

Integrated Delivery Schedule Sequencing Plan Summary Sheet

Sequencing Plan Name:

“Not Just Our Pet Pig”: Northern Estuaries Protection and Everglades Regional Benefits Sequencing Plan

Author of the Sequencing Plan: Identify the name of the Author(s) that developed the Sequencing Plan during the exercise and identify spokesperson if applicable.

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Anticipated Benefits: Identify geographic, ecological, hydrological, and/or economic benefits of your sequencing plan.

Geographic: reaching an overarching goal for Everglades restoration in supporting a sustainable wading bird population, provide water supply for agriculture; increase water supply for the Lake O service area users, and ability to send necessary water south to the ENP.

The following is an excerpt from the IRL-S PIR which supports the anticipated geographic benefits of our sequencing plan. Although throughout this sequencing plan write up we have relied heavily on our familiarity with the IRL-S PIR to draw examples, it should be noted that this type of information is available for all projects that we have listed in our sequencing plan.

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- support genetically viable numbers and sub-populations of species with large feeding ranges and/or narrow habitat requirements;
- provide the aquatic production to support large numbers of higher vertebrate animals in a naturally nutrient-poor environment; and
- sustain habitat diversity despite natural disturbances. The ability of animal populations to recover from disturbances decreases as the available habitat area decreases since habitat diversity, the amount of seasonal refugia, and the number of dispersal options also decrease (USACE, 1999). In south Florida roughly 50 percent of the pre-drainage

wetland area and 90 percent of pinelands have been lost to development. Lake Okeechobee was much larger than it is at present with an extensive littoral/marsh system extending north, west, and south. The IRL-S watershed provides a unique opportunity for rehydration and habitat restoration due to the current availability of large tracts of land. This component of the IRL-S Project Implementation Report will help meet that system-wide CERP goal (i.e., increase the spatial extent of the wetland/upland mosaic) that may be more difficult, if not impossible to do in the more populated areas to the south. The southern Indian River Lagoon.”

AND

“The southern Indian River Lagoon is an integral part of the Everglades ecosystem. It provides a unique opportunity to increase the spatial extent of short hydroperiod wetlands and restore habitat for the myriad of species dependent on this habitat for their survival.”

AND

“Providing an increase in the spatial extent of wetland communities is instrumental in providing habitat restoration opportunities for fish and wildlife resources both within the greater Everglades ecosystem and within the St. Lucie watershed. Proportionately, the largest loss of wetland type in South Florida has been the loss of peripheral wet prairie. (Davis et al, 1994). Among the many species of birds for which the Everglades is noted are the federally listed endangered wood stork (sometimes referred to as the wood ibis), and snail kite and the threatened Audubon’s crested Caracara and state listed sandhill crane. The restoration plan for the approximately 92,130 acres of natural storage and water quality treatment area will make many favorable breeding colony locations for these important birds.”

Ecological: Immediacy—“due to human activities in the watershed during the past 100 years, the southern Indian River Lagoon ecosystem is in imminent danger of ecological collapse.” (IRL-S Summary Final Project Implementation Report). “Without the IRL-S recommended plan, the southern Indian River Lagoon ecosystem will continue to deteriorate and will remain in imminent danger of ecological collapse as a result of regional water management practices.” (IRL-S Summary Final Project Implementation Report). The ecological resiliency of the IRL-S system has been decreasing, and continues to decrease. The ability of the ecosystem to rebound in the face of continued constrained water management has become challenged beyond recovery. High volume freshwater releases have always killed seagrass and oysters. They have not always produced massive outbreaks of lesioned fish or toxic blue green algae blooms. Releases of a size and duration that caused the dramatic damage in 2013 did NOT used to cause such dramatic damage. 2013 was not the worst discharges ever. It was the worst impact ever. The system is losing its resilience. Every additional insult hurts worse than it did last time. System collapse is not a hysterical figment of residents’ imagination. It is the cold hard words of the 2004 report and the reality of the impacts of discharges.

The overarching goals of CERP are to: Enhance Ecological Values through increasing the total spatial extent of natural areas, improving the habitat and functional quality, and improving native plant and animal species abundance and diversity. An additional goal is to Enhance Economic Values and Social Well Being through increasing availability of fresh water, reducing flood damages, providing recreational and navigational opportunities, and protecting cultural and archaeological resources and values. (Table 5-1 of Yellow Book). Our sequencing plan balances all of these goals, and makes significant accomplishments toward stopping damage to critical ecosystems in the short term, expanding critical habitat that provides unique ecotone functions for the greater Everglades system (e.g. wading bird habitat), and providing a source of water to ameliorate sea level rise impacts at the southern end of the Everglades ecosystem.

