



County Administration

P.O. Box 1989
West Palm Beach, FL 33402-1989
(561) 355-2040
FAX: (561) 355-3982
www.pbcgov.com



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February 7, 2022

Natalie Kraft
Lead Scientist, Applied Sciences Bureau
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

Dear Ms. Kraft,

**Subject: Palm Beach County Comments on Rulemaking to Protect
Water Made Available by the Loxahatchee River
Watershed Restoration Project**

Palm Beach County (County) supports South Florida Water Management District (SFWMD or District) efforts to advance Comprehensive Everglades Restoration Plan (CERP) projects within the County. More specifically, the County supports the District's ongoing rulemaking effort related to implementing the Loxahatchee River Watershed Restoration Project (LRWRP) and its associated forward momentum. This letter is intended to communicate the County's initial concerns and other comments to SFWMD based on the County's review of the proposed rule, published in the Florida Administrative Register on December 21, 2021, revisions to the Applicant's Handbook for Water Use Permit Applications (Applicant's Handbook), released January 12, 2022, the Draft Technical Document Supporting Rulemaking to Protect Water Made Available by the Loxahatchee River Watershed Restoration Project (Technical Document), dated January 2022, and the County's participation in Rule Development Workshop #1, held virtually on January 25, 2022.

Overall, the County has some key concerns and would like a clear understanding of the proposed rule's potential impacts on the County's natural areas, future water resources projects, and existing and future legal uses of water. In addition to the comments provided herein, Attachment 1 is the Applicant's Handbook with detailed County comments and Attachment 2 is the Technical Document with detailed County comments. Attachment 3 is a map of the SFWMD-proposed North Palm Beach County/Loxahatchee River Watershed Water Body boundaries along with boundaries of County Natural Areas that is intended to assist in communicating the inconsistencies in the above-referenced documents described below.

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The County is an integral partner and stakeholder in the joint state-federal process to restore and protect the Loxahatchee River watershed. The County, in collaboration with state and local partners, has invested well over \$400 million to acquire, restore and manage over 30,700 acres of land within the watershed. The County recognizes the District's obligation to allocate or reserve water related to this CERP project and the desire of SFWMD to move quickly with this rulemaking effort in advance of negotiating and executing a Project Partnership Agreement with the United States Army Corps of Engineers (USACE) later this year. However, public engagement activities and the quality of final rule language should not be sacrificed to meet arbitrary administrative deadlines and therefore the County urges the District to allocate sufficient time for this rulemaking effort.

Below are the County's observations, suggestions and questions compiled to date on the subject rulemaking effort:

1. The County seeks a better understanding regarding why the District chose to meet its statutory obligations to allocate or reserve water made available by LRWRP by expanding the Lower East Coast Everglades Waterbodies and Northern Palm Beach County/Loxahatchee River Watershed Waterbodies Restricted Allocation Area instead of implementing a water reservation. This decision seems to deviate from the District's previous practice of implementing a water reservation to meet its statutory requirements for other CERP projects, even when the area was already subject to a restricted allocation area. During Rule Development Workshop #1, District staff stated that duplicative rulemaking concerns and Governor DeSantis' Executive Order 19-12 influenced the District's current position. As such, the County requests additional information on this SFWMD decision because the stated concerns and Executive Order 19-12 existed during the District's prior rulemaking efforts in 2020 (e.g. Everglades Agricultural Area Reservoir) and yet the District chose to enact water reservations.
2. Section 1.1 (Definitions) of the Applicant's Handbook needs substantial revisions. First, some of the terms are "short-hand" and not the proper nor legal names of the identified areas/waterbodies. For example, the County owns and the County's Environmental Resources Management Department manages Loxahatchee Slough Natural Area, Hungryland Slough Natural Area, and Pine Glades Natural Area, not the Loxahatchee Slough, Hungryland Slough, and Pine Glades. Additionally, the reliance on the proposed Figure 3-2 within the Applicant's Handbook leads to significant confusion because the proposed Figure 3-2 is vague and inaccurately labeled. To highlight this confusion, the purple-shaded area immediately southeast of the Hungryland Slough Natural Area label and east of the C-18W Reservoir Area appears to incorporate portions of a privately-owned development and County's Sweetbay Natural Area, both of which are not labeled in proposed Figure 3.2 or defined in Section 1.1. In addition, the County's Cypress Creek and Pine Glades Natural Areas are not labeled on proposed Figure 3.2. The County suggests the District reevaluate the proposed definition and Figure 3-2 and revise both accordingly. Any revisions to the proposed definition and Figure 3-2 should also be included in the Technical Document.
3. Additional terms within the Applicant's Handbook are also unclear, undefined, or unnecessary. As presented, the proposed rule addresses impacts to the proposed use of

surface water and groundwater from integrated conveyance systems that are hydraulically connected to the defined waterbodies and the waterbodies themselves. The proposed rule identifies “integrated conveyance systems” as primary canals as well as secondary and tertiary canals that derive water from the defined waterbodies. Because proposed Figure 3-2 is the basis for these defined waterbodies, the confusion noted above leads to more confusion on what waterbodies are included as part of the “integrated conveyance systems”. The District’s reference to the “Central and Southern Florida Project Canals” provides little assistance because this term is not defined within the proposed rule nor within the larger definition section of the Applicant’s Handbook. The County suggests the District provide additional clarity on these terms. Additionally, the County suggests removal of “Acceler8 projects” and including a definition for “State Water Quality Standards” within the final rule as the first term is likely unnecessary and the second is undefined.

4. The County requests additional discussion on how the proposed rule may affect the surrounding natural areas. The Technical Document recognizes “[a]pproximately 63% of the watershed is natural area” and at least one County natural area, the Loxahatchee Slough Natural Area, is identified as one of the “eight major natural areas” within the Loxahatchee River watershed. The County would like clarification on how the proposed rule language’s expanded restrictions on consumptive uses will impact the surface water, groundwater, and the potential for excess or “available wet season water” within the watershed and specifically the County’s natural areas. As stated above, the County, in collaboration with state and local partners, has invested over \$400 million in the acquisition, restoration and management of its natural areas and is concerned that the proposed rule could negatively impact these efforts. This concern is highlighted by the Technical Document’s failure to discuss any potential impacts to the Florida Fish and Wildlife Conservation Commission’s J.W. Corbett Wildlife Management Area (Corbett WMA) or the County’s Hungryland Slough Natural Area. As identified in Figures 5-4 and 5-5 of the Technical Document, LRWRP’s modeled Aquifer Storage and Recovery (ASR) wells will create a 1-foot drawdown of groundwater. This drawdown will impact both the Corbett WMA and Hungryland Slough Natural Area, however, there is no discussion or analysis within the Technical Document on this point. The current unknowns created by the proposed rule language could lead to significant ramifications to the County’s natural areas. Please provide further discussion on the potential impacts of the proposed ASR wells and confirm the proposed rule language will not adversely affect the hydrology of these natural areas.
5. The County hopes to further understand the interplay between the proposed rule language and potential for excess or “available wet season water.” The USACE’s LRWRP Final Integrated Project Implementation Report and Environmental Impact Statement (PIR/EIS) identifies that water for LRWRP needs to be protected in 5 locations; one of those locations is flows from Indian Trail Improvement District (ITID) to the C-18W Reservoir. The M-0 Canal seems to be identified within proposed Figure 3-2 in the Applicant’s Handbook to meet this requirement. Because the proposed rule expands a restricted allocation area, the finalized rule language will apply when evaluating consumptive uses. The County seeks a better understanding on the consequences of the proposed rule, when applied in conjunction with the rest of the Applicant’s Handbook Section 3.2.1.E’s current criteria. Applicant’s Handbook Section

3.2.1.E.5 identifies that an applicant can identify “available wet season water” (i.e. excess water) and obtain allocations for the same under the conditions listed in Section 3.2.1.E.6. The County would like to understand what surface water and groundwater flows are restricted and how these restrictions may marry with the “available wet season water” that could be allocated to future consumptive uses and users. The County is currently evaluating the feasibility of implementing water storage projects to capture and store excess water from this area that is currently discharged in an undesirable manner to the Lake Worth Lagoon Estuary. Such projects may capture flows from the M-0 Canal and other ITID canals. Without additional clarity from the District, the proposed rule could hinder the County’s ability to initiate a water storage project within the watershed.

6. The County also seeks clarification on the groundwater restrictions within the proposed rule. This is the first time the District is required to protect or restrict groundwater for ASR wells included as part of a CERP project. Recognizing the precedential nature of this rule language, the County has concerns with the proposed rule, as written. The District’s reliance on proposed Figure 3-4 within the Applicant’s Handbook to define not only the lands for the C-18W Reservoir, but also the associated buffer zone, is vague and confusing. First, the County recommends the District add a definition for the C-18W Reservoir. Additionally, terms and restrictions within proposed Section G of the Applicant’s Handbook are inconsistent. For example, the Section G of the Applicant’s Handbook discusses an “associated buffer zone”, but Figure 3-4 includes a red dashed box labeled as the “Groundwater Protection Area Perimeter.” Further, the proposed language in the second paragraph of Section G states “[t]he applicant shall provide reasonable assurance that the requested allocation will not withdraw from the portion of the upper F[loridan] A[quifer] S[ystem] underlying the C-18W Reservoir and associated buffer zone...”, however, a later paragraph appears to allow groundwater allocations that “...will not result in 1-foot or more of drawdown...” from the exact same area. Additional definitions should be included and these inconsistencies should be rectified before the rule is finalized.
7. The County requests further discussion in the Technical Document regarding the methodologies used to determine the 1-foot drawdown and the groundwater bubble for the ASR wells. The Technical Document simply concludes that a “1-mile buffer from the boundaries of the C-18W Reservoir parcel was determined as the area necessary to protect the project water stored via ASR” and this conclusion seems to be the basis for the proposed rule’s new groundwater restrictions. Additional analysis within the Technical Document will be helpful for stakeholders.
8. Based on the County’s review of the SFWMD documents provided to date, additional time is needed for public comment, stakeholder engagement, and to allow the District to revise the proposed rule language within the rulemaking schedule. The District’s public comment period ending February 7, 2022 should be an initial comment period. Additional public comment periods are needed as well as sufficient time for discussion between stakeholders and the District. Additional time will go a long way to address not only the County’s current questions and initial concerns but also allow time for improvements to the proposed rule language before it is finalized. In addition, the District should present the proposed rule language to

the Loxahatchee River Management Coordinating Council (LRMCC) and solicit its feedback in accordance with the LRMCC's enacting legislation which empowers the LRMCC to "review, make recommendations... and render non-binding advisory opinions to the board [SFWMD] and the department [FDEP]." ¹

The County will continue to monitor and actively engage in this rule development process and looks forward to participating in the upcoming Rule Development Workshop #2 scheduled for February 22, 2022.

Sincerely,

A handwritten signature in black ink that reads "J McBryan" with a horizontal line extending to the right.

Jeremy McBryan, PE, CFM
County Water Resources Manager

Attachments (3)

cc: Lawrence Glenn, South Florida Water Management District
Sky Notestein, South Florida Water Management District
Jennifer Brown, South Florida Water Management District
Simon Sunderland, South Florida Water Management District
Jay Steinle, South Florida Water Management District
Patrick Rutter, Assistant County Administrator, Palm Beach County
Todd Bonlarron, Assistant County Administrator, Palm Beach County
Deborah Drum, Director, Environmental Resources Management, Palm Beach County
Michael W. Jones, Chief Assistant County Attorney
Scott A. Stone, Assistant County Attorney
Laura S. Olympio, Manson Bolves Donaldson Varn
Sheryl G. Wood, Manson Bolves Donaldson Varn

¹ See Laws of Florida 83-358 §5(3)(o).

Attachment 1

Applicant's Handbook for Water Use Permit Applications with Detailed
Comments from Palm Beach County

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

1.1 Definitions

Additional definitions can be found in Chapter 373, F.S., and Chapters 40E-3, 40E-8, and 62-40, F.A.C.

North Palm Beach County /Loxahatchee River Watershed Waterbodies - as used in Subsection 3.2.1.E, is defined as the surface and groundwater from the City of West Palm Beach Grassy Waters Preserve, Water Catchment Area, Pal-Mar and J.W. Corbett Wildlife Management Area, Loxahatchee Slough, Loxahatchee River, Riverbend Park, Dupuis Reserve, Jonathan Dickenson State Park, Kitching Creek, Moonshine Creek, Cypress Creek, and Hobe Grove Ditch, Hungryland Slough, Pine Glades, and the C-18W Reservoir, as depicted in Figure 3-2.

replace with "Loxahatchee Slough Natural Area"

add comma and delete the word "and"

add Cypress Creek Natural Area

replace with "Hungryland Slough Natural Area"

replace with "Pine Glades Natural Area"

3.2 Source Specific Criteria

3.2.1 Restricted Allocation Areas

Due to concerns regarding water availability, the following geographic areas are restricted with regard to the utilization of specific water supply sources. These areas and sources include the following:

Figure 3.1 identifies the area as the North Palm Beach County Service Area. Since Martin County is included, perhaps the "Loxahatchee River Service Area" would be a better term.

E. Lower East Coast Regional Water Availability

In addition to all other applicable consumptive use statutory and rule provisions, the following restrictions shall apply when allocating water by permit for water use withdrawals within the Northern Palm Beach County Service Area and Lower East Coast Service Areas 1, 2 or 3.

Should the title be amended to add the words "and Northern Palm Beach County" (or as amended)?

should this be "and" instead of "or"?

Subsection 3.2.1.E is a component of recovery strategies for MFLs for the Everglades and the Northwest Fork of the Loxahatchee River, as set forth in Chapter 40E-8, F.A.C., and assists in implementing the objective of the District to ensure that water necessary for Everglades restoration and restoration of the Loxahatchee River Watershed is not allocated for consumptive use upon permit renewal or modification under this rule.

1. - 2. No Change.

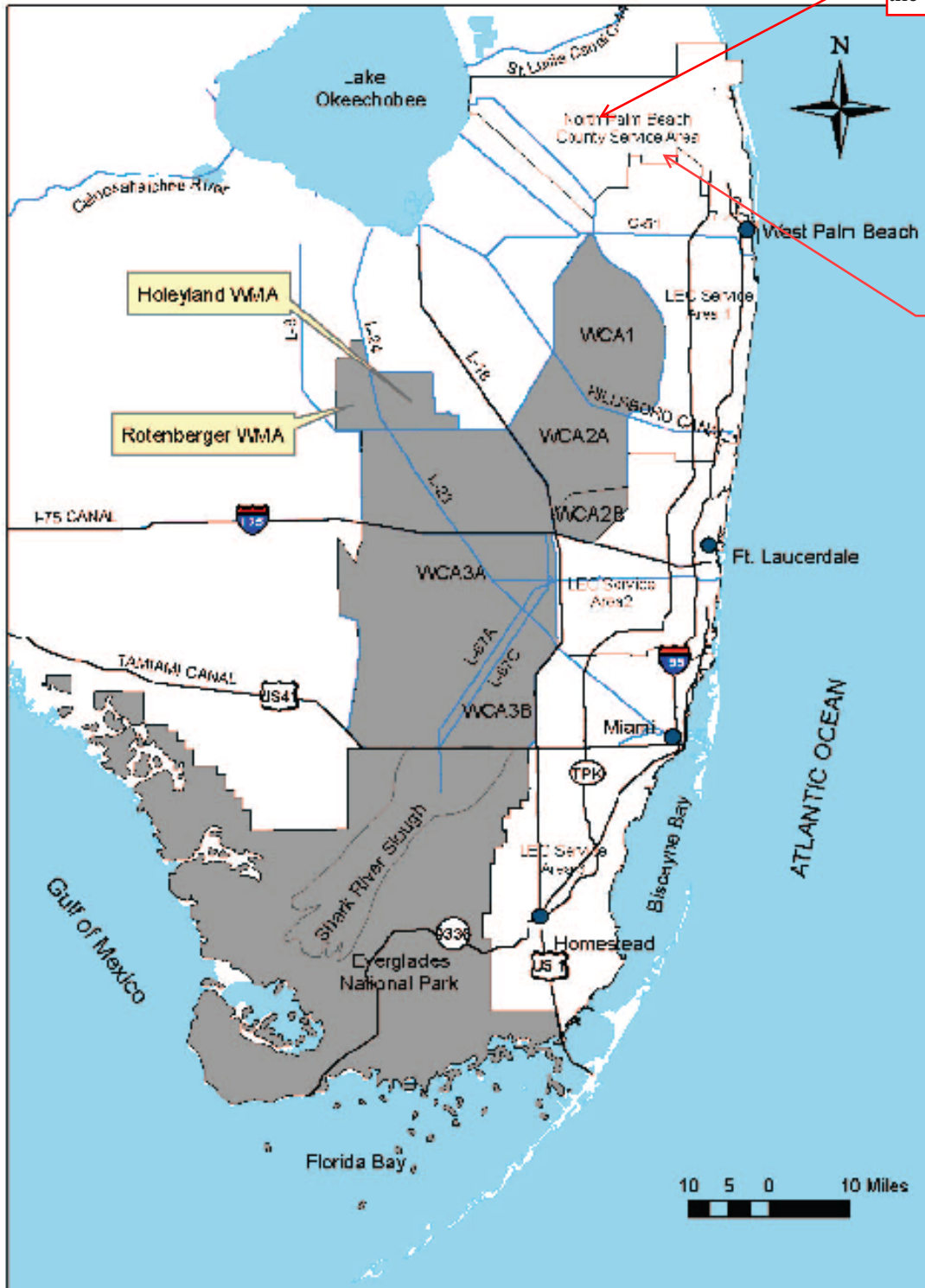
The evaluation of water withdrawn from Waterbodies under this section shall address the impacts of the proposed use on surface water and groundwater from: a) integrated conveyance systems that are hydraulically connected to the subject Waterbodies and are tributary to or receive water from such Waterbodies; and b) the Waterbodies. Integrated conveyance systems that are hydraulically connected to the subject Waterbodies include primary canals used for water supply including, but not limited to, the Central and Southern Florida Project Canals, and secondary and tertiary canals that derive water from primary canals.

3. - 7. No Change.

Where are these defined? (I could not find a definition in the full version of the Handbook.)

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

Subsection 3.2.1.E uses the word "Northern".



It is very difficult to determine which lands make up the "North Palm Beach County Service Area." Please make sure it includes all of the areas listed in Section 1.1 as revised.

The labels are very difficult to read on this map.

FIG. 3-1: Lower East Coast Everglades Waterbodies and Major Integrated Conveyance Canals

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

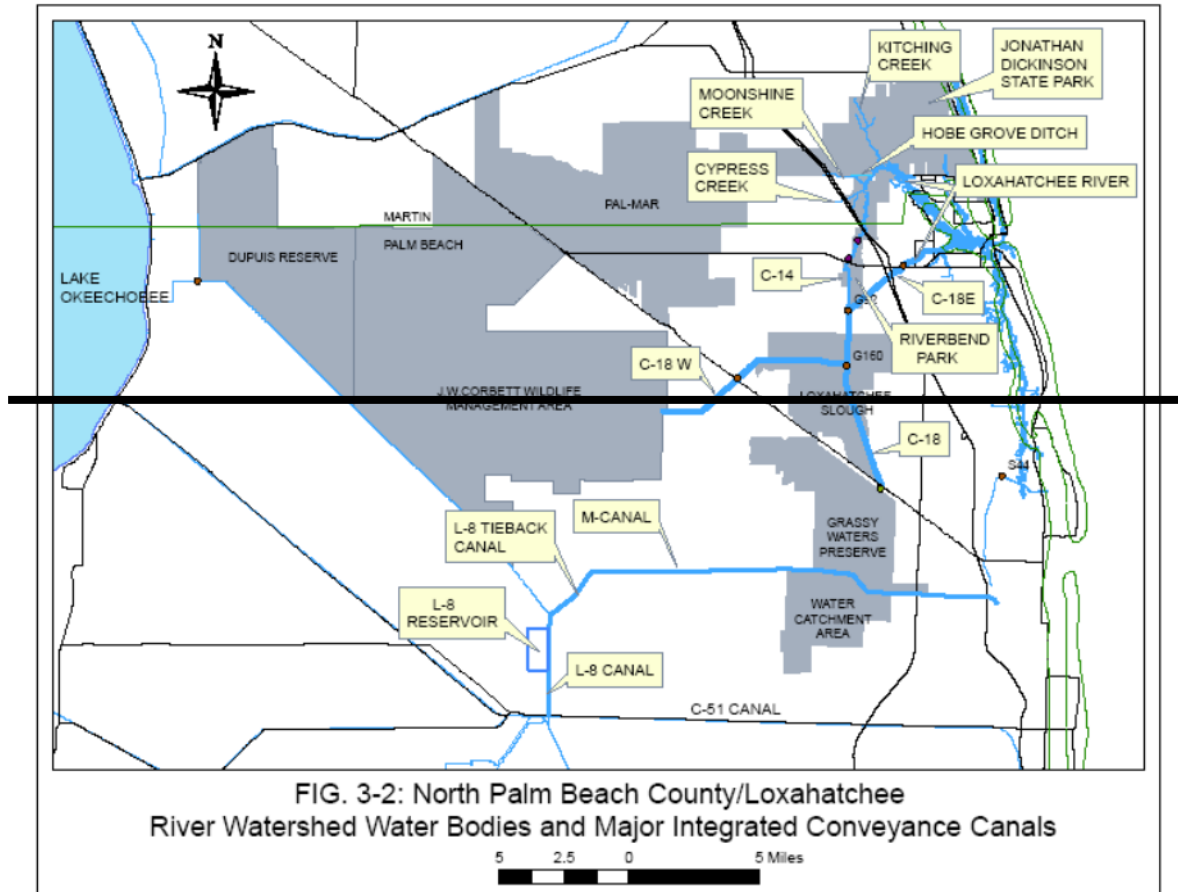


FIG. 3-2: North Palm Beach County/Loxahatchee River Watershed Water Bodies and Major Integrated Conveyance Canals

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APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

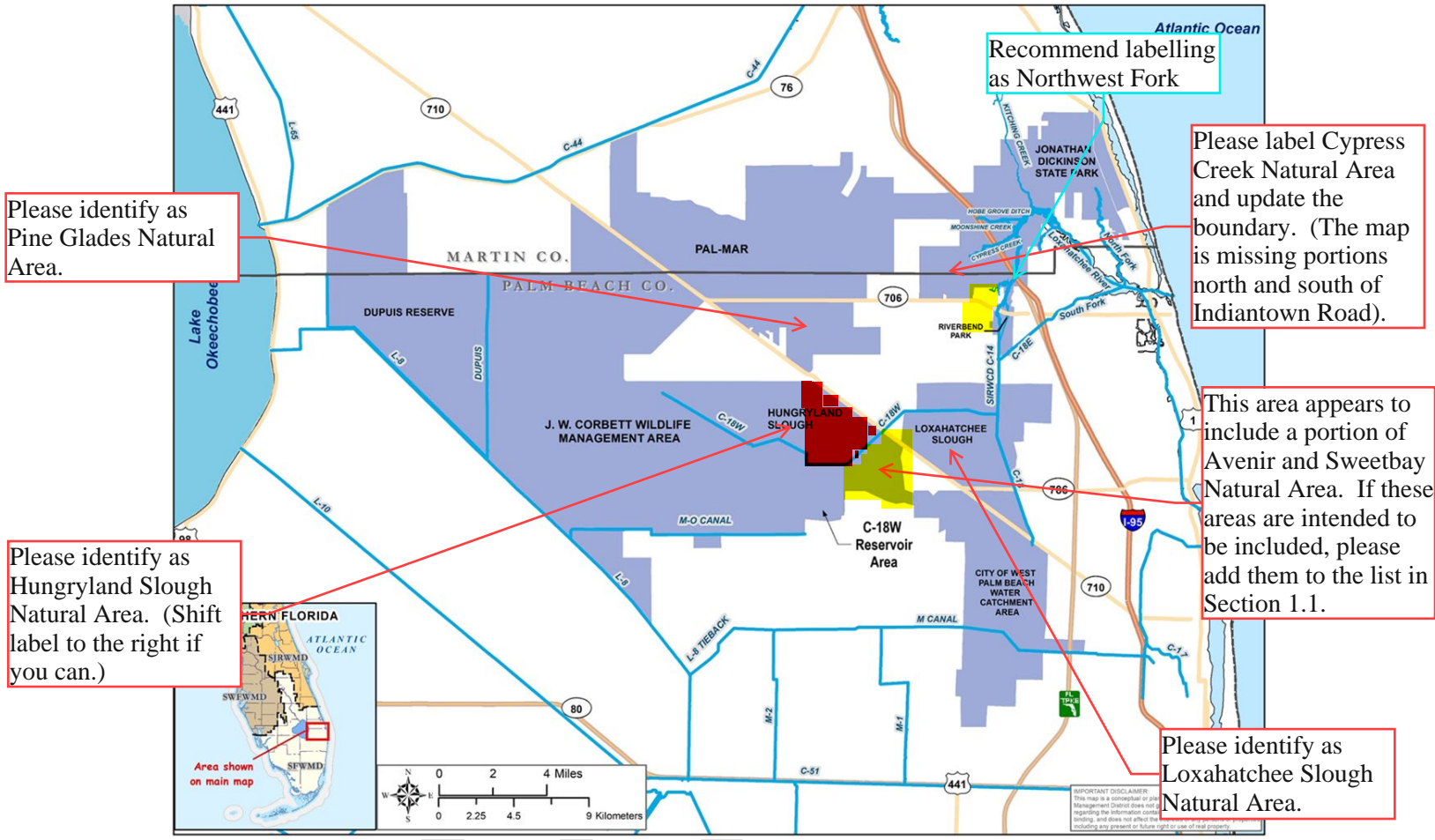


Figure 3-2. North Palm Beach County/Loxahatchee River Watershed Water Bodies and Major Integrated Conveyance Canals.

