 31 Oct is greater than 11.0 feet, NGVD; or</li> <li>2. WCA-3A stage is projected to rise above 11.25 feet, NGVD during November, based on consideration of projected inflows and direct rainfall.</li> <li>3. S-12B will be closed when the WCA-3A stage falls below 10.75 feet, NGVD, OR on 01 December, whichever comes first.</li> </ol> <p>S-12C no closure period.                      S-12D no closure period.</p> <p>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.</p> <p>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.</p> <p>S-12C/D Year-round: S-12C and/or S-12D release up to WCA-3A Regulation Schedule (Zone A maximum) or Rainfall Plan (target flow).</p> <p>S-12s Flow Distribution:                      S-12 opening sequence to meet Target Flows is from east (S-12D) to west (S-12A);</p> <p>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.</p> <p>DOI to install sandbags to prevent flow through culverts under ENP Tram Road by February 1 if necessary.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-333	<p>Closed when L-29 Canal stage is above its maximum limits under Increment 2. Refer to L-29 Borrow Canal criteria below.</p> <p>Rainfall Plan target flow for S-333 (to NESRS). Rainfall Plan target distribution through S-333 will be up to maximum practicable of the Rainfall Plan target.</p> <p>When WCA-3A is in Zone E1 or Zone A, up to maximum practicable through S-333 to NESRS.</p> <p>Water Supply and Supplemental Deliveries (up to 250 cfs) to Florida Bay via Taylor Slough may be delivered through this route when it does not conflict with use of S-356. However, more than 250 cfs may be conveyed to meet other purposes. Water Supply and Supplemental Deliveries may be delivered through the S-151, S-337, S-335 route.</p>	<p>Rainfall Plan target flow for S-333 (to NESRS), plus as much of the remaining Rainfall Plan target flow that the S-12s cannot discharge to be passed through S-334 and subject to capacity constraints, which are 1,350 cfs at S-333, L-29 maximum stage limit, and canal stage limits downstream of S-334.</p> <p>When WCA-3A is in Zone E1 or Zone A, up to maximum practicable through S-333 to NESRS.</p> <p>S-334 flows will not be constrained by S-333 flows, and there is no constraint to require matching S-333 and S-334 flows. S-333/S-334 are operated in accordance with Condition 3. Refer to Section 5.3 in the operational strategy. When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,125 cfs, S-334 may be utilized up to a maximum flow rate of 250 cfs. When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,000 cfs (increased storage capacity may be available within the SDCS), S-334 may be utilized up to 400 cfs.</p>
L-29 Borrow Canal	<p>The L-29 Canal will be operated to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334, based upon coordination with the FDOT concerning implementation of the Relocation Agreement dated September 25, 2008.</p> <p>Once the stage in the L-29 Canal reaches a stage of 8.5 feet, NGVD, input from all structures that discharge into the canal (S-333, S-355A/B, and S-356) shall be stopped until the level in the L-29 Canal recedes beneath 8.5 feet, NGVD. If unexpected high rainfall beyond what was forecasted causes the L-29 Canal to exceed 8.5 feet, NGVD, inflow structures will be operated with the intention of limiting event durations with L-29 Canal stages above 8.5 feet NGVD to a target maximum duration of 72 hours. For each water year (May through April), the L-29 Canal inflow structures will be managed to limit the duration of L-29 Canal stages near 8.5 feet, NGVD to 90 cumulative days* or a maximum of 90 consecutive days*, and the conditions of the Tamiami Trail roadway sub-base and roadway will be continuously monitored as detailed in the Increment 2 Monitoring Plan. Monitoring protocols and deployment shall be developed within 45 days of Increment 2 implementation. Continued L-29 structure inflows which result in either cumulative or consecutive durations with L-29 Canal stages at 8.5 feet, NGVD for longer than 90 days will require written approval from the FDOT, given evaluation of the monitoring data by the USACE and FDOT. L-29 canal elevation with regard to this criteria will be measured at the higher of the S-333 Tailwater (S-333 TW) or the S-334 Headwater (S-334 HW).</p> <p>L-29 Event Driven Criteria**: For example, the below Quantitative Precipitation Forecasts (QPF) ranges may be used to maintain L-29 below 8.5 feet, NGVD.</p> <ul style="list-style-type: none"> <li>8.4 If the 5-day QPF is for 2 to 3 inches L-29 structural inflows shall be reduced until the stage is below 8.4 feet, NGVD</li> <li>8.3 If the 5-day QPF is for 3 to 4 inches L-29 structural inflows shall be reduced until the stage is below 8.3 feet, NGVD</li> <li>8.2 If the 5-day QPF is for 4 to 5 inches L-29 structural inflows shall be reduced until the stage is below 8.2 feet, NGVD</li> <li>8.1 If the 5-day QPF is for 5 to 6 inches L-29 structural inflows shall be reduced until the stage is below 8.1 feet, NGVD</li> </ul> <p>* The number of either cumulative or consecutive days in each period will be measured when L-29 stages exceed 8.3 feet, NGVD. This does not exclude short-term operations to address the L-29 Event Driven Criteria. There will be one period per water year (May through April), subject to revision via FDOT approval.</p> <p>** Stopping flows shall occur in the order prescribed by S-356 and S-333 criteria specified in Conditions 1, 2, 3, and 4 with the intent to achieve the required stage reduction within 72 hours.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-355A & S-355B	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> <li>i. The S-355A or S-355B or both shall be opened only when there is sufficient stage difference between the water levels in Water Conservation Area (WCA)-3B at S-355A/S-355B and the L-29 Borrow Canal and whenever the gradient allows for southerly flow from WCA-3B at S-355A/S-355B to L-29 Borrow Canal;</li> <li>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;</li> <li>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 C&amp;SF Project including but not limited to flood damage reduction and water supply; and</li> <li>iv. Operations are consistent with, and follow, the existing regulation schedule and water control plan for WCA-3A/3B.</li> </ul> <p>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.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-334	<p>Water Supply</p> <p>Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes.</p> <p>Under Conditions 1 through 4, S-334 may be used to maintain the L-29 Canal stage at or below the adjusted constraint of 8.5 feet, NGVD to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334 based upon coordination with the FDOT concerning implementation of the Relocation Agreement dated September 25, 2008. If S-334 is operated in accordance with this condition, S-334 is closed as soon as 8.3 ft, NGVD in L-29 is reached following the post-event recession.</p>	<p>Pass all or partial S-333 flows subject to downstream constraints. S-334 flows will not be constrained by S-333 flows, and there is no constraint to require matching S-333 and S-334 flows.</p> <p>Under Conditions 1 through 4, S-334 may be used to maintain the L-29 Canal stage at or below the adjusted constraint of 8.5 feet, NGVD to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334, based upon coordination with the FDOT concerning implementation of the Relocation Agreement dated September 25, 2008. If S-334 is operated in accordance with this condition, S-334 is closed as soon as 8.3 ft, NGVD in L-29 is reached following the post-event recession.</p> <p>Operated in accordance with Condition 3. Refer to Section 5.3 in the operational strategy. The L-29 Canal must be below 7.8 feet, NGVD. When the daily average stage in L-31N using the HW of S-332B, S-332C, and S-332D can be maintained below 4.4 feet, NGVD then there is no limit on the S-334 discharge as long as the other L-31N canal reaches are maintained within their respective ranges. When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,125 cfs, S-334 may be utilized up to a maximum flow rate of 250 cfs. When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,000 cfs (increased storage capacity may be available within the SDCS), S-334 may be utilized up to 400 cfs.</p> <p>Water Supply</p> <p>Supplemental Water Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes.</p>

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-356	<p>Operating Range from 5.5 to 5.8 feet NGVD</p> <p>Operated in accordance with Condition 1, Condition 2, Condition 3 and Condition 4. Refer to the conditions language in the operational strategy.</p> <p>Under normal conditions, the intent will be to use S-356 to maximize flow to NESRS and thereby reduce the use of S-338/G-211 with the exception of water supply and supplemental water deliveries.</p> <p>S-336 will be closed when S-356 is operated.</p> <p>When supplemental water deliveries are being delivered through S-334 and they by themselves or in combination with local rainfall result in S-356 pumping to maintain the canal range below the top of the range, the supplement delivery will be stopped by closing S-334 by the next business day or sooner. Supplemental water can be delivered to Taylor Slough through S-151, S337, S-335 while S-356 is operating.</p> <p>S-356 may be used to divert excess flow from L-30 through S-335 if desired by the agencies (ENP, SFWMD, and USACE). S-335 releases are still dependent on having available downstream capacity.</p> <p>S-356 may be used to send water from WCA-3A to the NESRS by way of the S-151, S-337 and S-335 structures subject to L-29 Canal constraints if agreed upon by the SFWMD, ENP and the USACE. These deliveries are in addition to the Rainfall Plan target deliveries to NESRS.</p> <p>Compliance with the range limits is based on the daily average stage at S-356/S-336 headwaters.</p>	<p style="text-align: center;">Not Operated</p>
S-151	<p>Water Supply</p> <p>Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough.</p> <p>The available capacity of the S-152 structure will be considered any time S-151 is used to deliver water to WCA-3B.</p>	<p>Regulatory releases pursuant to WCA-3A Regulation Schedule during Conditions 3. Refer to the conditions language in the operational strategy.</p> <p>Water Supply</p> <p>Supplemental Deliveries (up to 250 cfs) to Florida Bay via Florida Bay.</p>

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-337	Water Supply  Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to, Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes.	Regulatory releases pursuant to WCA-3A Regulation Schedule during Conditions 3. Refer to the conditions language in the operational strategy. Supplemental Water Deliveries up to 250 cfs as measured at S-334 or S-337 to, Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes.
S-335	Condition 1 and Condition 2 Operating Range from 6.5 to 7.0 feet, NGVD  Condition 3 and Condition 4 Operating Range from 7.0 to 7.5 feet, NGVD  Water Supply  Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes.	
S-338	Operating Range from 5.5 to 5.8 feet, NGVD	
G-211	Operating Range from 5.5 to 6.0 feet, NGVD  Note: If S-331 pumping is limited and the G-211 tailwater rises above 5.3 feet, NGVD then close G-211.  Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes. It is the expectation that supplemental deliveries will not cause prolonged pumping with two or more units at S-331.	Operating Range from 5.3 to 5.7 feet, NGVD  Note: If S-331 pumping is limited and the G-211 tailwater rises above 5.3 feet, NGVD then close G-211.  Supplemental Deliveries up to 250 cfs as measured at S-334 or S-337 to Florida Bay via Taylor Slough. However, more than 250 cfs may be conveyed to meet other purposes. It is the expectation that supplemental deliveries will not cause prolonged pumping with two or more units at S-331.

