COMPREHENSIVE EVERGLADES RESTORATION PLAN

LAKE OKEECHOBEE WATERSHED RESTORATION PROJECT

REVISED DRAFT INTEGRATED PROJECT IMPLEMENTATION REPORT AND ENVIRONMENTAL IMPACT STATEMENT

July 2019

Annex B

ANNEX B
ANALYSES REQUIRED BY WRDA 2000 AND FLORIDA STATE LAW

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B ANALYSES REQUIRED BY WRDA 2000 AND FLORIDA STATE LAW

B.1 LEGAL BASIS – Background

Federal law and regulation implementing the CERP requires PIRs to address certain assurances as part of the project being recommended for approval and implementation. This section addresses provisions of Section 601(h) of the WRDA 2000, the Programmatic Regulations for the CERP (33 CFR Part 385) for Savings Clause requirements and Project-Specific Assurances.

The following sections describe the specific requirements from WRDA 2000 and the CERP Programmatic Regulations and present the methods, results, and conclusions of the analyses necessary to meet those requirements.

B.1.1 Water Resources Development Act 2000

Congress enacted the WRDA 2000, Section 601, Comprehensive Everglades Restoration Plan, which approved CERP "as a framework for modifications and operational changes to the Central and Southern Florida (C&SF) Project that are needed to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection." Section 601(h) of WRDA 2000, entitled, “Assurance of Project Benefits,” establishes project-specific assurances to be addressed as part of CERP implementation.

Section 601 (h)(1) of WRDA 2000 provides the following:

> IN GENERAL.—The overarching objective of the Plan is the restoration, preservation, and protection of the South Florida Ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Plan shall be implemented to ensure the protection of water quality in, the reduction of the loss of fresh water from, the improvement of the environment of the South Florida Ecosystem and to achieve and maintain the benefits to the natural system and human environment described in the Plan, and required pursuant to this section, for as long as the project is authorized.

This subsection of this annex discusses the Savings Clause and project assurances required by WRDA 2000 to be addressed in each PIR. **Subsection B.1.2.2** lists the Savings Clause and project assurances provisions of the CERP programmatic regulations, which provide supplemental information for implementing the WRDA 2000. **Subsection B.1.2.6** discusses the role of the Draft Guidance Memoranda in the analyses.

The Savings Clause analysis is listed in WRDA 2000 as a means to protect users of legal sources of water supply and to protect the levels of service for flood protection that were in place at the time of enactment. Specifically, Section 601(h)(5) of WRDA 2000, entitled “Savings Clause,” requires an analysis of each project’s effects on legal sources of water that were in existence on the date of enactment of WRDA 2000 (i.e., December 2000), effects on levels of service of flood protection in existence on the date of enactment of WRDA 2000, and effects on the Seminole Tribe of Florida Water Rights Compact with the State of Florida and SFWMD. Section 601(h)(5) of WRDA 2000 states the following:

> (A) NO ELIMINATION OR TRANSFER.–Until a new source of water supply of comparable quantity and quality as that available on the date of enactment of

> this Act is available to replace the water to be lost as a result of implementation of the Plan, the Secretary and the non-Federal sponsor shall not eliminate or transfer existing legal sources of water, including those for –
>
> (i) an agricultural or urban water supply;
>
> (ii) allocation or entitlement to the Seminole Indian Tribe of Florida under section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);
>
> (iii) the Miccosukee Tribe of Indians of Florida;
>
> (iv) water supply for Everglades National Park; or
>
> (v) water supply for fish and wildlife.
>
> (B) MAINTENANCE OF FLOOD PROTECTION.–Implementation of the Plan shall not reduce levels of service for flood protection that are–
>
> (i) in existence on the date of enactment of this Act; and
>
> (ii) in accordance with applicable law.
>
> (C) NO EFFECT ON TRIBAL COMPACT.–Nothing in this section amends, alters, prevents, or otherwise abrogates rights of the Seminole Indian Tribe of Florida under the compact among the Seminole Tribe of Florida, the State, and the South Florida Water Management District, defining the scope and use of water rights of the Seminole Tribe of Florida, as codified in section 7 of the Seminole Indian Land Claims Act of 1987 (25 U.S.C. 1772e).

The analysis of project-specific assurances is listed in WRDA 2000 as a means to assure that CERP project benefits are realized by establishing the appropriate quantity, timing, and distribution of water to be dedicated and managed for the natural system. Section 601(h)(4) of WRDA 2000, entitled "Project-Specific Assurances," contains the following requirements for PIRs:

> (A) PROJECT IMPLEMENTATION REPORTS. –
>
> (i) IN GENERAL. – The Secretary (of the Army) and the non-Federal sponsor shall develop project implementation reports in accordance with Section 10.3.1 of the Plan.
>
> (ii) COORDINATION. – In developing a project implementation report, the Secretary and the non-Federal sponsor shall coordinate with appropriate Federal, State, tribal, and local governments.
>
> (iii) REQUIREMENTS. – A project implementation report shall –
>
> …(IV) identify the appropriate quantity, timing, and distribution of water dedicated and managed for the natural system;
>
> (V) identify the amount of water to be reserved or allocated for the natural system necessary to implement under State law;

WRDA 2000 excerpts cited above are intended to provide a concise summary of the Savings Clause and Project-specific Assurances analyses required under WRDA 2000. Refer to WRDA 2000 for complete text.

The LOWRP PIR/EIS will not be the mechanism to propose or conduct the required NEPA evaluation of modifications to the LORS and system-wide operational modifications. These actions will be conducted under other authority consistent with the Integrated Delivery Schedule. The proposed modifications developed in LOWRP are meant as recommendations to inform this future LORS study. This analysis will identify water for the natural system and provide for all of LOWRP's purposes and CERP's overarching objectives. SFWMD anticipates reservation of water that is intercepted for LOWRP storage above and below ground, as well as protection of water stored in ASR below-ground facilities. Water returned to Lake Okeechobee after LOWRP storage will be available to meet all C&SF Project purposes and CERP's overarching objectives. LOWRP's stored water, upon return to Lake Okeechobee, will be accessible to both the lake ecology and users in accordance with SFWMD's water supply program and the lake regulation schedule.

B.1.2 Programmatic Regulations (33 CFR Part 385)

Section 601(h)(3) of WRDA 2000 required the Secretary of the Army, with the concurrence of the Governor and the Secretary of the Interior, to promulgate Programmatic Regulations to ensure that the goals and objectives of the CERP are achieved. See **Section 6.8, Table 6-18**, of the main report for a summary of compliance with the provisions of the Programmatic Regulations. The Final Programmatic Regulations for the CERP, which were published in 33 CFR Part 385 in 2003, establish the processes and procedures to guide the U.S. Army Corps of Engineers (USACE) in the implementation of the CERP. In this document, **Section B.1.2** summarizes the requirements of the Programmatic Regulations that provide supplemental information to WRDA 2000.

B.1.2.1 Pre-CERP Baseline

Section 385.35(a) of the Programmatic Regulations requires the development of a pre-CERP baseline to aid the USACE and SFWMD when implementing the Savings Clause to determine if existing legal sources of water will be eliminated or transferred and to demonstrate that the levels of service of flood protection in existence on the date of enactment of WRDA 2000, and in accordance with applicable law, will not be reduced by implementation of a project. The 2008 LORS was developed as a temporary schedule during the HHD repairs and changes to the water supply delivery approach represent a “non-CERP intervening activity. According to the draft Guidance Memoranda, the applicability of a “non-CERP intervening activity” shifts the baseline for savings clause analysis from use of the pre-CERP baseline (WRDA 2000) to use of the ECB.

B.1.2.2 Savings Clause - Elimination or Transfer of Existing Legal Sources of Water

Section 385.36 of the Programmatic Regulations requires that PIRs include a determination of existing legal sources of water that are to be eliminated or transferred as a result of project implementation. If a project is expected to result in an elimination or transfer of an existing legal source of water, the PIR shall include an implementation plan that ensures a new source of water of comparable quantity and quality is available to replace the source that is being transferred or eliminated.

B.1.2.3 Savings Clause - Flood Protection

Section 385.37 of the Programmatic Regulations requires that PIRs include an analysis of the project’s impacts on levels of service for flood protection that existed on the date of enactment of WRDA 2000 (December 2000) and are in accordance with applicable law to demonstrate that the levels of service for

flood protection will not be reduced by implementation of the project. Where appropriate and consistent with restoration of the natural system, opportunities to provide additional flood protection shall be considered. The conditions that existed on the date of enactment of WRDA 2000 are included in the Pre-CERP Baseline.

B.1.2.4 Project Assurances - Identification of Water for the Natural System

Section 385.35(b) of the Programmatic Regulations requires that each PIR identify the quantity, timing, and distribution of water to be dedicated and managed for the natural system necessary to meet CERP restoration goals.

B.1.2.5 Project Assurances - Identification of Water for Other Water-Related Needs

Section 385.35(b) of the Programmatic Regulations also requires that each PIR identify the quantity, timing, and distribution of water made available for other water-related needs of the region.

B.1.2.6 Draft Guidance Memoranda

The Programmatic Regulations require the development of six guidance memoranda jointly by the USACE and SFWMD in consultation with others. The Draft Guidance Memoranda dated July 2007 provided additional information to complete the analyses initially described in WRDA 2000; however, since the guidance memoranda exist in draft form only, the PIRs completed prior to their approval can use appropriate methods deemed reasonable at the time. The July 2007 Draft Guidance Memoranda are available for review at the following link:

http://141.232.10.32/pm/progr_regs_guidance_memoranda.aspx

Section 385.35(b)(3)(iii) of the Programmatic Regulations specifically states that "PIRs approved before... the development of the guidance memorandum may use whatever method the USACE and the non-Federal sponsor deem is reasonable and consistent with the provisions of Section 601 of WRDA 2000." During the preliminary planning phases of the LOWRP, based on consideration of the expedited schedule, the USACE and SFWMD advocated using efficiencies learned from the processes of developing prior PIRs, including prior CERP project methodologies for the technical analyses described in Draft Guidance Memoranda 3 (Savings Clause Requirements) and Draft Guidance Memoranda 4 (Identifying Water Made Available for the Natural System and for Other Water-Related Needs). The two draft memoranda provide additional background information and describe the analyses and tools used to address the Savings Clause and project assurances requirements of the Programmatic Regulations. The analyses completed for the LOWRP PIR, which are documented in **Section B.2**, **Section B.3**, and **Section B.4** within this Annex, meet the intent of the draft memoranda while fulfilling the requirements of Section 601 of WRDA 2000 and the Programmatic Regulations.

Section B.2.2.1 of this report contains the key assumptions common to Savings Clause and project assurance analyses including an overview of the modeling tools available, the scenario assumptions, and the regional project effects resulting from achieving the LOWRP PIR objectives.

Section B.2.2.2 of this report contains a description of the assumptions, concept, and methodologies applied for the LOWRP PIR evaluation of Savings Clause requirements.

Section B.2.3 contains a description of the assumptions, concepts, and methodologies applied for the LOWRP PIR evaluations to identify water made available by the project for the natural system and for other water-related needs of the region.

Section B.2.4 describes the results of these analyses, while **Section B.3** provides conclusions and identifies the amount of water made available by the project for the natural system to be reserved or allocated by the State of Florida and the amount of water made available for other water-related needs.

B.2 Methods

The same hydrologic models used for plan formulation are typically applied to the Savings Clause and project assurance analyses. This ensures consistency when representing the project effects in the analyses subsequent to plan selection. The RSM-BN hydrologic model was used to simulate and evaluate the environmental effects of the LOWRP array of alternatives through comparison with pre-project base conditions simulated with the same models. The RSM-BN model uses a 41-year period of hydrologic record (1965 through 2005) which includes sufficient climatological variability (including natural fluctuations of water) to represent the full range of hydrologic conditions experienced within the South Florida region over a long-term period. No one modeling tool or representation of model results can definitively predict with-project hydrologic conditions across the project area given the large regional scope of the project, model tools limitations and assumptions, and future uncertainties regarding the effects of other projects. However, each snapshot of model results can form the basis for applying best professional judgment to determine whether the potential effects of the Optimized TSP would reduce the availability of an existing source of water or reduce the level of service for flood protection, and to quantify the water necessary to achieve the benefits of the plan.

The plan formulation process applied during the LOWRP PIR analyzed the environmental effects and benefits of the project alternatives through qualitative and quantitative comparisons between the FWO condition and the FWP condition. The FWO condition describes what is assumed to be in place if none of the study's alternative plans are implemented. The FWO condition for the LOWRP assumes the construction and implementation of authorized CERP and non-CERP projects, and other Federal, State, or local projects constructed or approved under existing governmental authorities that occur in the LOWRP study area, as described in **Section 2.5** of the main report. The future with-project condition describes what is expected to occur as a result of implementing each alternative plan that is being considered in the study.

B.2.1 Project Objectives and Associated Baseline Model Assumptions

Viewed from a programmatic perspective, the identification of water for the natural system associated with the CERP involves an analysis of four different aspects of ecological responses to hydrologic changes: 1) responses to the change in the quantity of water received by the natural system; 2) responses to the timing of those deliveries; 3) responses to the distribution of water delivered to the natural system; and 4) responses to the quality of the water received by the natural system. In a project specific sense, however, the relative importance of each of these aspects (quantity, timing, distribution, and quality) will vary from project to project depending upon the specific objectives established for the project.