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

G. Aquifer Storage and Recovery Systems Utilizing the Upper Floridan Aquifer System

The following restrictions shall apply when allocating groundwater stored in the upper Floridan aquifer system (upper FAS) beneath the C-18W Reservoir, as depicted in Figure 3-4. This subsection assists in implementing the District's objective of ensuring that water necessary for the restoration of the Loxahatchee River Watershed is not allocated to consumptive use upon permit issuance, renewal, or modification under these criteria.

This text says "will not withdraw", however, subsection 2 below allows up to 1 foot of water to be removed from the upper FAS for non-river restoration purposes.

The applicant shall provide reasonable assurance that the requested allocation will not withdraw from the portion of the upper FAS underlying the C-18W Reservoir and associated buffer zone delineated in Figure 3-4. This demonstration is provided when the following criteria, pursuant to the impact evaluation provisions in Subsection 3.1.2, are met:

1. The requested allocation will not interfere with the C-18 W Reservoir ASR wells as described in Section 3.7, below; or,
2. The requested allocation will not result in 1-foot or more of drawdown to the portion of the upper FAS that underlies the C-18W Reservoir groundwater buffer zone delineated in Figure 3-4.

For existing legal users of the upper FAS as of [rule effective date] whose cone of depression intersects the zone delineated in Figure 3-4, the use may be renewed. However, no additional allocations that increase the withdrawal's impact beyond that of the previously permitted use as of [rule effective date] will be authorized.

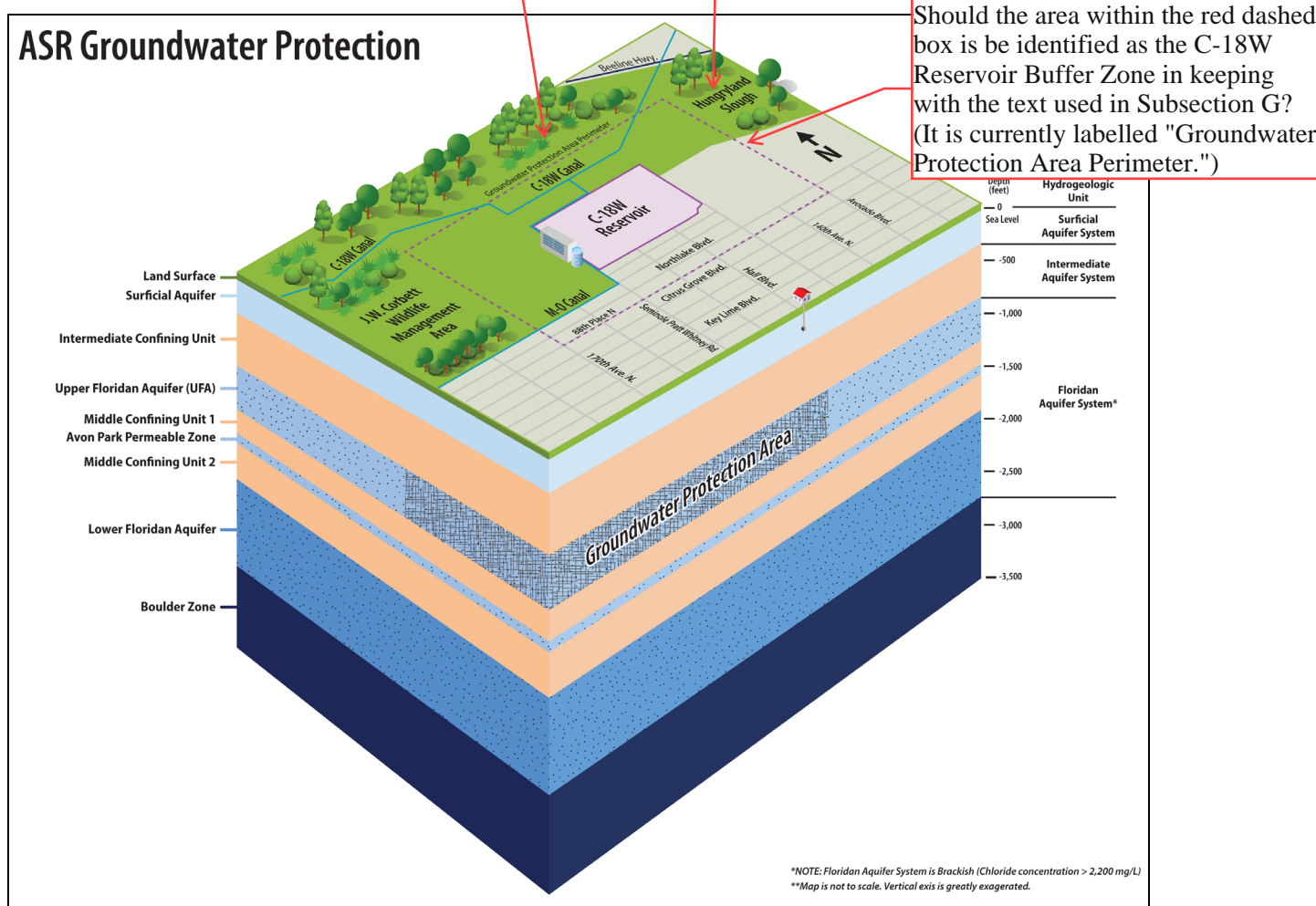
recommend that this text be changed to "...allocation, in combination with prior permitted allocations, will not..."

I don't see a definition of the C-18W Reservoir in Section 3.7.

Please move the label for "Hungryland Slough Natural Area" to this portion of the figure.

This label is in the wrong location. This area is part of the Avenir Development.

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS



Should the area within the red dashed box be identified as the C-18W Reservoir Buffer Zone in keeping with the text used in Subsection G? (It is currently labelled "Groundwater Protection Area Perimeter.")

Figure 3-4. Area of upper Floridan aquifer system protection related to the C-18W Reservoir and associated aquifer storage and recovery (ASR) wells.

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

3.7 Interference with Existing Legal Users

To obtain a water use permit the applicant must provide reasonable assurance that it will not interfere with any existing legal use of water, pursuant to Section 373.223(1)(b), F.S. In general, an applicant must provide reasonable assurances that the proposed withdrawal of water, together with other exempt or permitted uses ~~withdrawals~~ within the cone of influence of the proposed withdrawal, will not result in interference with those existing legal uses.

3.7.2 Definition of Interference with an Existing Legal Use

Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1-in-10 year drought event that results in the:

- A. Inability to withdraw water consistent with provisions of the permit or exempt use, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference;
- B. Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or when such change is imminent; ~~or,~~
- C. Inability of an existing legal user to meet its permitted demands without exceeding the permitted allocation; ~~:-~~
- D. If the proposed use is an ASR system, the applicant shall identify all existing legal uses within the area of influence and provide reasonable assurance that the operation of the proposed ASR system will not cause interference per the criteria contained in Subsections 3.7 and Subsection 3.10; or, ~~:-~~
- E. If the existing legal use is an ASR system, 1) the transmittance of ASR waters away from the delineated project area by changing or accelerating the flow velocity or flow direction; or 2) a change in the concentration of total dissolved solids

is this a reduction by the applicant? the existing legal use? or both?

recommend "increase" instead of "change"

Suggest the addition of the words "...for the applicant..."

3.7.3 Mitigation Requirements for Interference with Existing Legal Uses

If the applicant cannot provide reasonable assurance that a proposed withdrawal will not interfere with existing legal uses, the applicant must submit a mitigation plan. The mitigation plan shall identify actions necessary to mitigate for interference once the impact has occurred, or is imminent. Such actions must be sufficient to provide water consistent with the authorized use and will require a permit modification if required by Rule 40E-2.331, F.A.C. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means. If the existing legal use is an ASR system, replacement of the impacted user's equipment shall not be included in the mitigation plan.

applicant's withdrawal source?

Once the permit is issued, the permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the permittee's withdrawals, consistent with the approved mitigation plan. The mitigation plan will require a permittee to mitigate

Perhaps change to "...the applicant's mitigation plan..."

relocation of the applicant's wells?

Suggest that you insert the word "applicant's" here.

APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS

immediately, or upon the actual occurrence of an interference. The determination of when mitigation is required is based upon the likelihood that the interference is projected to occur.

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Attachment 2

Draft Technical Document Supporting Rulemaking to Protect Water Made
Available by the Loxahatchee River Watershed Restoration Project with
Detailed Comments from Palm Beach County

1 **TECHNICAL DOCUMENT SUPPORTING**
2 **RULEMAKING TO PROTECT WATER MADE**
3 **AVAILABLE BY THE LOXAHATCHEE RIVER**
4 **WATERSHED RESTORATION PROJECT**

5 Draft Report

6 January 2022



8 South Florida Water Management District

9 West Palm Beach, FL

10 **EXECUTIVE SUMMARY**

11 This technical document supports amending the South Florida Water Management District (SFWMD or
12 District) consumptive use permitting criteria to protect water made available by the Loxahatchee River
13 Watershed Restoration Project (LRWRP), a component of the Comprehensive Everglades Restoration Plan
14 (CERP). CERP is the framework to restore the Greater Everglades ecosystem, and the LRWRP aims to
15 improve the quantity, quality, timing, and distribution of water flows to the Northwest Fork of the
16 Loxahatchee River. The LRWRP is also a component of the Northwest Fork of the Loxahatchee River
17 minimum flow and minimum water level (MFL) recovery strategy [Subsection 40E-8.421(6), Florida
18 Administrative Code].

19 The SFWMD will design and construct the LRWRP as the non-federal sponsor of the project. The United
20 States Army Corps of Engineers (USACE) and SFWMD plan to execute a project partnership agreement
21 by September 2022. Project design is scheduled to begin in 2022, with construction occurring between 2023
22 and 2029. The operational testing and monitoring periods are expected to end in 2031.

23 The need to protect water for CERP projects arises from the Water Resources Development Act of 2000
24 (Public Law 106-541) and Section 373.470(3)(c), Florida Statutes, which require the SFWMD to allocate
25 or reserve the increase in water for the natural system resulting from a CERP project. The SFWMD fulfills
26 this requirement by adopting water reservations, consumptive use permitting rules, or both.

27 Specific rule development to protect water made available by the LRWRP involves amending the existing
28 Lower East Coast Regional Water Availability restricted allocation area (RAA) criteria to expand the
29 definition of North Palm Beach County/Loxahatchee River Watershed Waterbodies to include the project
30 components identified in the LRWRP. Including the project components increases the areal extent of the
31 RAA approximately 10%.

32 The rule development effort will also adopt new rules to protect the groundwater associated with the
33 LRWRP aquifer storage and recovery (ASR) wells. The ASR wells are anticipated to be constructed along
34 the western perimeter of the C-18W Reservoir. However, the final locations of the ASR wells have yet to
35 be determined. To account for this contingency, a conservative distance of 1 mile from the perimeter of the
36 reservoir is proposed to protect the project water stored via ASR wells. Existing legal users of surface water
37 and groundwater shall be protected so long as such use is not contrary to the public interest.

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103 **ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASURE**

104	ac-ft	acre-foot
105	APPZ	Avon Park permeable zone
106	ASR	aquifer storage and recovery
107	bls	below land surface
108	C&SF Project	Central and Southern Florida Flood Control Project
109	CERP	Comprehensive Everglades Restoration Plan
110	cfs	cubic feet per second
111	District	South Florida Water Management District
112	F.A.C.	Florida Administrative Code
113	F.S.	Florida Statutes
114	FAS	Floridan aquifer system
115	ft	foot
116	LRWRP	Loxahatchee River Watershed Restoration Project
117	MFL	minimum flow and minimum water level
118	mg/L	milligrams per liter
119	mgd	million gallons per day
120	NGVD29	National Geodetic Vertical Datum of 1929
121	PIR-EIS	Project Implementation Report and Environmental Impact Statement
122	PPA	project partnership agreement
123	RAA	restricted allocation area
124	RM	river mile
125	SAS	surficial aquifer system
126	SFWMD	South Florida Water Management District
127	UFA	Upper Floridan aquifer
128	USACE	United States Army Corps of Engineers
129	WRDA	Water Resources Development Act

C&SF Project should be defined more robustly.

130 **1 INTRODUCTION**

131 The South Florida Water Management District (SFWMD or District) is a regional governmental agency
132 charged with safeguarding the water resources in 16 counties, from Orlando to the Florida Keys. With a
133 population of approximately 9 million permanent residents, the District covers 17,930 square miles (31%
134 of the state) and includes vast areas of urban development, agricultural lands, and conservation areas. The
135 SFWMD is responsible for protecting water supplies and supporting water quality improvement in close
136 collaboration with the Florida Department of Environmental Protection and the Florida Department of
137 Agriculture and Consumer Services. The SFWMD also operates and maintains the **Central and Southern**
138 **Florida Flood Control Project** (C&SF Project) system. One of the world’s largest water management
139 systems, the C&SF Project is an extensive network of canals, levees, water storage areas, pump stations,
140 and other water control structures. The highly engineered system was built through one of the most diverse
141 ecosystems in the world: the interconnected Greater Everglades ecosystem, which the SFWMD is working
142 to restore and protect (SFWMD 2021a).

143 Located in Martin and Palm Beach counties, the Loxahatchee River is in the northern part of the Everglades
144 ecosystem and flows into the Atlantic Ocean through the Jupiter Inlet. Approximately 7.6 miles of the
145 river’s Northwest Fork were designated as Florida’s first Wild and Scenic River in 1985. Downstream
146 segments of the Northwest Fork floodplain contain dense red mangrove forest, while the upper segment
147 contains one of the last native cypress river swamps in southeastern Florida. Over the past century,
148 downstream floodplain wetlands once dominated by swamp hardwoods and bald cypress have changed to
149 mangrove-dominated swamp. This change in vegetation is believed to have occurred because of saltwater
150 intrusion into freshwater areas of the river, caused primarily by human-induced alteration of the watershed
151 and river. The restoration and protection of the Loxahatchee River and its associated ecosystems have been
152 the focus of several District projects, including the Loxahatchee River Watershed Restoration Project
153 (LRWRP; **Section 1.5**), which is part of the Comprehensive Everglades Restoration Plan (CERP;
154 **Section 1.4**).

155 **1.1 Overview and Purpose**

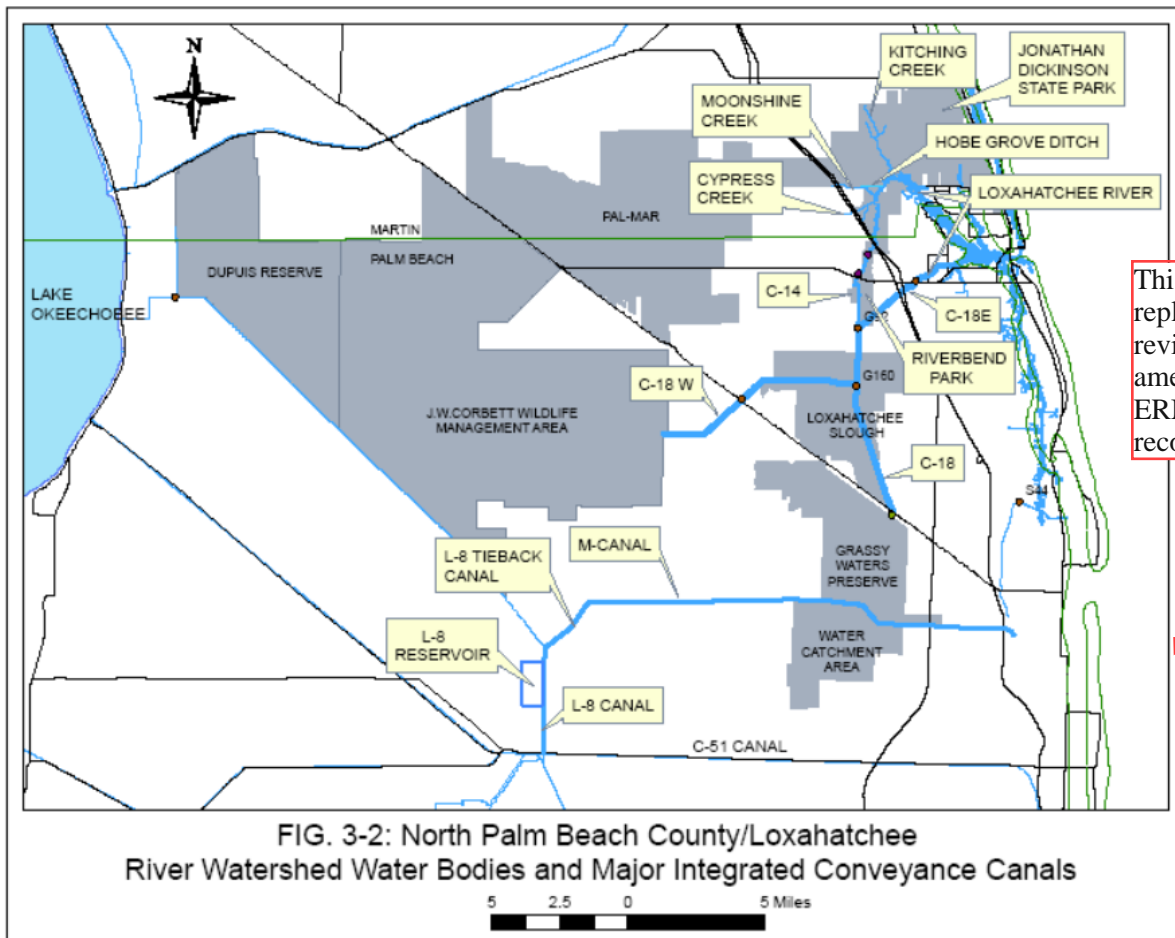
156 This technical document supports amending the existing Lower East Coast Regional Water Availability
157 restricted allocation area (RAA) criteria [Subsection 3.2.1.E of the *Applicant’s Handbook for Water Use*
158 *Permit Applications within the South Florida Water Management District* (Applicant’s Handbook);
159 SFWMD 2021b] and adopting new rules to protect groundwater components of the LRWRP. The existing
160 RAA boundaries for the North Palm Beach County/Loxahatchee River Watershed Waterbodies include
161 most, but not all, areas needed to complete the LRWRP. This rulemaking would modify the existing RAA
162 boundary to encompass all necessary surface water components identified in the Final Integrated Project
163 Implementation Report and Environmental Impact Statement (PIR-EIS) for the LRWRP [United States
164 Army Corps of Engineers (USACE) 2020]. Additionally, the LRWRP design includes four aquifer storage
165 and recovery (ASR) wells associated with the C-18W Reservoir. Therefore, new RAA criteria are being
166 developed to protect upper Floridan aquifer system (FAS) water associated with those ASR wells
167 (**Section 1.5.1**). This rulemaking effort fulfills the SFWMD’s state and federal obligations to protect the
168 water made available by the LRWRP (**Section 2.1.1**).

Please change to "Loxahatchee Slough Natural Area"

Should be modified to add Hungryland Slough Natural Area, Pine Glades Natural Area and Cypress Creek Natural Area.

1.2 Identification of the Existing Restricted Allocation Area

In 2007, an RAA was established for the North Palm Beach County/Loxahatchee River Watershed Waterbodies [part of the Lower East Coast Regional Water Availability criteria, Subsection 3.2.1.E of the Applicant’s Handbook (SFWMD 2021b)]. The current RAA includes surface water and groundwater bodies, such as the City of West Palm Beach Water Catchment Area, Pal-Mar property, J.W. Corbett Wildlife Management Area, Loxahatchee Slough, Loxahatchee River, Riverbend Park, Dupuis Reserve, Jonathan Dickinson State Park, Kitching Creek, Moonshine Creek, Cypress Creek, and Hobe Grove Ditch (Figure 1-1). The RAA also includes the integrated conveyance systems that are hydraulically connected to and receive water from the waterbodies, such as C&SF Project primary canals and the secondary and tertiary canals that receive water from those primary canals. Net increases in volume or changes in timing on a monthly basis of direct surface water and indirect groundwater withdrawals from the RAA are prohibited over that resulting from base condition uses permitted as of April 1, 2006. Allocations over the base condition water use are only allowed through sources detailed in Subsection 3.2.1.E.5 of the Applicant’s Handbook (SFWMD 2021b), such as certified project water, implementation of offsets, alternative water supply, terminated or reduced base condition water use that existed as of April 1, 2006, or available wet season water. The RAA is part of the MFL recovery strategy for the Northwest Fork of the Loxahatchee River.



This figure should be replaced with the revised Figure 3-2, as amended with ERM/PBC recommendations.