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-357	<p>S-357 will be the primary water control structure for flood mitigation in the 8.5 SMA.</p> <p>S-357 will be operated according to the below criteria.</p> <ul style="list-style-type: none"> <li>1a. Angels &lt; 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD.</li> <li>1b. <math>6.0 \leq</math> Angels &lt; 6.4 feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD</li> <li>1c. Angels <math>\geq</math> 6.4 feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD</li> <li>1d. Angels <math>\geq</math> 6.7 feet, NGVD and LPG2 <math>\geq</math> 6.6 feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 &lt; 6.4 feet, NGVD</li> <li>1e. Angels <math>\geq</math> 7.2 feet, NGVD, and LPG2 <math>\geq</math> 6.6 feet, NGVD for 7 days or more, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 &lt; 6.4 feet, NGVD</li> </ul> <p>2. LPG2 <math>\geq</math> 7.0 feet, NGVD for more than 24 hours, C-357 will be maintained between 3.5 and 4.5 feet, NGVD until LPG2 &lt; 6.4 feet, NGVD</p> <p>The stage and recession rate of 8.5 SMA gages will be reviewed based on conditions and if necessary the range may be lowered by 0.5 feet increments if the flood mitigation criteria is not being met. This flexibility will be used until LPG2 &lt; 6.6 feet, NGVD.</p> <p>When all available pumps at S-357 and S-331 are operating below 4.0 feet, NGVD for over two weeks and the 8.5 SMA flood mitigation criteria is not being met at LPG2 or LPG1, WCA-3A discharges through S-333 structure to NESRS will be incrementally reduced until the mitigation targets (Reference Appendix C, Part 1, Annex 2: MONITORING FOR 8.5 SMA FLOOD MITIGATION of the EA) at either LPG2 or LPG1 are met.</p> <p>Additional Operating Information:                      When operating near range limits operations may be adjusted to the nearest range without reaching the range. This allows a transition to the next projected range or to avoid rapid changes in operating ranges. When transitioning between the operational ranges, the intent is to transition within a 24 hour period.</p> <p>The North Detention Area will have an initial normal maximum water stage limit of 8.5 feet, NGVD at the NDA1W gauge. However, if the USACE determines that a flood emergency exists the depth of water would be increased to 3.5 feet*, if possible.</p> <p>*The depth limit is derived based on the estimated average across the entire detention area, although operations are limited by the availability of real-time stage monitoring gages.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-357N	<p>The testing protocol for S-357N during the Increment 2 field test is designed to establish the operating criteria for S-357N. The Corps and SFWMD will use the S-357N_H gage to develop the testing protocols of S-357N during the Increment 2 field test. The testing protocol for S-357N will be an iterative approach consisting of 4 to 5 weeks of gate changes during the wet season. The S-357N gate changes will be meant to test the hydrologic response of the system to minor adjustments in operations at S-357N in accordance with the S-357N testing protocol.</p> <p>NOTE:</p> <ul style="list-style-type: none"> <li>S-357N consists of 3 box type gated concrete control structures. Each structure will be equipped with a manually operated double leaf slide gate system. The double leaf slide gate system was designed to accommodate variable flow regimes: (1) weir flows by lowering the top gate; (2) orifice flows by raising the lower gate; or (3) submerged or un-submerged, uncontrolled flows by raising both the top and bottom gates above the top (crown) of the culvert.</li> <li>A newly installed water level monitoring gage (S-357N_H) approximately 1,600 feet upstream (west) of S-357N will be observed during S-357 pumping (refer to Figure 5).</li> </ul>	
S-331	<p>Initial operations of S-331 will be based on S-331 HW. If necessary, adjustments to the operational range of S-331 will be made after selecting a trigger location and criteria for providing flood mitigation along L-31N.</p> <p>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.</p> <ol style="list-style-type: none"> <li>When <math>LPG2 \geq 7.0</math> then S331 HW may be maintained between 4.5 to 5.0 until the stage at LPG2 falls below 6.5 feet, NGVD.</li> </ol> <p>The stage and recession rate of 8.5 SMA gages, especially LPG-2 will be reviewed based on conditions and if necessary the range may be lowered incrementally by 0.5 feet if the flood mitigation criteria is not being met. Conversely, if the operation ranges consistently provide drainage that exceeds the authorized flood mitigation the ranges will be incrementally raised by 0.5 feet or narrowed to the upper 0.5 feet of the range. However, S-331 will not be operated below 3.0 feet, NGVD.</p> <p>If the required capacity at S-357 is unavailable the operational range of S-331 may be lowered using the following criteria:</p> <p>When <math>LPG2 &gt; 7.0</math> then S331 HW will be maintained between 3.5 and 4.0 until the stage at LPG2 falls below 6.5 feet NGVD.</p>	
Northern Detention Area (NDA)	<p>The NDA connects the 8.5 Square Mile Area (SMA) Detention Cell and encompasses the S-332B North Detention Area.</p> <p>The NDA has a normal maximum water depth limit of 8.5 feet, NGVD at the NDA1W gage. However, if the USACE determines that a flood emergency exists the depth of water would be increased to 3.5 feet*, if possible.</p> <p>*The depth limit is based on the estimated average across the entire detention area.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
Southern Detention Area (SDA)	<p>The Southern Detention Area (SDA) encompasses what was previously the S-332B West Seepage Reservoir, the S-332C Seepage Reservoir, and the S-332B/C Connector and the western levee of the previous reservoirs.</p> <p>The SDA has a normal maximum water depth limit of 8.5 feet, NGVD at the SDA1 and SDA2 gauges. However, if USACE determines that a flood emergency exists the depth of water would be increased to 3.5 feet*, if possible.</p> <p>* The depth limit is based on the estimated average across the entire detention area.</p>	
<p>The operational components [S-338, S-332B, S-332C, S-332D, S-194, S-196, S-176, S-177, S-18C, S-197 and S-199/S-200 (SFWMD owned and operated)] of the following four sections interact differently based on the time of year, local conditions, and regional conditions. Specifically, during the time period from February through July the operation of many of the L-31N and C-111 structures will need to be adjusted to improve the likelihood of achieving stages that will facilitate (or at least reduce the conflict with) Cape Sable Seaside Sparrow (CSSS) nesting and habitat maintenance. Depending on the local and regional conditions, operations are expected to vary from conserving water to maintaining hydroperiod during drier times, to sending considerable flows to tide to moderate stages during periods of high rainfall. With some of these routes subject to downstream conditions the available capacity and routes are expected to change as conditions change; therefore, no fixed hierarchy for the order and location of discharge can be set.</p> <p><u>Example of Water Distribution During Wet Periods.</u> Adjust the use of S-332B, S-332C, and S-332D in preparation for and during the nesting season by 1) discharging water to tide through S-338 to the extent downstream conditions allow and the desired flow to Taylor Slough is achieved to reduce the use of S-331, 2A) use of S-194 and S-196 to send water to tide through the C-102 and C-103 canal to the extent that downstream conditions allow, and 3) release water through S-176 (SFWMD S-199/S-200 pump stations may use this water in accordance with the permitted operating plan) S-177, S-18C, and S-197 subject to the S-197 flow restriction.</p> <p><u>Example of Water Distribution During Dry Periods.</u> Use S-332B, S-332C, and S-332D to achieve target stages in southeastern ENP and use of S-332D to achieve target flows to Taylor Slough (up to 250 cfs as measured at S-334 or S-337).</p>		

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
<p><u>S-332B and S-332C, and S-332D</u></p>	<p>S-332B, S-332C, and S-332D operations are independent of whether other SDCS operations are under Column 1 or Column 2 mode of operations.</p> <p>S-332D Detention Area (S-332D minus S-332DX1) has the following calendar based flow limits</p> <ul style="list-style-type: none"> <li>• 07/15 through 11/30 No Constraint – May use all pumps (design capacity of 575 cfs)</li> <li>• 12/01 through 01/31 Limit of 3 diesel pumps (design capacity of 325 cfs)</li> <li>• 02/01 through 07/14 Limit of 2 diesel pumps (design capacity of 250 cfs)</li> </ul> <p>Operating Range from 4.2 to 4.8 feet, NGVD</p> <p>The NDA and SDA have a normal maximum water stage limit of 8.5 feet, NGVD at the NDA1W and at the SDA1 and SDA2 gauges respectively. However, if the USACE determines that a flood emergency exists the depth of water would be increased to 3.5 feet*, when possible.</p> <p>Use of C-102, C-103, S-199, S-200, S-197 as stages rise above 4.2 feet, NGVD to achieve the desired stage and recession rates for CSSS Sub Populations F, C &amp; D. Since the nesting window extends into the wet season it is expected that meaningful flow will need to be sent to tide to moderate the stage rise along the eastern boundary of ENP. When excess water is being discharged to tide an effort will be made to direct a large portion of the excess water to Biscayne Bay through the C-102/C-103 canal to the extent downstream capacity allows.</p> <p>During the period from 08/01 through 02/14 (outside of the CSSS nesting window), the normal management of water will be to fully maintain the hydraulic ridge and deliver water to eastern ENP using the full available capacity of S-332B, S-332C, and S-332D. If the capacity available at S-332B, S-332C, and S-332D is unable to maintain the operational range then use S-194/S-196/S-197 (Low flow discharges through S-197 available for conditions 1, 2, 3, and 4).</p> <p>To facilitate management of hydroperiods along the eastern boundary of ENP to better meet habitat and nesting targets (2016 B.O.), S-332BN, S-332B, S-332C and S-332D may be operated within an operating range from 3.8 to 4.2 feet, NGVD (highest stage at which water supply is usually initiated).</p> <p>The available capacity with consideration for the CSSS habitat at these pump stations is used before releases through S-177.</p>	
<p>S-332DX1</p>	<p>With the 2016 lowering of an approximately 250 feet long section of S-332D High Head Cell weir to ground surface, the concern of over-using S-332DX1 is lessened; as there is less available head to move water into the SDA. During Increment 2 there is full flexibility in the use of S-332DX1.</p> <p>S-332DX1 may be used to divert a portion of S-332D discharge when the CSSS calendar based flow restrictions limit the flow into the S-332D detention area.</p> <p>Use of S-332DX1 may be minimized to facilitate construction of the SDA L-321S interior berm.</p>	

Operational Component	<b>Column 1:</b> No WCA-3A Regulatory Releases to SDCS	<b>Column 2:</b> WCA-3A Releases to SDCS
S-328	The S-328 may be used to increase deliveries to Taylor Slough up to 250 cfs (as measured at S-332D) provided that an average water depth of at least six inches is maintained in Cell 1, or in accordance with the correlation between S-332D TW/S-332DX1 HW and S-328 HW to be determined once data becomes available.	
S-194 and S-196	Since S-194 and S-196 are currently manually operated structures (no remote control) and require downstream operational changes to effectively move water, these routes will be used to steadily move moderate (e.g. total of 100 to 200 cfs) flows to tide to allow the reduced use of S-332B, S-332C, and S-332D secondarily when this is likely to help achieve better CSSS habitat or nesting conditions. The objective will be to develop sustainable openings which move enough water to help achieve the desired stage or rate of rise in eastern ENP with relatively infrequent gate changes.  Operating Range from 4.2 to 4.8 feet, NGVD S-194 will be replaced due to Krome Avenue road widening within the next 1-2 years. The replacement structure will have remote telemetry and control.	
S-176	Operating Range from 4.75 to 5.0 feet, NGVD  When flows at S-332B/C/D are reduced to achieve the CSSS habitat or nesting conditions, up to 200 cfs may be released through S-176 when S-176 HW is below its operational range.  It is not the intent of these operations to trigger a S-197 release greater than 400 cfs.	
S-177	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. When flows at S-332B/C/D are reduced to achieve the CSSS habitat or nesting conditions, up to 200 cfs may be through S-177 when S-177 HW is below its operational range.  It is not the intent of these operations to trigger a S-197 release greater than 400 cfs.	
S-18C	Operating Range from 2.3 to 2.6 feet, NGVD	Operating Range from 2.0 to 2.25 feet, NGVD

Operational Component	Column 1: No WCA-3A Regulatory Releases to SDCS	Column 2: WCA-3A Releases to SDCS
S-197	Conditions cited below are referred in Section 4.0 of the Increment 2 Operational Strategy.	
	<p>1. Conditions 1 and 2</p> <p><del>S-18C HW</del> or <u>S-177 HW (feet, NGVD)</u></p> <p>&gt;3.3                      &gt;4.3</p> <p>&gt;3.1                      &gt;4.2</p> <p>&gt;2.8                      &gt;4.1</p> <p>&gt;Table 2B                NA</p> <p>&lt;Table 2B                NA</p> <p>2. Conditions 3 and 4</p> <p><del>S-18C HW</del> or <u>S-177 HW (feet, NGVD)</u></p> <p>&gt;3.3                      &gt;4.3</p> <p>&gt;3.1                      &gt;4.2</p> <p>&gt;2.8                      &gt;4.1</p> <p>&gt; Table 3B                NA</p> <p>&lt; Table 3B                NA</p>	<p><u>S-197 Target Flow (cfs) (daily time-weighted average)</u></p> <p>2,400 (full)</p> <p>1,600 (two-thirds)</p> <p>500</p> <p>minimum (S-176+100, S-177+100, 300)</p> <p>minimum (S-176+50, S-177+50, 250)</p> <p><u>S-197 Target Flow (cfs) (daily time-weighted average)</u></p> <p>2,400 (full)</p> <p>1,600 (two-thirds)</p> <p>500</p> <p>*minimum (S-176+200, S-177+200, 400)</p> <p>*minimum (S-176+100, S-177+100, 300)</p>
The criteria for S-177 and S-18C only applies when gate is fully open (or gates out of the water) for 24 hours.		
The flexibility at S-197 is expected to be used when the available upstream capacity is insufficient to keep S-176 and S-177 closed. However, S-197 is not intended to be opened greater than 400 cfs when S-18C HW is below 2.8 feet, NGVD or when S-177 HW is above 4.1 feet, NGVD.		
*No discharges from S-197 when the S-18C HW stage is below 2.3 feet, NGVD.		
TABLE 2B/3B	<u>Month</u>	<u>Monthly Median S-18C HW Stage (feet, NGVD)</u>
	January	2.2
	February	2.0
	March	2.0
	April	1.8
	May	2.0
	June	2.3
	July	2.4
	August	2.4
	September	2.5
	October	2.5
	November	2.3
December	2.2	

#### 4.1 S-333 AND S-356 OPERATIONAL STRATEGY

Once the stage in the L-29 Canal reaches a stage of 8.5 feet, NGVD, input from all structures that discharge into the canal (S-333, S-355A/B, and S-356) shall be stopped until the level in the L-29 Canal recedes below 8.5 feet, NGVD. For each water year (May through April), the L-29 Canal inflow structures will be managed to limit the duration of L-29 Canal stages near 8.5 feet (as measured at the S-333 tailwater[TW]), NGVD to 90 cumulative days or to a maximum of 90 consecutive days. The number of consecutive days in each period (only one period per water year) will be measured when L-29 stages exceed 8.3 feet, NGVD. Continued L-29 structure inflows which result in either cumulative or consecutive durations with L-29 Canal stages at 8.5 feet, NGVD for longer than 90 days will require written approval from the FDOT. The L-29 stage will be maintained at or below 8.5 feet, NGVD by ceasing inflow into L-29 when the L-29 stage rises above 8.5 feet, NGVD. Event driven criteria will be followed in accordance with Table 1. Both S-333 and S-356 releases to L-29 will be subject to this constraint. Additionally, S-334 may be used to expedite lowering of the L-29 Canal with the intent to ensure safety and stability of the Tamiami Trail Highway (U.S. 41) in accordance with the criteria defined in Table 1 only when conditions require.