For example, some CERP projects may focus formulation efforts on simply changing the timing (i.e., seasonality) or distribution (i.e., inflow and outflow points or internal movement) of water delivered to the natural system. Other projects may focus primarily on increasing or decreasing the amount of water

delivered to the natural system depending on its needs, while still other projects may focus on improving the quality of the water delivered to the natural system to maintain desirable ecological community structure. These aspects, depending upon their applicability to specific CERP projects, are addressed during plan formulation through performance measures and evaluation criteria used to evaluate alternative plans and ultimately select a plan. Hydrologic targets for the natural system applied during plan formulation help to identify the quantity of water required to meet restoration objectives, in contrast to water that exceeds the targets and may be harmful or otherwise not contribute to meeting the restoration targets.

The Optimized TSP achieves the project objectives by changing the timing, distribution, and volume of water conveyed to the natural system. The large regional scale of the Optimized TSP causes large volumes of water to move between ecosystems and basins consistent with the project's objectives (**Table B-1**). The water made available for the natural system is the water required for the protection of fish and wildlife within natural systems, including water that contributes to meeting hydrologic, water quality, and ecologic targets for natural system restoration. The Optimized TSP provides a further reduction in regulatory releases from Lake Okeechobee to the Northern Estuaries. The Savings Clause and project assurances analyses for the Optimized TSP will focus on whether these regional-scale changes meet the requirements of WRDA 2000 and the Programmatic Regulations.

The analyses of the Savings Clause and Project Assurance requirements includes considerations of three different sets of assumptions at two different points in time or conditions as depicted in **Table B-2**: 1) the ECB[1] and 2) the FWO baseline and 3) future with project Optimized TSP. The Initial Operating Regime (IOR) is represented by the FWO baseline. Comparison of the Optimized TSP to these baselines is discussed in the results section below. The model assumption tables for all base conditions are provided in the **Model Documentation Reports Annex (A-3)** to the Engineering Appendix (**Appendix A**). Please note that updates to the FWO were not needed to establish the IOR baseline. Therefore, the FWO is equal to IOR baseline. This is also mentioned in the Hydrologic Modeling section in **Appendix A**.

The LOWRP documentation and complete sets of RSM-BN hydrologic model performance measure output are posted on the CERPZone DASR system at www.cerpzone.org. All data sets will be permanently archived and available in this system for the public (after requesting a login), state and federal agencies. The following performance measure data sets are provided to facilitate additional review of the hydrologic modeling output for the baselines and Optimized TSP:

- ECB, FWO, 1BWR (Optimized TSP) — Comparison used for NEPA evaluation in **Section 5.**
- ECB, FWO, 1BWR (Optimized TSP) — Comparison used for the Savings Clause and Project Assurances evaluation in this annex.

Table B-1. Goals and objectives of CERP and LOWRP.

CERP Objective	LOWRP Objective
Improve habitat and functional quality.	Improve estuary discharges from Lake Okeechobee to improve the salinity regime and the quality of oyster, SAV, and other estuarine community habitats in the northern estuaries.

[1] Refer to Section 1.2.1 Pre-CERP Baseline for description of use of ECB as Savings Clause baseline.

CERP Objective	LOWRP Objective
Increase the total spatial extent of natural areas.	Increase the spatial extent and functionality of aquatic and wildlife habitat within Lake Okeechobee and the surrounding watershed.
Improve native plant and animal species abundance and diversity.	Improve quantity, timing, and distribution of flows into Lake Okeechobee to maintain ecologically desired lake stage ranges more often.
CERP Goal: Enhance Economic Values and Social Well-Being	
Increase availability of fresh water (agricultural/municipal & industrial).	Increase availability of water supply for existing legal water users of Lake Okeechobee.
Reduce flood damages (agricultural/urban).	No corresponding LOWRP objective beyond Savings Clause.
Provide recreational and navigation opportunities.	Provide recreational opportunities.
Protect cultural and archeological resources and values.	Protect cultural and archeological resources and values.

Table B-2. Key assumptions based on model documentation reports from Engineering Appendix (Appendix A, Annex A-3).

Condition	Intent	Equivalent for LOWRP	Model Scenario
Existing Conditions	Actual conditions at the time the Optimized TSP is selected, including land use, operations, and demands. Demand can be either permitted or projected, whichever is greater.	2016 conditions with only the projects and operations approved and in effect. Includes 2008 LORS. Permitted demands are included.	**ECBLOW**
Initial Operating Regime Baseline	Future conditions at the time the Optimized TSP is operational including land use, operations, and demands. Demands can be either permitted or projected, whichever is greater.	The future condition when the project will be initially operated, including non-CERP projects, CERP projects (with completed PIRs), and LOWRP features with associated operations. Includes 2008 LORS. Permitted demands are included.	**FWOLOW**

B.2.1.1 Volume Probability Curves and Stage Duration Curves

To identify the quantity, timing, and distribution of water for the natural system, a probabilistic approach was selected utilizing volume probability curves to depict the distribution of volumes of water that provide natural system benefits as a result of project features or to determine whether water is eliminated or transferred from natural systems. These volumes of water may include water that is already available to meet natural system needs and water made available from Optimized TSP features. For purposes of identifying the increase in the volume of water for the natural system, volume probability curves were produced depicting the range of the quantities of water delivered for natural system areas and coastal estuaries under all climatic conditions through the RSM period of simulation used to perform project evaluations.

The volume probability curve indicates the probability (percentage of time equaled or exceeded, on the x-axis) that a certain quantity of water (expressed as flow or volume on the y-axis) is made available as a function of historical rainfall distribution. The water quantities are aggregated for each water year within the RSM period of simulation, defined as starting in May of year 1 and continuing through April of year 2 (40 total water years in the 1965-2005 RSM period of simulation). Once computed, the values are ranked from highest to lowest. Volume probability curves quantify the water, along with its timing and distribution to the natural system.

B.2.2 Analyses for Savings Clause including Intervening non-CERP and CERP Projects

The changes to quantity, timing, and distribution of water to be produced by the project focus on meeting hydrologic restoration targets for Lake Okeechobee and the Northern Estuaries. The purpose of the Savings Clause analyses is to determine whether the effects of the project will cause an elimination or transfer of existing legal sources of water or reduction to the level of service of flood protection. The potential effects of the LOWRP WAF, ASR clusters, and wetland restoration improvements can be assessed by comparing stage duration curves and other results from the model simulations for the FWO and Optimized TSP (Alternative 1BWR). If no reductions to existing legal sources or levels of service for flood protection are indicated during the comparison, then the Savings Clause requirements are determined to have been met. If there is an elimination or transfer of an existing legal source of water, then a new source of water supply to replace the water lost as a result of implementation of the Optimized TSP would need to be identified.

Consistent with the approach outlined in Draft Guidance Memoranda 3, which was developed to meet the intent of WRDA 2000 and the Programmatic Regulation, the following guidance will be applied by the LOWRP to address the effects of intervening non-CERP activities:

- Savings Clause analysis only applies to changes from date of enactment of WRDA 2000 that result from “Implementation of the Plan”;
- Intervening non-CERP activities are changes wholly outside of CERP – e.g., LORS 2008, LOSOM, MWD, C-111 South Dade, ERTP, etc.;
- Savings Clause does not require CERP to make up for reductions in quantity or quality of existing legal sources or levels of service for flood protection caused by intervening non-CERP activities, but CERP cannot cause further reductions;
- Savings Clause does not prohibit CERP from reducing quantity or quality of existing legal sources or levels of service for flood protection increased by intervening non-CERP activities, but CERP cannot reduce those increases below those in place on the date of enactment of WRDA 2000.

To determine whether it is the Optimized TSP or other intervening CERP or non-CERP activities affecting the existing legal sources or levels of service for flood protection, the Optimized TSP can be compared to the ECB and FWO (**Table B-3**). The simulations for the Optimized TSP and FWO both include the effects of intervening CERP activities that were assumed to be implemented in the FWO condition, including Indian River Lagoon-South Project; Site 1 Impoundment Project; Biscayne Bay Coastal Wetlands Project; Broward County Water Preserve Areas Project; Caloosahatchee River (C-43) West Basin Storage Reservoir; the C-111 Spreader Canal Western Project; and CEPP (2014 PIR). In this analysis, the focus is to determine the

potential effects of the Optimized TSP by comparing the future with project (1BWR) to the FWOLOW. This comparison isolates the effects of the intervening CERP and non-CERP projects.

If no reduction occurs at any step, then requirements of Savings Clause have been met.

Table B-3. Summary of comparisons for savings clause for LOWRP.

Step	Base Condition Model Run	With-Project Model Run
1	Existing Conditions Baseline – ECBLOW	1BWR (Optimized TSP)
2	Future without the project – FWOLOW	1BWR (Optimized TSP)

B.2.2.1 Savings Clause – Elimination or Transfer of Existing Legal Sources of Water

To analyze the potential elimination or transfer of existing legal sources, affected basins or users are evaluated. The basins and users that may be affected by the project are displayed in **Table B-4**, classified according to the categories identified in WRDA 2000.

Table B-4. Existing legal sources evaluated for elimination and transfer.

WRDA 2000, Section 601(h)(5)	User or Natural System Evaluated in LOWRP
an agricultural or urban water supply;	LOSA, including the EAA
allocation or entitlement to the Seminole Indian Tribe of Florida under section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e);	Brighton Reservation Big Cypress Reservation
the Miccosukee Tribe of Indians of Florida;	N/A
water supply for Everglades National Park; or	N/A
water supply for fish and wildlife.	Caloosahatchee Estuary St. Lucie Estuary

The primary RSM-BN model results evaluated for effects to agricultural or urban water supply are the volume and/or frequency of cutbacks, which is applicable to the LOSA and the Seminole Tribe of Florida's (STOF's) Brighton and Big Cypress reservations. The selected metrics provide more direct and higher resolution measures of potential water supply effects for the LOWRP Savings Clause assessment than would be provided through assessment of inflow volume probability curves for these areas.

For the two northern estuaries, the Savings Clause analysis focuses on whether the project eliminates or reduces deliveries to meet the low flow criteria targets for the Northern Estuaries. The high flows to the estuaries occur during times of excess water when water supply scarcity is not a concern.

B.2.2.2 Savings Clause - Flood Protection

Flood protection is evaluated by a combination of best professional judgment interpreting model results and engineering analyses. Consistent with the Draft Guidance Memoranda, the same models and results used for plan formation were applied for the LOWRP Savings Clause assessment of the Optimized TSP. This varies from typical storm event analyses by using a long period of record simulation and focusing on

the wet events included within the 1965–2005 simulation period. This discussion can be found in **Section 2.5** of this document.

B.2.3 Analyses for Project Assurances – Identifying Water Made Available by the Project for the Natural System and Other Water-Related Needs

Identification of water for the natural system is based on the concept of water needed to achieve the benefits of the project and the overarching objective of restoration, preservation, and protection of the South Florida Ecosystem. The water made available for the natural system is the water required for the protection of fish and wildlife, including water that contributes to meeting hydrologic, water quality, and ecologic targets for restoration of natural systems. Hydrologic targets for the natural system applied during plan formulation help to identify water required to meet restoration objectives, in contrast to water that exceeds the targets and may be harmful or otherwise not contribute to meeting the restoration targets.

Water for project assurances is quantified where project benefits accrue, consistent with the habitat unit benefits quantified during plan formulation resulting from water being made available by the project. The ability of the Optimized TSP to provide water to meet other water-related needs in the LOSA was also analyzed. The basins where the project may potentially supply water for the natural system or other water-related needs are listed below:

- Natural System
  - Lake Okeechobee
  - Wetlands: Kissimmee River Center and Paradise Run
- Other Water-Related Needs
  - LOSA including EAA

Identification of the water made available by the project requires analysis of the RSM-BN results for the Optimized TSP. The identification of water involves both 1) existing water in the system that is available to the natural system and available for other water-related needs, and 2) water made available by the project to the natural system and for other water-related needs, as depicted in **Figure B-1**. The sum of these two categories is the total water that is expected to be available to the natural system and available for other water-related needs.

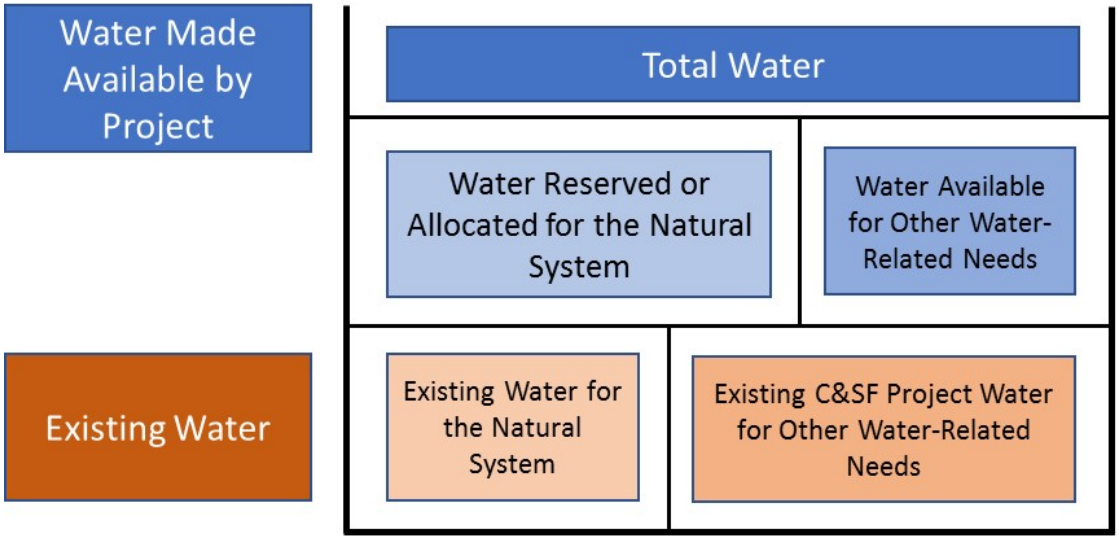

Figure B-1. Water needed to achieve the benefits of the plan.