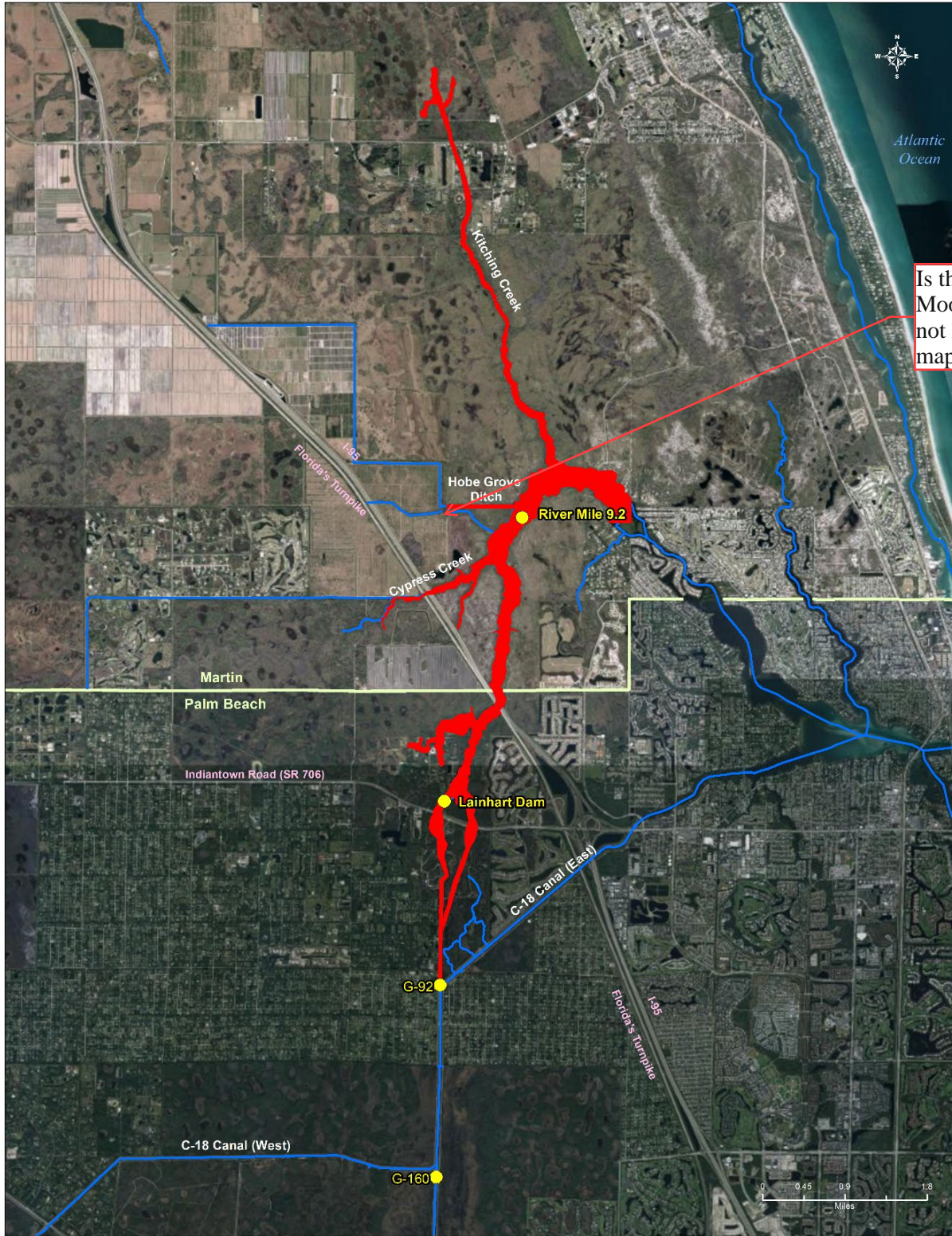
186
 187 Figure 1-1. Current extent of the North Palm Beach County/Loxahatchee River Watershed Waterbodies
 188 and major integrated conveyance canals (From: SFWMD 2021b).

189 **1.3 Northwest Fork of the Loxahatchee River MFL**

190 MFL criteria are flows or levels at which water resources, or the ecology of the area, would experience
191 significant harm from further withdrawals. Significant harm is defined in Subsection 40E-8.021(31),
192 F.A.C., as the temporary loss of water resource functions, which results from a change in surface water or
193 groundwater hydrology, that takes more than 2 years to recover, but is considered less severe than serious
194 harm. As of 2021, the SFWMD has adopted nine MFLs. Additional information about MFLs can be found
195 in the *Support Document for the 2021-2024 Water Supply Plan Updates* (SFWMD 2021c) and at
196 www.sfwmd.gov/mfls.

197 The Northwest Fork of the Loxahatchee River was designated as a Wild and Scenic River in 1985. An MFL
198 was adopted for the Northwest Fork of the Loxahatchee River in 2003 to protect the remaining floodplain
199 swamp community and downstream estuarine resources against significant harm [Subsection 40E-8.221(4),
200 F.A.C.]. An MFL exceedance occurs when 1) flows at Lainhart Dam decline below 35 cubic feet per second
201 (cfs) for more than 20 consecutive days; or 2) salinity, expressed as 20-day rolling average, is greater than
202 2 at river mile 9.2 (**Figure 1-2**). An MFL violation occurs when an exceedance occurs more than once in a
203 6-year period.

204 Pursuant to Section 373.0421, F.S., recovery strategies [Subsection 40E-8.021(25), F.A.C.] must be
205 adopted for waterbodies where MFLs currently are violated. The goal of a recovery strategy is to achieve
206 the established MFL as soon as practicable. The Northwest Fork of the Loxahatchee River was not meeting
207 the MFL criteria at the time of adoption. Therefore, an MFL recovery strategy [Subsection 40E-8.421(6),
208 F.A.C., and Appendix C of the *2018 Lower East Coast Water Supply Plan Update* (SFWMD 2018)] was
209 adopted simultaneously with the MFL adoption. As stated earlier, the RAA for the Lower East Coast
210 Everglades Waterbodies and North Palm Beach County/Loxahatchee River Watershed Waterbodies is part
211 of the MFL recovery strategy. The MFL criteria are anticipated to be met when the recovery strategy
212 projects are completed and fully operational.



213
214

Figure 1-2. Northwest Fork of the Loxahatchee River MFL area (shown in red).

add "local"?

215 1.4 Comprehensive Everglades Restoration Plan

216 CERP is one of the largest environmental restoration programs undertaken that builds upon and
217 complements other state and federal initiatives to revitalize South Florida’s ecosystem. The plan, submitted
218 to Congress in 1999, comprises a series of projects designed to address four major characteristics of water
219 flow: quantity, quality, timing, and distribution. Further information about CERP can be found at
220 <https://www.evergladesrestoration.gov>.

221 Upon congressional authorization in 2000, the Federal Government and the State of Florida entered into a
222 50/50 partnership to restore, protect, and preserve water resources in central and southern Florida, including
223 the Everglades. The USACE is the lead federal agency, and the SFWMD is the non-federal sponsor. A
224 status summary of CERP is provided by the secretaries of the Army and the Interior in the jointly submitted
225 Five-Year Report to Congress per the Water Resources Development Act (WRDA) of 2000, Section 601(l),
226 and as required by the Programmatic Regulations for the Comprehensive Everglades Restoration Plan
227 [33 C.F.R. § 385.40(d)(1)] (USACE and United States Department of the Interior 2020).

228 Legal protection of water for the natural system provided by CERP projects is required for the SFWMD
229 and USACE to execute project partnership agreements (PPAs). The SFWMD protects water through the
230 adoption of water reservations, consumptive use permitting criteria, or a combination of the two. The
231 SFWMD’s water reservation rules are found in Chapter 40E-10, F.A.C. Chapter 40E-2, F.A.C., contains
232 the SFWMD’s consumptive use permitting rules, including 1) regulatory components of an adopted MFL
233 prevention or recovery strategy, 2) implementation criteria for water reservations, and 3) RAA criteria.

234 1.5 Loxahatchee River Watershed Restoration Project

235 One of 68 CERP projects and the focus of this document, the LRWRP aims to improve the quantity, quality,
236 timing, and distribution of water flows to the Northwest Fork of the Loxahatchee River and restore
237 hydrologic conditions and connectivity of wetlands and watersheds that form the historical headwaters of
238 the river (USACE 2020). Project planning was completed with the signing of the Chief’s Report in
239 April 2020, which included the PIR-EIS completed in January 2020 (USACE 2020). The LRWRP was
240 authorized by Congress in WRDA 2020. The PIR-EIS identified the authorized plan for meeting the
241 objectives to capture, store, and treat surface water currently lost to tide and use that water to increase flows
242 to the Northwest Fork of the Loxahatchee River to meet restoration goals of the river and the natural
243 communities within the watershed. The LRWRP will achieve the intended hydrologic and ecologic
244 restoration goals without impacting existing legal water users or reducing the level of service for flood
245 protection. This fulfills WRDA 2000 and Section 373.470, F.S., Savings Clause requirements (further
246 discussed in **Section 5.3.1**).

PPA = Project Partnership Agreement

247 The SFWMD is the lead agency responsible for the design and construction of the LRWRP. A PPA between
248 the USACE and SFWMD is planned for execution by September 2022. Completion of the rule development
249 process to protect water generated by the LRWRP is a condition precedent to executing the PPA. The 2021
250 CERP Integrated Delivery Schedule (USACE 2021) contains the implementation schedule for the project.
251 Project design is scheduled to begin in 2022, with construction occurring between 2023 to 2029. The
252 operational testing and monitoring periods are expected to end in 2031. Most of the real estate acquisition
253 for the project is complete; however, some acquisition of land, canals, and easements in the northern portion
254 of the project area remains.

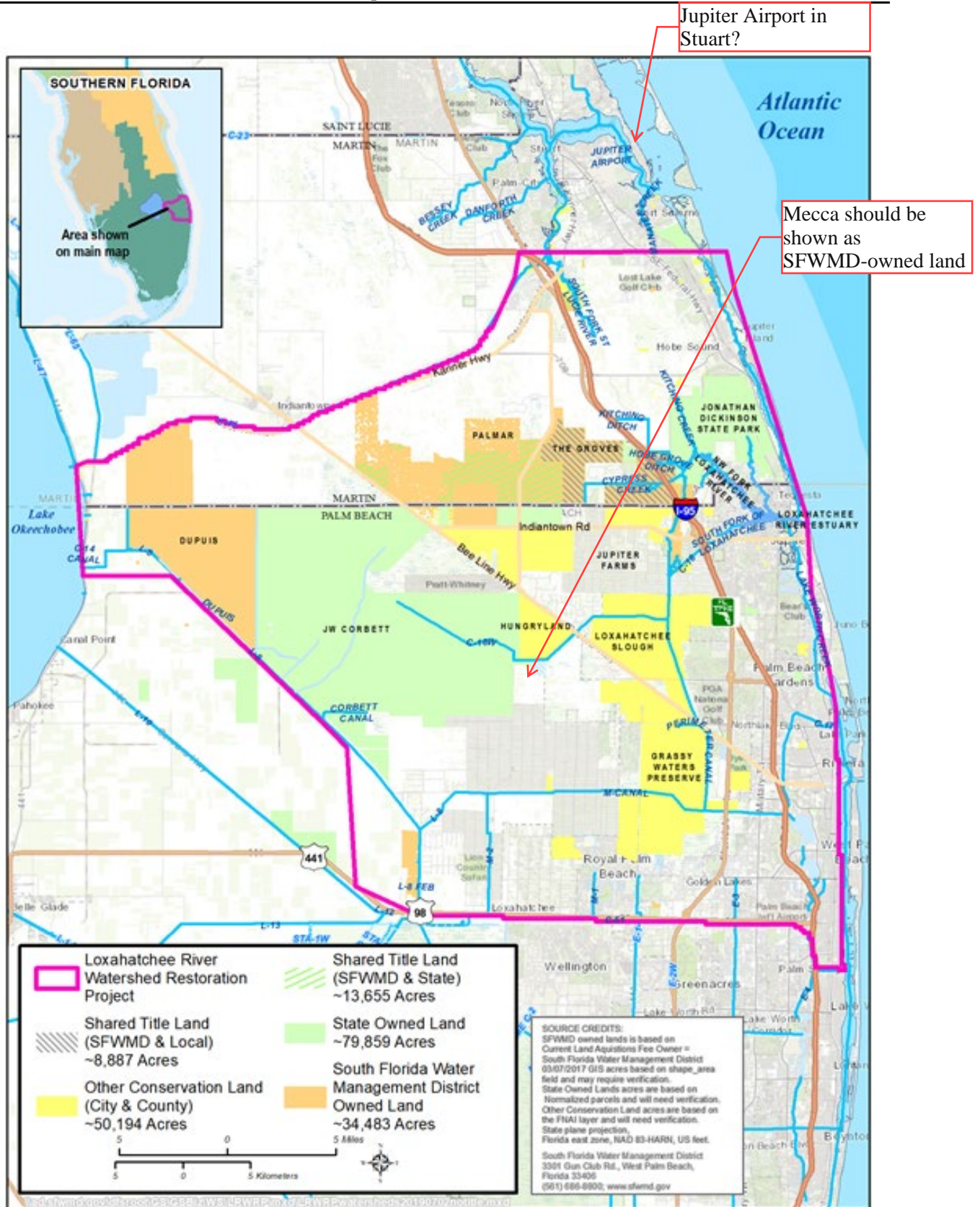
Loxahatchee Slough
Natural Area, Pine
Glades Natural Area,
Hungryland Slough
Natural Area, Cypress
Creek Natural Area
and Riverbend Park

255 **1.5.1 Project Components and Authorized Plan**

256 The project area encompasses approximately 481,920 acres of central and northern Palm Beach County and
257 southern Martin County, including Jonathan Dickinson State Park, Dupuis Wildlife and Environmental
258 Management Areas, J.W. Corbett Wildlife Management Area, the City of West Palm Beach Water
259 Catchment Area, and Loxahatchee Slough (Figure 1-3). The LRWRP project area is bound on the north by
260 the C-44 Canal, on the south by the C-51 Canal, on the west by the L-8 Canal and Lake Okeechobee, and
261 on the east by the Loxahatchee River Estuary and Lake Worth Lagoon. All of the Loxahatchee River
262 watershed and limited portions of the St. Lucie River watershed are included in the project area.

263 Multiple restoration plan alternatives were modeled during the plan formulation and evaluation process as
264 described in the PIR-EIS (USACE 2020). Each alternative plan was evaluated according to the USACE's
265 four "Principles and Guidelines" criteria: completeness, acceptability, efficiency, and effectiveness. Project
266 benefits and planning level costs were calculated for each alternative plan, and analyses were completed to
267 identify the alternative plans that maximized environmental benefits compared to costs. The evaluation and
268 comparison of alternative plans led to the selection of Alternative 5R, the Authorized Plan, for the LRWRP.

269 The project components of the Authorized Plan are grouped into three flow-ways based on geographic area
270 (Figure 1-4). Structural components of the Authorized Plan include a 9,500-acre-foot (ac-ft) reservoir, four
271 ASR wells, a flow-through marsh, and new pump stations, canals, culverts, weirs, and ditch plugs.
272 Structural components, along with other management measures and water control modifications, will
273 increase volume and improve timing of water deliveries to the Northwest Fork of the Loxahatchee River
274 while restoring hydrology and ecological connectivity in the surrounding natural areas and over-drained
275 wetlands within the watershed. The Authorized Plan will achieve 91% of the dry season target restoration
276 flows and 98% of the wet season restoration target flows to the Northwest Fork as measured at Lainhart
277 Dam (USACE 2020). In addition, the Authorized Plan will restore a total of approximately 27,000 acres of
278 disturbed wetlands (Section 1.5.2).



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Figure 1-3. Map of the Loxahatchee River Watershed Restoration Project and natural lands included in the project (From: USACE 2020).

Authorized Plan

- 1. Kitching Creek (Restoration/hydration):** (Spreader canal; weir/plug (Jenkins Ditch))
 - 2. Moonshine Creek (MC) & Gulfstream East (GE) Restoration:** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; grade area to historic topography
 - 3. Cypress Creek Canal (CCC) (Reduce over-drainage):** Replace CCC weir to raise control elevation, raise berm at Ranch Colony, automate twin 84" culverts; pump and spreader swale; regrade CC southern forks
 - 4. Gulfstream West (GW) (Restoration & reduce over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump, construct flow through marsh to attenuate flows
 - 5. Pal-Mar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm improve eastern berm; pumps at Thomas Farm to redirect drainage to GW flow- redirect drainage to GW flow-through marsh via north Nine-Gems Canal
- Flow-way 3**
- 6. C-18W Reservoir (9,500 ac-ft. & 4 ASR wells):** Above ground reservoir; inflow pump, discharge structure; seepage control; M-O canal connector and pump
- Flow-way 2**
- 7. G-160 Structure (Reduce over-drainage):** Improve hydroperiod in Loxahatchee Slough
 - 8. G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough
 - 9. GWP Triangle (Connectivity):** Grade and reconnect
 - 10. M-1 Pump Station (conveyance):** Deliver lower M-1 basin water to M-Canal, GWP and G-161
- Flow-way 1**



Figure 1-4. Project components and flow-ways of the Authorized Plan for the Loxahatchee River Watershed Restoration Project (From: USACE 2020).

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excess water from ITID will go to benefit Grassy Waters. How will this water be protected from use for City's drinking water supply?

285 Surface Water Components (Flow-ways 1, 2, and 3)

286 Flow-way 1 is in the southernmost portion of the LRWRP (Figure 1-4). Surface water from upstream basins
287 within flow-way 1 will be routed toward the Northwest Fork via three primary canal conveyances:
288 M-1 Canal, M-Canal, and C-18 Canal. The following provides an overview of the surface water
289 components for flow-way 1, which are described in further detail in the PIR-EIS (USACE 2020).

290 • **M-1 Pump Station:** A new pump station (S-100) will be constructed along the M-1 Canal to deliver
291 up to 75 cfs of water to the M-Canal when specific dry and wet season canal stages permit. Excess
292 water deliveries from the Indian Trail Improvement District Lower M-1 Basin will supplement the
293 City of West Palm Beach Water Catchment Area before the water is ultimately conveyed north to
294 the Northwest Fork.

Please change all references to Loxahatchee Slough Natural Area

295 • **G-161 Structure:** The G-161 structure was constructed in 2007 concurrent with the LRWRP
296 planning process to provide early and essential benefits to the Northwest Fork and its historical
297 headwaters. Benefits include increased base flows to the river as well as hydrologic connectivity
298 and improved hydroperiods for the City of West Palm Beach Water Catchment Area and
Loxahatchee Slough. G-161 is the primary structure through which water flows from the City of
West Palm Beach Water Catchment Area to the Northwest Fork. The structure is composed of two
60-inch culverts, with a total length of 240 feet (ft), and can discharge up to 150 cfs.

302 • **Grassy Waters Preserve (GWP) Triangle:** Although no structural surface water components are
303 planned for the GWP Triangle, hydrologic restoration will be achieved through earthwork and
304 construction of a shallow swale designed to improve hydrologic conditions within the property.
305 Water discharged from the G-161 structure will be distributed across the shallow swale to promote
306 hydrologic connectivity between the eastern and western portions of the property and to improve
307 the hydroperiod of the area. Surface water will flow from the GWP Triangle to the C-18 Canal,
308 then north toward the Northwest Fork through an existing culvert that passes under Beeline
309 Highway.

please add "..., including the Loxahatchee Slough Natural Area".

310 • **G-160 Structure:** The G-160 structure, completed in 2004, provides the dual purpose of flood
311 control and environmental restoration. Like the G-161 structure, G-160 was constructed concurrent
312 with the LRWRP planning process to achieve early benefits to the Northwest Fork and its historical
headwaters. Benefits include enhanced delivery of restoration flows to the river while maintaining
specific water levels for the Loxahatchee Slough. The G-160 structure is a reinforced concrete
spillway with two vertical lift gates; each spillway bay is 25 ft in length. The structure can discharge
up to 2,000 cfs to maintain flood control capability.

317 Flow-way 2 is in the western and central portion of the LRWRP (Figure 1-4). The M-O and C-18W canals
318 are the two primary canal conveyances for flow-way 2. The main surface water component for flow-way 2
319 is the C-18W Reservoir, which is designed to capture, store, and release water to improve seasonal timing
320 of water deliveries to the river. The following is an overview of the C-18W Reservoir and some of its
321 supporting infrastructure; further details about flow-way 2 surface water components can be found in the
322 PIR-EIS (USACE 2020).

323 • **C-18W Reservoir:** The C-18W Reservoir will be built on the former Mecca citrus grove property,
324 covering approximately 1,600 acres (including the perimeter embankment) and storing 9,500 ac-ft
325 of water. The reservoir embankment will be 20 ft high with a normal pool design depth of 7.5 ft.
326 The reservoir will receive excess surface water from the adjacent C-18W Canal, J.W. Corbett
327 Wildlife Management Area, and the upper Indian Trail Improvement District basin. A 150-cfs
328 intake pump will deliver water from the C-18W Canal to the northern portion of the reservoir, while
329 three 72-inch gated culverts and three 78-inch culverts will deliver water from the J.W. Corbett

Please clarify that water drawn from the C-18W Canal and J.W. Corbett WMA shall not adversely impact the hydrology of wetlands within Hungryland Slough Natural Area, J. W. Corbett WMA or Sweetbay Natural Area.

Wildlife Management Area and the new M-O connector canal (C-101W), respectively, to the western portion of the reservoir. The reservoir will be surrounded by a seepage canal and managed by a seepage control system. The new 3,500-ft long M-O connector canal (C-101W) will be constructed to convey water north from the eastern end of the existing M-O Canal toward the west side of the reservoir. A new 175-cfs pump station (S-109) will be constructed at the intersection of the M-O Canal and new M-O connector canal to pump surface water north.

Flow-way 3 is in the northern portion of the LRWRP (**Figure 1-4**), crossing the Palm Beach-Martin county boundary. Flow-way 3 includes the Northwest Fork and its historical tributaries (Kitching Creek, Moonshine Creek, and Cypress Creek). Primary conveyance canals in flow-way 3 include Jenkins Ditch, Hobe Grove Ditch, Cypress Creek Canal/Ranch Colony Canal, C-18 Canal, Nine Gems canals, and various canals within the Hobe St. Lucie Conservatory District and South Indian River Water Control District service areas. The following is an overview of the surface water components for flow-way 3, which are described in further detail in the PIR-EIS (USACE 2020).

- **Pal-Mar East (Nine Gems):** Interior drainage canals will be filled, and small drainage pipes and culverts will be removed to reduce drainage and restore hydrology to the property. Berm improvements (L-111) along the northern and eastern portion of the property will be required to retain onsite surface water. Additional discharge capacity for the property will be provided by three water control structures (S-114A, B, and C) discharging into a canal that runs along the southern property boundary, which ultimately discharges to the Cypress Creek Canal. An existing canal in the western and southwestern portion of Pal-Mar East will be plugged or backfilled to improve hydrologic connectivity between the Nine Gems and Culpepper tracts. This canal currently provides drainage to a farm west of the property and Seminole Pratt Whitney Road. This canal is proposed to be taken out of service and its water rerouted to an existing canal that runs along the northern boundary of Pal-Mar East. A new pump station, likely to be located on the farm property, and a new culvert installed under Seminole Pratt Whitney Road will be required to reroute surface water to the canal bordering the northern boundary of Pal-Mar East.
- **Cypress Creek Canal/Ranch Colony Canal:** Three existing water control structures (S-115A, B, and C) will be modified with telemetry controls to improve hydrologic conditions within the Culpepper tract of Pal-Mar East while reducing discharges into the Cypress Creek Canal. Berm improvements along the eastern boundary of the Culpepper tract and the Cypress Creek Canal will improve water flow and provide flood protection to adjacent residential developments. At the east end of the Cypress Creek Canal, a new water control structure (S-112) will be constructed to reduce over-drainage and improve water level management in the Cypress Creek Canal during the wet and dry seasons. The structure will be a telemetry-operated concrete spillway with two 16-ft wide bays. Perpendicular to the Cypress Creek Canal, a new 20-cfs pump station and spreader swale will be constructed parallel to Mack Dairy Road. The Mack Dairy spreader swale will extend roughly 4,900 ft south of the Cypress Creek Canal to improve sheetflow across the Cypress Creek Natural Area and restore historical flows to the Northwest Fork. The eastern forks of the historical Cypress Creek will be regraded to reduce flow velocities entering the river and restore/promote the growth of native vegetation.
- **Gulfstream West:** A shallow flow-through marsh will be constructed on the Gulfstream West property to restore wetlands, reduce over-drainage, and attenuate water flow. Existing drainage ditches within the property will be removed, and the site will be regraded with a slight southerly gradient to promote sheetflow across the constructed marsh. Water from the Hobe St. Lucie Conservatory District, Pal-Mar East, and the farm west of Pal-Mar East will be pumped into the northern end of the flow-through marsh via a new 150-cfs pump station (S-110). Water will be routed through the marsh by a series of collection ditches and spreader berms. A perimeter levee (L-111) will be constructed to contain surface water, which will be controlled at an average depth

378 of 3 ft. The discharge structure (S-111S) will consist of a notched weir with variable rates of flow
379 depending on marsh depth. Discharges from the flow-through marsh will be downstream of the
380 new Cypress Creek Canal structure (S-112).