Continuing the adaptive approach initially formulated for Increment 1, the water level constraint at G-3273 will not be a pre-determined constraint under Increment 2, allowing NESRS to receive more water, relative to ERTTP, pursuant to the WCA-3A Regulation Schedule and Rainfall Plan. G-3273 may be used as an indicator to define when NESRS is experiencing low, moderate, and high water levels. WCA-3A stage as measured by the three gage average (average of monitoring gage Sites 63, 64 and 65) will continue to be used to define the priority of releases from S-333 and S-356 to L-29/NESRS. Specifically, when WCA-3A stage is above the Increment 1 and 2 Action Line during the S-12A closure period (Figure 1 which varies from 10.0 to 10.75 feet, NGVD), all of the available L-29 capacity will be dedicated to lowering WCA-3A. However if S-333 is operating at capacity according to the Rainfall Plan target and there is capacity remaining in the L-29 Canal then S-356 may be operated. WCA-3A stages relative to the Increment 1 and 2 Action Line will typically be assessed weekly. When WCA-3A stages are falling from above the Increment 1 and 2 Action Line to below it, i.e., moving from conditions described in (3) or (4) to conditions described in (2) below, operations may be adjusted weekly. When WCA-3A stages are increasing from below the Increment 1 and 2 Action Line to above it, i.e., moving from condition 2 to conditions 3 or 4, operations may be adjusted more frequently than weekly. All structures in the MWD Increment 2 field tests will be evaluated and their operating criteria and canal levels will be subject to a complete revision that will be codified in the COP.

#### 4.2 REVISED CONDITIONS OF THE OPERATIONAL STRATEGY

The need to maintain flood mitigation for the 8.5 SMA while facilitating A) completion of the C-358 Canal installation of S-357N (C-358 control structure) and B) completion of C-111 South Dade Contract 8A warrant the following changes to the previous Increment 1.1 and 1.2 Operational Strategy.

- More flexibility in the S-357 range to compensate for the head losses expected due to hydraulic limitation imposed by the S-357N installation including but not limited to:

- a bypass culvert (two 72 inch diameter CMP) and trench system around the S-357N construction area,
- Short duration or limited use of S-332C and/or S-332DX1 during Contract 8A construction completion within the SDA, as these structures discharge near the southern extent of the Contract 8A work.

### 4.3 UNVARYING CONDITIONS OF THE OPERATIONAL STRATEGY

- a) WCA-3A Zone A Operations. When the WCA-3A 3-gage average is in Zone A if the regulation schedule maximum discharges will be made through the S-12A/B/C/D and S-333 to the NESRS in accordance with the Rainfall Plan subject to downstream constraints and the 2016 ERTTP BO closure dates. S-151 discharges may also be maximized to WCA-3B and to tide subject to downstream constraints. S-343A, S-343B and S-344 discharges may also be maximized subject to the 2016 ERTTP BO closure dates.
- b) L-29 Canal. The L-29 Canal will be operated to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334, based upon coordination with the FDOT concerning implementation of the Relocation Agreement dated September 25, 2008.

In accordance with Table 1, the L-29 Canal inflow structures (S-333, S-355A/B, and S-356) will be operated with the intention of limiting event durations with L-29 Canal stages above 8.5 feet NGVD to a target maximum duration of 72 hours. Once the stage in the L-29 Canal reaches a stage of 8.5 feet, NGVD, input from all structures that discharge into the canal (S-333, S-355A/B, and S-356) shall be stopped until the level in the L-29 Canal recedes below 8.5 feet, NGVD. For each water year (May through April), the L-29 Canal inflow structures will be managed to limit the duration of L-29 Canal stages near 8.5 feet (as measured at the S-333 tailwater[TW]), NGVD to 90 cumulative days or to a maximum of 90 consecutive days. The number of either cumulative or consecutive days in each period (only one period per water year) will be measured when L-29 stages exceed 8.3 feet, NGVD. Continued L-29 structure inflows which result in consecutive durations with L-29 Canal stages at 8.5 feet, NGVD for longer than 90 days will require written approval from the FDOT. The L-29 stage will be maintained at or below 8.5 feet, NGVD by ceasing inflow into L-29 when the L-29 stage rises above 8.5 feet, NGVD. Event driven criteria will be followed in accordance with Table 1. Continued L-29 structure inflows which result in consecutive durations with L-29 Canal stages above 8.3 feet for longer than 90 days will require written approval from the FDOT, given evaluation of the monitoring data by FDOT.

- c) S-151, S-337, S-335 and S-356. S-356 may be used to send water from WCA-3A to the NESRS by way of the S-151, S-337 and S-335 structures subject to L-29 Canal constraints if agreed upon by the SFWMD, ENP and the USACE. These deliveries are in addition to the Rainfall Plan target deliveries to NESRS. These operations are intended to be secondary to S-356's primary purpose of controlling the stage in L-31N.

- d) S-333, S-355A, S-355B, S-356 and S-334 for the L-29 Canal if stage exceeds 8.5 feet NGVD. All inflows to the L-29 canal which include S-333, S-355A, S-355B and S-356 will be secured in order to allow the canal to recede below 8.5 feet NGVD. S-334 may be used to maintain the L-29 Canal stage at or below the FDOT constraint of 8.5 feet, NGVD to ensure the stability and safety of the Tamiami Trail (U.S. 41) Highway between S-333 and S-334, based upon coordination with the FDOT concerning implementation of the Relocation Agreement dated September 25, 2008. As soon as 8.3 ft, NGVD in L-29 is reached following the post-event recession, S-334 is closed. The S-334 discharges will be as follows:
- i) When the daily average stage in L-31N using the HW of S-332B, S-332C, and S-332D can be maintained below 4.4 feet, NGVD the S-334 may discharge as necessary to maintain the L-29 Canal constraints defined in Table 1 as long as the other L-31N canal reaches are maintained within their respective ranges.
  - ii) When the average stage in L-31N at the HW of S-332B, S-332C, and S-332D cannot be maintained below 4.4 feet, NGVD then:
    - a) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,125 cfs, S-334 may be utilized up to a maximum flow rate of 250 cfs.
    - b) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,000 cfs (increased storage capacity may be available within the SDCS), S-334 may be utilized up to 400 cfs.

It is expected that during drier times the need to deliver supplemental flow to Taylor Slough would diminish the use of S-356 compared to Increment 1 if water was delivered through S-334. Water may be delivered through the S-151, S-337, S-335 route to reduce this conflict. During the wet season it is expected that supplemental deliveries will be relatively small and occurring during dry periods. At the end of the wet season it is expected that the supplemental deliveries be larger and more persistent. Deliveries through S-332D/S-332DX1 will still comply with the seasonal discharge limits for nesting of the CSSS.

- e) S-357 and S-331 for the 8.5 SMA. To help maintain 8.5 SMA flood mitigation, S-357 will conditionally operate up to its full capacity according to Table 1. S-331 will be operated as described in Table 1. Construction of the 8.5 SMA features and C-111 South Dade Contracts 8 and 8A will be considered functionally complete when the USACE construction manager with input from the USACE water managers and USACE Engineering Division formally communicate it to the SFWMD project manager and water managers. Once functionally complete, such that construction conflicts with water management of canal levels are resolved, the S-331 HW range specified In Table 1 may be raised by up to 0.5 feet and the S-357 HW range may be evaluated with the effects of this change.
- f) L-31N Canal Reach from S-331 to S-176. S-332B, S-332C, S-332D, S-176, S-194, and S-196 will be operated to maintain the L-31N Canal reach between S-331 and S-176 in accordance with Table 1 except during hydraulic testing of the NDA and SDA. The S-328 structure (eight 60 inch diameter CMP with gates) located in the southwest corner of Cell 1 of the S-332D Detention Area may be used to increase deliveries to Taylor Slough up to 250 cfs provided that an average water depth of at least six inches is maintained in Cell 1

or in accordance with the correlation between S-332D TW/S-332DX1 HW and S-328 HW to be determined once data becomes available. Prior to initial operation of S-328 in September 2017, construction of the three L-31W Canal plugs proposed between S-328 and the L-31W gap were completed as components of the SFWMD proposal to move more water to Taylor Slough and Florida Bay.

- g) C-111 Canal Reach from S-176 to S-177. Operating Range for S-177 is from 3.6 to 4.2 feet, NGVD. If the rainfall over the last 14 days exceeds 5.5 inches, or if water is being released through S-334 into L-31N and being passed through S-331, then S-177 may be opened to lower S-177 HW down to 3.3 feet-NGVD. When flows at S-332B/C/D are reduced to achieve the CSSS habitat or nesting conditions, up to 200 cfs may be through S-177 when S-177 HW is below its operational range. It is not the intent of these operations to trigger a S-197 release greater than 400 cfs.
- h) Supplemental Water Deliveries to Florida Bay via Taylor Slough. SDCS operations for increment 2 will utilize the C-111 South Dade SDA and the S-332D Detention Area to maintain canal stage targets in the lower L-31N and C-111 canals. S-176, S-177 and S-18C will be used to pass water to the marsh downstream of S-18C and utilize S-197 as needed.

Prolonged use of the C-111 South Dade detention areas, particularly following significant rain events, has the tendency to set up a large stage difference between the marsh to the west and the canal stage in the lower L-31N and C-111. This is expected and is how the system is designed to work, as it is the water level in the detention areas that provides the hydraulic ridge that supports this stage difference. However, after the rain event has passed through the system, the hydraulic ridge can dissipate quickly following an abrupt cessation of pumping. This abrupt cessation can lead to a rapid drainage of the marsh. While drydown of the marsh occurs naturally during dry seasons, the rate of marsh recession that can occur when pumping is halted after significant rain event is much faster than naturally induced recession rates, and rapid recession can be particularly harmful to fish communities. It is important to manage the operations in such a way that marsh recession resembles the natural recession rates that have beneficial effects for wildlife communities.

To mitigate for this potential rapid drainage of the marsh, Increment 2 will include the operational flexibility for water managers to convey water from WCA-3A to avoid excessive drainage of the marsh to the west of the detention areas. Supplemental water deliveries of up to 250 cfs from WCA-3A will be limited to conditions when WCA-3A is above its floor elevation of 8.0 feet, NGVD. These deliveries, if provided under Increment 2 operations, will be conducted in coordination with ENP and USACE to provide ecological benefits to Taylor Slough. This flow limit will be measured at S-334 or S-337. Measurements are made at these locations to tie back to WCA-3A stage. This operation is intended to support gradual recession rates in the marsh by providing additional water to the S332D pump station, or maintain a canal stage in a range conducive to gradual recession rates. Data collected during the incremental test will be assessed to evaluate the effectiveness of this operation as we move forward with the COP. The effects of supplemental water deliveries will be discussed among the USACE and SFWMD during

monthly meetings and prior to initiation of flows. Additional deliveries to Taylor Slough above those accommodated by Increment 2, if required, may be provided by SFWMD under the existing water supply authority of the SFWMD.

## 5.0 INCREMENT 2 OPERATIONAL STRATEGY CONDITIONS

### 5.1 **CONDITION 1. Year-round when stage at G-3273 is below 6.6 feet, NGVD and WCA-3A stage is below the Increment 1 and 2 Action Line (Figure 1) (S-333 has priority; S-356 use is secondary to S-333 but S-356 can and should be used subject to L-29 stage limitations):**

- a) S-333 and S-334. S-333 will be used to release up to the full rate prescribed by WCA-3A Regulation Schedule and the Rainfall Plan into NESRS subject only to the L-29 adjusted constraint. The combined flow from the S-333, S-12A, S-12B, S-12C, and S-12D should not exceed the total prescribed by the Rainfall Plan except as allowed by the 2012 WCP and constrained by the ERTP BO's stage and recession limits. The latitude to deliver water from WCA-3A via S-333/S-334 to supply water to Taylor Slough remains as long as WCA-3A's stage is above 8.0 feet, NGVD. Deliveries through S-332D will still comply with the seasonal discharge limits for nesting of the CSSS Sub Population C. This supplemental delivery from WCA-3A will only occur when it does not conflict with the ability to maintain canal stages within their operational ranges and is expected to occur during relatively drier conditions at which time this magnitude of flow will become important as it will help sustain the hydraulic ridge at S-332C and S-332D.
- b) S-356. S-356 may be used to control the stage in L-31N between 5.5 and 5.8 feet NGVD to the extent there is capacity in L-29. Compliance with the range limits is based on the daily average stage at S-356/S-336 headwaters. The operator of S-356 may operate the pumps within this range. Using S-356 to maintain the L-31N Canal range to 5.5 to 5.8 feet, NGVD allows the flexibility to keep G-211 and S-338 closed or reduce G-211 and S-338 discharge if conditions make this desirable.
- c) L-30 Canal and S-335. Excess flow from L-30 through S-335 may be diverted into NESRS using S-356. Delivery of water from WCA-3A (through S-151, S-337, and S-335) is allowed. When S-335 HW is above 6.5 feet, NGVD, the SFWMD has full latitude to make the S-335 discharge required to maintain the desired stage in the L-30 Canal and also provide S-335 discharge to reduce pump unit cycling at S-356 or S-331 (by releasing the flow required to maintain steady pumping at S-331 through G-211) or both. S-335 releases are still dependent on having available downstream capacity.
- d) S-197. For Increment 2, additional S-197 flexibility will be allowed to achieve the objectives. S-197 will be operated based upon S-18C HW or S-177 HW stage as prescribed below in Condition 2 (Tables 2A and 2B). These additional S-197 operating criteria do not change the existing S-197 operating criteria for openings prescribed by the conditions at S-177. The flexibility at S-197 is expected to be used when the available upstream capacity is insufficient to keep S-176 and S-177 closed. However, S-197 is not intended

to be opened greater than 400 cfs when S-18C HW is below 2.8 feet, NGVD or when S-177 HW is above 4.1 feet, NGVD.