Hydrological: The IRL-S and C-43 projects, once built, can supply significant quantities of water to move south to help ameliorate sea level rise impacts in the southern part of the Everglades system (e.g. Shark River Slough). Additionally, our sequence of projects directly addresses the protection of regional water resources, especially groundwater, that protects dry season salinities in the SLE and is critical to the protection of the estuarine function of the southern Indian River Lagoon.

Economic:

The projects in our sequencing plan collectively: add sources of water for agriculture, improves economic values and social well-being in the study area by increasing water supply, maintaining current levels of flood protection, and improving regional economic opportunities. This will be accomplished by providing additional water storage areas, creating an additional source for agricultural water supply. These new sources of agricultural water supply will result in a reduction of demand on the Floridan aquifer system, which may lead to increased agricultural productivity. Our plan also maintains the current level of flood protection in the study area provided by the Central and Southern Florida Project. Finally, our recommended plan would improve regional economic opportunities, including recreational opportunities, by improving the overall health of the southern Indian River Lagoon, Caloosahatchee, Lake Okeechobee, and Central Everglades ecosystems, upon which the local economy is primarily dependent. Apart from the environmental economic merits of the recommended sequencing plan, it enjoys overwhelming local support from an impressively active and involved community that supports this project for many varied reasons. First, the community wants the environmental restoration because it is good for business (ecotourism; resource dependent livelihoods, real estate, water quality dependent tourism, etc.). Business wants the restoration because the community identifies with and is built around the St. Lucie River, Caloosahatchee, Indian River Lagoon, Lake Okeechobee, and the greater Everglades. An attractive, clean healthy environment is believed to be good for property values and attracts good business opportunities. The agricultural community recognizes the water quality and water supply enhancement potential. Not to be overlooked, many of the ranchers and growers are also avid fishermen and sportsmen who personally value a high quality environment. In this region, the urban and agricultural business interests do not compete with the environmental interests. They are mutually supportive. An example of the importance of restoration to the economy is the fact that the citizens of Martin County in 1998 chose to tax themselves to support this project. This tax has provided over \$50 million in direct support to this project.

Example:

Like many of Florida's communities, Martin and St. Lucie Counties are highly dependent on their natural resources, especially those related to natural water bodies, whether freshwater, estuarine, or marine systems. The economic base of Martin and St. Lucie

Counties was originally founded upon and continues to be dependent upon the ecological functions provided by the St. Lucie River and St. Lucie Estuary and the adjacent Indian River Lagoon. Due the great diversity and biological productivity of the Indian River Lagoon ecosystem, the economy of the study area relies heavily on recreational and commercial fishing and marine-related activities (approximately \$731 million annual regional economic contribution; Day and Hart, 1996). A large number of service, tourism, and retail businesses support and are therefore dependent upon the commercial and recreational marine industry of the region. The agricultural community, another major economic force in the study area, relies on the existing canal system for drainage, flood protection, and water supply. Agricultural interests in the area also rely upon the upper Floridan aquifer to provide supplemental irrigation. As a result of this reliance, the aquifer is also affected by the regional water management system and local water management practices and operations.

Sequencing Plan: Identify projects in your recommended order of sequencing. (i.e. what projects show go below the black line on the Draft IDS Worksheet)

1. C-43 West Basin Storage Reservoir (Authorized; requires PPA; in progress)
2. IRL-S C-23/C-24 Reservoir and STAs (Authorized; appropriated; PPA executed)
3. IRL-S Phase 2: Natural Lands (Authorized; requires PPA)
4. Equivalent storage capacity as was included in the Lake Okeechobee ASR (may require a replacement project to complete all anticipated water storage capability from the original ASR plan e.g. purchase of River of Grass option lands and completed design for moving more water south) (Needs to go through planning process)
5. Central Everglades Planning Project – PPA North
6. Central Everglades Planning Project – PPA South
7. EAA Storage Reservoir – Phase 1 and Phase 2 (Needs to go through planning process, although partially part of CEPP)
8. Lake Okeechobee Watershed (Needs to go through planning process)
9. Loxahatchee River Watershed Restoration Plan (currently in CERP planning phase to complete the PIR)
10. Biscayne Bay Coastal Wetlands – Phase 2 (Needs to go through planning process)

11. Biscayne Bay Coastal Wetlands Phase 1: Cutler Wetlands

12. Biscayne Bay Coastal Wetlands Phase 1: L-31 East Flowway

CERP Goals: Identify which CERP goals your sequencing plan contributes towards and to what extent.