381 • **Moonshine Creek and Gulfstream East:** Restoration of the Gulfstream East property involves
382 earthwork to regrade the property to historical topography and backfill existing drainage ditches.
383 This project component also includes Moonshine Creek and Hobe Grove Ditch restoration efforts,
384 which involve creating a hydrologic connection between the two features by clearing and removing
385 heavy vegetation and sedimentation. A new weir (S-117) will be constructed at the eastern end of
386 Hobe Grove Ditch to increase surface water and groundwater levels within the ditch. Increased
387 water elevations will promote additional flow to Moonshine Creek, which is a historical tributary
388 to the Loxahatchee River.

389 • **Kitching Creek:** Kitching Creek restoration will occur within Jonathan Dickinson State Park. A
390 new east-west spreader swale (C-116) will be constructed perpendicular to an interior ditch (Jenkins
391 Ditch) located near the upstream portion of Kitching Creek. The spreader swale will redistribute
392 water to the upstream portions of Kitching Creek. To facilitate dispersion across the spreader swale,
393 a new gated culvert will be constructed in Jenkins Ditch upstream of Kitching Creek.

394 Aquifer Storage and Recovery Component

395 Four clustered ASR wells are planned to work in conjunction with the C-18W Reservoir to provide
396 additional water storage capacity and operational flexibility to the reservoir system. The ASR wells will be
397 installed in the upper FAS and are anticipated to be capable of pumping 5 million gallons per day (mgd)
398 for surface water storage and recovery (USACE 2020). The ASR wells will provide the C-18W Reservoir
399 with additional water for deliveries to the Northwest Fork (via the C-18W Canal) to meet downstream
400 restoration flows. Benefit calculations assumed 70% of the stored water in the ASR wells could be
401 recovered (USACE 2020). The four ASR wells, and the associated water treatment facility, will be located
402 along the western perimeter of the reservoir adjacent to Seminole Pratt Whitney Road and the J.W. Corbett
403 Wildlife Management Area. This location will provide partial institutional control of the ASR groundwater
404 “bubble” (i.e., water stored) due to its close proximity to public lands and a very low likelihood that any
405 new or additional ASR wells would be installed by public water supply utilities or municipalities near this
406 location in the future.

407 **1.5.2 Benefits of th**

Could the drawdown of the FAS adversely affect the hydrology of J. W. Corbett and/or Hungryland Slough Natural Area since the 1-2 foot drawdown cone extends into those conservation areas based on information presented during the 1/25/22 rule making workshop?

408 The LRWRP will provide direct hydrologic and ecologic benefits to the Northwest Fork of the Loxahatchee
409 River. The project will achieve 91% of the dry season target restoration flows and 98% of the wet season
410 target restoration flows, as measured at Lainhart Dam (USACE 2020). Restoration of seasonal flows will
411 improve salinity levels in the river and conserve freshwater habitat. Restored flows will help maintain the
412 last remaining riverine cypress habitat in southeastern Florida, riverine tapegrass habitat, oligohaline
413 salinity zones that support juvenile sportfish, mesohaline salinity zones that support oysters, and specific
414 riverine and estuarine conditions that support threatened Florida manatee and federally managed fish
415 species (USACE 2020).

Please add "Natural Area" to both of these.

416 The LRWRP will restore approximately 27,000 acres of disturbed wetlands: 17,000 acres of former
417 wetlands that were improved for agriculture and 10,000 acres of existing disturbed wetlands in the
418 J.W. Corbett Wildlife Management Area, Loxahatchee Slough, Hungryland Slough, Pal-Mar natural area
419 complex, Cypress Creek Natural Area, City of West Palm Beach Water Catchment Area, and Jonathan
420 Dickinson State Park (USACE 2020). These 27,000 acres of restored wetlands will connect to 51,000 acres
421 of other wetland communities for a total of 78,000 acres of connected habitat (USACE 2020). Wetland
422 restoration efforts will contribute to the recovery of threatened and endangered animal species, such as the

Please add Pine Glades Natural Area to the list.

423 snail kite and wood stork. The project will also improve native habitat for recreational species, such as
424 white-tailed deer and ducks.

425 The LRWRP will provide recreational and economic opportunities to the local area, such as hunting,
426 boating, fishing, and tourism. Construction of recreational facilities are included in the Authorized Plan,
427 which will improve public access and connectivity to natural areas and regional trail systems, such as the
428 Ocean to Lake Trail. Public use facilities will be constructed at Moonshine Creek, the Cypress Creek
429 Natural Area, and the C-18W Reservoir. These facilities will include parking areas, boat/kayak launches,
430 trailheads, bridges, a fishing platform, and dry vault toilets.

431 Implementation of the LRWRP will boost numerous ecosystem services throughout the Loxahatchee River
432 watershed and downstream Loxahatchee River Estuary. Ecosystem services can be defined as the benefits
433 human beings receive from resources and processes supplied by ecosystems (Murray et al. 2013). Some
434 ecosystem services are material (e.g., food, timber, water), while others are derived from ecological
435 processes (e.g., carbon sequestration). The LRWRP will benefit ecosystem services through ecological
436 restoration efforts. The ecosystem services that are expected to improve as a result of the project include
437 wildlife-associated activities in the form of wildlife photography, nature tours, and environmental
438 education, which can facilitate mental health and wellbeing; ecological connectivity of landscapes;
439 biodiversity and species composition; commercial and recreational fishing; outdoor recreational
440 opportunities such as biking, hiking, and kayaking; water quality nutrient and sedimentation assimilation;
441 and atmospheric carbon sequestration (USACE 2020).

442 The LRWRP will provide the aforementioned benefits to the watershed while meeting the requirements of
443 the WRDA 2000 Savings Clause by maintaining current levels of service for flood protection and water
444 supply to existing legal users within the project area.

445 **2 BASIS FOR THE RESTRICTED ALLOCATION AREA RULES**

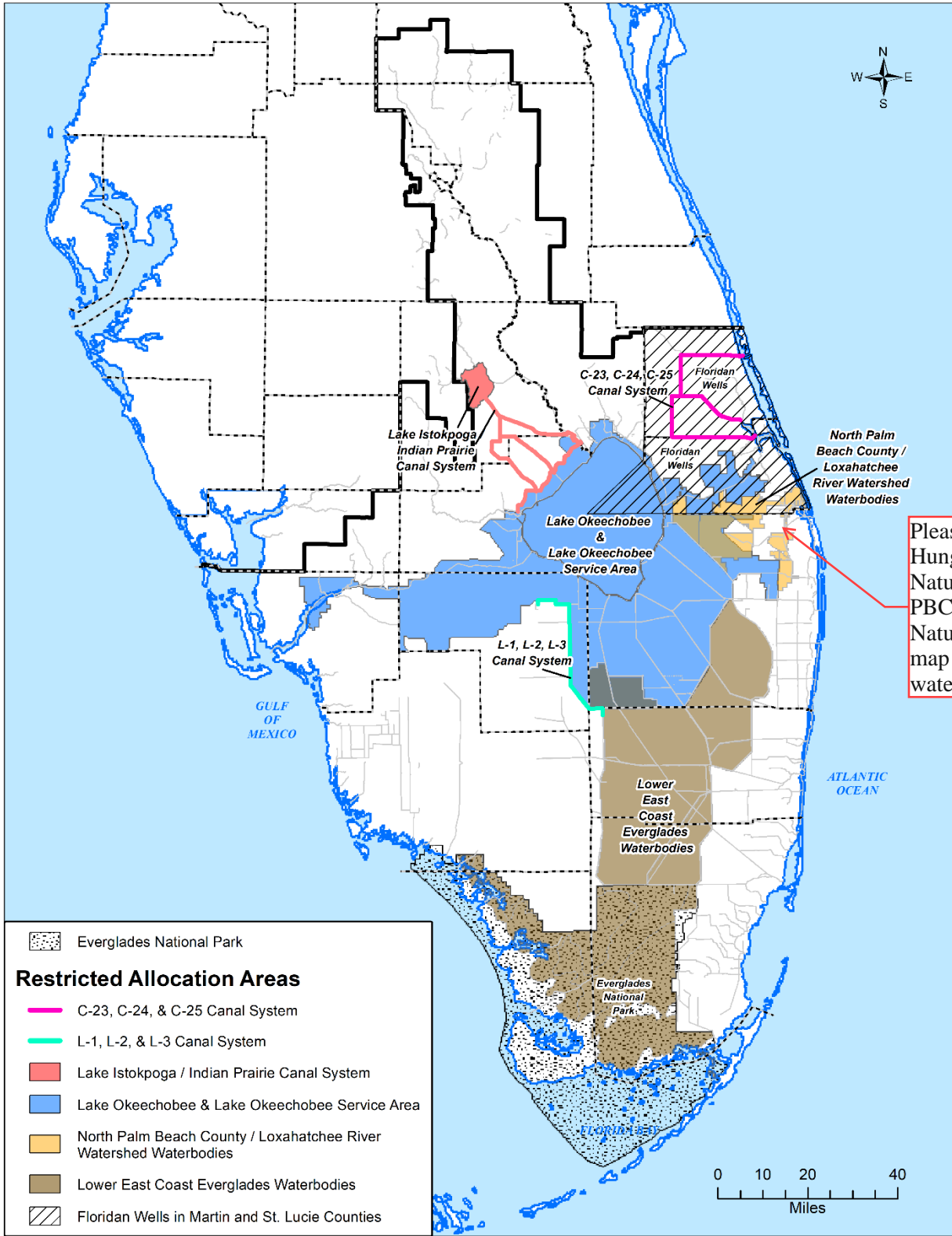
446 **2.1 Definition and Statutory Authority**

447 Section 373.044, F.S., authorizes the governing board of a water management district to adopt rules to
448 implement the various provisions of Chapter 373, F.S. Section 373.216, F.S., requires the water
449 management districts to implement a consumptive use permitting program. The consumptive use permitting
450 program is designed to protect water resources of the area from harm. *See* § 373.219(1), F.S. The District's
451 consumptive use permitting rules include RAAs designed to address a specific water resource concern and
452 protect the water resource from harm.

453 RAAs are defined geographic areas where use of specific water supply sources (e.g., lakes, rivers, wetlands,
454 canals, aquifers) is restricted due to concerns regarding water availability or other water resource concerns.
455 RAAs are adopted for a variety of reasons, including 1) where there is insufficient water to meet the
456 projected needs of a region, 2) to protect water for natural systems and future restoration projects
457 (e.g., CERP), or 3) as part of MFL recovery or prevention strategies. RAAs are listed in Section 3.2.1 of
458 the Applicant's Handbook (SFWMD 2021b), which is incorporated by reference in Rule 40E-2.091, F.A.C.
459 Requests for water allocations in these regions must comply with the region-specific criteria in addition to
460 all other applicable criteria listed in the Applicant's Handbook.

461 As of 2021, six RAAs have been adopted for the following geographic areas within the District
462 (**Figure 2-1**):

- 463
- 464 • C-23, C-24, and C-25 Canal System
 - 465 • Floridan Aquifer Wells in Martin and St. Lucie Counties
 - 466 • L-1, L-2, and L-3 Canal System
 - 467 • Lake Istokpoga/Indian Prairie Canal System
 - 468 • Lake Okeechobee Service Area
 - 469 • Lower East Coast Everglades Waterbodies and Northern Palm Beach County/Loxahatchee
469 River Watershed Waterbodies



470
471

Figure 2-1. Restricted allocation areas within the South Florida Water Management District.

472 **2.1.1 Protecting Water for CERP Projects**

473 WRDA 2000 and Section 373.470(3)(c), F.S., require the SFWMD to allocate or reserve water for the
474 natural system resulting from a CERP project before executing a cost-share agreement with the USACE to
475 construct the project. The SFWMD fulfills this requirement by adopting water reservations, consumptive
476 use permitting rules, or both. The USACE has previously verified that these mechanisms meet the federal
477 requirements for several CERP projects. Together, these measures protect water resources across
478 substantial portions of the District. Any water made available by a CERP project beyond that needed for
479 the natural system may be certified by the District's Governing Board as available to be allocated for
480 consumptive uses to meet the CERP goal of water made available for other water-related uses.

481 **2.2 Rulemaking Process**

482 General rulemaking requirements and procedures are described in Chapter 120, F.S., consistent with state
483 law and SFWMD policy. The general rulemaking process includes many steps (**Figure 2-2**). On
484 December 9, 2021, the District's Governing Board authorized publication of a Notice of Rule Development
485 for Rulemaking to Protect Water Made Available by the Loxahatchee River Watershed Restoration Project.
486 The Notice of Rule Development was published in the Florida Administrative Register on December 21,
487 2021. Building on the analyses conducted for the PIR-EIS, this technical document and the proposed rules
488 and revisions to applicable sections of the Applicant's Handbook (SFWMD 2021b) were drafted.

489 Two rule development workshops will be held on January 25 and February 22, 2022, to gain public input
490 on the rulemaking. The SFWMD encourages stakeholder review and comment on the draft rules. Public
491 comments, questions, and SFWMD responses given during and after the workshops will be provided as
492 appendices to the final technical document. Once the public comment has been appropriately considered
493 and incorporated, District staff will seek authorization to publish a Notice of Proposed Rule from the
494 District's Governing Board.

Key Steps in the Rule Development Process



495

496 Figure 2-2. Key steps in the rule development process.

497 **3 EXISTING CONDITION OF THE LOXAHATCHEE RIVER**
498 **WATERSHED**

499 **3.1 Description of Watershed**

500 **3.1.1 Hydrology**

501 The Loxahatchee River watershed historically spanned more than 216 square miles and primarily comprised
502 pine flatwoods interspersed with cypress sloughs, hardwood swamps, marshes, and wet prairies (USACE
503 2020). The three forks of the Loxahatchee River—Northwest, North, and Southwest—discharge into the
504 Loxahatchee River Estuary where freshwater from the river meets saltwater flowing in from the Atlantic
505 Ocean through the Jupiter Inlet. The Loxahatchee River Estuary’s central embayment is located at the
506 confluence of the river’s three forks. There are eight major subwatersheds within the Loxahatchee River
507 watershed: Kitching Creek basin, Grove basin, Pal-Mar basin, Jupiter Farms basin, Historic Cypress Creek
508 basin, Loxahatchee Estuary, C-18/Corbett basin, and L-8 basin (USACE 2020).

Loxahatchee Slough?

please add
"...Hungryland
Slough, and..."

The Hungryland and Loxahatchee sloughs are located upstream and provide significant freshwater input to the Loxahatchee River, including the Northwest Fork. The C&SF Project, authorized by Congress in 1948 primarily for flood control, altered the hydrology of the Loxahatchee Slough and River by redirecting freshwater that naturally flowed out of the Northwest Fork to the Southwest Fork and then out to tide (McVoy et al. 2011). The primary canal conveyances constructed as part of the C&SF Project include the L-8 Canal, the east and west legs of the C-18 Canal, and the C-51 Canal, all of which impacted the hydrology of the watershed to varying degrees. Dry season flows to the Northwest Fork were limited by altered drainage patterns and lowered groundwater levels due to the construction of canals, levees, and supporting water control infrastructure. Other types of development activities that followed the C&SF Project, such as road construction and urbanization, further limited dry season flows to the Northwest Fork. The permanent opening and management of the Jupiter Inlet post 1947 allowed more saltwater entry to the Loxahatchee River estuary. The original C&SF Project resulted in changes to the watershed hydrology as the landscape was fragmented while the Loxahatchee River estuary has also experienced more Atlantic Ocean connectivity through Jupiter Inlet management.

523 Land development over the last century has altered the natural hydrology of the watershed, resulting in
524 community-wide changes to aquatic vegetation (freshwater and estuarine), including productivity and
525 function. Collectively, the hydrologic changes have promoted the upstream movement of saltwater. As a
526 result, cypress and other freshwater vegetation intolerant of elevated salinity conditions have been replaced
527 by mangroves and other estuarine plant communities. If freshwater dry season flows are not increased to
528 improve riverine system resilience, the salinity cline will continue to extend farther upriver than under
529 historical conditions, thereby converting more freshwater habitat to estuarine habitat. These effects are
530 likely to be exacerbated by potential sea level rise effects (USACE 2020). Additionally, the hydrologic
531 impacts have had repercussions throughout the food web (USACE 2020). Under the current hydrologic
532 conditions, further reduction in habitat function is possible, resulting in a decrease in the abundance and
533 diversity of fish and wildlife resources throughout the watershed.

534 **3.1.2 Habitats**

535 The land within the Loxahatchee River watershed can be grouped into three broad land use categories:
536 natural areas, agricultural lands, and residential/commercial space. Approximately 63% of the watershed is
537 natural area (USACE 2020). This includes eight major natural areas: Jonathan Dickinson State Park, the
538 Northwest Fork, Loxahatchee River Estuary, Pal-Mar, J.W. Corbett Wildlife Management Area,
539 Loxahatchee Slough Natural Area, City of West Palm Beach Water Catchment Area, and Dupuis Wildlife

These are not natural areas.

Recommend the addition of Hungryland Slough Natural Area, Pine Glades Natural Area and Cypress Creek Natural Area.

540 and Environmental Area (USACE 2020). The 10 major freshwater and saltwater habitats that make up the
541 Loxahatchee River watershed are cypress swamp, pine uplands, scrub, freshwater marshes, hardwood
542 hammock, mangrove swamp, seagrass beds, oyster reef and beds, estuary (lagoons and inlets), and coastal
543 dunes (USACE 2020). Although the C&SF Project altered hydrology and fragmented the landscape into
544 variously sized habitat patches, the watershed still supports diverse ecological communities that provide
545 food, cover, and roosting and nesting habitats used by a wide range of wildlife.

546 **3.1.3 Fish and Wildlife Resources**

547 The fish and wildlife resources within the Loxahatchee River watershed comprise many taxonomic groups
548 of aquatic macroinvertebrates, freshwater and saltwater fish, amphibians, reptiles, birds, and mammals.
549 Because the Northwest Fork of the Loxahatchee River is a federally designated Wild and Scenic River,
550 area-specific regulations affect the management of fish and wildlife resources.

551 Shellfish

552 The Loxahatchee River Estuary supports a variety of shellfish, including crabs, clams, shrimp, and oysters.
553 Of commercial importance, the estuary is home to blue crabs and stone crabs. Oyster reefs within the estuary
554 have been monitored for the past 30 years and shown decreased abundance due to flood control measures
555 that have altered freshwater flows of the river (USACE 2020). South of the Loxahatchee River Estuary, the
556 Lake Worth Lagoon was also impacted by the C&SF Project and has experienced changes in the magnitude
557 and duration of saline conditions, which has prohibited the establishment of oyster communities.

558 Fish

Oscar and tilapia are not native and should not be considered in the plan

559 Christensen (1965) identified more than 250 species of fish within the Loxahatchee River and Estuary. The
560 abundance, distribution, and diversity of fish are affected by season, salinity, and habitat availability. The
561 upstream area of the river is characterized by freshwater fish species, and the lower portion is characterized
562 by marine and estuarine species. The freshwater marshes, creeks, and river reaches include many species
563 of small and large fish. Small fish provide an important food source for wading birds, reptiles, and
564 amphibians. Common small freshwater fish include the golden topminnow (*Fundulus chrysotus*), least
565 killifish (*Heterandria formosa*), Florida flagfish (*Jordenella floridae*), golden shiner (*Notemigonus*
566 *crysoleucas*), sailfin molly (*Poecilia latipinna*), bluefin killifish (*Lucania goodei*), oscar (*Astronotus*
567 *ocellatus*), eastern mosquitofish (*Gambusia holbrooki*), and small sunfishes (*Lepomis* spp.) (USACE
568 2020). Larger freshwater fish occur in deeper ditches, canals, and the upper river reaches where tapegrass
569 occurs in widespread beds on the river bottom. This includes largemouth bass (*Micropterus salmoides*),
570 bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), black crappie (*Pomoxis*
571 *nigromaculatus*), yellow bullhead (*Ameiurus natalis*), white catfish (*Ameiurus catus*), bowfin (*Amia calva*),
572 and tilapia (*Tilapia* spp.) (USACE 2020). Larger fish are prey for birds, alligators, and mammals and serve
573 as a recreational and commercial fishery resource.

574 Seagrass and mangrove habitat within the estuarine and marine portions of the river provide important
575 habitat and nursery grounds for many fish species. Common recreational and commercial fish species found
576 within the estuarine and marine reaches of the Loxahatchee River include mutton snapper (*Lutjanus analis*),
577 yellowtail snapper (*Ocyurus chrysurus*), lane snapper (*Lutjanus synagris*), yellowtail parrotfish (*Sparisoma*
578 *rubripinne*), gag grouper (*Mycteroperca microlepis*), pinfish (*Lagodon rhomboids*), tarpon (*Megalops*
579 *atlanticus*), common snook (*Centropomus undecimalus*), crevalle jack (*Cranx hippos*), spotted sea trout
580 (*Cynoscion nebulosus*), redfish (*Sciaenops ocellatus*), sheepshead (*Archosargus probatocephalus*), mullet
581 (*Mugil* spp.), threadfin shad (*Dorosoma petenense*), and gizzard shad (*Dorosoma cepedianum*)
582 (USACE 2020).

583 Amphibians and Reptiles

584 The freshwater wetland complex of the watershed supports a diverse assemblage of amphibians and reptiles.
585 Amphibians are an important food source for wading birds, alligators, and larger predatory fish. Common
586 amphibians include the greater siren (*Siren lacertina*), Everglades dwarf siren (*Pseudobranchius striatus*),
587 two-toed amphiuma (*Amphiuma means*), pig frog (*Rana grylio*), southern leopard frog (*Rana*
588 *sphenocephala*), Florida cricket frog (*Acris gryllus*), southern chorus frog (*Pseudacris nigrita*), squirrel tree
589 frog (*Hyla squirela*), and green tree frog (*Hyla cinerea*) (USACE 2020). Common reptiles include the
590 American alligator (*Alligator mississippiensis*), snapping turtle (*Chelydra serpentina*), striped mud turtle
591 (*Kinosternon bauri*), mud turtle (*Kinosternon subrubrum*), cooter (*Chrysemys floridana*), Florida chicken
592 turtle (*Deirochelys reticularia*), Florida softshell turtle (*Trionyx ferox*), water snakes (*Nerodia* spp.), mud
593 snake (*Francina abacura*), eastern ratsnake (*Pantherophis obsoletus*), and Florida cottonmouth (*Agkistrodon*
594 *piscivorus*) (USACE 2020). Protected species such as the eastern indigo snake (*Drymarchon corais*
595 *coupieri*), gopher tortoise (*Gopherus polyphemus*), and gopher frogs (*Lithobates capito*) are also present in
596 the watershed.

597 Birds

598 Wading birds and marsh birds are frequently observed in depressional marshes and littoral zones of ditches,
599 canals, and stormwater detention ponds within the watershed. Common wading birds include white ibis
600 (*Eudocimus albus*), glossy ibis (*Plegadis falcenellus*), great egret (*Ardea albus*), snowy egret (*Egretta*
601 *thula*), great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta*
602 *tricolor*), green heron (*Butorides virescens*), cattle egret (*Bubulcus ibis*), black-crowned night heron
603 (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violacea*), roseate spoonbill (*Platalea*
604 *ajaja*), and wood stork (*Mycteria americana*) (USACE 2020). Common marsh birds include the common
605 gallinule (*Gallinula galeata*), purple gallinule (*Porphyrio martinicus*), least bittern (*Ixobrychus exilis*),
606 limpkin (*Aramus guarauna*), king rail (*Rallus elegans*), and black rail (*Laterallus jamaicensis*).