\* Note: For the time period from January 1<sup>st</sup> through near the end of May that a stage of 6.6 at G-3273 reflect a very wet (above median and near P75). For the period from mid-May through December 6.6 is near (+/- 0.2 feet) median (P50) conditions.

**5.2 CONDITION 2. Year-round when stage at G-3273 is above 6.6 feet, NGVD \* and the WCA-3A stage is below the Increment 1 and 2 Action Line (Figure 1) (S-356 has limited priority over S-333):**

The following criteria will be triggered when G-3273 rises above 6.6 feet, NGVD for more than 24 hours and will remain in effect until G-3273 declines to 6.5 feet, NGVD.

- a) S-333 and S-334. S-333 will be used to release up to the full rate prescribed by the WCA-3A Regulation Schedule and the Rainfall Plan into NESRS subject to the L-29 adjusted constraint and an assured minimum available capacity of 3 units at S-356 (375 cfs) when the L-29 constraint is up to 8.5 feet, NGVD. If the assured minimum available capacity indicated at S-356 is not possible due to the L-29 constraint, then S-333 releases will be reduced to allow S-356 to achieve the specified minimum available capacity.
- b) S-356. S-356 may be used to control the stage in L-31N Canal between 5.5 and 5.8 feet, NGVD with an assured minimum available capacity of 3 units (375 cfs) when the L-29 constraint is up to 8.5 feet, NGVD. Compliance with the range limits is based on the daily average stage at S-356/S-336 headwater. The operator of S-356 may operate the pumps within this range. Using S-356 to maintain the L-31N Canal between 5.5 and 5.8 feet NGVD, allows the flexibility to keep G-211 and S-338 closed or reduce G-211 and S-338 discharge if conditions make this desirable.
- c) L-30 Canal and S-335. Excess flow from L-30 through S-335 may be diverted into NESRS using S-356. Delivery of water from WCA-3A (through S-151, S-337, and S-335) is allowed. When S-335 HW is above 6.5 feet, NGVD, the SFWMD has full latitude to make the S-335 discharge required to maintain the desired stage in the L-30 Canal and also provide S-335 discharge to reduce pump unit cycling at S-356 or S-331 (by releasing the flow required to maintain steady pumping at S-331 through G-211) or both. S-335 releases are still dependent on having available downstream capacity.
- d) S-18C. S-18C will be operated in accordance with the Column 1 (operating range of 2.3 to 2.6 feet NGVD) of the 2012 WCP.
- e) S-197. For Increment 2, additional S-197 flexibility will be allowed to achieve the objectives. S-197 will be operated based upon S-18C HW or S-177 HW stage as prescribed below (Tables 2A and 2B). These additional S-197 operating criteria do not change the existing S-197 operating criteria for openings prescribed by the conditions at S-177. The flexibility at S-197 is expected to be used when the available upstream capacity is insufficient to keep S-176 and S-177 closed. However, S-197 is not intended to be opened

greater than 400 cfs when S-18C is below 2.8 feet, NGVD or when S-177 HW is above 4.1 feet, NGVD.

\* Note: For the time period from January 1<sup>st</sup> through near the end of May a stage of 6.6 at G-3273 reflects a very wet (above median and near P75) condition. For the period from mid-May through December 6.6 is near (+/- 0.2 feet) median (P50) conditions.

**TABLE 2A: S-197 Operating Criteria**

S-18C HW (feet, NGVD)	or	S-177 HW (feet, NGVD)	Maximum S-197 Flow (cfs) (daily time-weighted average)
> 3.3		> 4.3	2,400 (full)
> 3.1		> 4.2	1,600 (two-thirds)
> 2.8		> 4.1	500
> Table 2B		NA	minimum(S-176+ <u>100</u> , S-177+ <u>100</u> , <u>300</u> )
< Table 2B		NA	minimum(S-176+ <u>50</u> , S-177+ <u>50</u> , <u>250</u> )
The criteria for S-177 and S-18C only applies when gate is fully open (or gates out of the water) for 24 hours.			

**TABLE 2B: Monthly Median S18C HW Stages (POR 1978-2015)**

Month	Monthly Median S-18C HW Stage
January	2.2 feet, NGVD
February	2.0 feet, NGVD
March	2.0 feet, NGVD
April	1.8 feet, NGVD
May	2.0 feet, NGVD
June	2.3 feet, NGVD
July	2.4 feet, NGVD
August	2.4 feet, NGVD
September	2.5 feet, NGVD
October	2.5 feet, NGVD
November	2.3 feet, NGVD
December	2.2 feet, NGVD

**5.3 CONDITION 3. When WCA-3A stage is above the Increment 1 and 2 Action Line (Figure 1) during S-12A seasonal closure window from 01 October (or initial S-12A closure date) through 14 July \*(S-333 has priority; S-356 use is secondary to S-333 but S-356 can and should be used subject to L-29 stage limitations):**

The following criteria will be triggered when WCA-3A three gage average exceeds the Increment 1 and 2 Action line for more than 24 hours and will remain in effect the three gage average declines to 0.1 feet below the Increment 1 and 2 Action line for 48 hours.

- a) S-356. S-356 may be used to control the stage in L-31N between 5.5 and 5.8 feet NGVD to the extent there is capacity in L 29. S-333 releases have priority over S-356 pumping. Compliance with the range limits is based on the daily average stage at -S-356/S-336 headwaters. The operator of S-356 may turn pump units on and off within this range. Using S-356 to maintain the L-31N Canal range to 5.5 to 5.8 feet, NGVD allows the flexibility to keep G-211 and S-338 closed or reduce G-211 and S-338 discharge if conditions make this desirable.
- b) S-333 and S-334. S-333 makes maximum releases to NESRS subject to the L-29 constraint. When the L-29 canal is below 7.8 feet, NGVD (operations are comparable to conditions under Increment 1.1 and Increment 1.2) and is reached or exceeded, S-334 may be used to maintain the L-29 Canal stage at or below the adjusted constraint by delivering a portion of the WCA-3A regulatory releases to the SDCS (including the use of pumping stations S-331, S-332B, S-332C, and S-332D) when the following conditions (i, ii, and iii) are met:
- i) S-12C and S-12D are full open.
  - ii) The discharge to tide from all of the WCAs are maximized to the extent that downstream conditions allow.
  - iii) The SDCS has available capacity (as defined in paragraph “iv)” below) while maintaining L-31N canal stage between S-335 and G-211 below 4.6 feet, NGVD. Under these conditions (i, ii, and iii), the following criteria (iv, v, and vi) will govern S-334 operation, including maximum discharge limits:
  - iii) When the daily average stage in L-31N using the HW of S-332B, S-332C, and S-332D can be maintained below 4.4 feet, NGVD then there is no limit on the S-334 discharge as long as the other L-31N canal reaches are maintained within their respective ranges.
  - iv) S-334 will not be operated when L-29 is above 7.8 feet, NGVD (subject to L-29 lowering operations per FDOT constraint and Section 5.7 Additional Operational Flexibility, for Extreme High Water Levels in WCA-3A). When L-29 is below 7.8 feet, NGVD the below constraints established under Increment 1.1 and 1.2 will be followed:
    - (1) When the average stage in L-31N at the HW of S-332B, S-332C, and S-332D cannot be maintained below 4.4 feet, NGVD then:
      - (a) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,125 cfs, S-334 may be utilized up to a maximum flow rate of 250 cfs.

- (b) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,000 cfs (increased storage capacity may be available within the SDCS), S-334 may be utilized up to 400 cfs.
- v) S-334 flows will not be constrained by S-333 flows, and there is no constraint to require matching S-333 and S-334 flows.

\* The use of S-334 based on criteria “i)” through “v)” may continue long enough past the end of the S-12A and S-12B closure period (14 July) to release the volume of water that would have been released, according to the WCA-3A Regulation Schedule, had the S-12s been allowed to be open, but in no case beyond August 15<sup>th</sup>. The determination of the extent to which the S-12 closures cause water to be retained in WCA-3A beyond that expected during the pre-ISOP schedule for WCA-3A (1993 Experimental Program, including no seasonal closure of the S-12s) will be computed monthly by USACE water managers and reported annually by the USACE for the period from 1 October through 14 July. When the combined WCA-3A releases from the S-12s and S-333 are less than the releases computed for the pre-ISOP schedule, a WCA-3A “discharge deficit” resulting in additional accumulation of water in WCA-3A is indicated for the period from 1 October through 14 July. For this WCA-3A accounting computation, S-333 discharges to NESRS computed under the pre-ISOP schedule will be based on inclusion of the G-3273 constraint of 6.8 feet, NGVD. S-334 deliveries will be discontinued when S-334 capacity is no longer required to meet the discharge prescribed by the Rainfall Plan and the WCA-3A storage volume accumulated due to the discharge deficit (the balance) is discharged but in no case beyond August 15<sup>th</sup>. S-334 discharges to the SDCS under all conditions and S-333 deliveries to NESRS when G-3273 (S-333 flows greater than S-334 flows) will both count as flows to be subtracted from the WCA-3A balance computed through 14 July.

- I. S-334 will not be used after 14 July during periods when the WCA-3A stage is below the Increment 1 and 2 Action Line. S-334 may be used to discharge accumulated water from 15 July through 14 August if WCA-3A stage is above the Increment 1 and 2 Action Line. Regardless of conditions within WCA-3A or any residual WCA-3A storage deficit balance, the use of S-334 to deliver a portion of WCA-3A regulatory releases to the SDCS will be discontinued on 15 August. The WCA-3A storage deficit balance resultant from the S-12 closures, if applicable for the prior period from 1 November through 14 July, will zero-out on 15 August and will preclude a balance carryover into the next year.
  - II. If more water was released from WCA-3A under Increment 2 than computed for the pre-ISOP schedule, a WCA-3A “discharge surplus” balance is indicated for the period from 1 November through 14 July, and S-334 will not be utilized for WCA-3A regulatory releases to the SDCS during the period from 15 July through start of S-12A Seasonal Closure window on 30 September.
- e) L-30 Canal. Delivery of water from WCA-3A (through S-151, S-337, and S-335) is allowed. Net flow from the L-30 Canal should be minimized with the corresponding

lowering of the C-4 Canal (opening G-119 and S-380) if downstream conditions allow. When S-335 HW is above 7.0 feet, NGVD, the SFWMD has full latitude to make the S-335 discharge required to maintain the desired stage in the L-30 Canal below 7.5 feet, NGVD if there is capacity available downstream. When S-335 HW is above 7.0 feet, NGVD discharge from the L-30 canal through S-335 may be used to reduce pump unit cycling at S-331 (by releasing the flow required to maintain steady pumping at S-331 through G-211). Delivery of water from WCA-3A through S-151, S-337, and S-335 is allowed.

- f) S-18C. Operation of S-18C will be in accordance with the Column 2 of the 2012 WCP with an operating range from 2.0 to 2.25 Feet, NGVD.
- g) S-197. S-197 will be operated based upon S-18C HW or S-177 HW stage as described below. These additional S-197 operating criteria do not change the existing S-197 operating criteria based on conditions at S-177 and contained in the 2012 WCP.

**TABLE 3A: S-197 Operating Criteria**

S-18C HW (feet, NGVD)	or	S-177 HW (feet, NGVD)	Maximum S-197 Flow (cfs) (daily time-weighted average)
> 3.3		> 4.3	2,400 (full)
> 3.1		> 4.2	1,600 (two-thirds)
> 2.8		> 4.1	500
> Table 3B		NA	minimum(S-176+ <u>200</u> , S-177+ <u>200</u> , <u>400</u> )
< Table 3B		NA	minimum(S-176+ <u>100</u> , S-177+ <u>100</u> , <u>300</u> )

The criteria for S-177 and S-18C only applies when gate is fully open (or gates out of the water) for 24 hours.

**TABLE 3B: (same as Table 2B): Monthly Median S-18C HW Stages (POR 1978-2015)**

Month	Monthly Median S-18C HW Stage
January	2.2 feet, NGVD
February	2.0 feet, NGVD
March	2.0 feet, NGVD
April	1.8 feet, NGVD
May	2.0 feet, NGVD
June	2.3 feet, NGVD
July	2.4 feet, NGVD
August	2.4 feet, NGVD
September	2.5 feet, NGVD
October	2.5 feet, NGVD
November	2.3 feet, NGVD
December	2.2 feet, NGVD

Within these operational ranges, S-197 gates may be adjusted to maintain the daily average flow rates and stages within the appropriate and corresponding ranges. If a flow or stage is outside of the corresponding range for more than one day (24 hour average) then the appropriate gate change will be made no later than the next working day.

Water managers may use any or all of the four gates at S-197 to achieve the daily average flows prescribed by the stage ranges while, when possible keeping gate openings small enough to prevent manatee movement.