Identification of water made available by the project is represented by the with-project condition (Optimized TSP, 1BWR model run) as depicted in **Table B-5**. Given that the LOWRP contains discrete storage (WAF, WAF-assisted ASR wells, and watershed ASR wells) and wetland features (Kissimmee River-Center and Paradise Run), the water made available by the project can be quantified as the volume discharged from these features annually. Water returned to Lake Okeechobee or delivered to wetlands (i.e., Kissimmee River-Center and Paradise Run) was quantified for the Optimized TSP (1BWR) only. In addition, because the LOWRP storage features do not exist in the pre-project condition, water is not quantified for the FWO condition.

Table B-5. Summary of analyses for the identification of water made available by the project.

Analysis	Water for the Natural System
Existing pre-project water for the natural system	FWO (FWOLOW)
Total water for the natural system with the project	Optimized TSP (1BWR)
Identification of water made available by the project	Difference between Optimized TSP (1BWR) and FWO (FWOLOW)

Quantification of water made available for the natural system is displayed using volume probability curves. The 10th, 50th, and 90th percentiles will be identified for the Optimized TSP representing water made available by the project for the natural system. Benefits projected for the Northern Estuaries are the result of reduced discharges from Lake Okeechobee, and therefore water for the natural system is not identified. To evaluate whether additional water is made available by the project to meet other water-related needs, specifically water supply for existing legal users in LOSA, the changes to the level of service were evaluated.

B.2.4 Elimination or Transfer of Existing Legal Sources of Water

The following information describes the elimination or transfer of existing legal sources of water.

B.2.4.1 Lake Okeechobee Service Area

Consistent with the WRDA 2000 and the Programmatic Regulations, the Savings Clause analysis removes the effects of the intervening non-CERP projects and compares the Optimized TSP to the FWO condition.

The volume of demand not met for the existing legal users in LOSA during the 8 years with the largest water shortage cutbacks is improved when comparing the Optimized TSP to the FWO condition. Refer to **Section 5** for a complete evaluation of water supply performance. The severity, duration, and magnitude of water supply shortages (i.e., cutbacks) for existing legal users decrease with the project.

RECOVER's performance measure for water supply in LOSA (WS-1) quantifies the frequency and severity of water restrictions over the period of simulation (**Table B-6**). Cutbacks are reduced by the Optimized TSP compared to the FWO condition. A simulated cutback total of 688,000 acre-feet in the FWO condition is reduced to 520,000 acre-feet by the Optimized TSP (1BWR). Similarly, the severity score is decreased from 12 to 7. The water supply improvements for the Optimized TSP compared to the FWO condition, as quantified in RECOVER WS-1, satisfy Savings Clause requirements.

Table B-6. RECOVER Performance Measure WS-1: Frequency and severity of water restrictions for LOSA.

Simulation	POR	Cutback Total (kaf)	Frequency	Severity Score	Number of Water Years with at Least 1 Cutback
ECB	1965-2005	857	8	13	8
FWO	1965-2005	688	8	12	8
1BWR	1965-2005	520	6	7	6

For the 8 years in the period of simulation with the largest water supply shortages in LOSA, cutback volumes are reduced, in aggregate, by the Optimized TSP compared to the FWO condition (**Figure B-2**).

The Optimized TSP reduces the percentage of demands not met in the EAA in comparison to both the ECB and FWO. The Optimized TSP also reduces the percentage of demands not met in the other LOSA areas which include: 298-Districts, S4, L8, C43, C44, North & Northeast Lakeshore, and Lower Istokpoga (**Figure B-3).**

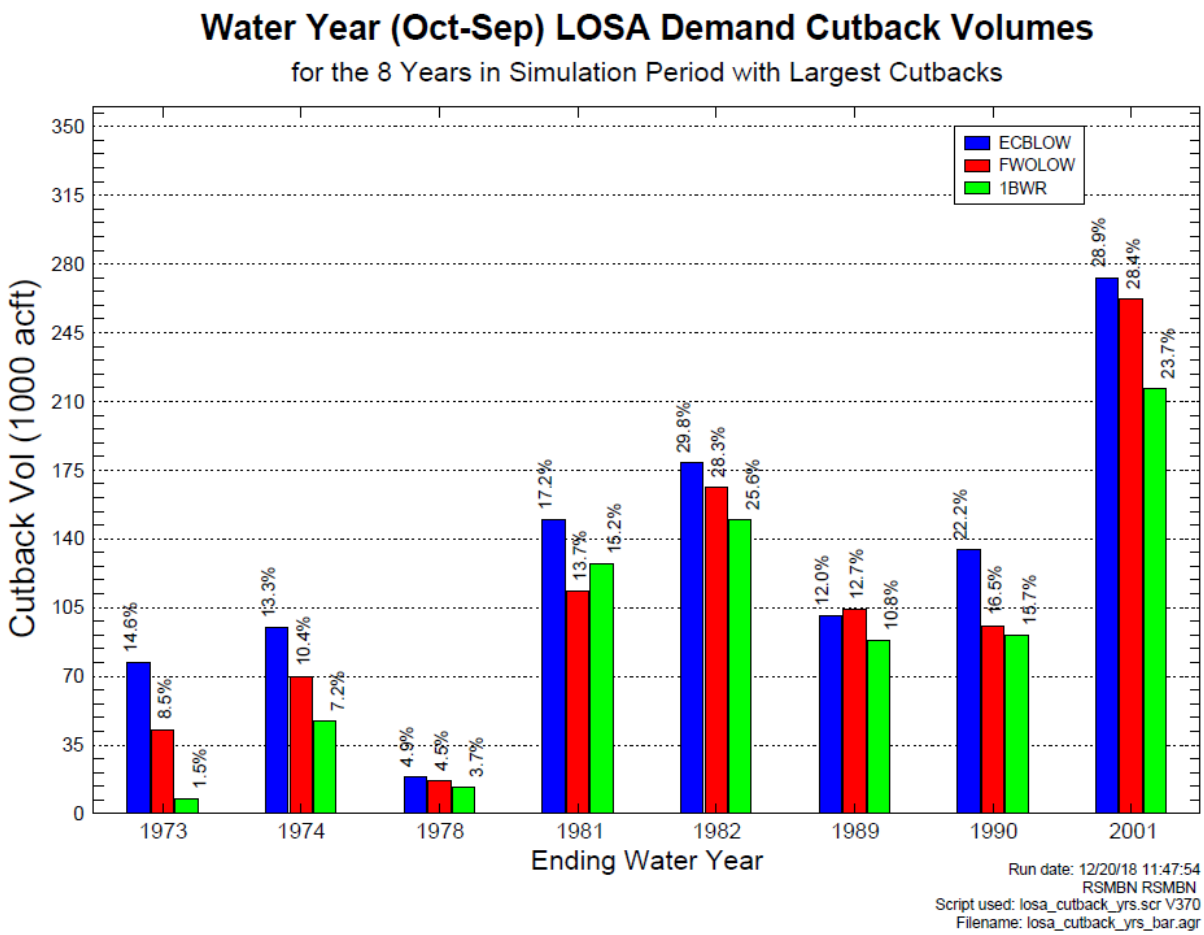

Figure B-2. LOSA demand cutback volumes for the 8 years with the largest cutbacks.

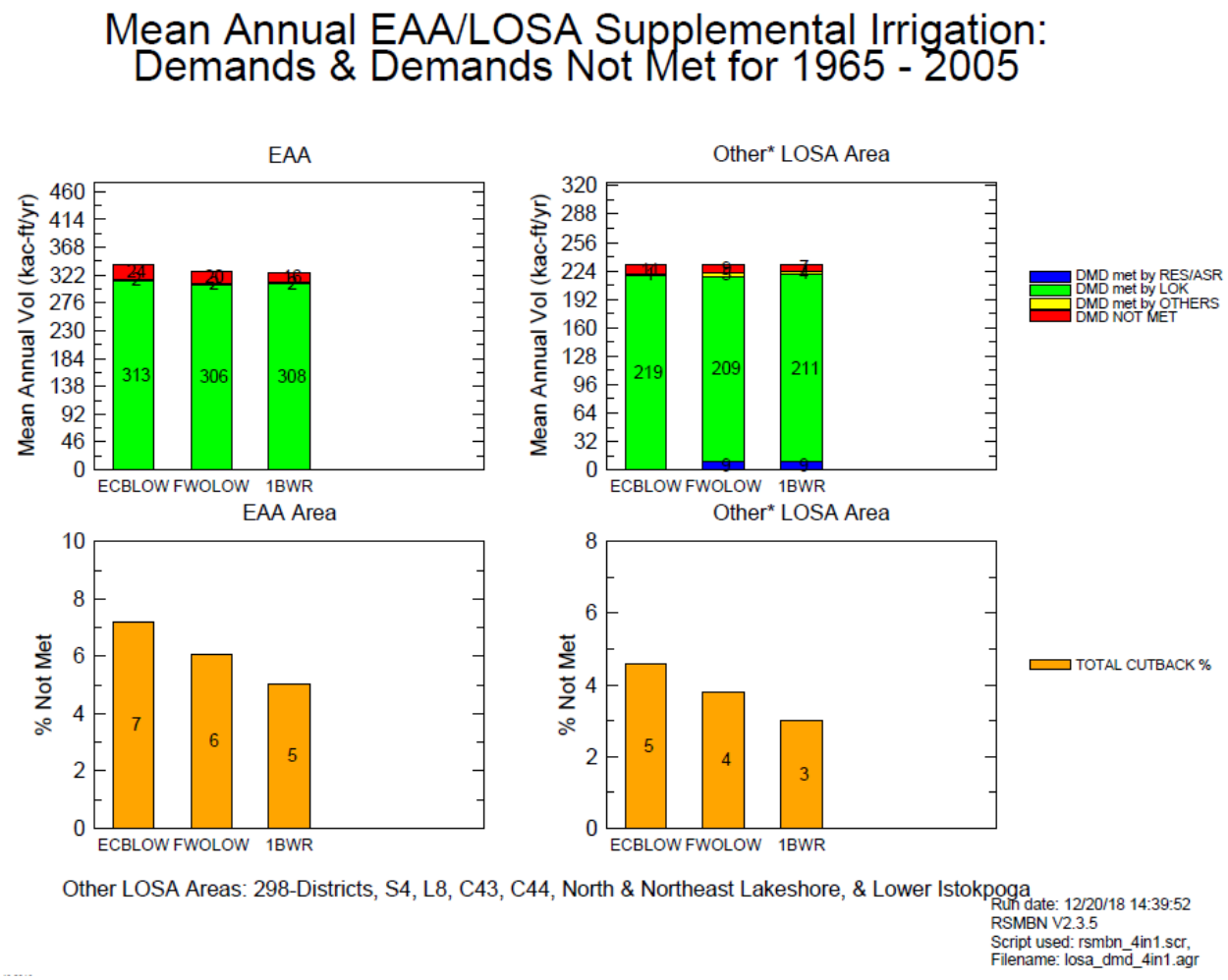

Figure B-3. Mean annual EAA/LOSA supplemental irrigation: demands & demands not met for 1965-2005.

B.2.4.2 Seminole Tribe of Florida

Both the Brighton and Big Cypress Reservations depend partially on Lake Okeechobee for supplemental irrigation water supplies for agricultural and other needs. The volume and percentage of water demand not met can be compared to assess the ability of existing legal sources to continue to meet demands. For the Brighton Reservation, water supply performance in the Optimized TSP is similar to the FWO condition. In the Optimized TSP, the volume and percentage of demand not able to be met are 1,000 acre-feet and 2.6%, respectively. For the FWO condition, the volume and percentage of demand not able to be met are 1,000 acre-feet and 3.3%, respectively (**Figure B-4**).