607 Additional protected bird species found in the watershed include bald eagles (*Haliaeetus leucocephalus*),
608 northern crested caracaras (*Caracara cheriway*), sandhill cranes (*Antigone canadensis*), and red-cockaded
609 woodpeckers (*Picoides borealis*). The red-cockaded woodpecker has a small population in the J. W. Corbett
610 Wildlife Management Area, where it tends to nest in mature pine trees.

black bear and panther may rarely occur in the Lox River watershed, which is not part of any "home ranges"

611 Mammals

612 A variety of mammal species are found throughout the Loxahatchee River watershed from the uplands to
613 the estuary. The rice rat (*Oryzomys palustris natator*), round-tailed muskrat (*Neofiber allen*), river otter
614 (*Lontra canadensis*), marsh rabbit (*Sylvilagus palustris*), and raccoon (*Procyon lotor*) are common mammal
615 species that inhabit the upland and wetland plant habitats. White-tailed deer (*Odocoileus virginianus*), black
616 bear (*Ursus floridanus*), bobcat (*Lynx rufus*), and the federally endangered Florida panther (*Puma concolor*
617 *coryi*) also use portions of the watershed as part of their home ranges.

618 **3.2 Description of Northwest Fork of the Loxahatchee River**

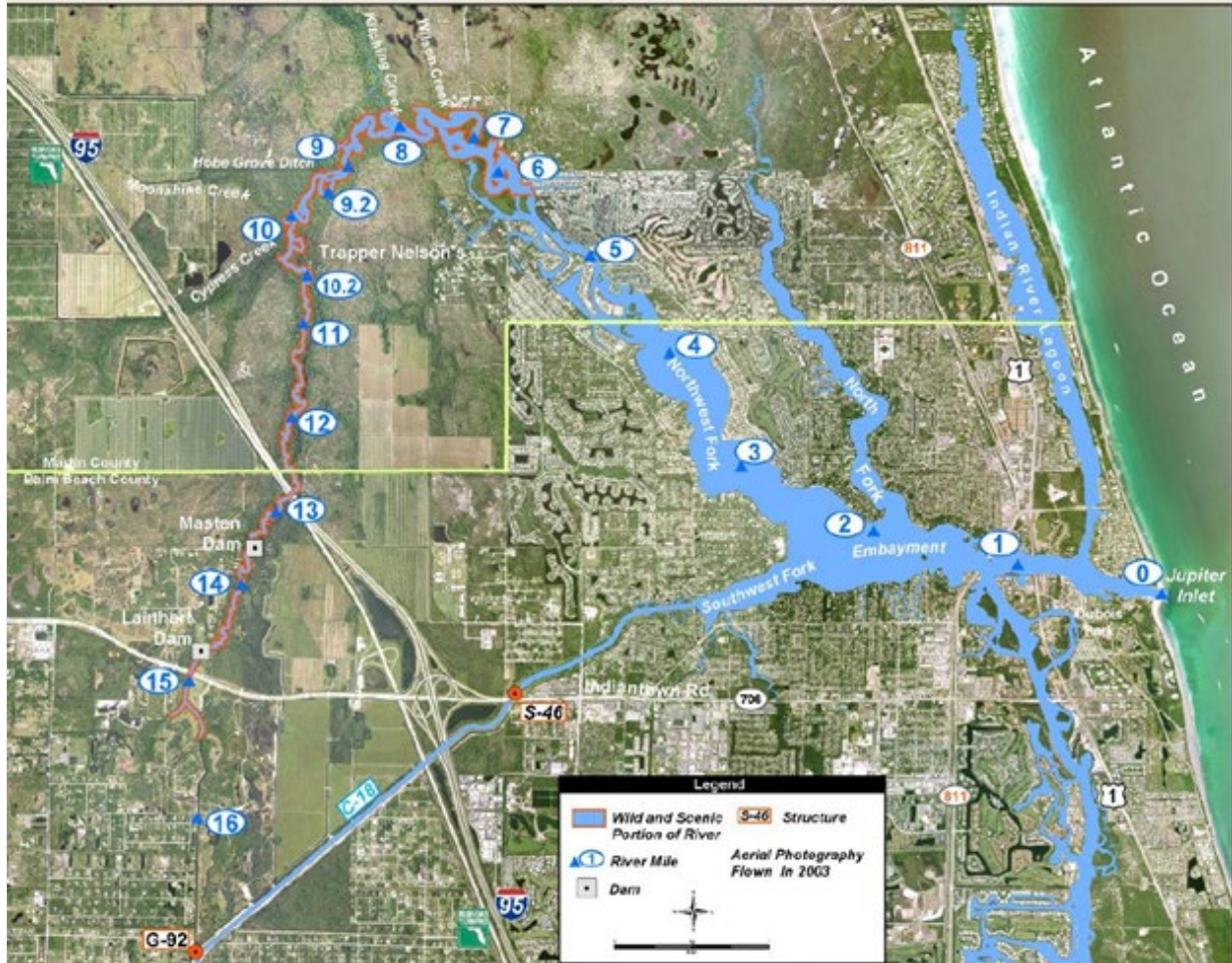
619 The Northwest Fork of the Loxahatchee River naturally originates in the Loxahatchee and Hungryland
620 sloughs, which are south and west of the river. The C&SF Project cut off these hydrologic connections to
621 the Northwest Fork and diverted freshwater flow to the Southwest Fork and out to tide through construction
622 of canals (e.g., C-18) and water control structures (e.g., G-92). Downstream from the Loxahatchee and
623 Hungryland sloughs, the Northwest Fork also receives input from other major tributaries of the Loxahatchee
624 River, such as Cypress Creek/Cypress Creek Canal, Hobe Grove Ditch, Moonshine Creek, Wilson Creek,
625 and Kitching Creek. Three distinct reaches (riverine, lower tidal, and upper tidal) and four major forest

626 community types (swamp, bottomland hardwood, hydric hammock, and upland) are found in the floodplain
627 of the Northwest Fork. The following descriptions of the river reaches and dominant vegetative
628 communities were summarized from the *Restoration Plan for the Northwest Fork of the Loxahatchee River*
629 SFWMD (2006).

- 630 • The riverine reach of the Northwest Fork primarily consists of freshwater canopy forest that
631 generally is unaffected by salinity. This area ranges from just north of the G-92 structure to river
632 mile (RM) 9.5 (**Figure 3-1**). Vegetative communities in this reach are dominated by bald cypress
633 (*Taxodium distichum*), pop ash (*Fraxinus caroliniana*), red maple (*Acer rubrum*), pond apple
634 (*Annona glabra*), and water hickory (*Carya aquatica*).
- 635 • The upper tidal reach between RM 9.5 and RM 8.13 (**Figure 3-1**) consists of mixed
636 freshwater/brackish canopy forest that has experienced some saltwater intrusion due to tidal
637 influences and lack of freshwater flow during the dry season. Upper tidal reach communities are
638 dominated by pond apple, red and white mangrove (*Rhizophora mangle* and *Laguncularia*
639 *racemosa*), and cabbage palm (*Sabal palmetto*), with some communities of bald cypress located in
640 the inner floodplain away from the riverbed.
- 641 • The lower tidal reach from approximately RM 8.13 to RM 5.5 (**Figure 3-1**) includes salt-tolerant
642 species and is highly influenced by tides and salinity in the water and soils. The lower tidal reach
643 is dominated by red and white mangrove.

644 Among other contributing factors—including widening and dredging of the Jupiter Inlet, groundwater
645 drawdown in Jupiter and Tequesta, and sea level rise—decreased freshwater input to the Northwest Fork
646 of the Loxahatchee River has led to an increase in upstream salinity, which has caused a decline in rare
647 riverine cypress and an encroachment of mangroves. Restoration target flows developed in the *Restoration*
648 *Plan for the Northwest Fork of the Loxahatchee River* (SFWMD 2006) identified dry season and wet season
649 flows at Lainhart Dam (located between RM 14 and RM 15; **Figure 3-1**). The restoration target flows would
650 provide preferred seasonal flows to the Northwest Fork and reduce saltwater intrusion in the tidal plain,
651 while maintaining appropriate environmental conditions in the riverine floodplain for aquatic-dependent
652 species, communities, and wildlife (USACE 2020). The target flows developed in 2006 were re-examined
653 in 2012 using new flow, salinity, and biological monitoring data and were found to be valid. Those target
654 flows were used to develop the LRWRP (USACE 2020). Salinity target zones or “envelopes” were also
655 developed in 2006 for the four major salinity zones: freshwater, oligohaline, mesohaline, and polyhaline
656 (SFWMD 2006). Ecological indicators such as tapegrass, fish larvae and juveniles, oysters, and seagrass
657 are monitored within each respective salinity zone to track the health, abundance, and distribution of native
658 riverine and estuarine species.

659 Sea level rise is a concern for all coastal areas of South Florida. The PIR-EIS reported sea levels relative to
660 the Loxahatchee River and Estuary could rise 0.4 to 2.4 ft over the next 50 years (USACE 2020). This rise
661 in sea level could result in saltwater migration upstream in the Loxahatchee River. The additional
662 freshwater flows resulting from the LRWRP may help mitigate this saltwater migration. Modeling was
663 performed as part of the project and details can be found in the PIR-EIS (USACE 2020).



664
665 Figure 3-1. River mile designations for the Loxahatchee River (From: SFWMD 2006).

666 **3.3 Geology and Hydrogeology of Aquifer Systems in the Vicinity**
667 **of the C-18W Reservoir**

668 The geological framework of South Florida has been studied by numerous investigators, including Miller
669 (1990), Meyer (1989), and Reese and Richardson (2008). Most of the following is summarized from Reese
670 and Richardson (2008), supplemented with more recent data. Florida is underlain by a thick sequence of
671 carbonate and clastic sedimentary rocks ranging in age from Paleocene to recent. There are three principal
672 hydrogeologic units present in the study area: the surficial aquifer system (SAS), intermediate confining
673 unit, and Floridan aquifer system (FAS). In this area, the SAS consists of fine- to medium-grain quartz sand
674 with varying amounts of silt, clay, and shell deposits. It is unconfined and produces small quantities of good
675 to fair quality water. The intermediate confining unit generally consists of the fine-grained sediments of the
676 Hawthorn Group. The Hawthorn Group generally acts as a regionally extensive confining unit overlying
677 the FAS in southeastern Florida. In the area of the C18-W Reservoir, the Hawthorn Group is approximately
678 700 ft thick.

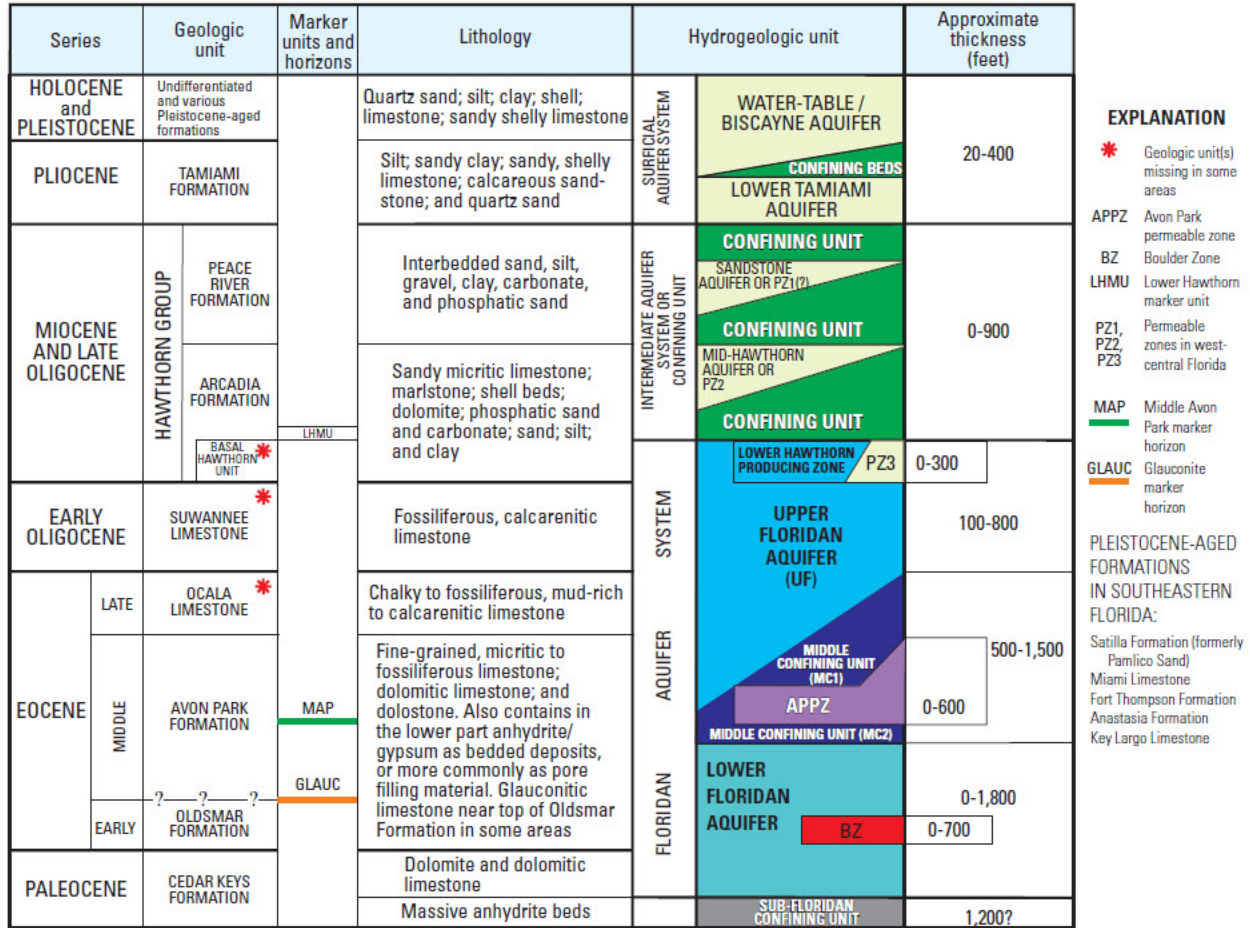
679 3.3.1 Floridan Aquifer System

680 The FAS consists of the Upper Floridan aquifer (UFA), middle confining unit, and Lower Floridan aquifer
681 (Miller 1990). Reese and Richardson (2008) refined these units and provided a more consistent
682 hydrogeologic framework using multiple methods for identifying hydrostratigraphic units, including
683 lithologic and geophysical methods.

684 Generally located about 1,000 ft below land surface (bls), the UFA occurs at the base of the Hawthorn
685 Group and includes the Suwannee Limestone and upper portions of the Avon Park Formation and Ocala
686 Limestone. In the study area, it generally consists of several thin, highly permeable water-bearing zones
687 interbedded with thicker zones of lower permeability. Because of good confinement above the UFA and
688 artesian pressure within it, the top of the UFA is marked by a large increase in hydraulic head. Drilling
689 characteristics, such as a lost-circulation zone, also help identify the top of the UFA. The thickness of the
690 UFA varies between less than 100 ft in central Florida to more than 700 ft in some areas of southern Florida.
691 The bottom of the UFA tends to be gradational in nature and its elevation is difficult to define precisely.
692 The UFA is the target horizon for implementation of ASR at the C-18W Reservoir.

693 The middle confining unit is divided into three units: upper middle confining unit, Avon Park permeable
694 zone (APPZ), and lower middle confining unit (Miller 1986). As stated above, the boundary between the
695 UFA and middle confining unit is gradational and difficult to define precisely; therefore, the altitude of the
696 top of the upper middle confining unit has a significant degree of variability. The thickness of the upper
697 middle confining unit varies between less than 100 ft to more than 800 ft. The APPZ is a productive unit in
698 the study area. The APPZ is present throughout most of South Florida, although it thins and may pinch out
699 along the southeast coast of Florida and may be absent in portions of Collier and Monroe counties. In other
700 portions of South Florida, it can be up to 500 ft thick. Permeability of the APPZ is mainly associated with
701 fracturing. Transmissivity of the APPZ ranges from less than 100,000 ft²/day in the southern portions of
702 southern Florida to 1,600,000 ft²/day in west-central Florida.

703 The Lower Floridan aquifer consists of a sequence of permeable zones separated by semi-confining units.
704 The first permeable zone is somewhat contiguous throughout South Florida. It is located near the base of
705 the Avon Park Formation at elevations between -1,400 and -2,600 ft National Geodetic Vertical Datum of
706 1929 (NGVD29). Its thickness ranges from near absent to more than 150 ft. Reported transmissivities range
707 between 10,000 and 50,000 ft²/day, with some localized higher values. Water quality within the first
708 permeable zone is generally saline throughout South Florida. The first permeable zone is generally above
709 the glauconitic limestone marker bed (**Figure 3-2**). Below the first permeable zone is a series of confining
710 units with localized permeable zones in the upper portion of this deeper unit. The spatial extent of the thin
711 permeable zones has not been fully mapped or identified in the deeper wells that penetrate this unit and
712 would be difficult to treat as distinct hydrostratigraphic units. As a result, these lower confining units and
713 the thin permeable zones within them are treated as a single semi-confining unit referred to as the Lower
714 Floridan confining unit. Below the Lower Floridan confining unit is an extremely transmissive zone of
715 cavernous and fractured dolomites and limestones of the Oldsmar Formation locally referred to as the
716 Boulder Zone. The Boulder Zone occurs at elevations of approximately -2,100 to -3,500 ft NGVD29 and
717 can be several hundred feet thick in some areas (Reese and Richardson 2008), with extremely high
718 transmissivity values. The Boulder Zone represents the base of the FAS in South Florida as it is underlain
719 by the massive impermeable anhydrite beds of the Cedar Keys Formation (**Figure 3-2**).



720
721 Figure 3-2. Generalized geologic and hydrogeologic framework of South Florida (From: Reese and
722 Richardson 2008).

723 **3.3.2 Hydrogeology at Nearby FAS and Aquifer Storage and Recovery Wells**

724 There are several wells in Palm Beach County that provide information pertinent to the ASR well
725 component of the C-18W Reservoir (Figure 3-3). The deep injection wells provide hydrostratigraphic and
726 some water quality information, but generally do not provide information regarding aquifer characteristics
727 in the UFA and APPZ. The FAS supply wells, ASR test wells, and SFWMD exploratory wells have more
728 robust data sets that typically provide this information.

729 The hydrostratigraphic units most associated with water supply are the UFA and APPZ. Permeable zones
730 within the upper portions of the Lower Floridan aquifer are too brackish to expect reasonable ASR recovery
731 rates. For the UFA and APPZ, chloride and total dissolved solids (TDS) concentrations of 2,000 and
732 4,000 milligrams per liter (mg/L) are typical in Palm Beach County. The base of the underground source
733 of drinking water, defined as the depth where ambient water quality is 10,000 mg/L total dissolved solids,
734 is encountered between depths of 1,700 ft bls (Geraghty & Miller 1986, 1987) and 1,920 ft bls (PBF-15 at
735 L-8 flow equalization basin; Anderson 2008). The transition to poorer water quality typically occurs over
736 a short interval (approximately 100 ft) based on water quality samples obtained during reverse-air drilling
737 at these sites.

738 **Pratt & Whitney Injection Well:** The closest wells to the C-18W Reservoir site that penetrate the entire
739 FAS are located at the Pratt & Whitney deep injection well facility, approximately 4 miles north. The wells
740 at this facility are completed within the Boulder Zone (approximately 3,000 ft bls). The Pratt & Whitney
741 investigation revealed the top of the UFA occurs within the Suwannee Limestone at approximately
742 800 ft bls (CH2M HILL 1985). Additionally, there are deeper, permeable dolomitic portions of the aquifer
743 that may also be available for storage.

744 **Seacoast Injection Well:** The stratigraphy at the Seacoast Utility Authority deep injection well system,
745 9 miles east of the C-18W Reservoir site, is similar to that at the Pratt & Whitney deep injection well
746 facility. Investigation at this location showed there are several potential storage zones within the upper
747 portions of the FAS, the uppermost of which is at 900 ft bls (CH2M HILL 1989).

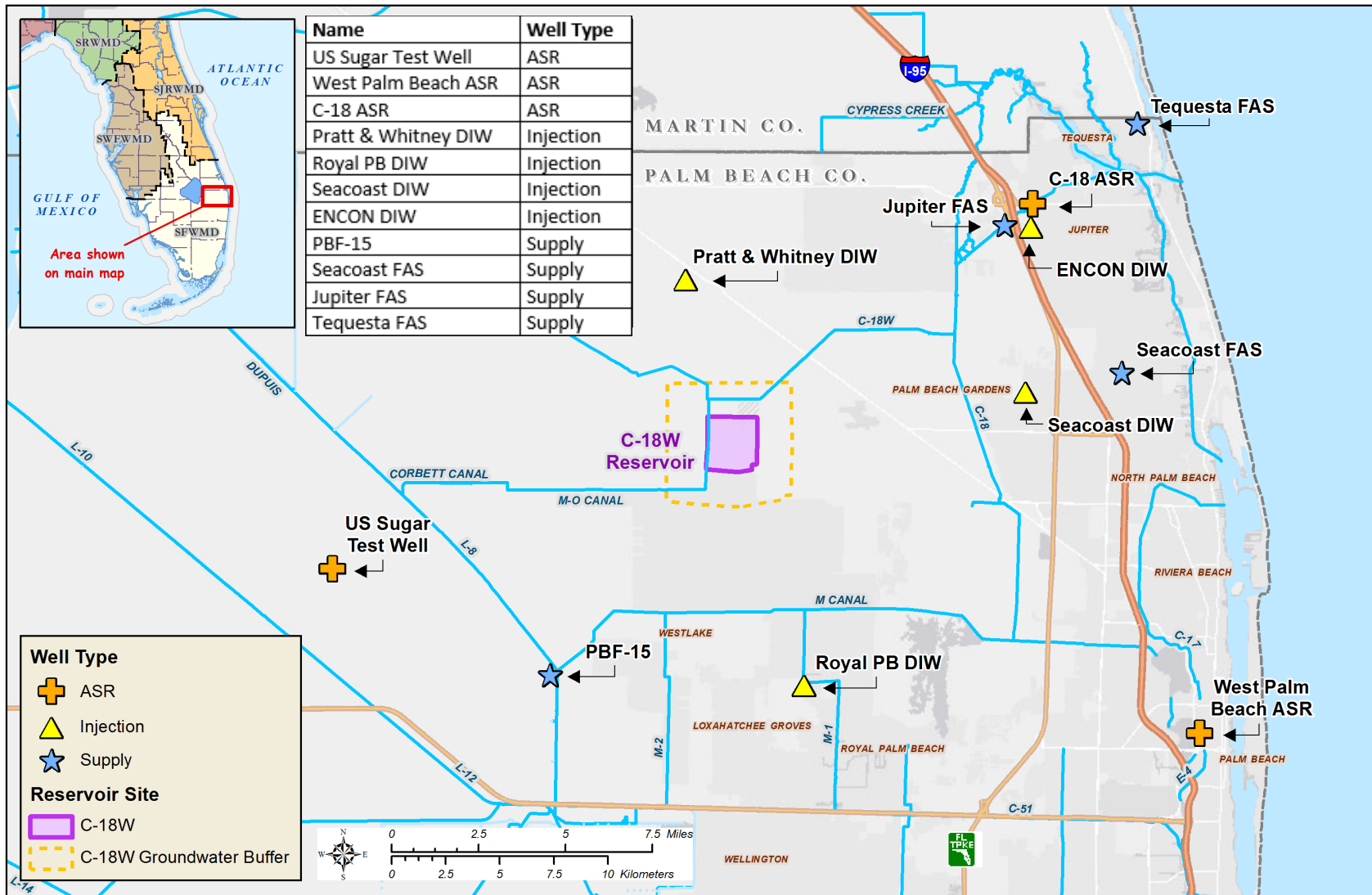
748 **C-18 Test ASR Well:** In 1976, the Florida Department of Natural Resources constructed and tested an ASR
749 system along the C-18 Canal, approximately 11 miles northeast of the C-18W Reservoir site (Palappert
750 1977). A 12-inch diameter test ASR well drilled within the UFA underwent four short test cycles at recharge
751 rates of 3 mgd at relatively low pressures. During the fourth cycle, the system exhibited a recovery
752 efficiency of 36% after recharging for only one month and a storage period of 120 days. Testing indicated
753 the UFA would be conducive to future implementation of larger-capacity ASR wells at this site at rates of
754 5 mgd, with high recovery efficiency.