**5.4 CONDITION 4. When WCA-3A stage is above the Increment 1 and 2 Action Line (Figure 1) from 15 July through start of S-12A Seasonal Closure window on 30 September (or initial S-12A closure date) (S-333 has priority; S-356 use is secondary to S-333 but S-356 can and should be used subject to L-29 stage limitations and no use of S-334):**

The following criteria will be triggered when WCA-3A three gage average exceeds the Increment 1 and 2 Action line for more than 24 hours and will remain in effect until the WCA-3A three gage average declines to 0.1 feet below the Increment 1 and 2 Action line for 48 hours.

- a) S-356. S-356 may be used to control the stage in L-31N between 5.5 and 5.8 feet NGVD to the extent there is capacity in L-29. S-333 releases have priority over S-356 pumping. Compliance with the range limits is based on the daily average stage at S-356/S-336 headwaters. The operator of S-356 may turn pump units on and off within this range. Using S-356 to maintain the L-31N Canal range to 5.5 to 5.8 feet, NGVD allows the flexibility to keep G-211 and S-338 closed or reduce G-211 and S-338 discharge if conditions make this desirable. S-334 remains closed.
- b) S-333. S-333 makes maximum releases to NESRS subject only to the L-29 constraint.
- c) L-30 Canal. Delivery of water from WCA-3A (through S-151, S-337, and S-335) is allowed. Net flow from the L-30 Canal should be minimized with the corresponding lowering of the C-4 Canal (opening G-119 and S-380) if downstream conditions allow. When S-335 HW is above 7.0 feet, NGVD, the SFWMD has full latitude to make the S-335 discharge required to maintain the desired stage in the L-30 Canal below 7.5 feet NGVD, if there is capacity available downstream. When S-335 HW is above 7.0 feet NGVD, discharge from the L-30 canal through S-335 may be used to reduce pump unit cycling at S-331 (by releasing the flow required to maintain steady pumping at S-331 through G-211) or both if the flow at S-334 is insufficient.
- e) S-18C. Operation of S-18C will be in accordance with the Column 2 of the 2012 WCP.
- f) S-197. S-197 will be operated based upon S-18C HW or S-177 HW stage as described below. These additional S-197 operating criteria do not change the existing S-197 operating criteria based on conditions at S-177, and contained in the 2012 WCP.

**TABLE 4A: (same as Table 3A): S-197 Operating Criteria**

S-18C HW (feet, NGVD)	or	S-177 HW (feet, NGVD)	Maximum S-197 Flow (cfs) (daily time-weighted average)
> 3.3		> 4.3	2,400 (full)
> 3.1		> 4.2	1,600 (two-thirds)
> 2.8		> 4.1	500
> Table 4B		NA	minimum(S-176+ <u>200</u> , S-177+ <u>200</u> , <u>400</u> )
< Table 4B		NA	minimum(S-176+ <u>100</u> , S-177+ <u>100</u> , <u>300</u> )
The criteria for S-177 and S-18C only applies when gate is fully open (or gates out of the water) for 24 hours.			

**TABLE 4B: (same as Table 2B and Table 3B): Monthly Median S18C HW Stages (POR 1978-2015)**

Month	Monthly Median S-18 HW Stage
January	2.2 feet, NGVD
February	2.0 feet, NGVD
March	2.0 feet, NGVD
April	1.8 feet, NGVD
May	2.0 feet, NGVD
June	2.3 feet, NGVD
July	2.4 feet, NGVD
August	2.4 feet, NGVD
September	2.5 feet, NGVD
October	2.5 feet, NGVD
November	2.3 feet, NGVD
December	2.2 feet, NGVD

Within these operational ranges, S-197 gates may be adjusted to maintain the daily average flow rates and stages within the appropriate and corresponding ranges. If a flow or stage is outside of the corresponding range for more than one day (24 hour average) then the appropriate gate change will be made no later than the next working day.

Water managers may use any or all of the four gates at S-197 to achieve the daily average flows prescribed by the stage ranges while, when possible keeping gate openings small enough to prevent manatee movement.

### **5.5 PRE-STORM, STORM/POST-STORM OPERATIONS**

These operations remain unchanged from the 2012 WCP, Table 7-6.

### **5.6 OPERATIONAL FLEXIBILITY (CONDITIONS 1, 2, 3 and 4):**

The following areas have been identified to have some uncertainties which may require some additional operational flexibilities:

- Operational range of L-30 may be adjusted by +/- 0.5 feet
- Operational range for S-338 may be adjusted by +/- 0.5 feet
- Operational range for S-194 may be adjusted +/- 0.5 feet
- Operational range for S-196 may be adjusted +/- 0.5 feet
- During the period when pumping at S-332B, S-332C, S-332D combined is restricted to less than 1,125 cfs total due to the operational restrictions associated with the RPA targets of the 2016 ERTF BO or maintenance/repair issues which result in reduced pump capacity or a combination of both, the operational range for S-176 may be lowered 0.5 feet from the operating range of 4.75 to 5.0 feet, NGVD.
- During the period when pumping at S-199 and S-200 combined is restricted to less than 300 cfs total due to the operational restrictions associated with the RPA targets of the 2009 C-111 Spreader Canal Western Project BO and/or 2016 ERTF BO or maintenance/repair issues which result in reduced pump capacity, the operational range for S-177 may be lowered 0.2 feet from the operating range of 3.6 to 4.2 feet, NGVD (the adjusted lower limit of S-177 HW is 3.4 feet, NGVD).
- Operational flexibility for S-357 and S-357N is included within the 8.5 SMA test operations which includes adjustments up to +/- 0.5 feet after the initial + 0.5 feet change. S-357 will not be operated below 3.0 feet, NGVD.

### **5.7 ADDITIONAL OPERATIONAL FLEXIBILITY, FOR EXTREME HIGH WATER LEVELS IN WCA-3A: (WCA-3A Stage is above the Extreme High Water Action Line or SFWMD position analysis shows a 10 percent probability of WCA-3A, 3-station average exceeding 12.7 feet NGVD)**

The purpose of this flexibility is to allow for adaptive management to provide a response to extreme high water levels in the WCA-3A. The operational flexibilities are not expected to be triggered frequently. When comparing the Extreme High Water Action Line to the historical WCA-3A 3-gage average these operations would have been triggered five times within the past 15 years (See Figure 3). Emergency events will be addressed following all levee and dam safety regulations separate from Increment 2.0 operations.

Extreme high water levels in WCA-3A is defined as when either of the following two conditions are met:

1. WCA-3A is above the Extreme High Water Action Line. See figure 2.
2. SFWMD position analysis (monthly, semi-monthly) shows at least a 10 percent probability of WCA-3A, 3-station average exceeding 12.7 feet NGVD along with other forecast information prior to September 15<sup>th</sup>.

Under Section 5.7 operations (Additional Operational Flexibility, for Extreme High Water Levels in WCA-3A), Increment 2 will include the following additional operational flexibility for the extreme high water condition:

- a) WCA-3A. WCA-3A discharges through the SDCS may continue beyond the date at which the deficit due to S-12 closures has been met or past the cutoff date of 15 August.
- b) L-29. When L-29 is maintained above 7.8 feet NGVD, and either extreme high-water condition is likely, S-334 will not be constrained to the closure period window. S-334 discharges will be subject to the following downstream conditions:
  1. When the daily average stage in L-31N using the HW of S-332B, S-332C, and S-332D can be maintained below 4.4 feet, NGVD then there is no limit on the S-334 discharge as long as the other L-31N canal reaches are maintained within their respective ranges.
  2. When the average stage in L-31N at the HW of S-332B, S-332C, and S-332D cannot be maintained below 4.4 feet, NGVD then:
    - a) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,125 cfs, S-334 may be utilized up to a maximum flow rate of 250 cfs;
    - b) When daily combined pumping at S-332B, S-332C, and S-332D is less than 1,000 cfs (increased storage capacity may be available within the SDCS), S-334 may be utilized up to 400 cfs.
- c) S-197 discharges may increase up to 1200 cfs when the flow through S-334 exceeds 600 cfs and the flow through S-176 exceeds 300 cfs to handle up to maximum discharges from WCA-3A to the SDCS using S-333/S-334 while retaining capacity to manage local basin runoff. For flows at S-197 exceeding 600 cfs the expectation is to maximize upstream discharges including S-194 and S-196 to the extent practicable in 24 hrs. Available capacity at S-197 will decrease to 600 cfs when S-18C HW falls below median elevation provided in Table 2B/3B. S-199 and S-200 available capacities are subject to CSSS criteria. When L-29 is maintained above 7.8 feet NGVD and a forecast of one of the extreme high water level conditions are expected, S-197 may be increased up to 2400 cfs.

Section 5.7 operations (Additional Operational Flexibility, for Extreme High Water Levels in WCA-3A) will be ceased when the WCA-3A 3-gage average is at least 0.1 feet below the Extreme High Water Action Line and not projected to rise above the line based on forecasts. .

## 5.8 OPERATIONAL FLEXIBILITY GUIDANCE

Increment 2 field test will be followed until COP is approved by SAD and is implemented. Prior to the initiation of operations under COP, the revisions made to the 2012 WCP will be fully coordinated through the NEPA process to assess the operational criteria defined in the COP.

During the field testing period of up to three years, the Increment 2 criteria will have to respond to considerable variations in weather, flows, stages, and structural conditions including constructed minor and major operational features. To do so effectively, considerable operational flexibility was incorporated into the operational criteria for each of the four operational conditions detailed in Table 1 and Sections 5.1 through 5.4 of this Operational Strategy.

It has also been demonstrated that along the L-31N Canal reach, operation of the SDA has maintained the hydraulic ridge and effectively held stages in eastern ENP higher, while also simultaneously maintaining lower L-31N Canal levels to prevent or reduce seepage under the L-31N. This has been observed during recent operations. Both operational experience and modeling conducted under the 2015-2016 SFWMD South Dade Investigation study show that operational levels within the L-31N and C-111 Canals need to transition up (become higher) as conditions become dry (reducing availability of water to maintain the hydraulic ridge within the NDA/SDA). An abrupt shut down of S-332B, S-332C, and S-332D when water levels decline in the early dry season below the flood control level causes flow to Taylor Slough from S-332D to end abruptly, as well as undesirable recession rates in ENP and undesirable seepage to the east. The following bullets describe guidance that the additional operational flexibility will use to ensure that the use of the operational flexibility does not have unintended impacts:

- When WCA-3A is in Zone A of the WCA-3A Regulation Schedule Use Upstream Discharges to Tide to Reduce Inflows. The operational flexibility included in the 2012 WCP will continue to be used to increase the delivery of water to NESRS, while also continuing to use existing ERTTP operational flexibility to reduce inflows into WCA-3A by discharging water to tide as required to moderate the use of Column 2 deliveries to the SDCS. This includes short-term holding of additional water in WCA-2A to provide more opportunity to discharge excess water to tide through S-38/S-34.
- Supplemental water deliveries to Florida Bay via Taylor Slough. The volume supplied will be limited to 250 cfs or less (measured at S-337 or S-334) supplied to Taylor Slough to reduce water supply impacts. This delivery is only available while WCA-3A three gage average is above 8.0 feet, NGVD.
- Maintain Operational Flexibility of Remaining Structures in Miami-Dade County. The SFWMD retains its authority to lower the operational ranges of the remaining structures in eastern Miami-Dade County in response to rain, direct flows from Increment 2 operations, and increased seepage from Increment 2 Operations. These structures include all structures not listed in Table 7-5 of the ERTTP (April 2012). Specific structures included are S-148, S-21, S-165, S-21A, S-167, S-179, S-20F, and S-178.

## 5.9 WATER SUPPLY OPERATIONS

Consistent with the 2015 G-3273 Constraint Relaxation/S-356 Field Test and S-357N Operational Strategy, no changes to water supply operations are proposed. It is anticipated that water supply deliveries to the SDCS will not be needed when S-356 is pumping. If S-356 is pumping and S-334 and/or S-335 are to be utilized to deliver water supply to SDCS, then S-356 will stop pumping.

## 5.10 HYDRAULIC TESTING FOR DETENTION AREAS

During Increment 2, there may also be hydraulic testing to support analyses undertaken to define the performance of Increment 2. Based on preliminary analysis by the SFWMD, the historical flow data for periods with low rainfall has consistently shown that, in absence of the operation of the C-111 Spreader Canal Western Project S-200 pump station, approximately half of the water pumped into the S-332D Detention Area flows as groundwater to the C-111 Canal. Hydraulic testing may include the use of S-332B North (pumps to NDA), S-332B (pumps to SDA), S-332C (pumps to SDA), and S-332D, as well as the C-111 Spreader Canal Western Project (C-111SC) S-199 and S-200 pump stations (currently operated by SFWMD) and all associated detention areas. The operational levels allowed by Increment 2 provide sufficient flexibility for the proposed hydraulic testing.

Hydraulic testing for both the L-31N and C-111 should not exceed one month duration. Hydraulic testing of the L-31N Canal should not lower the canal below the water supply level of 4.0 feet, NGVD. Hydraulic testing of the C-111 Canal should not lower the canal below the water supply level of 3.0 feet, NGVD.

## 5.11 OPERATIONAL STRATEGY FOR 8.5 SQUARE MILE AREA

During Increment 2, the 8.5 SMA structures (S-357 and S-357N) and Canals (C-357, C-358) will be operated and managed to provide the authorized flood mitigation.