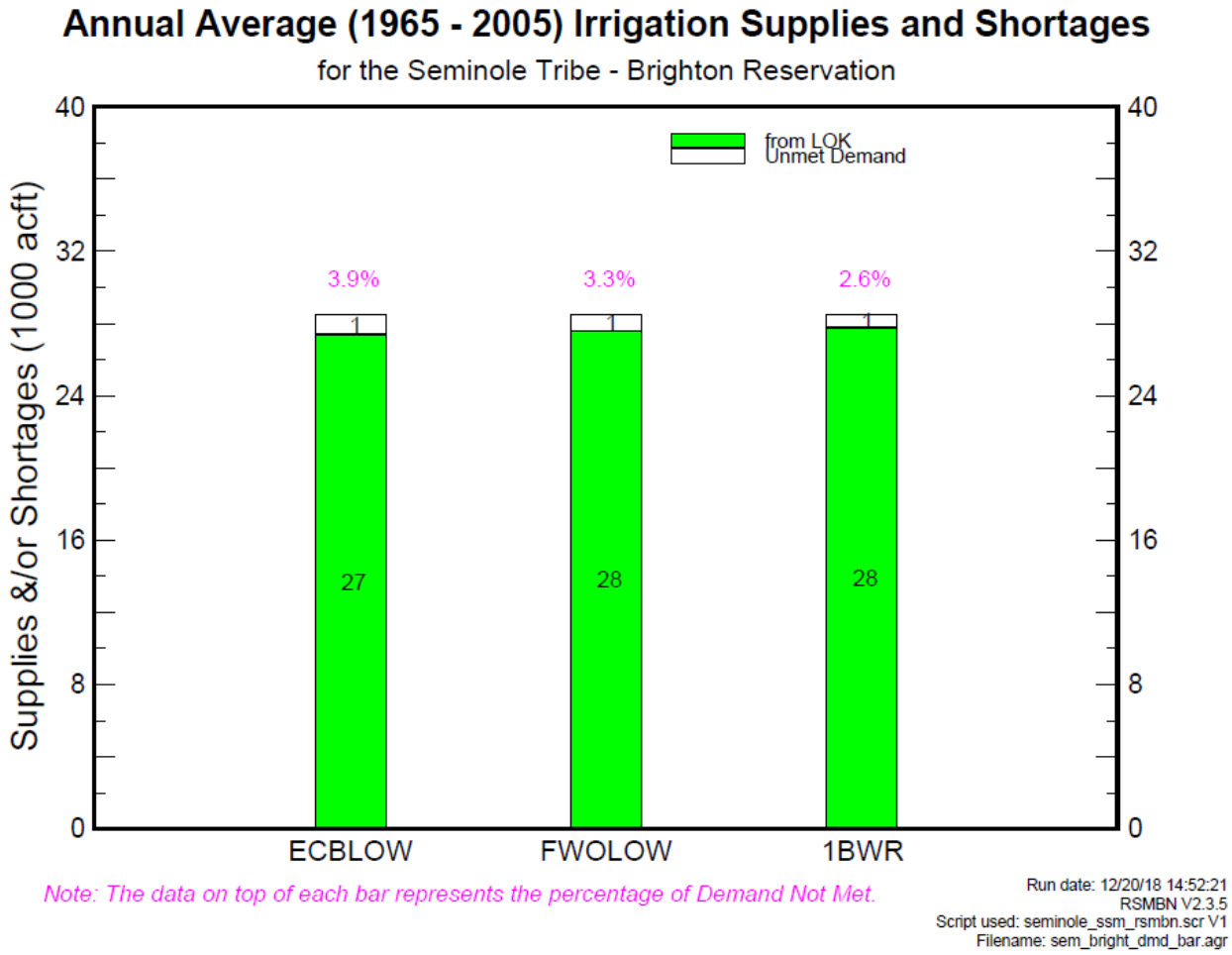

Figure B-4. Annual average (1965–2005) irrigation supplies and shortages for the Seminole Tribe of Florida – Brighton Reservation.

For the Big Cypress Reservation, the volume and percentage of demand not able to be met are essentially the same for the ECB, FWO, and Optimized TSP. In the Optimized TSP, the volume and percentage of demand not met are 1,000 acre-feet and 3.3%, respectively. For the FWO condition, the volume and percentage of demand not met are 1,000 acre-feet and 3.7%, respectively (**Figure B-5**). The volume of water supplied by the three sources (Lake Okeechobee, STAs, and S-190) remains unchanged; therefore, no transfer occurs. Based on this comparison, water supply performance for the STOF Brighton and Big Cypress Reservations is unchanged with the LOWRP implementation.

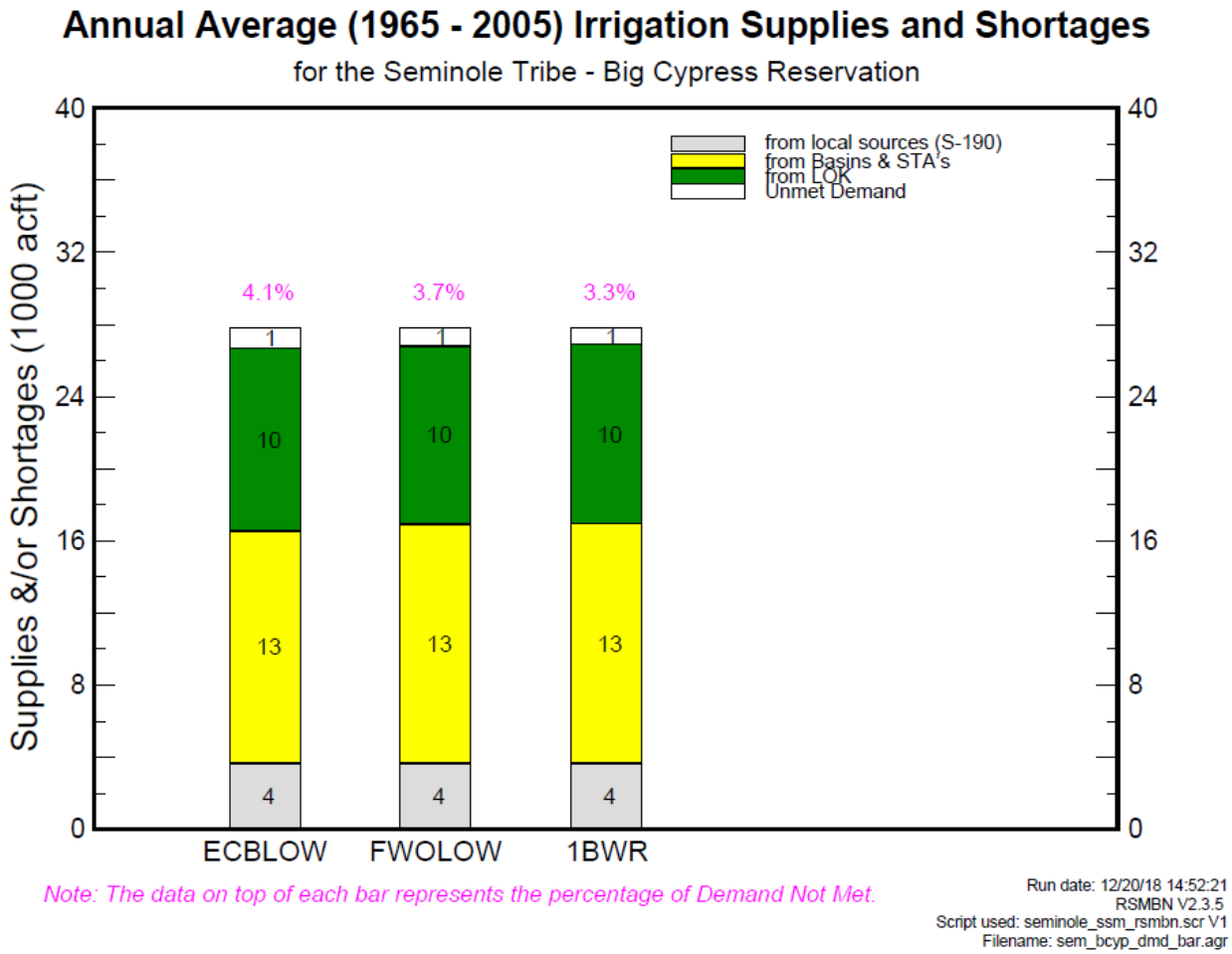

Figure B-5. Annual average (1965–2005) irrigation supplies and shortages for the Seminole Tribe of Florida – Big Cypress Reservation.

B.2.4.3 Water Supply for Fish and Wildlife

The following sections describe the water supply for fish and wildlife.

B.2.4.3.1 Caloosahatchee Estuary

The low-flow criterion as defined by RECOVER for the Caloosahatchee Estuary is an average monthly flow of less than 450 cfs. In the Caloosahatchee Estuary, the number of months the low-flow criterion is not met is similar in the Optimized TSP and FWO conditions (**Figure B-6**). The estuary low-flow criterion is not met in 24 months out the 41-year period of simulation in Optimized TSP and 23 months in the FWO. The with-project condition does not significantly change the frequency of achieving the low-flow target.

Comparisons to the existing condition baseline show significant improvement in low-flow performance with the Optimized TSP. The ECB shows 116 months when average monthly flows are less than 450 cfs,

compared to 24 months in Optimized TSP. The ECB does not benefit from the inclusion of the CERP Caloosahatchee River (C-43) West Basin Reservoir, which is included in the future with and without project conditions.

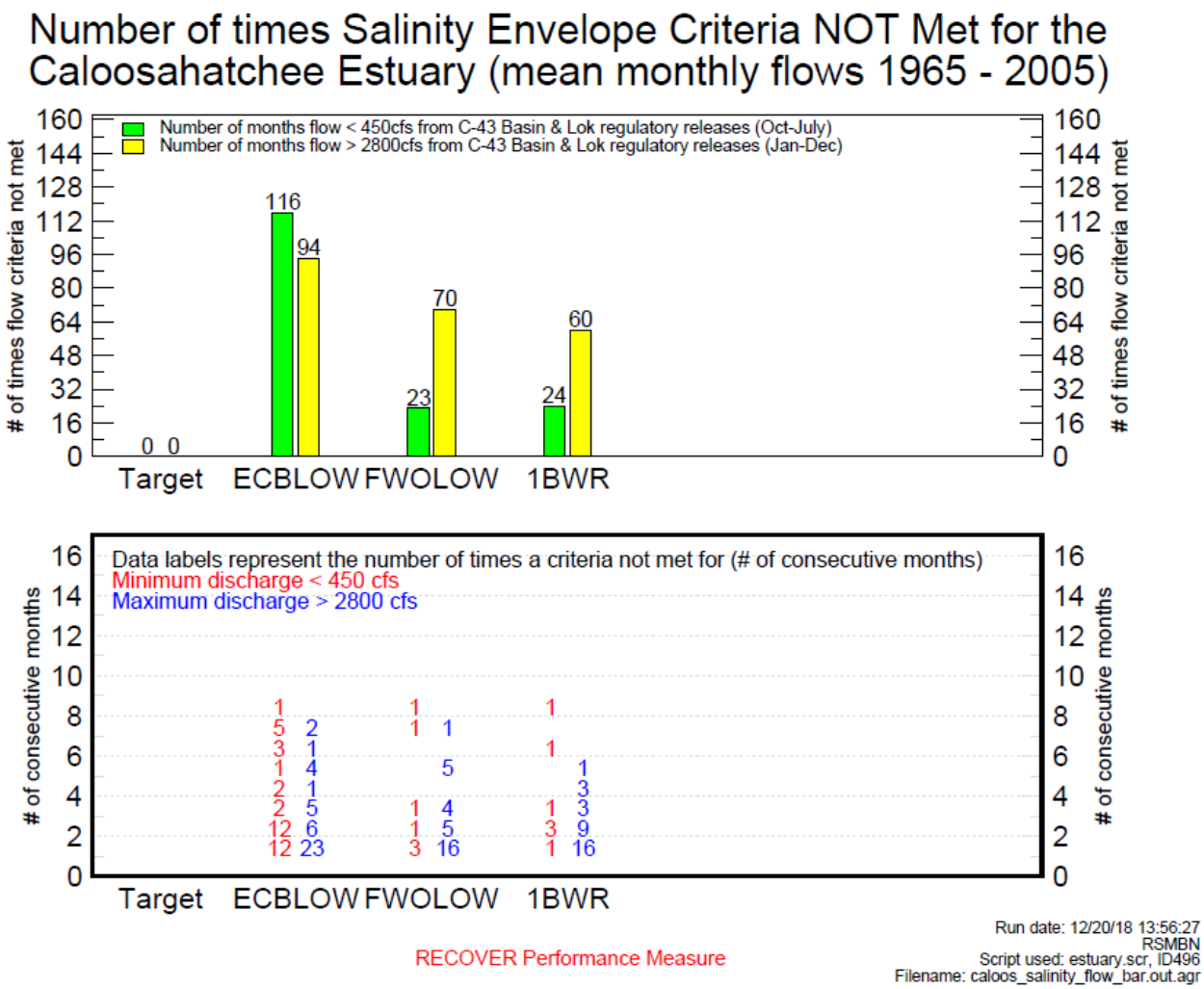

Figure B-6. Number of times salinity envelope criteria not met for the Caloosahatchee Estuary (mean monthly flows 1965–2005).

B.2.4.3.2 St Lucie Estuary

The low-flow criterion defined by RECOVER for the St. Lucie Estuary is an average monthly flow of less than 350 cfs. In the St. Lucie Estuary, the number of months the low-flow criterion is not met is the same in the Optimized TSP as the FWO condition (**Figure B-7**). The low-flow criterion is not met in 83 months out the 41-year period of simulation in the Optimized TSP and the FWO conditions. The with-project condition does not change the frequency of achieving the low flow target.

Comparisons to the ECB show a significant improvement in low-flow performance with Optimized TSP. The ECB shows 95 months when average monthly flows are less than 350 cfs, compared to 83 months for Optimized TSP. The existing condition baseline does not benefit from the inclusion of the Indian River Lagoon-South Project's C-44 Basin Reservoir, which is included in the future with and without project conditions.