755 **West Palm Beach ASR Well:** The City of West Palm Beach is currently operating an ASR system
756 approximately 11 miles southeast of the C-18W Reservoir site (CH2M HILL 1998). The ASR system is
757 operating at recharge rates in excess of 7 mgd within the UFA and is currently conducting test cycles using
758 filtered surface water. The City has obtained a water quality criteria exemption from the Florida Department
759 of Environmental Protection that allows the ASR system to operate without a disinfection treatment process.

760 **US Sugar ASR Test Well:** In 1992, the United States Sugar Corporation constructed a test well system
761 approximately 11 miles west of the C-18W Reservoir site. A 6-inch diameter test well, cased to the top of
762 the FAS at a depth of 925 ft bls, was constructed with an open-hole extending to 1,690 ft bls. The well was
763 hydraulically tested, and results indicated the UFA exhibited a transmissivity of 540,000 gallons/day/ft
764 (Missimer & Associates, Inc. 1993). These attributes indicate a larger-diameter ASR well at this location
765 could be pumped at a rate of 5 mgd, while exhibiting reasonable drawdowns and recharge pressures.
766 Additionally, the water within the UFA exhibited chloride concentrations between 1,100 and 1,800 mg/L,
767 which are similar to other ASR facilities in southern Florida that have had high recovery efficiencies.

768 **Royal Palm Beach Injection Well:** The stratigraphy at the Royal Palm Beach deep injection well, located
769 7 miles south of the C-18W Reservoir site, confirms that the UFA is present at a depth of 900 ft bls, and
770 artesian limestone and dolomitic intervals are present to depths greater than 2,500 ft bls. A lost circulation
771 zone at 950 ft bls indicates a permeable zone corresponding to the top of the UFA, with a total dissolved
772 solids concentration of 4,000 mg/L. These findings indicate that multiple, vertically stacked zones may be
773 available for high-capacity water recharge and storage in the area (CH2M HILL 1988).

774 **L-8 Flow Equalization Basin Site (PBF-15):** The SFWMD constructed a tri-zone monitor well to measure
775 groundwater levels continuously in FAS permeable zones at the northeast corner of the L-8 flow
776 equalization basin. Two permeable zones suitable for storage were identified between 890 and 1,100 ft bls.
777 While drilling through this interval, numerous lost circulation zones were encountered, indicating highly
778 fractured or otherwise permeable strata within the UFA that would be capable of accommodating
779 high-capacity recharge and recovery rates (Anderson 2008).



780

781 Figure 3-3. The C-18W Reservoir and nearby Floridan aquifer system wells.

782 **3.3.3 Conclusions**

783 Review of hydrogeologic data in the vicinity of the C-18W Reservoir site was based on consultant reports
784 and United States Geological Survey and SFWMD water resource investigations. Based on this review, it
785 appears that subsurface conditions in the general depth range of the UFA (the target zone) are suitable for
786 ASR implementation. The UFA's hydrogeology, background water quality, aquifer characteristics, regional
787 hydraulic gradient, and anticipated pumping rates are all within reasonable ranges associated with other
788 successful ASR systems. There is no specific information in the area that precludes the C-18W Reservoir
789 site from being considered for ASR.

DRAFT

790 **4 IMPROVEMENTS TO HYDROLOGY, HABITATS, AND FISH AND**
791 **WILDLIFE RESOURCES**

792 **4.1 Hydrology**

793 One of the five planning objectives of the LRWRP is to restore wet and dry season flows to the Northwest
794 Fork of the Loxahatchee River and the river’s floodplain (USACE 2020). The Authorized Plan will improve
795 the quantity, quality, timing, and distribution of freshwater flow to the Northwest Fork by achieving 91%
796 of the dry season target restoration flows and 98% of the wet season target restoration flows as measured
797 at Lainhart Dam (USACE 2020). To improve seasonal flows, freshwater currently lost to tide (via the
798 Southwest Fork) will be captured and redirected to the Northwest Fork to meet restoration flows before
799 being discharged into the Loxahatchee River Estuary. These improvements will be realized through the
800 construction of structural project components, including a 9,500-ac-ft reservoir, four ASR wells, a
801 flow-through marsh, pump stations, canals, and water control structures, in addition to management and
802 operational modifications to existing water control infrastructure. Fewer high-discharge events (from the
803 Northwest Fork) and low-flow days will improve salinity along the river, which will conserve the river’s
804 unique blend of freshwater and estuarine habitats. The LRWRP will also improve the timing and
805 distribution of flows to the Northwest Fork’s tributary creeks (Kitching Creek, Moonshine Creek, and
806 Cypress Creek).

807 Beyond the Northwest Fork of the Loxahatchee River, the LRWRP will provide significant hydrologic
808 improvements to wetlands through restoration of sheetflow and increased hydroperiods. Specific restoration
809 actions include removal of berms, filling of ditches, connecting surface water and groundwater flows
810 between natural areas, and moving water through spreader canals and natural flow-ways. Although
811 hydrology to the watershed and Northwest Fork will be improved, the LRWRP will not fully restore
812 hydrology to pre-drainage conditions (USACE 2020).

813 **4.2 Habitats**

814 The spatial extent and quality of wetland resources within the Loxahatchee River watershed have been
815 impacted by drainage, conversion to agriculture, and urban development. The LRWRP proposes to restore
816 approximately 27,000 acres of disturbed wetlands within the watershed: 17,000 acres of former wetlands
817 that were improved for agriculture and 10,000 acres of existing disturbed wetlands in the J.W. Corbett
818 Wildlife Management Area, **Loxahatchee Slough, Hungryland Slough,** Pal-Mar natural area complex,
819 Cypress Creek Natural Area, City of West Palm Beach Water Catchment Area, and Jonathan Dickinson
820 State Park (USACE 2020). These 27,000 acres of restored wetlands will connect to 51,000 acres of other
821 wetland communities for a total of 78,000 acres of connected habitat (USACE 2020). Restoration and
822 connectivity in these areas will result in habitat improvements for a mix of ridge-and-slough, pine
823 flatwoods, wet prairie, cypress floodplain, cypress strand, dome swamps, depression marsh, and mesic and
824 hydric hammock plant communities (USACE 2020). The LRWRP will also improve conditions for aquatic
825 vegetation and seagrass communities through decreases in the number of high-discharge events and
826 increases in dry season flows to the Northwest Fork and Loxahatchee River Estuary. While the spatial
827 extent of natural plant communities will not be restored to their historical extents and proportions, the
828 quality and quantity of vegetative communities will be greatly improved (USACE 2020).

Please change to
"...Loxhatchee Slough Natural
Area, Hungryland Slough
Natural Area..."

Please add Pine
Glades Natural Area.

829 **4.3 Fish and Wildlife Resources**

830 Alterations to historical drainage patterns and modifications to water management practices have impacted
831 aquatic vegetation communities within the watershed, resulting in disrupted aquatic productivity and
832 function throughout the food web (USACE 2020). The LRWRP will provide habitat improvements
833 benefitting a wide range of fish and wildlife resources through implementation of project components that
834 improve the timing, quantity, quality, and distribution of freshwater flow to the Loxahatchee River and
835 Estuary. The project will also provide habitat connectivity between natural areas and patches of fragmented
836 habitat as lands are committed to the project. This increase in the spatial extent of suitable habitats will
837 provide additional foraging and nesting opportunities for fish and wildlife, including threatened and
838 endangered species.

839 In the estuarine environment, oysters will benefit from the project as a result of fewer high-discharge events
840 to the Loxahatchee River and Estuary. Commercially and recreationally important species of fish, such as
841 snapper and grouper, will benefit from improved seagrass habitat and an increase in forage prey availability
842 as the project re-establishes a more natural salinity regime to the river and downstream estuary. Increased
843 freshwater flows to the river and estuary will improve habitat for other estuarine wildlife species such as
844 manatees, sea turtles, and wading birds. In the freshwater environment, fish and wildlife will benefit from
845 expansion of the riparian fringe due to implementation of project components that restore flow to the river
846 and its historical tributaries. Restoration efforts for natural areas and hydrologically impacted lands
847 throughout the project area will increase stages and hydroperiods of wetlands. Such wetland improvements
848 will provide better habitats for crayfish and small fish, thus increasing prey and foraging opportunities for
849 amphibians, reptiles, birds, and small mammals.

850 Currently degraded populations of listed species are expected to improve after the restoration and
851 enhancement of suitable habitat. Nine federally listed species are either known to exist or potentially exist
852 within the project area (USACE 2020). Those that would benefit from the LRWRP include the Florida
853 manatee, Florida bonneted bat, snail kite, and wood stork. Twelve state-listed species are also potentially
854 present in the project area (USACE 2020). Those that will benefit from the LRWRP include beach-nesting
855 bird species (e.g., American oystercatcher, black skimmer, least tern), wading birds (e.g., reddish egret,
856 little blue heron, roseate spoonbill, tricolored heron), and sandhill cranes. The LRWRP will contribute to
857 the ongoing monitoring and management of threatened and endangered species, which will help maintain
858 or enhance existing populations.

Everglade

859 **5 IDENTIFICATION OF WATER TO BE PROTECTED**

860 The purpose of amending the Lower East Coast Regional Water Availability RAA rule to expand the
861 boundaries of the North Palm Beach County/Loxahatchee River Watershed Waterbodies is to ensure water
862 associated with the operation of the LRWRP is protected from consumptive use. Expansion of the RAA
863 will protect surface waterbodies that deliver water to the Loxahatchee River or its tributaries. New rules are
864 needed to protect the water stored in the upper FAS via ASR wells included in the LRWRP's Authorized
865 Plan.

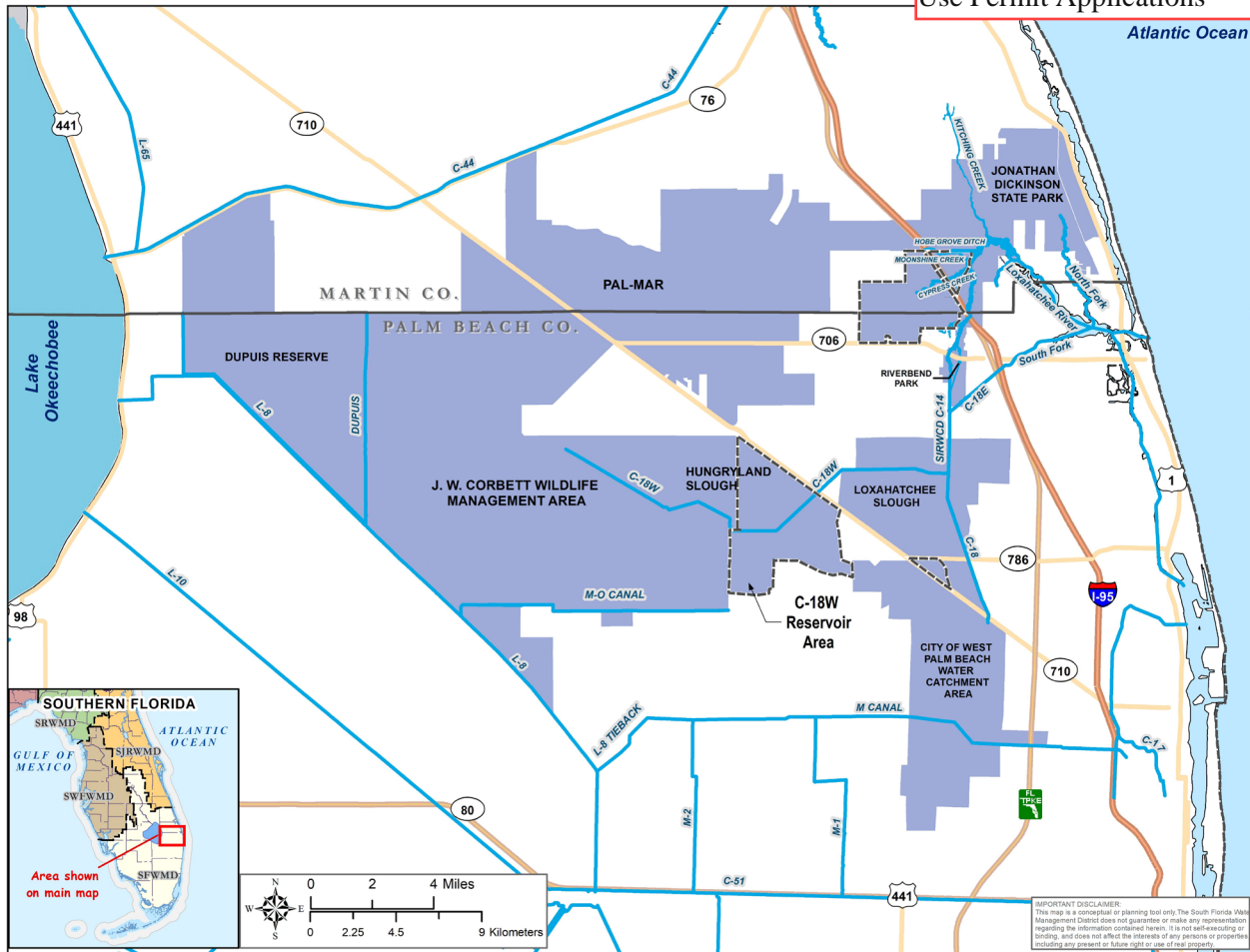
866 **5.1 Surface Water**

867 The RAA for the Lower East Coast Everglades Waterbodies and North Palm Beach County/Loxahatchee
868 River Watershed Waterbodies is a component of the MFL recovery strategy for the Northwest Fork of the
869 Loxahatchee River, as set forth in Chapter 40E-8, F.A.C. The RAA helps implement the SFWMD's
870 objective to ensure that water necessary for restoration of the Loxahatchee River watershed is not allocated
871 for consumptive use upon permit renewal or modification under this rule. Any evaluation of water
872 withdrawn from the North Palm Beach County/Loxahatchee River Watershed Waterbodies shall address
873 the impacts of the proposed use on surface water and groundwater from: a) integrated conveyance systems
874 hydraulically connected to the North Palm Beach County/Loxahatchee River Watershed Waterbodies and
875 are tributary to or receive water from such waterbodies; and b) the North Palm Beach County/Loxahatchee
876 River Watershed Waterbodies. Integrated conveyance systems hydraulically connected to the North Palm
877 Beach County/Loxahatchee River Watershed Waterbodies include primary canals used for water supply,
878 including, but not limited to, C&SF Project canals and secondary and tertiary canals that derive water from
879 primary canals for supply purposes. Canals used strictly for drainage are not considered part of the North
880 Palm Beach County/Loxahatchee River Watershed Waterbodies.

881 The LRWRP is a CERP project designed to restore the Loxahatchee River and meet part of the Northwest
882 Fork of the Loxahatchee River MFL recovery strategy. As discussed previously, a condition of CERP
883 projects is the legal protection of project water for the natural system prior to entering a cost-share
884 agreement with the federal government. Most, but not all, the areas included in the LRWRP are already
885 within the existing definition of the North Palm Beach County/Loxahatchee River Watershed Waterbodies
886 and, therefore, protected under the existing RAA. However, to fully protect the water needed for the
887 LRWRP, the existing RAA needs to be amended to include the remaining project areas. **Figure 5-1** shows
888 the proposed, expanded RAA boundaries for the North Palm Beach County/Loxahatchee River Watershed
889 Waterbodies under the Lower East Coast Regional Water Availability rule. Added areas are shown with
890 dashed outlines.

Please see all of the comments on Figure 3.2 of the Applicants Handbook for Water Use Permit Applications

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Figure 5-1. The proposed, expanded restricted allocation area boundaries for the North Palm Beach County/Loxahatchee River Watershed Waterbodies under the Lower East Coast Regional Water Availability rule. Dashed lines indicate new areas added to the existing restricted allocation area.

897

5.2 Groundwater

Please explain and provide background information on why the 2006 base condition assumption is still valid considering the Lox River CERP project has been authorized by Congress and it is now 2022?

898

5.2.1 Surficial Aquifer System

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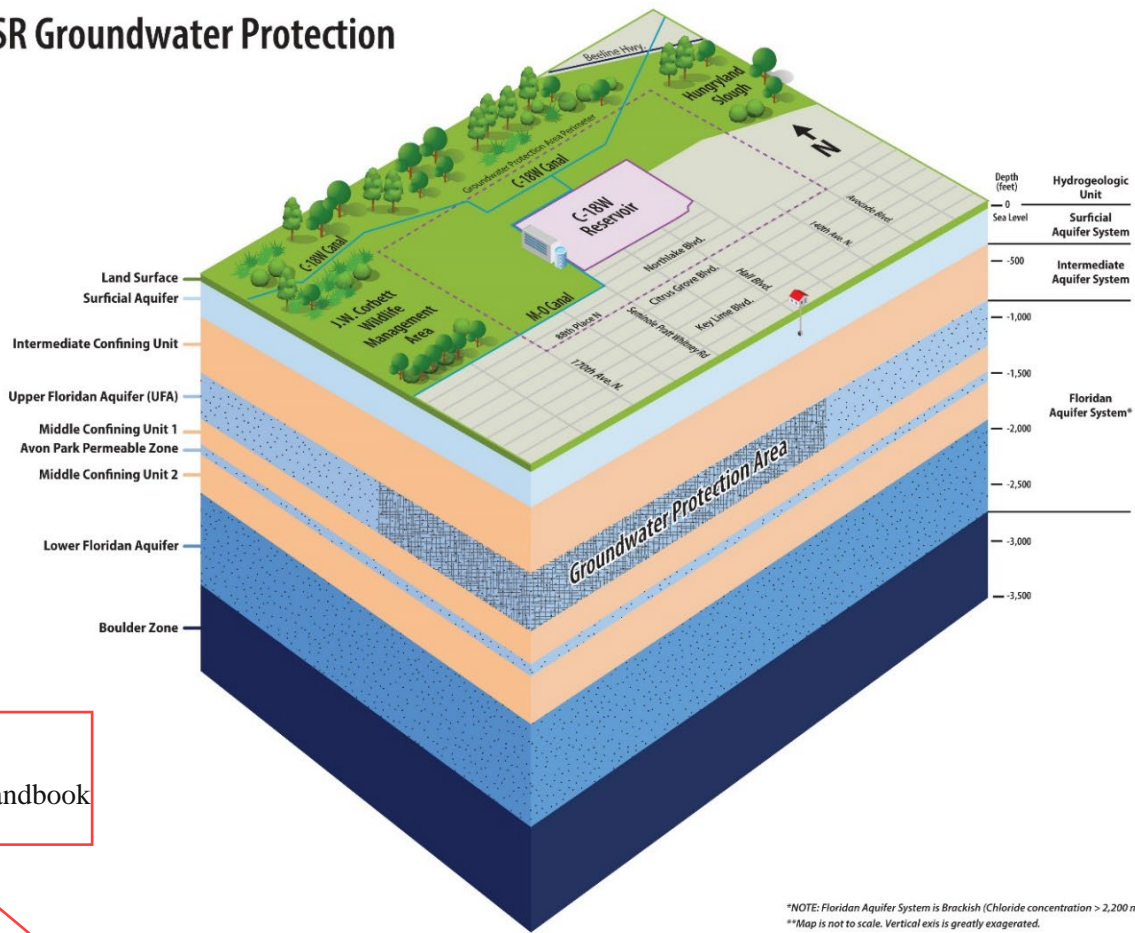
905

Under the Lower East Coast Regional Water Availability RAA rule, groundwater withdrawals from the unconfined surficial aquifer system (SAS), including the Biscayne aquifer, are limited to the extent that they induce seepage from the North Palm Beach County/Loxahatchee River Watershed Waterbodies above an established base condition (maximum annual average use for a 5-year period ending on April 1, 2006). The current rule applies to the areas shown in **Figure 5-1**. The same base condition will apply to consumptive use permits within the expanded areas in this update to the Lower East Coast Regional Water Availability RAA rule (the areas shown with dashed outlines in **Figure 5-1**).

906 **5.2.2 Floridan Aquifer System**

907 The LRWRP ASR component will store excess surface water in the upper FAS via four ASR wells adjacent
 908 to the C-18W Reservoir, as described in the Authorized Plan. To protect the water stored in the upper FAS,
 909 the SFWMD will implement a new RAA and modify the current criteria pertaining to existing legal users.
 910 The proposed rule will prohibit direct withdrawals from the upper FAS within the RAA boundary identified
 911 in **Figure 5-2** to protect the groundwater storage zone associated with the project’s ASR wells. This RAA
 912 is narrowly defined to continue to encourage water users to utilize the FAS outside the boundary as an
 913 alternative water supply source. Consideration of withdrawals that induce seepage across the groundwater
 914 RAA boundary will be evaluated as described in Subsection 3.2.1.G of the Applicant’s Handbook (SFWMD
 915 2021b). Based on information from previous ASR investigations and modeling performed for the LRWRP,
 916 a 1-mile buffer from the boundaries of the C-18W Reservoir parcel was determined as the area necessary
 917 to protect the project water stored via ASR (**Figure 5-2**).

ASR Groundwater Protection



See County comments on Applicant's Handbook Figure 3-4

*NOTE: Floridan Aquifer System is Brackish (Chloride concentration > 2,200 mg/L)
 **Map is not to scale. Vertical axis is greatly exaggerated.