During Increment 2, S-331 will be used to 1) provide flood risk management for the lands located along the east side of the L-31N Canal; 2) convey excess water from WCA-3A to the C-111 Detention Areas and the C-111 Canal as required by this field test; 3) provide water supply to Taylor Slough, the L-31N, and C-111 Canals; and 4) act as a partial or complete replacement to S-357 should mechanical issues, or seepage impacts limit or preclude the use of S-357.

The operational criteria in conditions 1 through 4 provide the criteria and ranges which will continue to inform development of the final operating criteria under COP. Though construction for the MWD S-357N structure may be delayed beyond the start of Increment 2, continued incremental testing of criteria with Increment 2 may still occur as long as the temporary C-358 bypass culverts installed during the 2016 Temporary Emergency Deviation from Increment 1 Field Test remains in place and fully operational. The temporary by-pass culverts provide a simple hydraulic connection without the operational flexibility which will be provided by S-357N, but the design capacity is approximately equivalent to the 325 cfs provided by S-357N.

The 2012 WCP does not contain water management operating criteria for the S-357N located upstream of S-357, at the intersection of C-357 and the newly constructed seepage collection canal (C-358). The 2012 Design Refinement for the 8.5 SMA EA did not address water management operating criteria for S-357N or C-358 and stated that all gates would be in the closed position until a new operational protocol is developed for S-357N as part of the MWD Project.

The testing protocol for S-357N during the Increment 2 field test is designed to establish the operating criteria for S-357N. The testing protocol remain unchanged from the criteria initially

proposed for Increment 1, since delays during construction have resulted in S-357N being unavailable for testing to date under Increment 1 and Increment 1.1. A newly installed water level monitoring gage (with telemetry) upstream of S-357N will be observed during S-357 pumping. The testing protocol for S-357N will be an iterative approach consisting of 4 to 5 weeks of gate changes during the wet season. The S-357N gate changes will test the hydrologic response of the system to minor adjustments in operations at S-357N. S-357N consists of 3 box type gated concrete control structures. Each structure will be equipped with a manually operated double leaf slide gate system. The double leaf slide gate system was designed to accommodate variable flow regimes: (1) weir flows to by lowering the top gate; (2) orifice flows by raising the lower gate; or (3) submerged or un-submerged, uncontrolled flows by raising both the top and bottom gates above the top (crown) of the culvert.

As a prerequisite to raising the L-29 Canal constraint above 7.8 feet, NGVD (Increment 1.2 upper limit), the C-111 South Dade Project NDA will be functionally operable to receive and store inflows from S-357 including modification of the S-360W outlet weir for the 8.5 SMA detention area. Operating criteria for the S-357N will be further developed and refined during Increment 2 for inclusion in the COP.

#### Operation Limit for this Test Phase

The following operational limits will be maintained or relaxed during test phases conducted concurrent with Increment 2:

- No limit to S-357 pumping (up to 575 cfs); to allow testing of C-358 and S-357N.
- Stage limit of 8.5 feet, NGVD within the Northern Detention Area (NDA1W)
- If there is insufficient water for sustained pumping with two units and:
  - (1a) Angels < 6.0 feet, NGVD, C-357 will be maintained between 5.5 to 6.0 feet, NGVD.
  - (1b)  $6.0 \leq \text{Angels} < 6.4$  feet, NGVD, C-357 will be maintained between 5.0 and 6.0 feet, NGVD
  - (1c) Angels  $\geq 6.4$  feet, NGVD, C-357 will be maintained between 4.5 and 5.5 feet, NGVD
  - (1d) Angels  $\geq 6.7$  feet, NGVD and LPG2  $\geq 6.6$  feet, NGVD, C-357 will be maintained between 4.0 and 5.0 feet, NGVD until LPG2 < 6.4 feet, NGVD
  - (1f) Angels  $\geq 7.2$  feet, NGVD, and LPG2  $\geq 6.6$  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  $\geq 7.0$  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
- It is preferred that sustained pumping can be achieved while not lowering the C-357 below 5.0 feet, NGVD. If this flexibility is used the stage in the L-31N Canal between G-211 and S-331 should be allowed to rise to the top half of the operation range (5.0 to 5.5 feet, NGVD). Operational flexibility under wet conditions could allow S-357 stage range to be lowered to 5.0 to 3.0 feet, NGVD.
- During testing phases S-331 HW operational range will lower as the stage at LPG2 rises as long as there is downstream capacity. Providing capacity for the operational ranges prescribed below will be a higher priority than regulatory releases from WCA-3A to S-331.
  - (1) When  $6.0 < \text{LPG2} < 6.5$  then S331 HW will be maintained between 4.5 and 4.0
  - (2) When  $5.5 < \text{LPG2} < 6.0$  then S331 HW will be maintained between 5.0 and 4.5.

- (3) When  $LPG2 < 5.5$  then S331 HW will be maintained between 6.0 and 5.0.
- Limit sustained flow from S-357N to less than 200 cfs (40 percent of the total capacity of S-357). It is generally expected that S-357N discharge will be less than 100 cfs.

When there is sufficient excess water for sustained pumping with one to two units at S-357 (e.g. 75, 125, 200, or 250) a test phase may be initiated. Each Test Phase should be at least four weeks in duration to gain experience over a representative range of conditions. A Test Phase Form summarizing the criteria, desired pumping rates, constraints, desired duration, initial setting for S-357N, strategy for adjusting S-357N in response to changes, and the operational monitoring required will be prepared for each test in advance. During conditions with sufficient excess water at least one test will try to achieve sustained pumping with two units at S-357 (either two diesel pump units for a total discharge rate of about 250 cfs, or one diesel pump unit and one electric pump for a total discharge of about 200 cfs).

Test Phases should be designed and executed to achieve the required groundwater control (prescribed levels above) and to prevent daily average discharges through S-357N exceeding 200 cfs (40% of S-357 total capacity).

#### Example of a Test Phase

During conditions with sufficient excess water at least one test will try to achieve sustained pumping with two units at S-357 (either two diesel pump units for a total discharge rate of about 250 cfs or one diesel pump unit and one electric pump for a total discharge of about 200 cfs). The duration of this test will be four to six weeks. The water manager will determine the sustainable pumping rate and try to keep it unchanged. However, pumping between 200 and 250 cfs is allowed. Pumping should be reduced from 250 to 200 if the C-357 stage falls below 5.7 for more than 24 hours. If the C-357 canal stage falls below 5.5 feet for more than 24 hours, then S-357 should be reduced (e.g. to 200 cfs, or 125 cfs, or 75 cfs) to allow the C-357 canal stage to rise to above 5.7, and this reduced pumping rate should be maintained until water levels rise enough to support the targeted pumping rate.

The three upper (weir) gates at S-357N should be opened (lowered) one foot from about 6.5 feet to 5.5 feet, NGVD. These opening are expected to result in a sustained discharge of about 80 cfs. When sufficiently steady conditions occur, flow measurements at S-357 should be scheduled to the extent they are required to collect enough data to develop a refined flow equation for S-357N. If the discharge from S-357N is insufficient to provide water levels that meet (or are expected to meet) the prescribed levels above criteria within three days, then the openings at S-357N should be increased by either 0.5 or 1.0 feet based on what is expected to achieve compliance with the prescribed levels within three days. Conversely, if the S-357N discharges are resulting in an undesirable/untenable drawdown then the S-357N opening should be reduced by raising the weirs in 0.2 feet increments. Subsequent to the initial changes, based upon discussions with SFWMD and ENP, the USACE shall determine through iterative changes fixed weir elevations which will result in adequate levels.

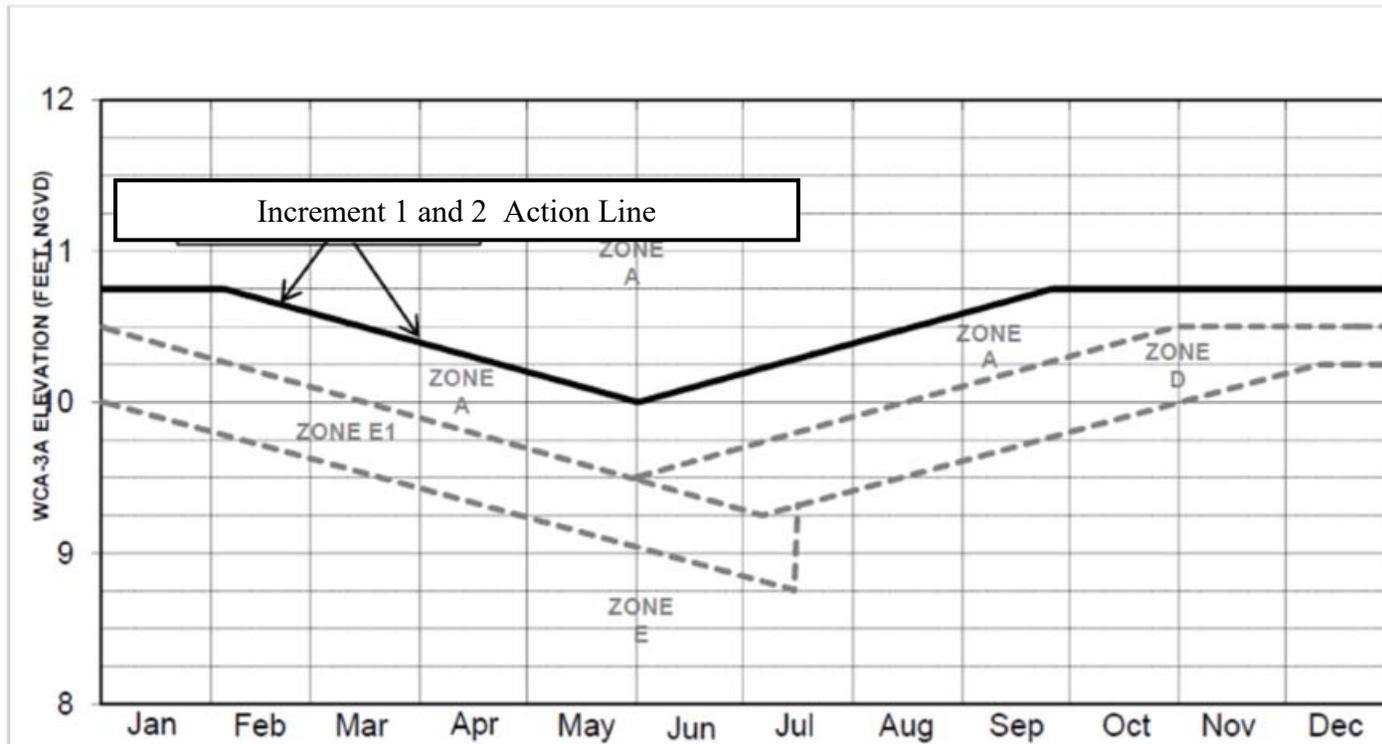
**TABLE 5: HYDRO-METEOROLOGIC MONITORING LOCATIONS**

<b>Feature</b>	<b>Parameter</b>	<b>Purpose</b>
S-12A	HW, TW, Q	Flow volume
S-12B	HW, TW, Q	Flow volume
S-12C	HW, TW, Q	Flow volume
S-12D	HW, TW, Q, Precipitation	Flow volume
S-343A	HW, TW, Q	Flow volume
S-343B	HW, TW, Q	Flow volume
S-344	HW, TW, Q	Flow volume
SRS1	Stage	Depth, duration, recession
3B-71	Stage	Depth, duration, recession
S-151	HW, TW, Q	Flow volume (to L-31N/S-356 or Taylor Slough)
S-337	HW, TW, Q	Flow volume (to L-31N/S-356 or Taylor Slough)
S-335	HW, TW, Q	Flow volume (to L-31N/S-356 or Taylor Slough)
S-333	HW, TW, Q	Canal level, flow volume
S-334	HW, TW, Q	Canal level, flow volume
S-336	HW, TW, Q	Canal level, flow volume
S-355A	HW, TW, Q	Canal level, flow volume
S-355B	HW, TW, Q	Canal level, flow volume
S-356	HW, TW, Q	Canal level, flow volume
G-3273	Stage	Depth, duration, recession
S-357N	HW, Q	Canal level, flow volume
S-357	HW, TW, Q	Canal level, flow volume
S-331	HW, TW, Q, Precipitation	Canal level, flow volume
S-338	HW, TW, Q	Canal level, flow volume
S-332B	HW, TW, Q	Canal level, flow volume
S-332C	HW, TW, Q	Canal level, flow volume
S-194	HW, TW, Q	Canal level, flow volume
S-196	HW, TW, Q	Canal level, flow volume
S-332D	HW, TW, Q	Canal level, flow volume
S-328	HW, TW, Q	Flow volume
RG4	Stage	Depth, duration, recession
NTS18	Stage	Depth, duration, recession
S-332DX1	HW, TW, Q	Depth, duration, recession, flow volume
G-3574	Stage	Depth, duration, recession
G-3576	Stage	Depth, duration, recession
G-3577	Stage	Depth, duration, recession
G-3578	Stage	Depth, duration, recession
G-3272	Stage	Depth, duration, recession
G-596	Stage	Depth, duration, recession
G-3626	Stage	Depth, duration, recession
G-3627	Stage	Depth, duration, recession
G-3628	Stage	Depth, duration, recession