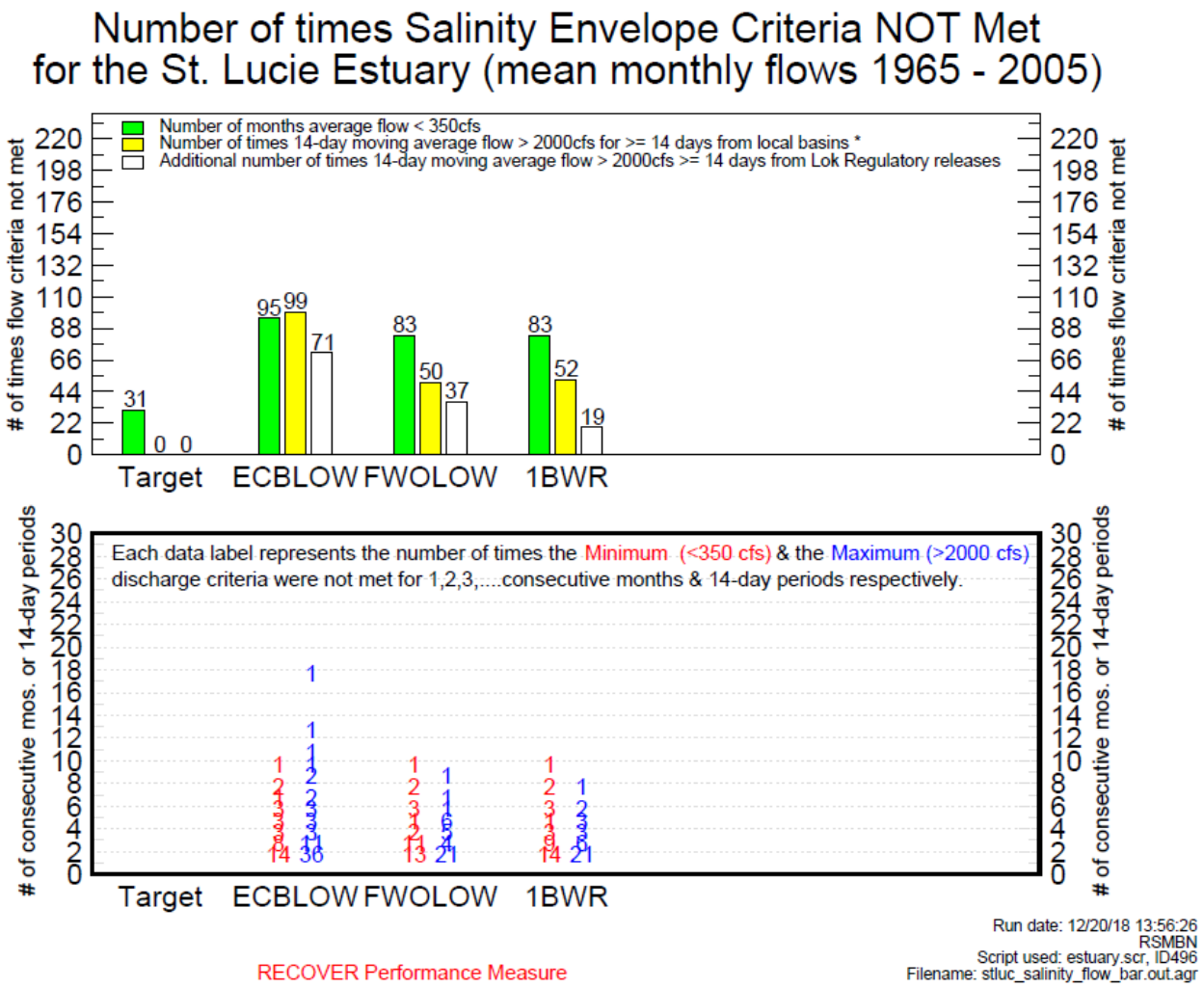

Figure B-7. Number of times salinity envelope criteria not met for the St. Lucie Estuary (mean monthly flows 1965–2005).

B.2.5 Savings Clause - Flood Protection

The three areas potentially affected by an increase in water stages from the project, and analyzed for related flood protection effects, include: 1) the WAF, 2) restored wetlands (Kissimmee River-Center and Paradise Run), and 3) Lake Okeechobee HHD. From all three areas, Lake Okeechobee HHD was selected to be analyzed in more detailed due to the high level of risk drivers in the area.

B.2.5.1 Wetland Attenuation Feature

The WAF is located in the K-05 footprint within the Indian Prairie sub-watershed west of the C-38 Canal, north of SR 78, east of the STOF Brighton Reservation, and south of the C-41A Canal. The WAF is primarily used for surface water storage to attenuate peak flows into Lake Okeechobee from the Kissimmee River Basin. Although the WAF provides above-ground storage like a reservoir, water levels may be suitable for growth of wetland vegetation due to the water depths typically realized through operation of the facility (see **Figure B-8**). The WAF footprint, including the embankments, seepage canal, and other perimeter features, is approximately 13,600 acres with a storage capacity of approximately 46,000 ac-ft. A pump station located downstream of the existing S-84 structure on the C-41A canal serves as the water source for the WAF. The pump draws water from the downstream area considered to be part of Lake Okeechobee.

The implementation of the WAF will not degrade the existing level of flood protection offered by various components of the C&SF Project for this area. Further, the WAF will ensure flood protection of the area through engineering design and construction following state of the practice methods for design and construction of pertinent features associated with this facility. By looking at the physical characteristics of the area, the construction of the WAF will reduce the amount of the original design basin, helping to reduce flooding in the case on an event such a Probable Maximum Precipitation (PMP), which in the area would result in approximately 55.7 inches of rainfall over 72 hour duration in the 31.2 square mile basin. Also, the WAF has been conceptually designed to intercept any potential seepage with a seepage canal located in the western and southern sides of the facility. In terms of seepage, where there is an adjacent seepage canal, this feature captures almost 100 percent of the seepage loss from the WAF. Where there is no seepage canal (i.e. along Paradise Run), seepage loss from the WAF moves eastward to recharge Paradise Run. Refer to **Section A.6.2.3.5.4 Seepage Modeling Results** of the **Appendix A Engineering Appendix** for more details on the conceptual 2D seepage analysis performed for LOWRP. However, additional groundwater modeling will be required to assess this site-specific performance during PED. Based on gauge information, historical water levels in the L-59 canal have been recorded up to 20.33 feet NGVD29 in November 2016, while the design SPF for L-59 is 23.00 feet NGVD29. The engineering design and construction of the WAF will follow state of the practice methods for design and construction of pertinent features of the plan. U.S. Army Corps of Engineers, ER 1110-2-1150, *Engineering and Design for Civil Works Projects*, and ER 1110-2-1156, *Engineering and Design Safety of Dams – Policy and Procedures*, along with various other site/structure-specific regulations, will be adhered to prior to and during the PED phase.

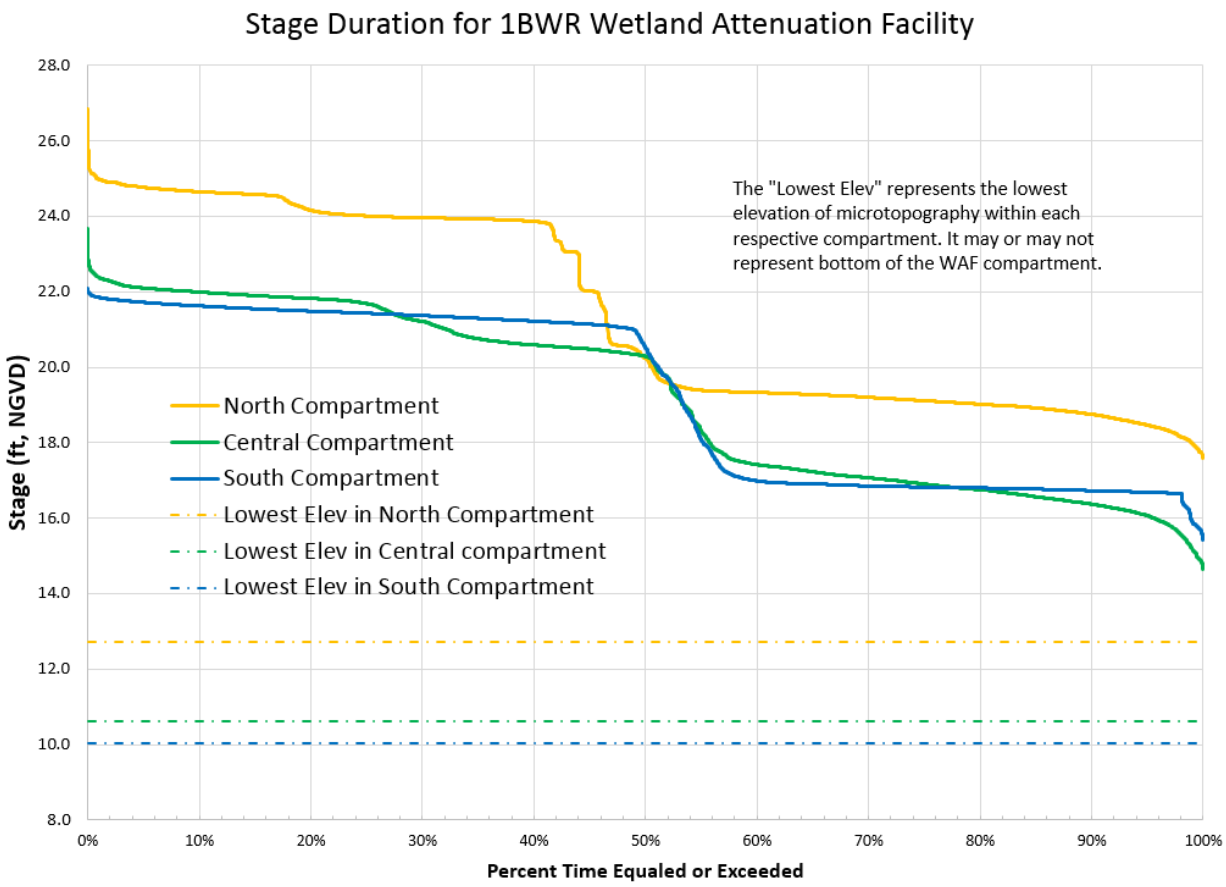

Figure B-8. Stage duration curve for -1BWR wetland attenuation facility.

B.2.5.2 Restore Wetlands: Kissimmee River Center and Paradise Run

The purpose of the Kissimmee River-Center and Paradise Run wetland restoration is to reconstruct historical natural areas within the LOWRP boundary. For Kissimmee River-Center, a pump will be placed in the C-38 Canal to divert water into a section of the old Kissimmee River channel. The channel will be excavated in some locations due to existing silted areas. The water will flow through the channel and reenter the C-38 Canal through a canal at the southern end of the wetland footprint. The water will stage up and fill the entire wetland footprint when water is available upstream of S-65E, also called Pool E. The normal water elevation for Pool E is 21 ft-NGVD29. There are no perimeter berms in this configuration. This assumption is possible due to the topography in the area. For Paradise Run, the unique characteristics of the topography enables water to be pumped from the C-41A Canal over the HHD into the old Kissimmee River channel. This area is surrounded by the HHD embankments towards the north and east, and the proposed WAF to the west. On the southern end, the Paradise Run is limited by a proposed levee, parallel to state Route 78.The channel will be excavated in some locations where it has silted in. The water will flow through the old river channel and reenter a canal at the southern end. A levee notch will be cut in the L-59 Canal to allow flow from the northern to southern parts of Paradise Run. There will also be stage control at the existing structures G-33 and G-34. The water will stage up and fill the entire wetland footprint when water is available.

In both cases, the implementation of the wetlands will not degrade the existing level of flood protection offered by various components of the C&SF Project for this area. Rehydration of the area will be controlled through the operation of pump stations by keeping water levels within the topographic constrains. U.S. Army Corps of Engineers, ER 1110-2-1150, *Engineering and Design for Civil Works Projects*, along with various other site/structure-specific regulations, will be adhered to prior to and during the PED phase.

B.2.5.3 Lake Okeechobee Herbert Hoover Dike

At the request of the LOWRP plan formulation team, the USACE Engineering team developed in May 2017 a set of plan formulation criteria to be adhered to the LOWRP alternatives and Optimized TSP. The criteria limit the higher lake stages for the LOWRP alternatives to the previously implemented WSE Regulation Schedule. Lake stages higher than those specified by the risk assessments conducted in support of the Dam Safety Modification Report (DSMR) on the HHD System would require a comprehensive dam safety reevaluation study, as the planned and approved remedial measures identified in the DSMR may not be sufficient to support higher stages. The following sections provide background information about the DMSR, criteria and results when compared with the LOWRP Optimized TSP.

B.2.5.3.1 Background

Prior to the 2008 LORS, Lake Okeechobee was operated under the WSE regulation schedule. The WSE regulation schedule held lake stages approximately 1.0–1.5 feet higher than the 2008 LORS. Prior to the implementation of the WSE Regulation Schedule, Lake Okeechobee was operated under the Run 25 regulation schedule from May 1992 through July 2000. The Run 25 regulation schedule held lake stages approximately 0.1–0.3 feet higher than the WSE regulation schedule (refer to **Figure B-9**), based on previous regional modeling analysis using a period-of-record from 1965-1995.

The LORS study which led to the implementation of the 2008 LORS was initiated because of the adverse environmental impacts that WSE Regulation Schedule had on lake ecology. Dam safety was later added as a performance criterion. Lowering a lake is one of the basic Interim Risk Reduction Measures implemented for deficient dams until appropriate rehabilitation is effectuated.