The suggested sequencing plan contributes to all of the CERP goals contained within each of the PIR or other planning documents of each project listed. The sequencing plan strives to have both direct benefits to reduce damaging high volume discharges to both the Caloosahatchee and St. Lucie Rivers and Estuaries, increase storage around Lake Okeechobee, increase storage south of Lake Okeechobee, and protection of the Loxahatchee River and watershed.

Essentially, our sequencing plans looks at system-wide improvements to QQTD (Quantity, Quality, Timing, Distribution) to restore the greater Everglades through increasing storage, protecting wetlands, enhancing wading bird habitat, and fulfilling to original goals set forth in CERP to significantly reduce current damages occurring on a regular basis to the Northern Estuaries.

The following is an excerpt from the IRL-S PIR which further details the goals and expected improvements from full implementation. This is one example of the kind of information that already exist within the ACOE and SFMWD for each of the project listed in our sequencing plan.

IRL-S: PURPOSE AND NEED FOR THE STUDY

This report is a result of years of intensive problem identification, scientific investigations and modeling. A multi-agency team evaluated suites of components combined together to form alternatives, which resulted in the selection of a preferred plan. The preferred plan, when implemented, will lead to successful restoration of southern Indian River Lagoon and will provide for the other water-related needs of the region. The southern Indian River Lagoon is an estuary of national significance, recognized by the U.S. Environmental Protection Agency National Estuary Program and designated a Florida Aquatic Preserve and Outstanding Florida Southern Florida Water. However, the lagoon ecosystem is suffering from unnaturally large, poorly located and poorly timed freshwater discharges (arriving through the St. Lucie Canal and other elements of the Central and Project). A consequence of rapid delivery of freshwater runoff to the lagoon is the accumulation of muck over the bottom of the estuary, reducing water transparency and eliminating many original estuarine bottom communities such as seagrasses and oyster flats. The large freshwater discharges and existing muck deposits interact to stress estuary bottom communities and prevent their natural regeneration, resulting in a severely degraded ecological system.

System-wide importance of IRL Natural Areas in meeting over-arching CERP goal. Further, scientists have identified the large spatial extent of south Florida wetlands as one of the defining physical characteristics of the pre-drainage ecosystem. The size of the south Florida wetlands, in combination with the complex mosaic of habitats, enabled multiple populations of plants and animals to thrive and persist over time. The size of

the pre-drainage area in south Florida made it possible for the natural ecosystem to:

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In south Florida roughly 50 percent of the pre-drainage wetland area and 90 percent of pinelands have been lost to development. Lake Okeechobee was much larger than it is at present with an extensive littoral/marsh system extending unique opportunity north, west, and south. The IRL-S watershed provides a unique opportunity for rehydration and habitat restoration due to the current availability of large tracts of land. This component of the IRL-S Project Implementation Report will help meet that system-wide CERP goal (i.e., increase the spatial extent of the wetland/upland mosaic) that may be more difficult, if not impossible, to do in the more populated areas to the south.

The southern Indian River Lagoon estuarine complex has been described as the most bio-diverse estuary system in all of North America. However, the hydraulic connection of the lagoon to the Central and Southern Florida Project, which facilitates regional flood protection and drainage, is causing extensive damage to lagoon bottom vegetation, water transparency and living organisms. Regional development, drainage and navigation improvements, including connection of the St. Lucie River to the Okeechobee Waterway and other operations of the Central and Southern Florida system, led to discharges of large volumes of freshwater to the estuary during intense rainfall events. Along with the freshwater discharges have come muck deposits, other sediments and excessively high levels of nutrients including phosphorus and nitrogen. Muck has accumulated on estuary bottoms and has covered large areas, impeding penetration of sunlight to the bottom, reducing oxygen levels in the water column, and indirectly causing the disappearance of native seagrass and oyster beds. The remaining portion of the biological component of the estuarine ecological system is no longer capable of supporting the rich assemblage of invertebrates, fishes and wildlife that made it renowned.