<b><u>Feature</u></b>	<b><u>Parameter</u></b>	<b><u>Purpose</u></b>
G-3437	Stage	Depth, duration, recession
Angel's Well	Stage	Depth, duration, recession
LPG1	Stage	Depth, duration, recession
LPG2	Stage	Depth, duration, recession
LPG3	Stage	Depth, duration, recession
LPG5	Stage	Depth, duration, recession
LPG7	Stage	Depth, duration, recession
LPG8	Stage	Depth, duration, recession
LPG11	Stage	Depth, duration, recession
LPG12	Stage	Depth, duration, recession
LPG13	Stage	Depth, duration, recession
LPG14	Stage	Depth, duration, recession
LPG15	Stage	Depth, duration, recession
NE1	Stage	Depth, duration, recession
NE2	Stage	Depth, duration, recession
NE4	Stage	Depth, duration, recession
G-3557	Stage	Depth, duration, recession
G-3558	Stage	Determine duration, recession rates
S-177	HW, TW, Q	Canal level, flow volume
S-178	TW, Q	Canal level, flow volume
S-18C	HW, TW, Q, Precipitation	Canal level, flow volume
S-197	Q	flow volume
G-613	Stage	Depth, duration, recession
G-864A	Stage	Depth, duration, recession
G-3336	Stage	Depth, duration, recession
G-3338	Stage	Depth, duration, recession
G-3350	Stage	Depth, duration, recession
G-3355	Stage	Depth, duration, recession
G-3620	Stage	Depth, duration, recession
G-3901	Stage	Depth, duration, recession
G-789	Stage	Depth, duration, recession
ENP-TSB	Stage	Depth, duration, recession
C-358	Stage	Canal level
G-211	HW, TW, Q	Canal level, flow volume
S-199	HW, TW, Q	Canal level, flow volume
S-200	HW, TW, Q	Canal level, flow volume
LPDC2	Stage	Depth
NDA1W	Stage	Depth
NDA1E	Stage	Depth
SDA1	Stage	Depth
SDA2	Stage	Depth

Notes: HW– headwater stage; TW– tailwater stage; Q– flow rate

**Figure 1: WCA-3A Regulation Schedule with the Increment 1 and 2 Action Line**



**NOTES:**

WCA-3A Elevation is the average of Sites 63, 64 and 65.

Increment 1 and 2 Action Line is not part of the 2012 WCA-3A Interim Regulation Schedule. For ease of reference, the Increment 1 and 2 Action Line is shown with the 2012 WCA-3A Interim Regulation Schedule Zones.

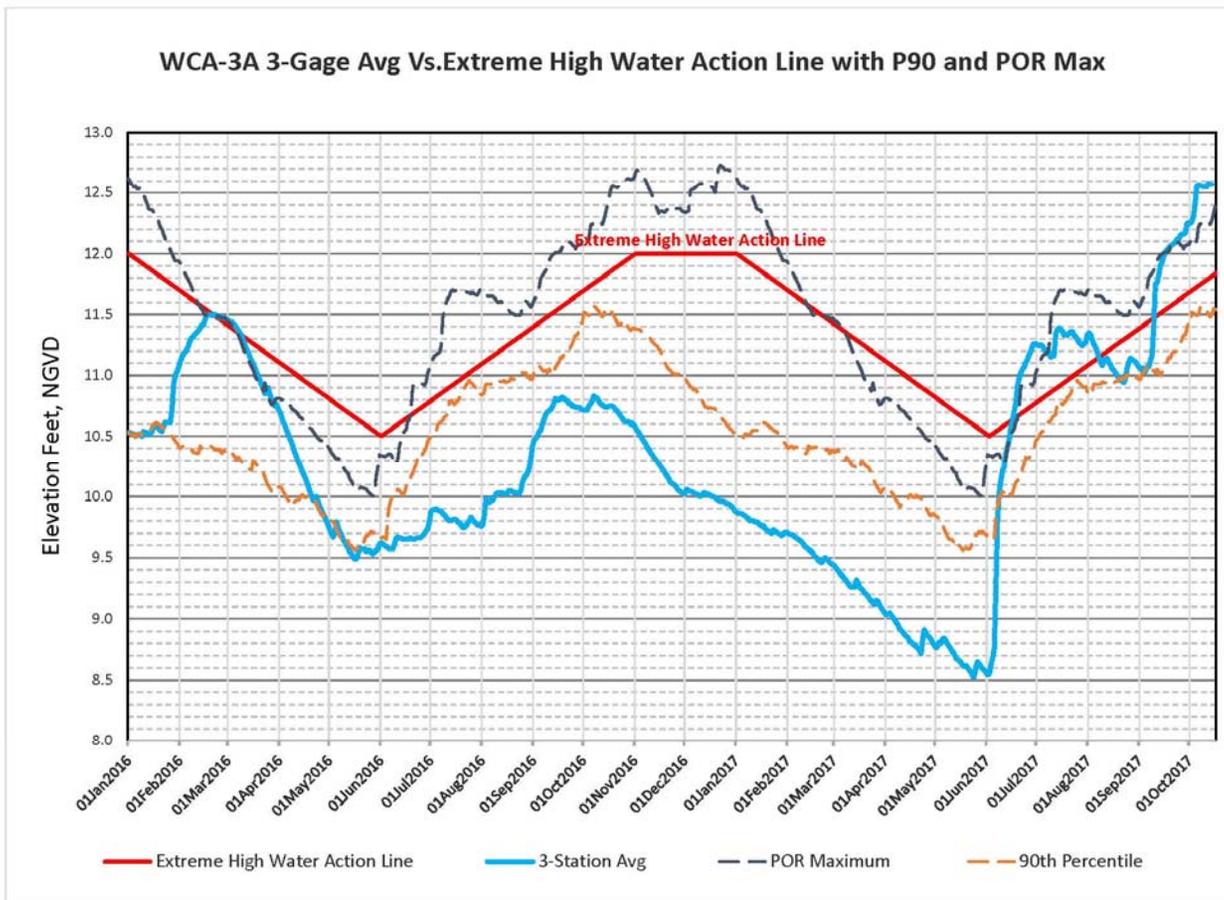
The Increment 1 and 2 Action Line to be referenced as indicated in the G-3273 Relaxations/S-356 Field Test and S-357N Operational Strategy.

CENTRAL AND SOUTHERN  
FLORIDA PROJECT  
2018 L-29 Canal and G-3273  
Constraint Relaxations, Including  
Northern Detention Area (NDA)  
Revised Operational Strategy

**Increment 1 and 2 Action Line**

DATED: August 2017  
US ARMY ENGINEER DISTRICT  
JACKSONVILLE, FLORIDA

Figure 2: WCA-3A 3-Gage Average with the Extreme High Water Action Line



**Figure 3: Historical WCA-3A 3-Gage Average with the Extreme High Water Action Line**

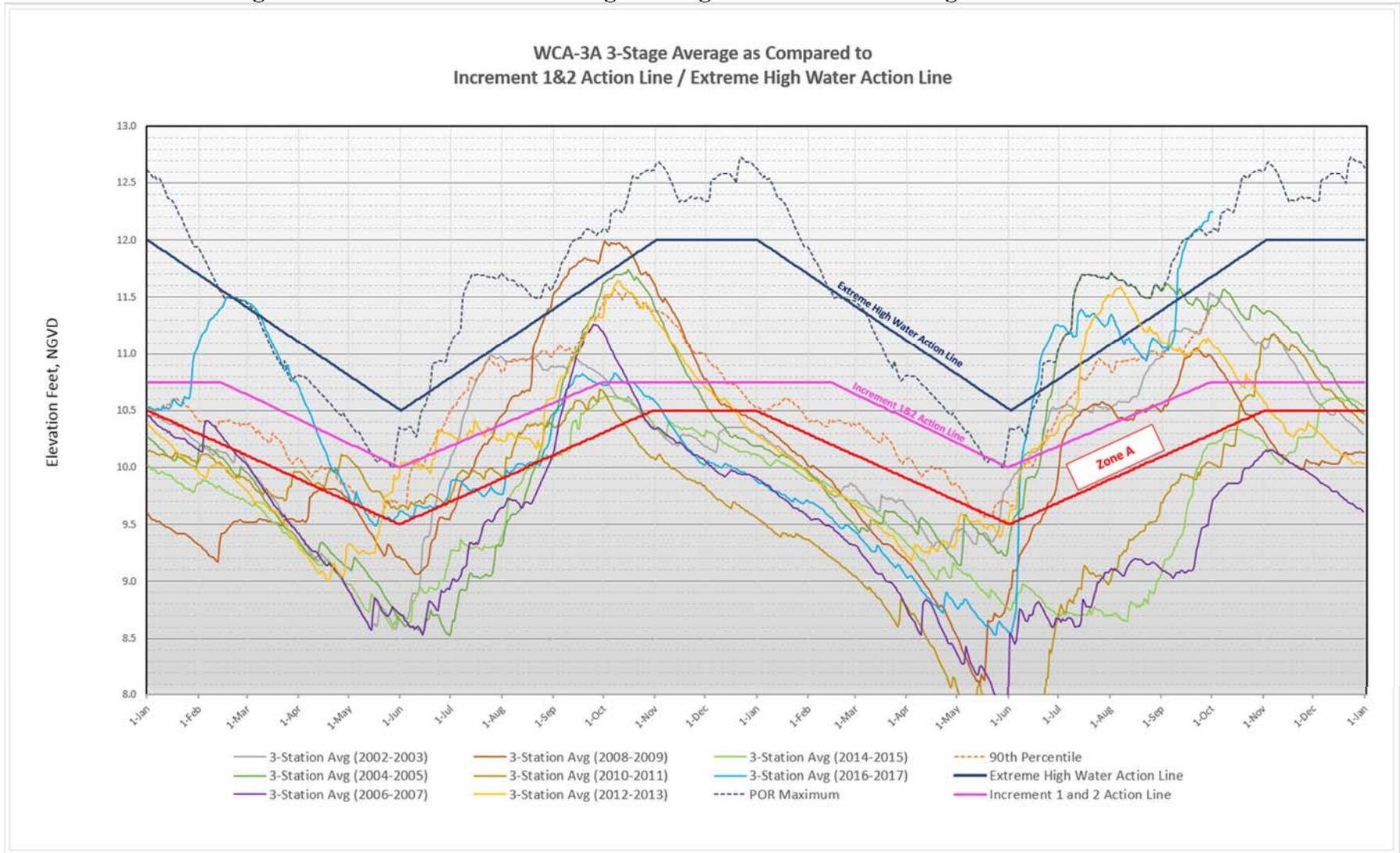
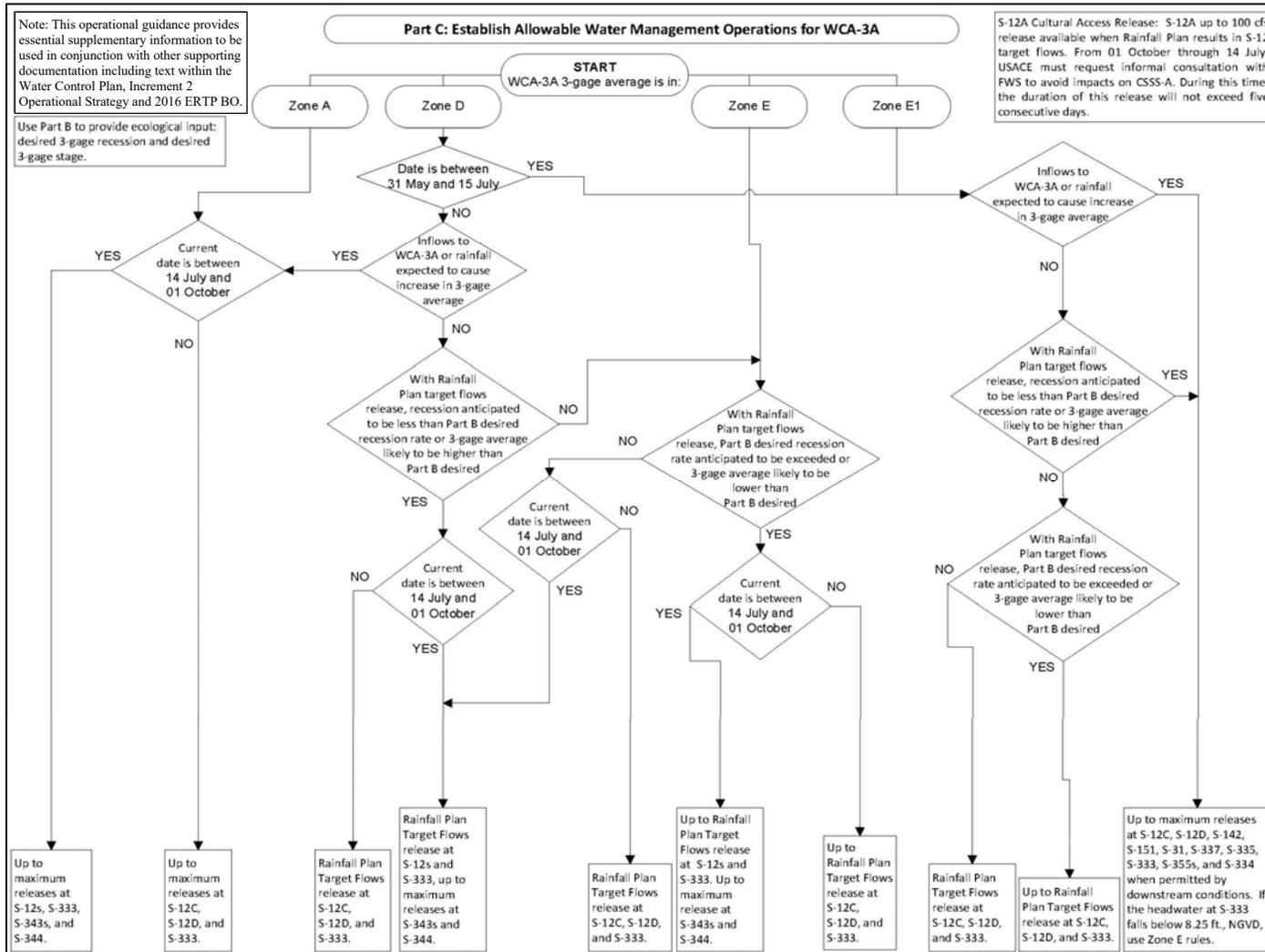