The DSMR and corresponding EIS utilized the 2008 LORS for the risk assessment and assumed that, in the absence of Federal risk reduction measures being implemented, the current regulation schedule will continue into the future. The DSMR included a sensitivity analysis to evaluate the variation in Average Annual Life Loss (AALL) and Annual Probability of Failure (APF) that could result from possible future changes in the lake regulation schedule; for this analysis, the DSMR risk assessment evaluated the Run 25 regulation schedule. The DSMR did not conduct a risk assessment using the WSE Regulation Schedule.

The DSMR assumed that the Run 25 schedule represents the maximum reasonable change (or upper bound) that could be expected from future studies. Considering that the operation schedules are indistinguishable above the 19.3 feet NGVD 29 (18.0 feet NAVD 88) elevation, there was no discernible difference between AALL estimates from the two operation schedules modeled, Run 25 and the 2008 LORS.

The DSMR recommended remediation of the remaining areas of the HHD that exhibited intolerable risk. The existing condition risk assessment completed for the HHD in 2014 identifies significant PFM that were determined to be intolerable for large portions of the dam. The DSMR addressed these failure modes and identified the mitigation needed to reduce the probability of catastrophic failure of the dam. The primary

dam safety risk drivers are internal erosion and storm surge overtopping of isolated areas of embankment. The target for risk reduction related to the HHD is to reduce risk to within USACE tolerable risk guidelines for APF and to AALL, and to consider opportunities to reduce risk to As Low as Reasonably Practicable (ALARP).

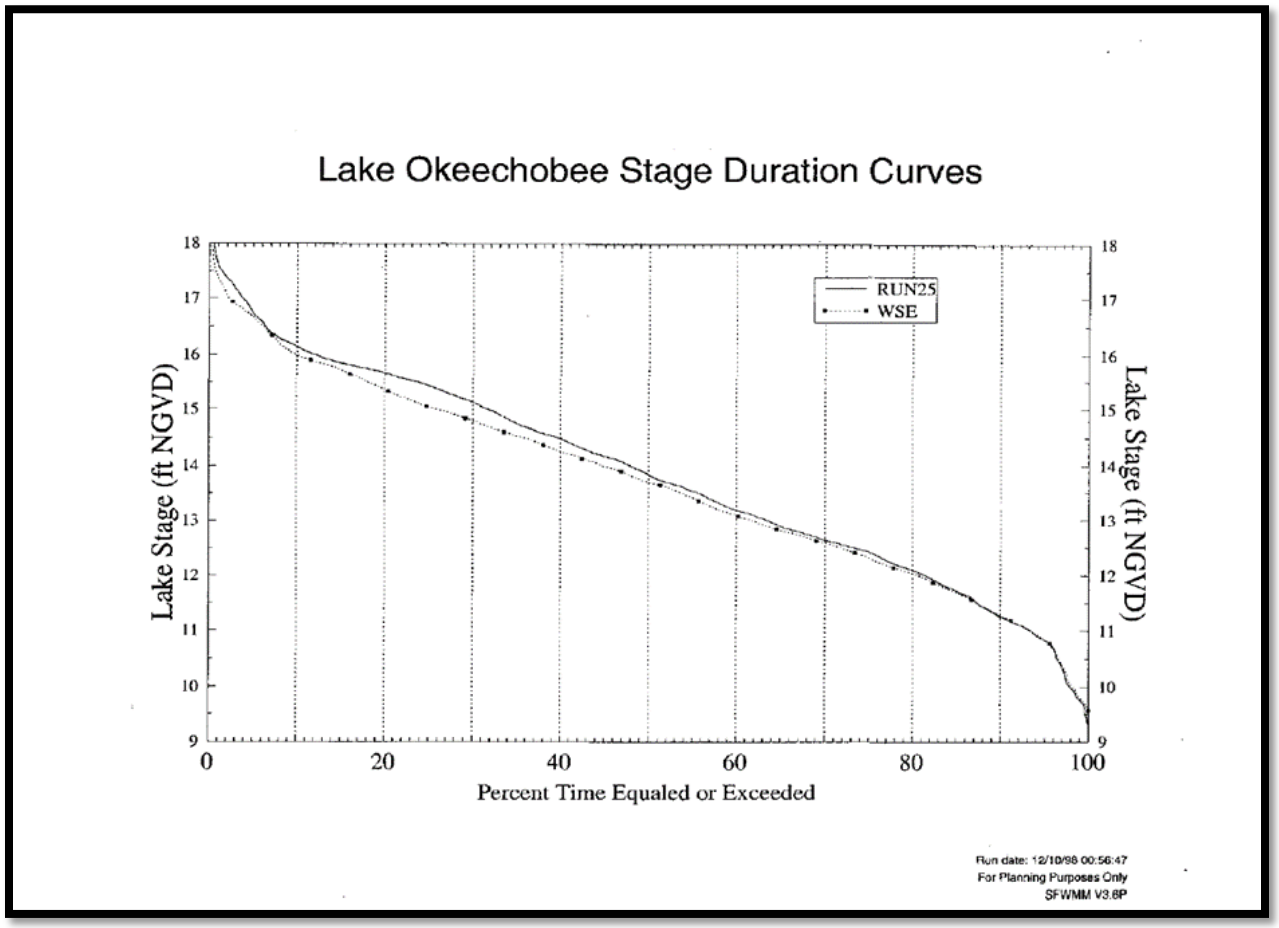

Figure B-9. Variation of Lake Okeechobee water stages with Run 25 and WSE regulation schedules (USACE, 2016).

B.2.5.3.2 LOWRP RSM-BN Sensitivity Simulation Water Supply and Environment (WSE) Regulation Schedule comparison with LOWRP Existing Condition Baseline - 2008 LORS

The following performance metrics from LOWRP RSM-BN sensitivity simulation conducted using the WSE Regulation Schedule (2017 Interagency Modeling Center) characterize the performance difference between the 2008 LORS (LOWRP Existing Condition Baseline) and the WSE Regulation Schedule (LOWRP Sensitivity Simulation with WSE Regulation Schedule replaced in the Existing Condition Baseline):

(1) Total number of days in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above 18.0 feet NGVD 29 increased from 0 days to 29 days (longest duration event is 20 days).

(2) Total number of days in the LOWRP RSM-BN period-of-record (1965-2005; 14,970 total days) with Lake Okeechobee mean daily stage above 17.25 feet NGVD 29 increased from 16 days to 537 days.

(3) Total number of days in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above the 2008 LORS Zone A (seasonal range between 16.0–17.25 feet NGVD 29) increased from 37 days to 830 days.

(4) Total number of days in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above 16.0 feet NGVD 29 increased from 859 days to 2,523 days.

(5) The number of events in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above 16.0 feet NGVD 29for longer than 90 consecutive days; increased from 3 events to 12 events.

(6) The number of events in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above 16.0 feet NGVD 29 for longer than 180 consecutive days; increased from 1 event to 5 events.

B.2.5.3.3 LOWRP Existing Condition Baseline Compared to the Optimized TSP (1BWR)

The hydrologic modeling conducted for the Optimized TSP to refine system-wide performance incorporated the Regulation Schedule management bands of the 2008 LORS. The hydrologic modeling of the Optimized TSP included proposed revisions to the 2008 LORS flow chart guidance of maximum allowable discharges, which are dependent on the following criteria:

- Class limits for Lake Okeechobee inflow and climate forecasts, including tributary hydrologic conditions, seasonal climate outlook, and multi-seasonal climate outlook
- Stage level, as delineated by the Regulation Schedule management bands
- Stage trends (whether water levels are receding or ascending)

Most of the 2008 LORS refinements applied in Optimized TSP modeling lie within the bounds of the operational limits and flexibility available in the 2008 LORS, except for the adjustments made to the class limits for the Lake Okeechobee inflow and climate forecasts. Under some hydrologic conditions, the class limit adjustments made to the Lake Okeechobee inflow and climate forecasts reduced the magnitude of allowable discharges from the Lake, thereby resulting in storage of additional water in the Lake in order to optimize system-wide performance and ensure compliance with Savings Clause requirements. However, these class limit changes represent a change in the flow chart guidance that extends beyond the inherent flexibility in the 2008 LORS. Additional information and documentation of the Optimized TSP modeling assumptions for Lake Okeechobee operations are found in **Appendix A, Annex A-3**.

Independent of implementation of the Optimized TSP, there is an expectation that revisions to the 2008 LORS will be made in response to implementation of other CERP projects, HHD infrastructure remediation, and other factors. Upon completion of HHD remediation and associated culvert improvements, and the HHD Dam Safety Action Classification (DSAC) Level 1 rating is lowered, higher maximum lake stages and increased frequency and duration of high lake stages may be possible to provide the additional storage capacity assumed with the Optimized TSP. The USACE expects to operate under the 2008 LORS until it is replaced.

Lake Okeechobee stage duration curves for the RSM-BN model simulation of the ECBLOW (2008 LORS; note that plot lines overlap), FWOLOW (2008 LORS, plus additional CERP and non-CERP projects), and 1BWR, the Optimized TSP, (LORS 2008, additional CERP and non-CERP projects, and prescribed assumed operational flexibility) are included as **Figure B-10**. Peak stages for the LOWRP Savings Clause baselines and Optimized TSP are summarized as follows: 17.58 feet NGVD for the ECBLOW; 17.65 feet NGVD for the FWOLOW; and 17.56 feet NGVD for the LOWRP Optimized TSP.

The USACE 2008 LORS Environmental Impact Statement (EIS) assessment recognized that minimizing the frequency of exceedance of the 17.25 feet elevation offers additional protection for public safety and the HHD, for the condition prior to completion of the approved and planned HHD remediation measures. The frequency of occurrence for lake stages above 16.0 feet, 16.5 feet, 17.0 feet, and 17.25 feet are summarized in **Figure B-11**. The baselines and the Optimized TSP all show simulated stages above 17.25 feet NGVD: 16 days for the ECBLOW; 30 days for the FWOLOW; and 42 days for the Optimized TSP (note: there are 14,975 days in the RSM-BN 41-year period of simulation).

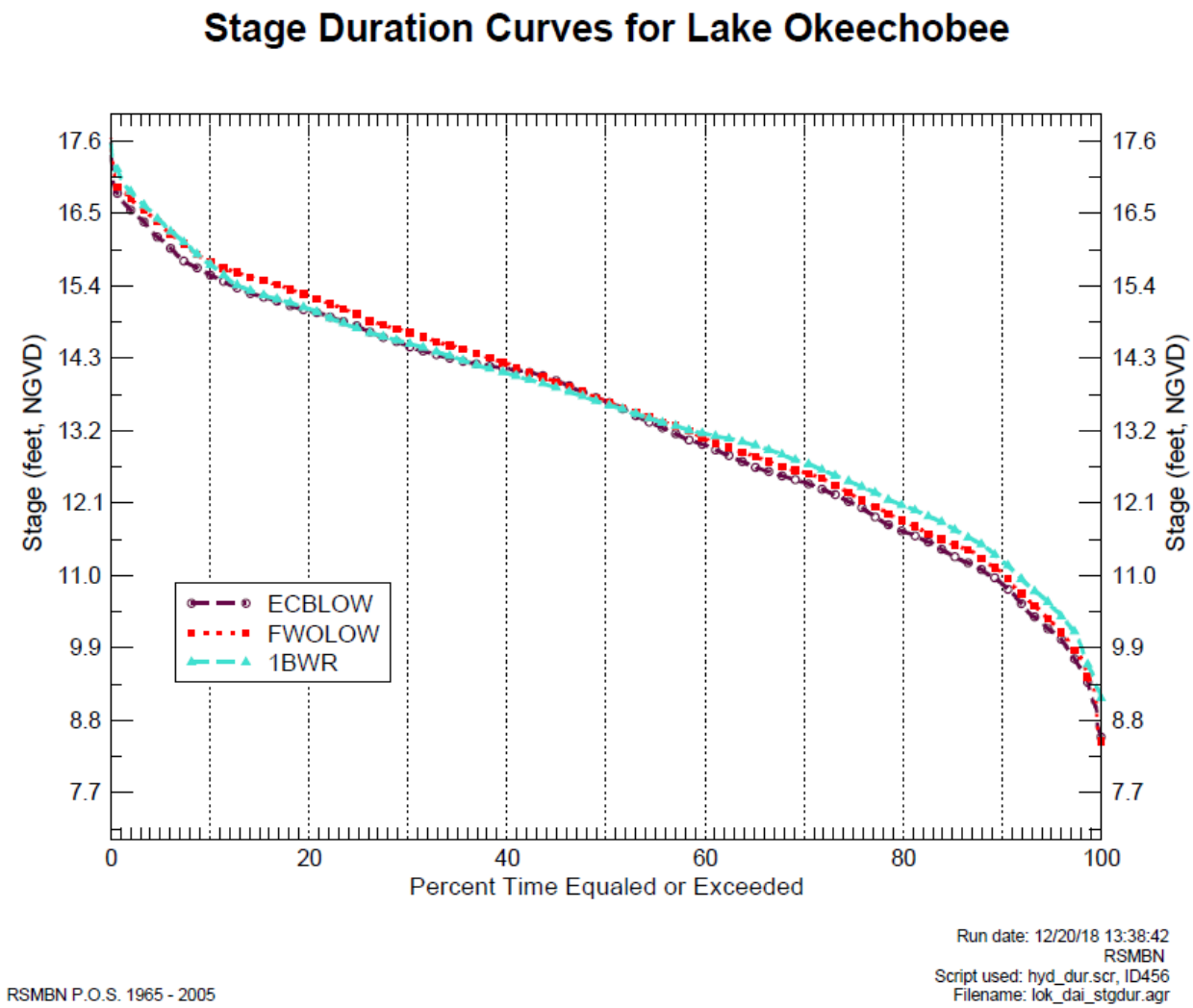

Figure B-10. Lake Okeechobee stage duration curve.