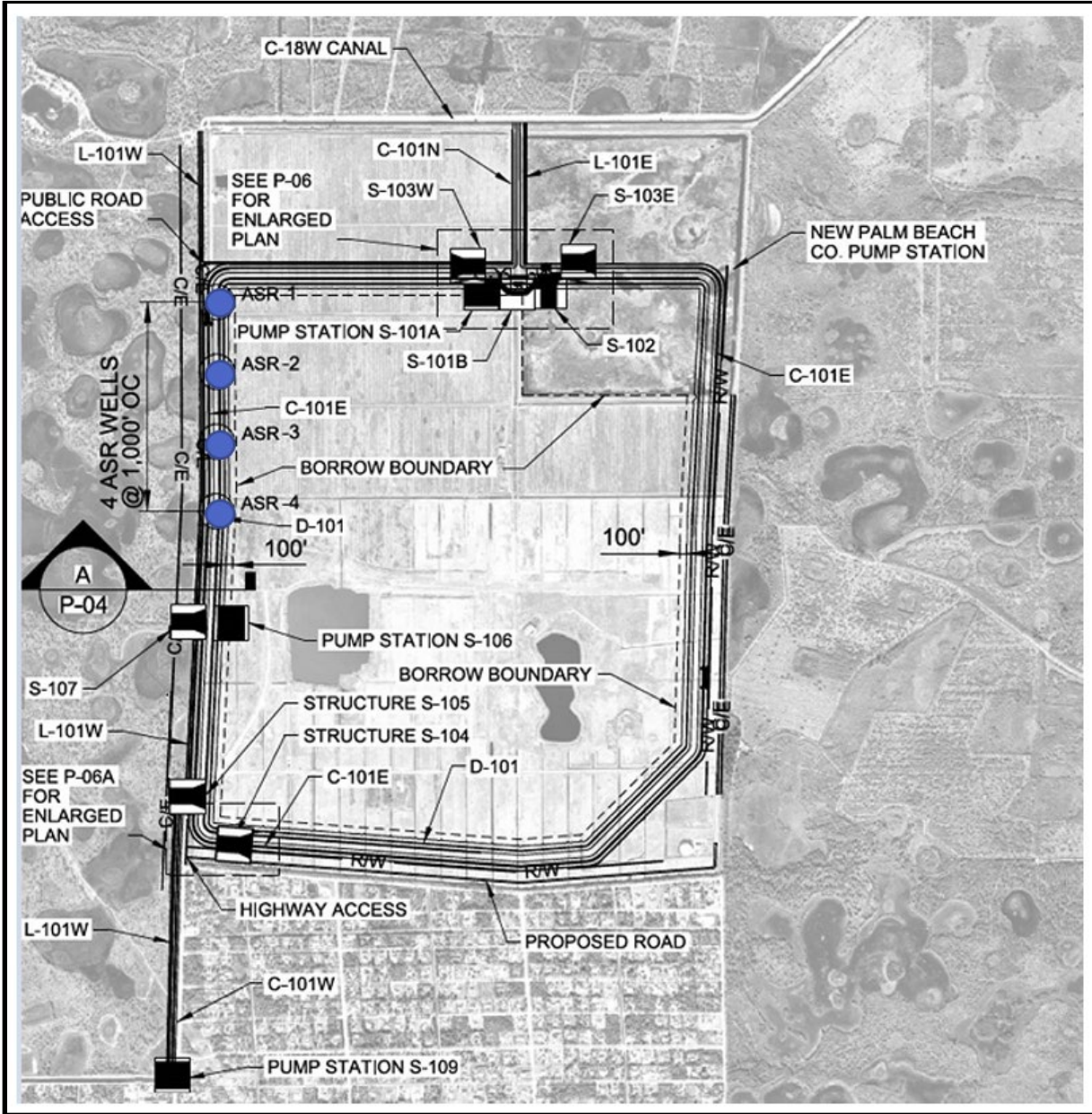
918 Figure 5-2. Graphic representation of the hydrogeology beneath the C-18W Reservoir (not to scale). The
 919 Upper Floridan aquifer (and possibly the Avon Park permeable zone) are anticipated to be
 920 utilized for storage and recovery of treated surface water beneath the C-18W Reservoir.
 921

922 Groundwater Modeling of Aquifer Storage and Recovery at the C-18W Reservoir

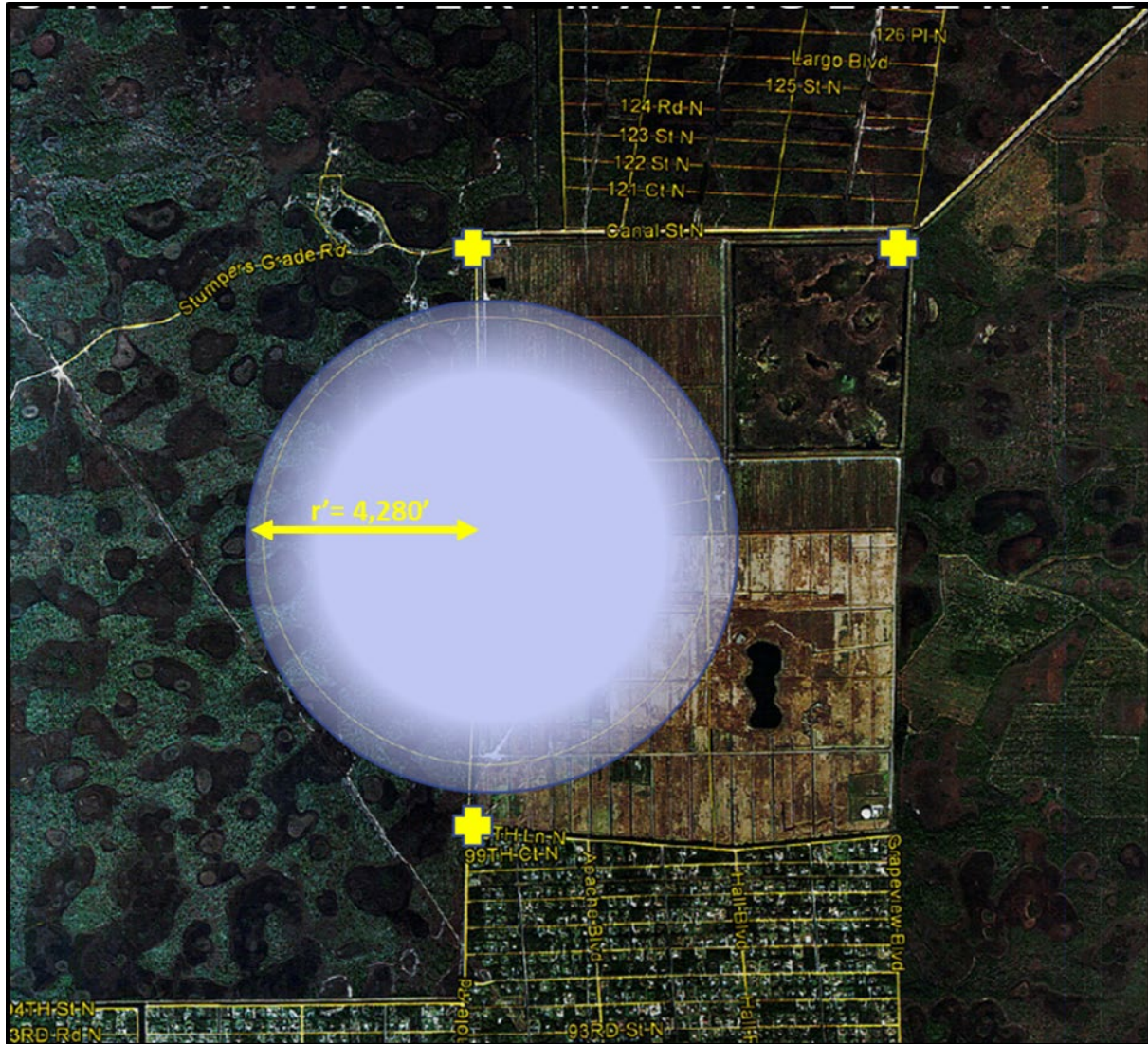
923 During development of the LRWRP PIR-EIS, four ASR wells were simulated as part of the
924 C-18W Reservoir operation. In the model, the minimum and maximum volumes of the ASR storage bubble
925 were 8,700 and 30,000 ac-ft, respectively. Inflow and outflow capacities were limited to a combined flow
926 rate of 30 cfs. The ASR system assumed a 70% recovery efficiency. Results from the Kissimmee River
927 ASR Pilot Project system (nearly 100% recovery efficiency during each cycle over a 4-year testing period;
928 SFWMD and USACE 2013) give some assurance that the 70% recovery efficiency assumed in the LRWRP
929 model is conservative.

930 To achieve high recovery efficiencies, the brackish water in the storage zone must be displaced away from
931 the ASR well, so a freshwater target storage volume (i.e., the bubble) can be established. To accomplish
932 this, the initial recharge volumes/durations should be large and the recovery volumes purposefully limited.
933 The operational model simulation assumed a minimum bubble volume of 8,700 ac-ft would always be
934 maintained within the aquifer.

935 The ASR wells are anticipated to be constructed along the western perimeter of the C-18W Reservoir
936 (**Figure 5-3**). Assuming a maximum bubble volume of 30,000 ac-ft, the radial extent of the bubble was
937 estimated using a calculation developed by Warner and Lehr (1981) (**Figure 5-4**). The calculation assumed
938 the upper FAS storage zone was 200 ft thick, with an effective porosity of 20%, and used a dispersivity
939 coefficient of 65 to account for mixing, diffusion, and dispersion within the storage zone. The radial edge
940 of the bubble was estimated to extend 4,280 ft from the injection (recharge) point. The ASR well locations
941 will be determined during preconstruction engineering and design and may be positioned at alternative
942 locations adjacent to the reservoir. To account for this contingency, a conservative distance of 1 mile
943 (5,290 ft) around the perimeter of the reservoir is proposed to protect the project water stored via ASR
944 (**Figure 5-2**).



945
 946 Figure 5-3. Conceptual design of the C-18W Reservoir and aquifer storage and recovery (ASR) wells
 947 (From: USACE 2020).



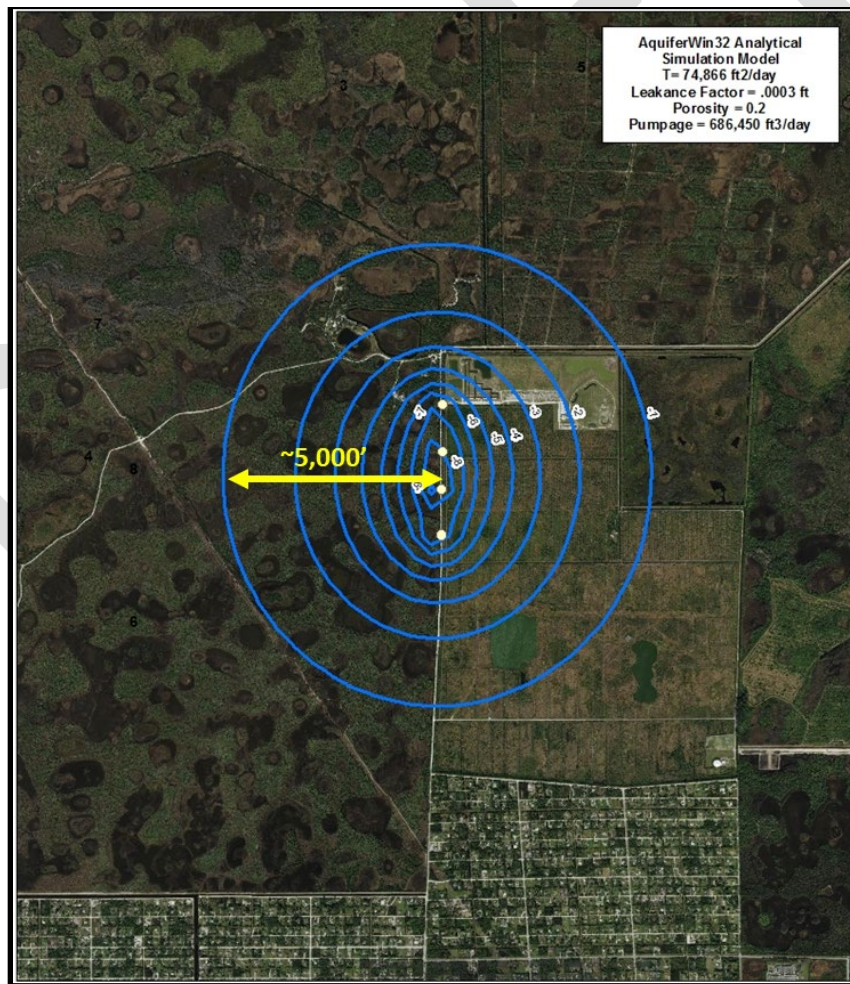
948
 949 Figure 5-4. Estimated lateral extent of a 30,000-acre-foot groundwater bubble (light blue) in the upper
 950 Floridan aquifer system beneath the western border of the C-18W Reservoir parcel where
 951 four ASR wells are planned for construction. Yellow crosses are potential monitor well
 952 locations.

953 The effects of operating the ASR wells at the C-18W Reservoir were estimated using WinFlow groundwater
 954 modeling software. WinFlow is an interactive, analytical model that simulates two-dimensional
 955 steady--state and transient groundwater flow (in confined and unconfined aquifers) with wells, uniform
 956 recharge, circular recharge/discharge areas, and line sources or sinks. The model depicts the flow field using
 957 streamlines, particle traces, and water-level contours. The steady-state module simulates groundwater flow
 958 in a horizontal plane using analytical functions developed by Strack (1989). The transient module uses
 959 equations developed by Theis (1935) and Hantush and Jacob (1955) for confined and leaky aquifers,
 960 respectively.

961 The results of an exploratory/test well would provide the best data to derive site-specific aquifer hydraulic
 962 properties such as transmissivity, storativity, and leakance. These properties play a role in determining the
 963 effects of operating the ASR wells. Transmissivity is the rate at which water passes through a unit width of
 964 the aquifer under a unit hydraulic gradient. Storativity is a dimensionless measure of the volume of water

965 discharged from an aquifer per unit area of the aquifer and per unit reduction in hydraulic head. For a
 966 confined aquifer, storativity results only from the rock and fluid compressibility and is typically very small
 967 ($\sim 10^{-4}$ to 10^{-5}). Leakage is the volume of water that flows through a unit area of a semi-confining layer
 968 separating two aquifers per unit head difference per unit time. At this time, an exploratory well has not been
 969 constructed at the project site. In the absence of measured values for these parameters, the reported values
 970 from nearby wells described in the previous section include transmissivities of 46,000 to 221,925 ft²/day,
 971 storativity of 0.0004, and leakage 0.007 ft.

972 A WinFlow simulation at the C-18W Reservoir was conducted by using the Hantush-Jacob solution to
 973 assess the potential drawdown that could result from the four proposed ASR wells, each pumping at a rate
 974 of 5 mgd (3,500 gallons per minute). ASR wells were spaced 1,000 ft apart, as shown in the conceptual
 975 design plans (**Figure 5-3**). Aquifer parameters for the WinFlow model were estimated from review of
 976 aquifer performance tests conducted at wells in proximity to the project site. A conservative approach to
 977 the analysis was conducted using a low range of transmissivity (74,866 ft²/day) and leakage (0.0003 ft)
 978 and a porosity of 20% for the UFA. Pumping withdrawals from the four ASR wells were simulated for
 979 90 days with no recharge. The resulting model 1-ft drawdown contour lines are shown in **Figure 5-5**. Model
 980 results indicate the 1-ft drawdown contour would extend to a maximum of approximately 1 mile beyond
 981 the western boundary of the reservoir. Based on this analysis, a 1-mile buffer around the C-18W Reservoir
 982 would be reasonable and not overly protective for operation of the ASR system.



The 1-foot drawdown area affects a portion of the area under the Hungryland Slough Natural Area and J. W. Corbett WMA. Please confirm that this will not adversely affect the hydrology of the natural area or Corbett.

983
 984 Figure 5-5. The estimated lateral extent of 1-foot drawdown contour lines from simulated withdrawals
 985 from the four aquifer storage and recovery (ASR) wells for 90 days with no recharge.

986 **5.3 Effects of the Amended and New Rules on Existing Legal Users**

987 An existing legal use of water is defined as a water use authorized under a SFWMD water use permit or
988 existing and exempt from permit requirements. The LRWRP maintains existing water supply performance
989 for agricultural and municipal water users in the Lake Okeechobee Service Area (LOSA) and North Palm
990 Beach Service Area within the LRWRP project area.

991 **Table 5-1** lists the active existing permitted users (as of October 31, 2021) in northern Palm Beach County
992 and southern Martin County, from Lake Okeechobee to the west to the Atlantic Ocean to the east. The first
993 and second columns of **Table 5-1** list the water use permit numbers and permittee names. The remaining
994 columns show the water sources for each permit.

995 **5.3.1 Surface Water Use Permits**

996 Implementation of the LRWRP will not diminish water supplies for existing users, as required by the
997 Savings Clause. The Savings Clause analysis is listed in WRDA 2000 as a means to protect users of legal
998 sources of water supply (and to protect the levels of service for flood protection) that were in place at the
999 time of enactment. Specifically, Section 601(h)(5) of WRDA 2000, titled “Savings Clause,” requires, in
1000 part, an analysis of each project’s effects on legal sources of water that were in existence on the date of
1001 enactment of WRDA 2000. Existing legal sources provide water to permitted users, as shown in **Table 5-1**
1002 at the end of this chapter. For a full discussion on the LRWRP’s compliance with the Savings Clause and
1003 Section 373.1501, F.S., see the PIR-EIS (USACE 2020).

1004 Existing water use permits were reviewed to determine the surface water withdrawal locations and volumes
1005 within the expanded North Palm Beach County/Loxahatchee River Watershed Waterbodies boundary.
1006 Permit selection included direct withdrawals of surface water from a regional waterbody. Of the existing
1007 permits (**Table 5-1**), 81 were identified as withdrawing from a surface waterbody within 0.5 mile of the
1008 expanded North Palm Beach County/Loxahatchee River Watershed Waterbodies area. Surface water
1009 withdrawals are used for multiple use classes (**Table 5-1**). Stakeholders can search for water use permits
1010 through the SFWMD’s online maps (<https://apps.sfwmd.gov/WAB/SFWMDMapping/index.html>).

1011 The waterbodies proposed to be added to the definition of North Palm Beach County/Loxahatchee River
1012 Watershed Waterbodies are located on publicly owned lands that have minimal potential for future water
1013 use permitting. Water needs for future uses will continue to be met by public water supply utilities, on-site
1014 surface water storage, domestic wells, and reclaimed water systems. In homeowners’ associations and
1015 community development districts, a combination of on-site waterbodies, off-site waterbodies, and the SAS
1016 are used for landscape and recreation irrigation and will remain available.

1017 Any domestic self-supply water users can continue to use surface water as their source of water. Over time,
1018 potable water, reclaimed water, and wastewater utility service areas will expand into the unincorporated
1019 areas of Martin and Palm Beach counties. The Palm Beach County Water Utility Department projects 60%
1020 of the domestic self-supply population will eventually convert to public utility use. This population is
1021 included in the *2018 Lower East Coast Water Supply Plan Update* (SFWMD 2018); therefore, it is
1022 considered an existing water use.

1023 Most existing legal users in the region will not be affected by the amended Lower East Coast Regional
1024 Water Availability rule. The existing surface water use permits are already complying with the Lower East
1025 Coast Regional Water Availability rule. Any existing legal user within the RAA seeking an increase in
1026 allocation will need to perform modeling to demonstrate the cone of depression from the increased
1027 withdrawal. If the 0.1-ft cone of depression reaches one of the defined North Palm Beach

1028 County/Loxahatchee River Watershed Waterbodies, the user will need to identify one of the sources in
1029 Subsection 3.2.1.E.5 to meet the difference between the base condition and the proposed increase. The user
1030 may incur additional costs related to the new source. If the user is located in area with plans for reclaimed
1031 water expansion, the user would experience increased water source costs regardless of the proposed RAA
1032 amendments.

1033 **5.3.2 Groundwater Use Permits**

1034 **Surficial Aquifer System**

1035 Existing water use permits were reviewed to determine the withdrawal locations and volumes of
1036 groundwater from the SAS within the expanded North Palm Beach County/Loxahatchee River Watershed
1037 Waterbodies boundary. Permit selection included withdrawals of groundwater from the SAS that could
1038 cause drawdown in a protected surface waterbody. Of the existing permits (**Table 5-1**), 189 were identified
1039 as having at least one well completed in the SAS within the vicinity of the expanded North Palm Beach
1040 County/Loxahatchee River Watershed Waterbodies boundary. Groundwater withdrawals from the SAS are
1041 used for multiple use classes (**Table 5-1**). Existing SAS water use permits are complying with the Lower
1042 East Coast Regional Water Availability rule. Stakeholders can search for water use permits through the
1043 SFWMD’s online maps (<https://apps.sfwmd.gov/WAB/SFWMDMapping/index.html>).

1044 Many residential properties south of the C-18W Reservoir site have domestic SAS wells that are permitted
1045 by rule and are not required to submit consumptive use permit applications. The cone of depression from
1046 these wells is small, generally not extending beyond the property boundaries. The SAS and FAS are
1047 hydrogeologically separated by an intermediate confining unit that prevents cross-aquifer interference.

1048 The C-18W Reservoir site is surrounded by natural areas, including J.W. Corbett Wildlife Management
1049 Area to the west and Hungryland Slough to the north. Further development of SAS wells in these natural
1050 areas is unlikely.

Natural Area

1051 **Floridan Aquifer System**

1052 Existing water use permits were reviewed to determine the withdrawal locations and volumes of
1053 groundwater from the FAS within 1 mile of the C-18W Reservoir site (**Figure 5-4**). Of the existing permits
1054 (**Table 5-1**), none were identified as having at least one well completed in the FAS within 1 mile of the
1055 C-18W Reservoir site. Groundwater withdrawals from the FAS are primarily used for public water supply
1056 by larger utilities such as the Town of Jupiter, Village of Tequesta, and Seacoast Utility Authority northeast
1057 of the C-18W Reservoir site (**Table 5-1**). Some utilities also use FAS water for blending with SAS
1058 withdrawals. For example, Palm Beach County Water Utility Department has proposed FAS/SAS blending
1059 in its recent permit modification (application 210924-3/permit 50-00135-W). Expanded use of brackish
1060 groundwater from the FAS for public water supply requires planning and wellfield management to prevent
1061 undesirable changes in water quality. In addition to public water supply, the FAS is used for some power
1062 generation activities in the vicinity of the project. The FPL West County Energy Center has three FAS wells
1063 that are used as needed for cooling water.

1064 The SFWMD encourages water users to utilize the FAS as an alternative water supply source where
1065 possible. However, to protect the water stored in the upper FAS, the SFWMD will implement a new RAA
1066 rule and modify the criteria pertaining to existing legal users. The proposed rule will prohibit direct
1067 withdrawals from the upper FAS within the RAA boundary. Consideration of withdrawals that induce
1068 seepage across the groundwater RAA boundary will be evaluated as described in Subsection 3.2.1.G of the
1069 Applicant’s Handbook (SFWMD 2021b). There are no existing FAS users within the RAA boundary. Any

1070 FAS users seeking to modify their consumptive use permit allocation will have to model the proposed use
1071 to determine if it will impact the area of protected water in the upper FAS.

1072 Future use of the FAS would require an applicant to provide reasonable assurances that the proposed
1073 withdrawal of water, together with other exempt or permitted uses within the cone of influence of the
1074 proposed withdrawal, will not result in interference with existing legal uses, pursuant to
1075 Section 373.223(1)(b), F.S. The definition of interference with an existing legal use is provided in
1076 Section 3.7.2 of the Applicant’s Handbook (SFWMD 2021b). In regard to the C-18W Reservoir ASR
1077 waters, future requested allocations should not interfere with the ASR wells or result in 1 ft or more of
1078 drawdown to the portion of the upper FAS that underlies the C-18W Reservoir groundwater buffer zone
1079 delineated in **Figure 5-2**. The groundwater buffer zone must be maintained to allow stored water to be
1080 recovered when needed for the benefit of the LRWRP. Any action causing the groundwater bubble to move
1081 away from the recovery zone or reducing the quality of recovered water would impact project water
1082 reserved for natural systems. It is proposed that, for an ASR system, interference includes the movement of
1083 stored ASR waters away from the delineated project area by changing or accelerating the flow velocity or
1084 flow direction, or a change in the concentration of total dissolved solids.

1085 The proposed Applicant’s Handbook rules for the FAS do not increase water use permitting fees or
1086 regulation (e.g., additional licensure, continuing education requirements). Water use permit applications
1087 from the FAS already require staff time and specialized knowledge (e.g., legal, technical). The current rules
1088 require existing and future FAS users to model proposed withdrawals to determine potential impacts to the
1089 FAS. *See* Section 3.1.2 of the Applicant’s Handbook (SFWMD 2021b). Under the proposed rules, if the
1090 modeling results show interference or a cone of depression touching the delineated zone in **Figure 5-2**,
1091 users/applicants will need to modify the proposed water allocation, which could include reducing the
1092 volume sought from the well or relocating the well.