Figure 4: WCA-3A Regulation Schedule Revised Figure 7-5C



Note: S-12A and S-12B operations in October and November are subject to WCA-3A high water strategy (please refer to Table 1)

Figure 5: Hydro-meteorological Monitoring Location

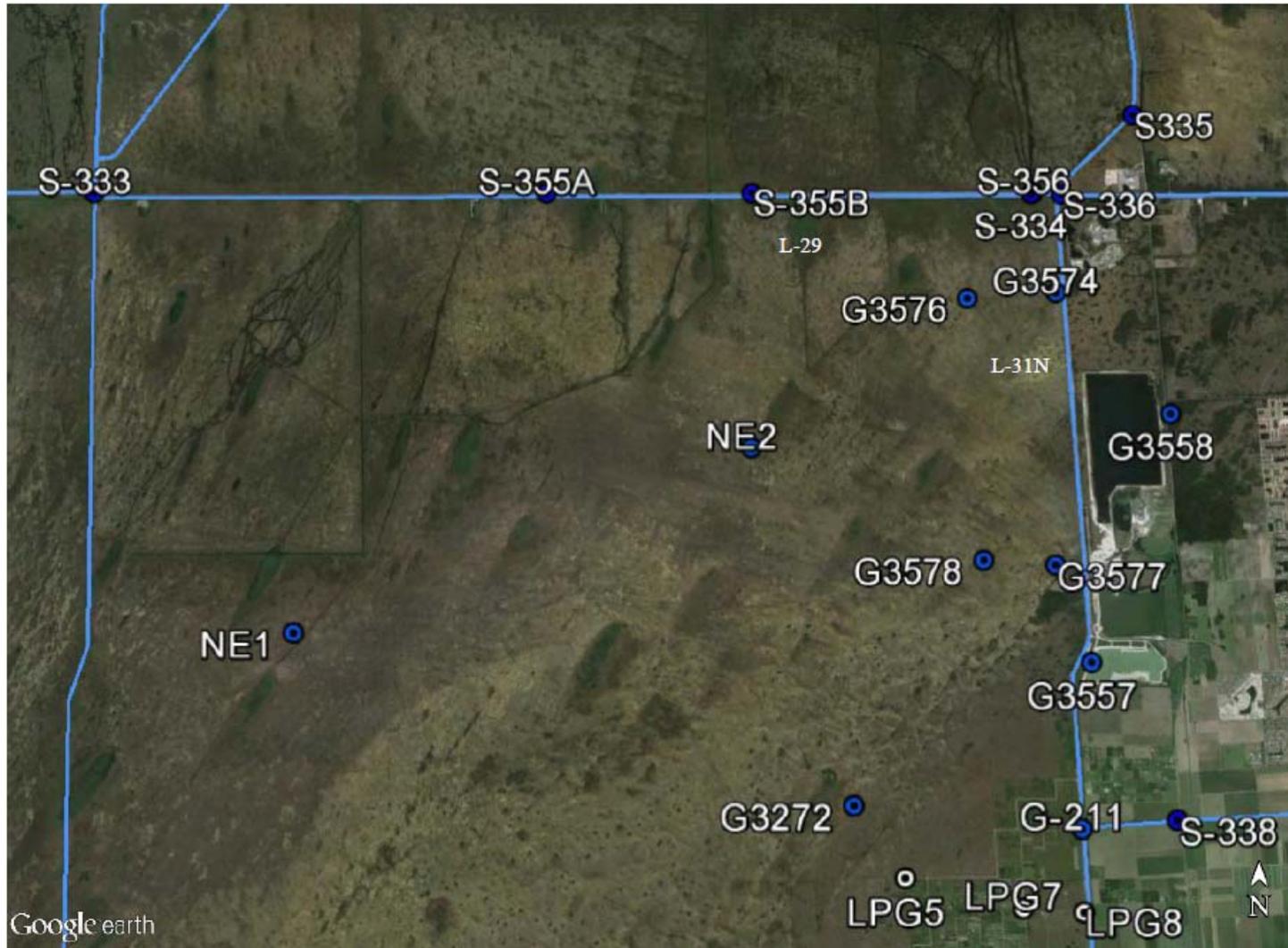


Figure 6: Hydro-meteorological Monitoring Location (continued)



Figure 7: Hydro-meteorological Monitoring Location (continued)

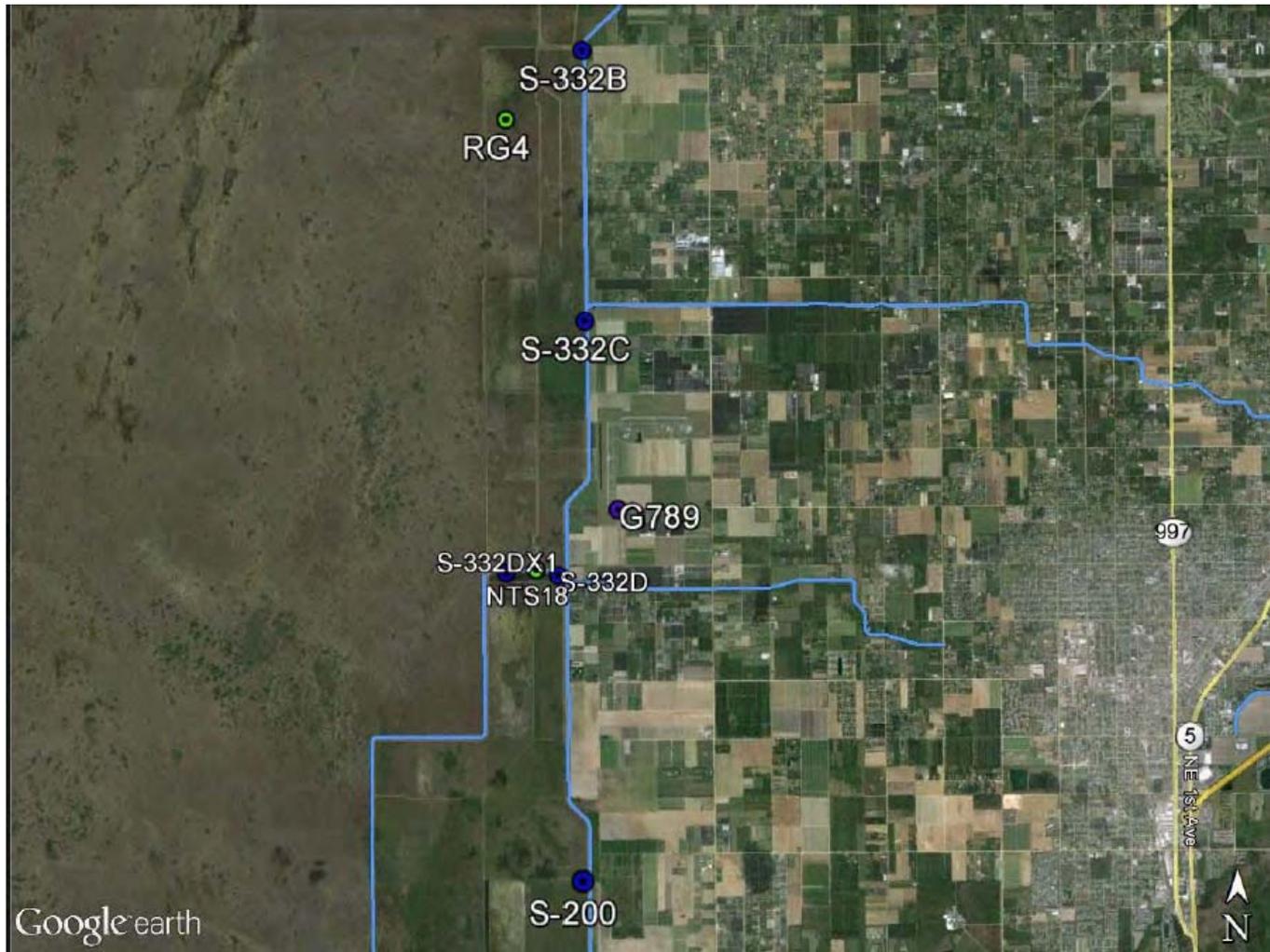
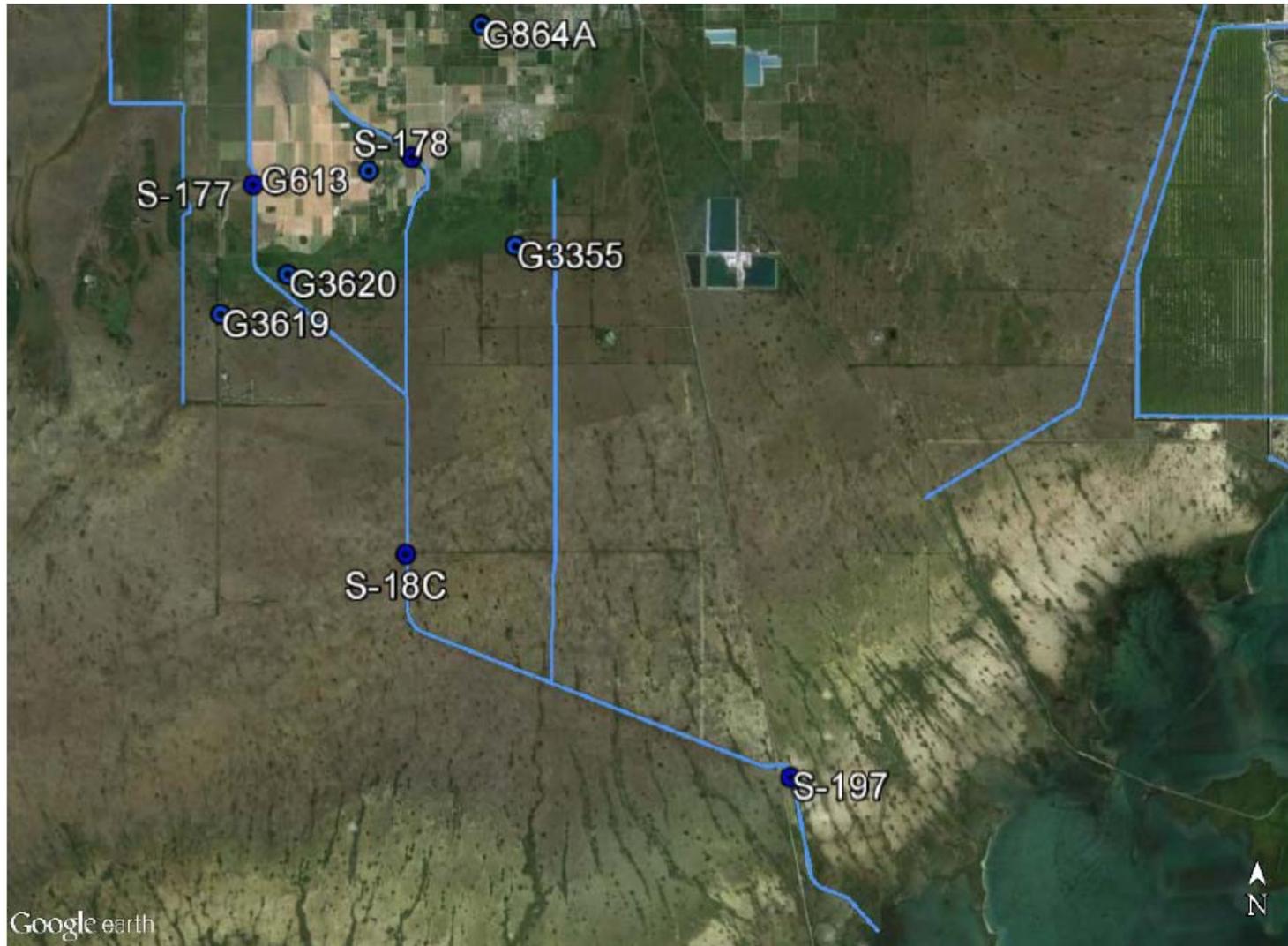


Figure 8: Hydro-meteorological Monitoring Locations (continued)





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