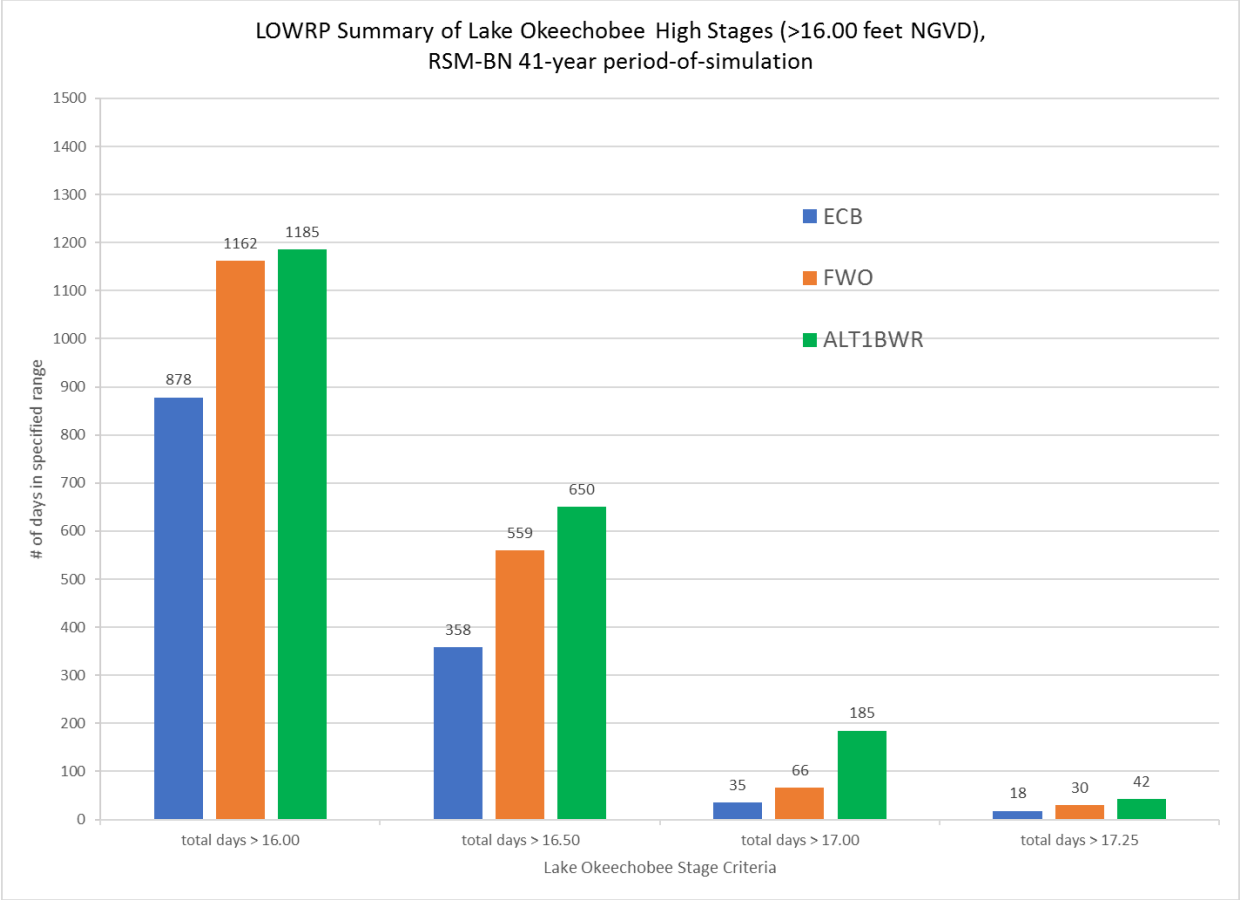

Figure B-11. Lake Okeechobee extreme high lake stage.

B.2.5.3.4 Optimized TSP comparison with LOWRP RSM-BN Sensitivity Simulation Water Supply and Environment Regulation Schedule

The modified Lake Okeechobee operations with the project does increase the frequency, duration, and magnitude of Lake Okeechobee peak stages (compared to the FWO) but it doesn't exceed the LOWRP RSM-BN Sensitivity Simulation WSE Regulation Schedule model run. Therefore, the LOWRP stage duration curve trends for increased high water conditions appear reasonable based on the expectations for the HHD remediation. The following summarized information demonstrate explicitly compliance with some of the criteria established in the USACE EN May 2017 MFR, also listed in Section 2.5.3.2 of this Annex B:

(1) 1BWR does not have events in the LOWRP RSM-BN period-of-record (1965-2005; 14,975 total days) which exceed 20 consecutive days with Lake Okeechobee mean daily stage above 18.0 feet NGVD29.

(2) 1BWR does not exceed 537 total days in the LOWRP RSM-BN period-of-record (1965-2005; 14,975 total days) with Lake Okeechobee mean daily stage above 17.25 feet NGVD29 (the maximum elevation of Zone A of the 2008 LORS Regulation Schedule). See **Figure B-12**.

(3) 1BWR does not exceed 803 days in the LOWRP RSM-BN period-of-record with Lake Okeechobee mean daily stage above the 2008 LORS Zone A (seasonal range from 16.0–17.25 feet NGVD29). See **Figure B-12**.

Following completion of the HHD remediation, the degree to which higher maximum lake stages and increased frequency and duration of high lake stages would be accepted, if at all, will be contingent on the conclusions identified in the 2015 DSMR (note: this process is independent and separate from the LOWRP). Given recognition of the DSMR uncertainty and the continued utilization of the 2008 LORS, the assessment of the Lake Okeechobee high water performance with the project indicated consistency with the HHD formulation assumptions established for the LOWRP FWO condition, which included general consideration of potential risk and uncertainty associated with increased lake stages. Lake Okeechobee high water performance requirements will likely need to be revisited following completion of a future DSMR.

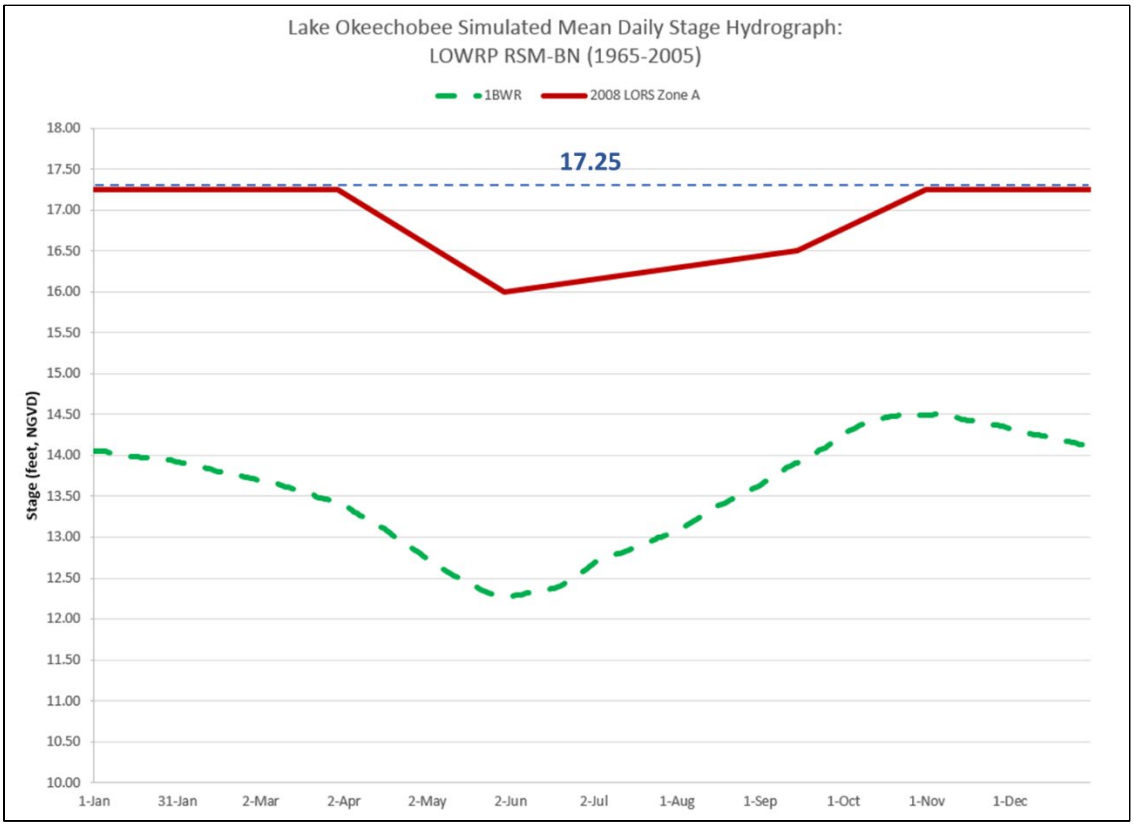

Figure B-12. Lake Okeechobee Simulated Mean Daily Stage Hydrograph for LOWRP RSM-BN (1965-2005)

B.2.6 Project Assurances – Identification of Water Made Available by the Project

The total water and the water made available for the natural system and other-water-related needs are quantified when all project features are constructed, and the project is expected to be operational as identified in the with-project condition, the Optimized TSP. The pre-project water expected to be available when the project is operational is represented by FWO.

B.2.6.1 Water Made Available for the Natural System

The habitat unit benefits were calculated during plan formulation at four locations: Lake Okeechobee, within the footprint of the WAF, the restored Kissimmee River-Center wetlands, and the restored wetlands at Paradise Run. These locations represent where ecosystem benefits (habitat units) are expected as a result of implementation of the Optimized TSP. Quantification of flows produced from all storage management features benefiting Lake Okeechobee which includes the (1) WAF assisted by ASR and (2) independent, regional ASR facilities can be found in **Figure B-13**. Quantification of flows into Kissimmee River-Center and Paradise Run wetlands can be found in **Figure B-14**. Although habitat unit benefits were tabulated for the Northern Estuaries, they benefit from reducing high discharge events. For that reason, water made available for the natural system is not quantified for the Northern Estuaries.

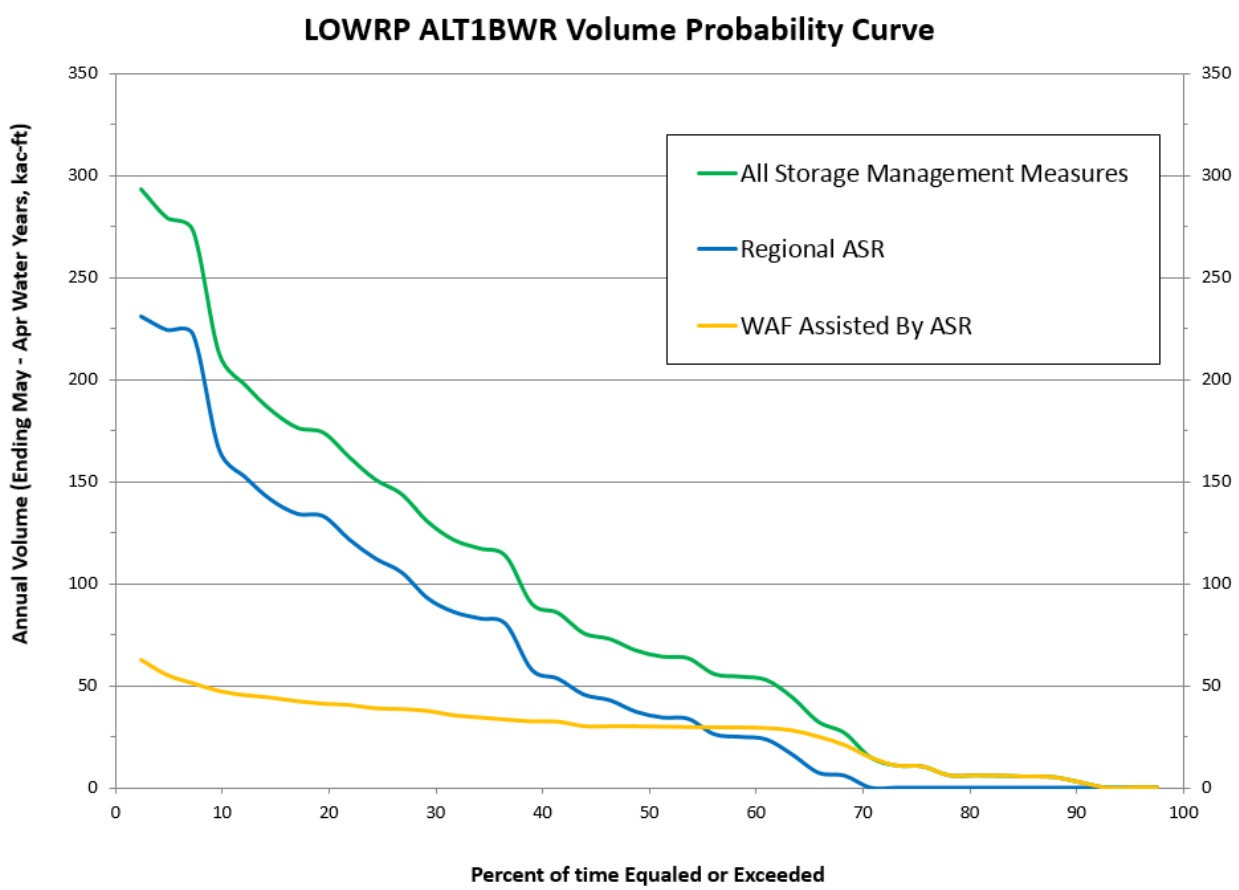

Figure B-13. LOWRP volume probability curve for Optimized TSP: WAF with wetland attenuation ASR and regional ASR.