1093 Due to high costs of constructing an FAS well and the treatment needed to make the water potable, domestic
1094 wells typically are drilled into the SAS (100 to 120 ft bls maximum compared to approximately 1,000 ft bls
1095 to reach the UFA). Therefore, the new proposed rule to protect water in the upper FAS for the ASR wells
1096 at the C-18W Reservoir site is not likely to affect any domestic self-supply water users in the region.
1097 Additionally, domestic SAS wells will not affect the ASR water protected in the upper FAS.

1098 Table 5-1. Existing legal users and sources in the vicinity of the Loxahatchee River Watershed
 1099 Restoration Project footprint. Note: primary source – 1°; secondary source – 2°; tertiary
 1100 source – 3°.

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
Martin County								
Agricultural								
43-00436-W	Armstrong Property	1°						
43-02552-W	Hobe Sound Farms		1°		2°			
43-00200-W	Jack Martin Farms/Shiloh Farms		1°		2°			
43-00045-W	Hobe Tree Farm				1°			
Diversion & Impoundment Secondary User								
43-02339-W	Harmony Ranch	1°						
43-02340-W	The Burg Farm	1°						
Diversion & Impoundment								
43-00087-W	Box Ranch of Martin County D & I	1°						
43-00057-W	Hobe St Lucie Conservancy District		2°	1°	3°			
Golf Course								
43-00138-W	Cypress Links Golf		1°		2°			
43-00221-W	Jonathans Landing at Old Trail		1°		2°			
43-00054-W	Jupiter Hills Club				1°			
43-00091-W	Riverbend Golf Club		1°		2°			
43-00140-W	Turtle Creek Club				1°			
Industrial								
43-00764-W	Girl Scout Camp Welaka				1°			
Landscape								
43-01726-W	Bridge Water Estates				1°			
43-01072-W	Coastal Waste & Recycling of Martin				1°			
43-02790-W	Corner Pine Ranch				1°			
43-01822-W	County Line Park				1°			
43-02228-W	Daystar Storage				1°			
43-00679-W	Florida Power & Light - Martin County				1°			
43-01696-W	Gille Residence		1°		2°			
43-02485-W	Hair Designer				1°			
43-01760-W	Hemingway Estates				1°			
43-01371-W	Hobe Sound Commerce Lot No 9				1°			
43-02045-W	Island Country Estates HOA Inc				1°			
43-01805-W	Jupiter Equestrian Estates				1°			
43-01995-W	Jupiter Hills		1°		2°			
43-00722-W	Jupiter Hills Homeowners Association		1°		2°			
43-01414-W	Lot 23 Ranch Colony - Landscape Irrigation		1°		2°			
43-02984-W	Martin County Fire Rescue Station 36				1°			
43-00877-W	Nichols Sanitation Inc (Hobe Sound Site)		1°		2°			
43-01633-W	North Passage HOA				1°			
43-01890-W	Old Cypress				1°			

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
43-02680-W	Old Trail Entrance Feature Landscape Irrigation				1°			
43-02042-W	Pennock Preserve				1°			
43-01905-W	Pennock Preserve PUD		1°		2°			
43-01179-W	Public Works Facility Irrigation Well				1°			
43-02410-W	Ranch Colony				1°			
43-01763-W	Ranch Colony Lot 16				1°			
43-01744-W	Ranch Colony Property Owners Association				1°			
43-02199-W	River Ridge – New Well				1°			
43-01372-W	Sharma Residence Ranch Colony Lot 1				1°			
43-02921-W	T Asplundh Project				1°			
43-02686-W	Tennis Court Irrigation				1°			
43-00813-W	Tequesta Park				1°			
43-00603-W	The Little Club Condominium Association Incorporated		1°		2°			
43-01602-W	The Prado				1°			
43-01444-W	Tranquility				1°			
43-02803-W	Turtle Creek Common Areas				1°			
43-02679-W	Turtle Creek East				1°			
43-01994-W	Turtle Creek Village POA				1°			
43-01970-W	Waters Edge Property Owners Association Phase Two				1°			
43-01765-W	YZ Ranch		1°		2°			
Livestock								
43-02738-W	Armstrong Property				1°			
43-01599-W	Funny Farm		2°		1°			
43-02645-W	HB10E-004 - Cypress Creek				1°			
43-02378-W	Indiantown Property				1°			
43-01679-W	Kitchen Creek Ranch				1°			
43-02852-W	Mancils Cattle Grazing Lease				1°			
43-02919-W	Powerline Road				1°			
43-03067-W	SS Farms, LLC				1°			
Nursery								
43-02142-W	Alfred M Levy Nursery				1°			
43-02753-W	Jenkins Landscape		1°		2°			
43-02146-W	Toms Tropical Trees				1°			
Public Water Supply								
43-01982-W	Bridge Water Estates				1°			
43-01745-W	Equestrian Camp Sites				1°			
43-02971-W	Fernlea Nursery				1°			
43-02732-W	Hummingbird Substation				1°			
43-00782-W	Jonathan Dickinson State Park - Trapper Nelson & Stop Camp				1°			
43-02256-W	Oblivious Land LLC Private Helistop				1°			
43-02017-W	Old Trail at Jonathans Landing				1°			

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
43-00609-W	Payson Park Thoroughbred Training Center				1°			
43-00066-W	South Martin Regional Utility				1°	2°		
43-01284-W	St Lucie Mobile Home Village				1°			
43-02101-W	State Road No 9 I-95 Weigh-in Motion Station				1°			
43-00498-W	Tanah Keeta Scout Reservation				1°			
Palm Beach County								
Agricultural								
50-04659-W	Moules Nursery		1°					
50-08980-W	Riverbend Park				1°			
Diversion & Impoundment								
50-00793-W	Lake Worth Drainage District	1°		2°				
50-01584-W	Town of Jupiter Recharge System	1°						
Golf Course								
50-00203-W	Breakers West Development		1°		2°			
50-00941-W	Eastpointe Country Club Irrigation System		1°		3°		2°	
50-02831-W	Golf & Racquet Club at Eastpointe		1°		3°		2°	
50-02120-W	Ibis Golf and Country Club		1°		2°			
50-01906-W	Iron Horse Lake Wells				1°			
50-01905-W	Ironhorse Country Club Irrigation		1°					
50-00537-W	Mayacoo Lakes Country Club		1°		2°			
50-01443-W	Old Marsh Golf Club		1°		2°			
50-00617-W	PGA National Golf Club and Sports Center		1°		2°			
50-00223-W	Tequesta Country Club		1°		2°			3°
50-07881-W	The Resort at Jupiter Country Club		1°					2°
Industrial								
50-01849-W	Jupiter Ready-Mix Concrete Plant				1°			
50-03722-W	Matheson Tri Gas West Palm Beach				1°			
50-05185-W	Pratt & Whitney, A Div. of Raytheon Tech Fire & Cooling	1°						
50-08888-W	Pratt & Whitney, A Div. of Raytheon Tech Aquifer Remediation				1°			
50-06015-W	Walgreens Distribution Center				1°			
Landscape								
50-07721-W	15835 Corp. Rd. L.L.C.				1°			
50-02446-W	Acreage Substations		2°	1°				
50-09412-W	Adult Quality Care				1°			
50-06316-W	All About Storage				1°			
50-08665-W	Alloy Cladding			1°				
50-05714-W	Alta Terrace-Phase Ii		1°					
50-02788-W	Amoco Food Mart				1°			
50-07042-W	Andros Isle				1°			
50-04149-W	Andros Isle Oakton Lakes		1°					

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
50-11742-W	Avenir Ph. 2 Spine Rd No. 2 Streetscape Common Irr.			1°				
50-11769-W	Avenir Pod-5			1°				
50-04494-W	Baywinds		1°		2°			
50-05628-W	Baywinds Rpd Pod F Lots 1-68		1°					
50-08880-W	Beacon Baptist Church		1°		2°			
50-11331-W	Bella Villaggio				1°			
50-05434-W	Bimini Twist Plaza				1°			
50-03597-W	Breakers Pointe Lake		1°					
50-09266-W	Breakers West Association				1°			
50-06192-W	Briggs Equipment				1°			
50-11905-W	Calvary Church of Jupiter				1°			
50-02314-W	Caribbean Villas Apartments				1°			
50-05727-W	Chase Bank				1°			
50-04336-W	Church of God of Prophecy				1°			
50-06713-W	Cobblestone Village			1°				
50-05757-W	Costco Wholesale of West Palm Beach		1°		2°			
50-07883-W	Cvt Properties LLC			1°				
50-03735-W	Devonshire at PGA National		1°					
50-10422-W	Discovery Village at Palm Beach Gardens				1°			
50-05200-W	Donald Ross Land Owners Association				1°			
50-05618-W	Donald Ross Road Beautification				1°			
50-11301-W	Dunbar Woods		1°		2°			
50-08766-W	Dunkin Donuts				1°			
50-03282-W	Eastpointe Homeowners Association		1°		2°			
50-05598-W	Eckerd Drugs 31				1°			
50-03122-W	Elementary School E		1°					
50-11938-W	FPL Avenir Substation				1°			
50-06268-W	FAS Well Irrigation (Town of Jupiter)				1°			
50-08213-W	Fimco Manufacturing Inc				1°			
50-08830-W	First Park South Florida-Entry Irrigation				1°			
50-03288-W	Flagler Manor				1°			
50-05615-W	Florida Power and Light Ryder Substation			1°	2°			
50-08576-W	Fox Parcel 4c				1°			
50-08776-W	Foxhall Homeowners Association				1°			
50-06792-W	Golden Corral				1°			
50-10667-W	Gramercy Park				1°			
50-12022-W	Ground F X Equipment and Hauling				1°			
50-06060-W	Hamilton Bay Recreation Center				1°			
50-09892-W	Haverhill Affordable Housing L T D				1°			
50-11967-W	Homesafe				1°			
50-07966-W	Ibis Isle		1°					
50-07991-W	Ibis Lakes Homeowners Association Inc		1°					
50-09050-W	Ibis Property Owners Association		1°		2°			

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
50-01664-W	Irrigation (Pratt & Whitney, A Div. of Raytheon Tech Corp)		1°					
50-09403-W	Jupiter 7th Day Adventist Church		1°		2°			
50-07320-W	Jupiter Country Club		1°					2°
50-07348-W	Jupiter Country Club				1°			
50-10557-W	Jupiter/Palm Beach RV Motorcoach Resort		1°		2°			
50-02315-W	Landscape Irrigation for Administration Building				1°			
50-07093-W	Loxahatchee Reserve		1°					
50-07356-W	Mirasol Irrigation System		2°	1°			3°	
50-06863-W	New Frito-Lay DC				1°			
50-03139-W	North Palm Beach County Aviation Airport				1°			
50-05331-W	North River Plantation		1°		2°			
50-03247-W	Northlake Boulevard Landscape Improvements			1°				
50-09128-W	Oceanside Masonary				1°			
50-06494-W	PDD BE Group Irrigation				1°			
50-07503-W	PM Group				1°			
50-06202-W	Palazzo Grande				1°			
50-06069-W	Palisades PUD		1°					
50-08788-W	Palm Beach County Fire Station No. 14				1°			
50-08991-W	Palm Beach Park of Commerce Lot 35G				1°			
50-11899-W	Palm Beach Park of Commerce Parcel 7				1°			
50-12117-W	Palm Coast Sales				1°			
50-11954-W	Park of Commerce - Building 26				1°			
50-11935-W	Park of Commerce - Project Energy				1°			
50-06257-W	Parkwood Estates PUD				1°			
50-07161-W	Portosol		1°					
50-08943-W	Portosol Okeechobee Blvd Median				1°			
50-08873-W	Precision Contracting Services				1°			
50-06373-W	Premier Park of Commerce		1°					
50-11281-W	Project Beach Ball		2°	1°				
50-04161-W	Publix Shoppes At Ibis 651				1°			
50-02238-W	R and M Management Co LLC				1°			
50-06405-W	Riverside Oaks				1°			
50-03425-W	Riverwalk		1°		2°			
50-03454-W	Royal Palm Beach High School				1°			
50-09166-W	S & K Sales Office				1°			
50-06254-W	Shirley Investment Properties				1°			
50-10724-W	Shoppes At Andros Isle Publix No 0653				1°			
50-10187-W	Sierra Square Irrigation Well				1°			
50-10916-W	Sikorsky D F C		1°					
50-09162-W	Sikorsky Sloped Landing Area		1°					
50-09162-W	Sikorsky Sloped Landing Area		1°					

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
50-11672-W	Sisson				1°			
50-10703-W	Sonoma Isles		1°					
50-05642-W	South Florida Donuts				1°			
50-09600-W	SR 704 Okeechobee Blvd Beautification				1°			
50-10261-W	State Road 7 - Irrigation Conversion				1°			
50-06518-W	Suntrust Bank at Baywinds Commercial				1°			
50-06300-W	Super Target at Royal Palm Beach		1°					
50-06223-W	T.M. Russell Inc				1°			
50-06947-W	Tangelo Substation				1°			
50-07757-W	TDSI West Palm		1°					
50-09902-W	The Big Green Egg Building				1°			
50-04642-W	The Reserve at Ibis			1°				
50-10578-W	Thousand Pines				1°			
50-05847-W	Tribute Boats				1°			
50-05442-W	Village Shoppes LLC				1°			
50-07504-W	Walgreens Distribution Center				1°			
50-06496-W	West Palm Commerce Park		1°					
50-05706-W	West Palm Commerce Park and Haverhill Commerce Park		1°		2°			
50-06889-W	Western Repump				1°			
Livestock								
50-09293-W	Riverbend Park- Equestrian				1°			
50-09781-W	Rocky Pines Rd				1°			
Nursery								
50-08594-W	Hammock Tropical Garden			1°				
50-11658-W	Ibis Nursery				1°			
50-04449-W	Lidonna Nursery and Landscape		1°		1°			
50-09747-W	Terracon Nursery Tree Farm				1°			
50-08340-W	The Bushel Stop				1°			
Public Water Supply								
50-09534-W	Bushel Stop				1°			
50-02825-W	Church 12265 Indiantown Rd Jupiter Farms		1°		2°			
50-00615-W	City of West Palm Beach Public Utilities	3°		1°		2°		
50-02654-W	Everglades Youth Camp				1°			
50-09243-W	Firestation 14				1°			
50-10610-W	Jupiter/Palm Beach RV Motorcoach Resort				1°			
50-06546-W	Palm Beach County Research Park Temp Construction				1°			
50-11198-W	Palm Beach County Shooting Sports Park				1°			
50-00135-W	Palm Beach County Water Utilities Department				1°			
50-00460-W	Riviera Beach Public Water Supply				1°			
50-07662-W	Sandhill Crane Access Park				1°			
50-00365-W	Seacoast Utility Authority				1°	2°		

Chapter 5: Identification of Water to be Protected

Permit	Permittee Name	SFWMD Canal	On-site Lake	Other Off-site Surface Water	Surficial Aquifer System	Floridan Aquifer System	Public Water Supply Utility	Reclaimed Water
50-05234-W	Storage Facility at J W Corbett Preserve				1°			
50-00010-W	Town of Jupiter Water Utilities				2°	1°		
50-00046-W	Village of Tequesta - Public Water Supply				2°	1°		
50-00046-W	Village of Tequesta - Public Water Supply				2°	1°		

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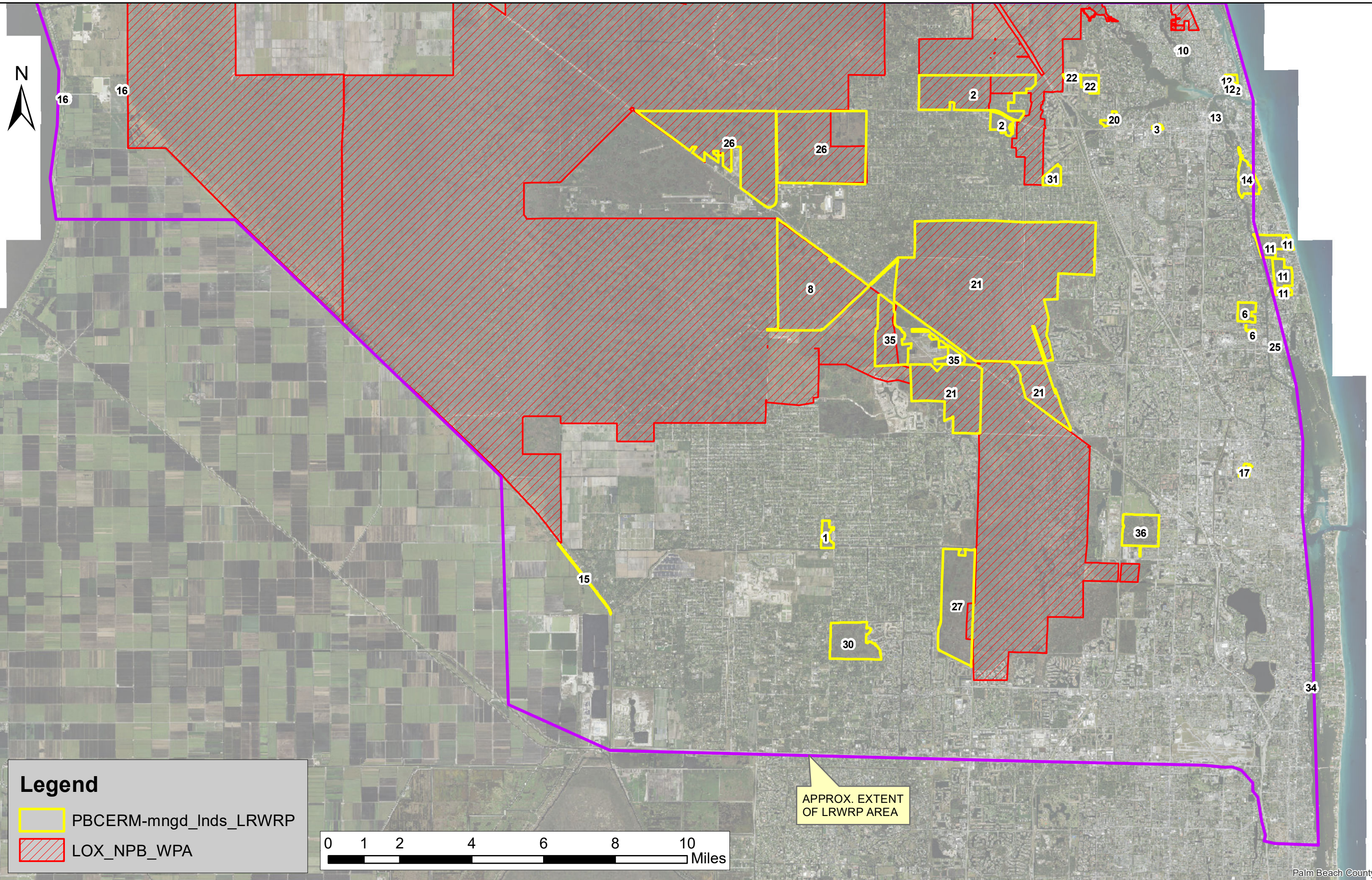
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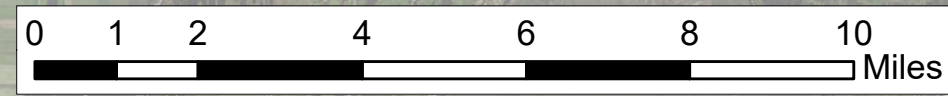
Attachment 3

Map of the SFWMD-proposed North Palm Beach County/Loxahatchee River
Watershed Water Body boundaries along with boundaries of Palm Beach
County Natural Areas



Legend

- PBCERM-mngd_Inds_LRWRP
- LOX_NPB_WPA



APPROX. EXTENT OF LRWRP AREA

PALM BEACH COUNTY NATURAL AREAS PROGRAM STATUS

Updated November 23, 2021

Lands Owned/Managed by ERM (31,659 acres)

- 1 **Acreage Pines** – 124 acres
- 2 **Cypress Creek** – 2,044 acres¹
- 3 **Delaware Scrub** – 19 acres (includes 3 acres of mangroves leased from state)
- 4 Delray Oaks – 25 acres
- 5 East Conservation Area – 216 acres
- 6 **Frenchman's Forest** – 174 acres (includes Prosperity Oaks and 2.2 acres along N and E sides managed by ERM, and 1.6 acres along north edge of Cabana Colony canal)
- 7 High Ridge Scrub – 39 acres
- 8 **Hungryland Slough** – 3,047 acres²
- 9 Hypoluxo Scrub – 99 acres (includes retention area and abandoned right of way managed by ERM)
- 10 **Jackson Riverfront Pines** – 3 acres
- 11 **Juno Dunes** – 569 acres
- 12 **Jupiter Inlet** – 78 acres
- 13 **Jupiter Mangroves** – 1 acre
- 14 **Jupiter Ridge** – 269 acres
- 15 **J.W. Corbett/Lox. Refuge Connector** – 3 acres
- 16 **Lake Okeechobee Connector** – 8 acres
- 17 **Lake Park Scrub** – 55 acres
- 18 Lantana Scrub – 33 acres
- 19 Leon M. Weekes Envl. Preserve – 12 acres
- 20 **Limestone Creek** – 52 acres (includes 29.3 acres along C-18 Canal managed by ERM)
- 21 **Loxahatchee Slough** – 13,010 acres (includes 257 acres leased from SFWMD + 3 acres leased from TIITF)
- 22 **North Jupiter Flatwoods** – 163 acres (includes 3.0-acre P&V right of way, 5.9-acre connector in Martin County and 9.3-acre Jupiter Cypress Preserve managed by ERM)
- 23 North Ocean Ridge Mangroves – 20 acres
- 24 Ocean Ridge – 27 acres (includes 12.3 acres owned by Town)
- 25 **Pawpaw** – 3 acres
- 26 **Pine Glades** – 6,689 acres (includes 273 acres in Palm Beach Heights)
- 27 **Pond Cypress** – 1,824 acres
- 28 Pondhawk – 79 acres
- 29 Rosemary Scrub – 14 acres
- 30 **Royal Palm Beach Pines** – 772 acres
- 31 **Sandhill Crane Wetlands** (formerly C-18 Triangle) – 138 acres
- 32 Seacrest Scrub – 54 acres
- 33 Snook Islands – 118 acres
- 34 **South Cove** – 5 acres
- 35 **Sweetbay** – 1,094 acres
- 36 **Winding Waters** – 562 acres (includes 14 acres within the Turnpike right of way that are managed by ERM)
- 37 Yamato Scrub – 217 acres

SITES OWNED OR MANAGED BY PBC ERM

¹ Acreage shown includes all lands managed by ERM. This number does not include the 42 acres located south of the C-2 Canal and existing lake that the Parks Department manages.

² Includes 48.37 acres in Unit 11 and 23.0 acres in RPB Colony reserved for proposed road right-of-way along western boundary of natural area.

Natural Areas with Public Use Facilities (26)

Acreage Pines, Cypress Creek, Delaware Scrub, Delray Oaks, Frenchman's Forest, High Ridge Scrub, Hungryland Slough, Hypoluxo Scrub, Jackson Riverfront Pines, Juno Dunes, Jupiter Inlet Lighthouse Outstanding, Jupiter Ridge, Lake Okeechobee Scenic Trail trailhead, Leon M. Weekes, Limestone Creek, Loxahatchee Slough, North Jupiter Flatwoods, Ocean Ridge, Pine Glades, Pondhawk, Rosemary Scrub, Royal Palm Beach Pines, Seacrest Scrub, Snook Islands, South Cove, Sweetbay, Winding Waters and Yamato Scrub