The IRL-S Restoration Study was authorized under the 1992 and 1996 Water Resources Development Acts, as part of the authorizations for the Restudy of the entire Central and Southern Florida Project. The Comprehensive Everglades Restoration Plan (CERP) included in the Central and Southern Florida Restudy Report of 1999 recommended design of above ground storage reservoirs to attenuate damaging freshwater discharges to the St. Lucie estuary and southern Indian River Lagoon. The Water Resources Development Act of 2000 approved the Comprehensive Everglades Restoration Plan as a framework for modifications to the Central and Southern Florida Project necessary to restore the south Florida ecosystem, and further included a

specific authorization for the C-44 Basin Storage Reservoir in the southern St. Lucie Estuary drainage basin. This report recommends a project that supports the goals and objectives of the CERP. The purpose of the IRL-S study, like the CERP, was investigation of modifications to the C&SF Project, but at a much finer level of detail. The goal for this study is to synergistically optimize the performance of the CERP within Martin and St. Lucie Counties by refining the design and operation of components such that the system-wide performance of the CERP equals or exceeds the performance of the CERP recommended by the Restudy in a cost effective manner. The IRL-S study built upon the work done in the Restudy to address water resource problems in the Upper East Coast Region by providing a much finer level of detail gained through area-specific hydrologic modeling, environmental analysis and a detailed problem definition and solution analysis process.

Subsequent to the approval of the Comprehensive Everglades Restoration Plan and the specific authorization of the C-44 Basin Storage Reservoir, the –IRLS interdisciplinary Project Delivery Team identified additional project needs and reduces nutrients to Lake O as well as to the SLE purposes: stormwater treatment was recommended to reduce phosphorus and nitrogen loads in water discharged to Lake Okeechobee and the estuary; an meets overarching goal of CERP increase in natural wetlands acreage was needed to meet one of the overarching goals of the larger Comprehensive Everglades Restoration Plan program, as well as to provide additional in-ground water storage to attenuate rainfall-driven runoff events and further reduce nutrient loads in canal waters; and specific restorative actions, such as muck removal and provisions for artificial settling substrates, were determined to be necessary in the estuary to help “jump start” restoration of seagrass and oysters.

Dependendices: Identify predecessor projects that impact your sequencing plan.

It is essential to have a parallel process focused on **land acquisition** separate from the construction schedule. In order for Everglades restoration to be successful, we collectively must take action on all opportunities from willing sellers, especially for lands within authorized plans. Without the land, construction sequencing plans will not work. Once the land is in government ownership for the purposes of CERP implementation, the sequencing plan can be adapted to respond to current conditions.

Lake Okeechobee ASR has been investigated and found to not be as technically feasible as originally assumed. Therefore, a replacement project for the quantity of water originally assumed to be stored as part of ASR around Lake Okeechobee needs to be identified (e.g. purchase of River of Grass option lands by October 2015).

Continued work as per the current schedule for Herbert Hoover Dike and completion of Kissimmee River Restoration is essential for successful implementation of our sequencing plan.

A robust and active ecological monitoring program is essential to continue adaptive

management throughout Everglades restoration implementation. These costs should be associated with each plan/project as it moves forward on this sequencing plan.

Other Considerations: Any other factors that were relevant in developing your sequencing plan.

In determining our project sequence, we took into account a “readiness” component (e.g. current authorized plan, current activity, etc.). We also focused on the most important projects to achieve system-wide benefits, while prioritizing the fact that aside from restoration, there is current damage occurring to the Northern Estuaries on a regular basis. There is an analogy with the medical profession: when you are treating a patient, a doctor performs triage, and focuses on the most threatening symptom first. In other words, the doctor would ensure that the patient received a necessary heart bypass prior to performing cosmetic surgery. The Northern Estuaries receive environmental harm on a regular basis. That needs to stop before focusing on enhancement activities. We believe that these activities can occur concurrently, but we are asking for a commitment to see through the projects on our sequencing plan, especially stopping damage / harm where it is occurring.

In Florida where people *choose* to live, the “quality of life” factor is critical to the economy. Clean water and the ability to swim, fish, boat, hike, and otherwise enjoy Florida’s natural environment is critical to our quality of life.

***“South Florida is not sustainable upon its present course.”
(Governor’s Commission for a Sustainable South Florida)***

COMPONENTS AND MAJOR ELEMENTS OF THE RECOMMENDED PLAN FOR IRL-S