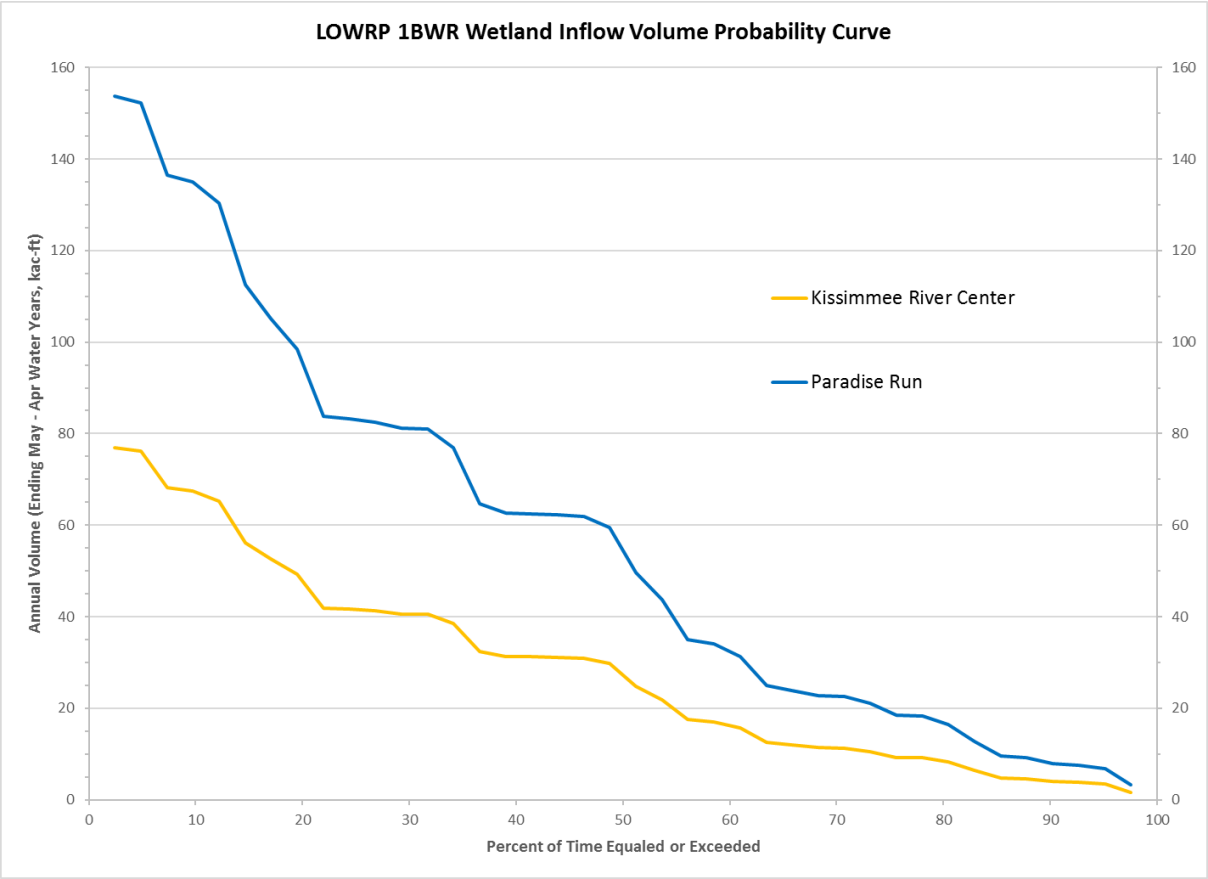

Figure B-14. LOWRP volume probability curve for Optimized TSP: Kissimmee Center and Paradise Run wetlands.

B.2.6.2 Water for Other Needs

The ability of the LOWRP water storage features to return water to Lake Okeechobee to meet other water-related needs in the LOSA and STOF Brighton and Big Cypress Reservation was analyzed for the Optimized TSP. The storage features of the LOWRP are designed to capture water from Lake Okeechobee during high stage events that would otherwise be lost to tide. Water stored in LOWRP is released during dry periods when lower stages in Lake Okeechobee may present water supply risks within LOSA. Water made available by the LOWRP benefits water users within LOSA by increasing the reliability of their supply relative to ECB or FWO.

B.3 Conclusion

Based on the analysis, the level of service for LOSA water supply is improved by the project. Water returned to Lake Okeechobee after the LOWRP storage will be available to meet all C&SF Project purposes and CERP's overarching objectives. The LOWRP's stored water, upon return to Lake Okeechobee, will be accessible to both benefit the lake ecology and meet existing legal users' needs.

The following sections summarize the results of the Savings Clause Analysis.

B.3.1 Savings Clause - Elimination or Transfer of Existing Legal Sources of Water

During high stage events, the Optimized TSP will draw water from Lake Okeechobee into a WAF or regional ASR facilities for retention until Lake Okeechobee stage falls. The WAF and co-located ASRs (wetland attenuation ASRs) and regional ASR facilities will provide storage capacity and attenuation of high flows, prior to delivery back to Lake Okeechobee. The cumulative water storage capacity of the Optimized TSP will decrease high-volume freshwater discharges from Lake Okeechobee that are currently conveyed to the Northern Estuaries.

With implementation of the Optimized TSP, sources of water to meet agricultural and urban demand in the LOSA will continue to be met by their current sources, primarily Lake Okeechobee. Sources of water for the Seminole Tribe of Florida (STOF) and Miccosukee Tribe of Indians of Florida (MTOF) are influenced by the regional water management system (C&SF Project, including Lake Okeechobee); these sources will not be negatively affected by the project. Water sources for fish and wildlife located in Lake Okeechobee and the Northern Estuaries will not be diminished. Therefore, as a result of the Optimized TSP, there will be no elimination or transfer of existing legal sources of water supply for the following:

- Agricultural or urban water supply in LOSA
- Allocation or entitlement to the Seminole Tribe of Florida under Section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e)
- Water supply for fish and wildlife in Lake Okeechobee or the Northern Estuaries

B.3.2 Savings Clause – Flood Protection

The implementation of the Optimized TSP will not degrade the existing level of flood protection offered by various components of the C&SF Project for this area. Further, the Optimized TSP will ensure flood protection of the area through engineering design and construction following state of the practice methods for design and construction of pertinent features of the plan. U.S. Army Corps of Engineers, Engineering Regulations (ER) 1110-2-1150 *Engineering and Design for Civil Works Projects* and ER 1110-2-1156 *Engineering and Design Safety of Dams – Policy and Procedures* along with various other site/structure specific regulations will be adhered to prior to and during the PED phase.

B.3.3 Project Assurances - Identifying Water for the Natural System

Identification of water for the natural system is quantified at three locations in the Optimized TSP: 1) releases from the WAF and co-located wetland attenuation ASR, 2) releases from Regional ASR (ASR separate from the WAF), and 3) deliveries to the restored wetland features at Kissimmee River-Center and Paradise Run. These locations represent inflows to the basins where ecosystem benefits (habitat units) are expected as a result of implementation of the Optimized TSP.

Water returned to Lake Okeechobee or delivered to wetland features (Kissimmee River-Center and Paradise Run) was quantified. The volumes of water at the 10th, 50th, and 90th percentiles are identified for the Optimized TSP (future with-project) condition only (**Table B-7**). Because the LOWRP storage features do not exist in the pre-project condition, water is not quantified for the without project condition. Benefits projected for the Northern Estuaries are the result of reduced discharges from Lake Okeechobee and therefore water for the natural system is not identified.

Table B-7. Water made available for the natural system by the LOWRP.

Location	Water Available equaled or exceeded 10% of Water Years (1,000 ac-ft)	Water Available equaled or exceeded 50% of Water Years (1,000 ac-ft)	Water Available equaled or exceeded 90% of Water Years (1,000 ac-ft)
Regional ASR	165	37	0
WAF Assisted by ASR	47	30	3
Kissimmee River-Center Wetlands	68	30	4
Paradise Run Wetlands	135	60	8

B.3.3.1 Water to be Reserved or Allocated for the Natural System

As required by Section 601(h)(4)(A) of the of the WRDA 2000, and Section 385.35 of the Programmatic Regulations for the Implementation of CERP, the water made available by the project will be protected using the State of Florida's reservation or allocation authority under state law as described in **Table B-7**. Water made available by the Optimized TSP must be protected before the SFWMD and Department of the Army enter into one or more Project Partnership Agreements to construct the Optimized TSP project features.

B.3.3.1.1 Lake Istokpoga/Indian Prairie Canal System - Restricted Allocation Area

The footprint of the Optimized TSP's WAF is contained within the Restricted Allocation Area (RAA) for the Lake Istokpoga/Indian Prairie Canal System. Within this RAA, no additional surface water will be allocated from District canals over and above existing allocations.

B.3.3.1.2 Lake Okeechobee Service Area - Restricted Allocation Area

Lake Okeechobee is an MFL waterbody. MFLs are the minimum flow or minimum water level at which further withdrawals would be significantly harmful to the water resources or ecology of the area. The 2008 LORS analysis revealed that the anticipated lower lake stages would turn Lake Okeechobee into an MFL waterbody in recovery. As part of the recovery strategy while 2008 LORS is in effect, the District adopted RAA criteria for LOSA. The criteria limit users' withdrawals to their base condition water use. Applicants are not authorized to use additional volumes from Lake Okeechobee waterbodies unless they identify one of the specified sources listed in the rule.

The LOSA RAA includes the waters of Lake Okeechobee including integrated conveyance systems that are hydraulically connected to and receive water from Lake Okeechobee such as the C-43 Canal, the C-44 Canal, and secondary canal systems that receive Lake Okeechobee water for water supply purposes via gravity flow or by pump.

B.3.4 Project Assurances – Identifying Water Made Available for Other Water Related Needs

The ability of the LOWRP to provide water to meet other water-related needs in the LOSA was analyzed for the Optimized TSP. Based on the analysis, the water supply level of service for existing legal users in

LOSA is improved over the FWO. Increased water supply does not enable new or expanded allocations in LOSA.

B.3.5 Project Assurances Commitments for All CERP Projects

The overarching objective of the CERP (referred to as simply the "Plan" in WRDA 2000 and the Programmatic Regulations) is the restoration, preservation, and protection of the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Federal government and the State of Florida are committed to the protection of the appropriate quantity, quality, timing, and distribution of water to achieve and maintain the benefits to the natural system described in CERP. As envisioned in WRDA 2000 and the Programmatic Regulations, each PIR will identify this appropriate quantity, quality, timing, and distribution of water for the natural system.

The following language sets forth these commitments:

> The overarching objective of the Plan is the restoration, preservation, and protection of the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Federal Government and the non-Federal sponsor are committed to the protection of the appropriate quantity, quality, timing, and distribution of water to ensure the restoration, preservation, and protection of the natural system as defined in WRDA 2000, for so long as the project remains authorized. This quantity, quality, timing, and distribution of water shall meet applicable water quality standards and be consistent with the natural system restoration goals and purposes of CERP, as the Plan is defined in the programmatic regulations. The non-Federal sponsor will protect the water for the natural system by taking the following actions to achieve the overarching natural system objectives of the Plan:
>
> 1. Ensure, through appropriate and legally enforceable means under Federal law, that the quantity, quality, timing, and distribution of existing water that the Federal Government and the non-Federal sponsor have determined in this Project Implementation Report is available to the natural system, will be available at the time the Project Partnership Agreement for the project is executed and will remain available for so long as the Project remains authorized.
>
> 2a. Prior to the execution of the Project Partnership Agreement, reserve or allocate for the natural system the necessary amount of water that will be made available by the project that the Federal Government and the non-Federal sponsor have determined in this Project Implementation Report.
>
> 2b. After the Project Partnership Agreement is signed and the project becomes operational, make such revisions under Florida law to this reservation or allocation of water that the Federal Government and the non-Federal sponsor determines, as a result of changed circumstances or new information, is beneficial for the natural system.
>
> 3. For so long as the Project remains authorized, notify and consult with the Secretary of the Army should any revision in the reservation of water or other

legally enforceable means of protecting water be proposed by the non-Federal sponsor, so that the Federal Government can assure itself that the changed reservation or legally enforceable means of protecting water conform with the non-Federal sponsor's commitments under paragraphs 1 and 2. Any change to a reservation or allocation of water made available by the project shall require an amendment to the Project Partnership Agreement

B.4 State Compliance Report

The State Compliance Report, Section 373.1501, Florida Statutes, follows.