APPENDIX F

RECREATION ANALYSIS OF THE LOXAHATCHEE RIVER WATERSHED RESTORATION PROJECT

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F ECONOMIC AND SOCIAL CONSIDERATIONS

F.1 Authorization

On December 11, 2000 the Water Resources Development Act of 2000 (WRDA, 2000) was signed into law by the President of the United States (Public Law No. 106-541, of the 106th Congress). Title VI, Section 601 of the Act provides for and guides modifications to Central and Southern Florida project and describes authorizations specific to the CERP. Section 601(b)(A) "Comprehensive Everglades Restoration Plan Approval" provides authority for CERP as stated below.

(b) Comprehensive Everglades Restoration Plan –

(1) Approval-

(A) IN GENERAL. – Except as modified by this section, the Plan is approved as a framework for modifications and operational changes to the Central and Southern Florida Project that are needed to restore, preserve, and protect the South Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Plan shall be implemented to ensure the protection of water quality in, the reduction of the loss of fresh water from, and the improvement of the environment of the South Florida ecosystem and to achieve and maintain the benefits to the natural system and human environment described in the Plan, and required pursuant to this section, for as long as the project is authorized.

F.2 Introduction

F.2.1 Proposed Recreation Overview

The recreation appendix for the Loxahatchee River Watershed Restoration Project contains a description of the conceptual plan that is being proposed for recreation purposes. Recreation features are being planned in the Loxahatchee River Watershed Restoration Project as an incidental project benefit. These recreation benefits will not be used in the justification of the recommended plan. Order of magnitude costs have been included as provided by the South Florida Water Management District (SFWMD), gleaned from other approved reports and recent construction. Costs have updated in consultation with the Jacksonville District Cost Engineers, using Palm Beach County water preserve area (WPA) recreation and MCASES costs. A determination of recreation facility design standards to meet Corps and local building code requirements is under way. SFWMD will be operating and maintaining the Loxahatchee River Watershed Restoration Project recreational features. The cost for proposed recreation features would be $2,930,000 (FY20 dollars). To ensure that the developed costs comply with USACE cost estimating policy, a 33 percent contingency cost has been applied to the total cost, resulting in total estimated cost of $3,897,000. Including an additional 15.9 percent for planning, engineering and design (PED), and a 10 percent for construction supervision and administration (S/A) brings the estimated total costs for recreation to $4,920,000. (See **Table F-12** for details.)

It is assumed that all the proposed recreational features will be located on project fee title lands, and thus no additional real estate would be required. The real estate appendix will verify this within the Draft Real Estate Plan for the Draft PIR. All proposed features are compatible with the environmental purposes of the plan and will not detract from the environmental or socioeconomic benefits being generated by the project.

The recreation facilities proposed for the Loxahatchee River Watershed Restoration Project will create additional opportunities for biking, hiking, nature study, equestrian, freshwater fishing non-boating, canoeing/kayaking, and wildlife viewing which will fit with the project purposes as managed by the SFWMD.

F.2.2 Conceptual Recreation Plan

Planning the recreation for the Loxahatchee River Watershed Restoration Project has been somewhat different than has been the planning of previous federal projects for which the SFWMD is the non-federal sponsor (NFS). Typically, a project will have an area bounded by a levee with a public access area into the water for boating within the project and access to the levees to be used as trails.

This recreation plan is primarily a trail-oriented plan which follows the flow ways toward the Loxahatchee River. Large tracts of public land within the watershed offers several possible flow ways to the Loxahatchee River. While the project will connect and enhance the flow ways for providing water to the Loxahatchee River with water control structures and storage areas; the recreation features will enhance trail connections with portages and bridges. Recreational users will seamlessly cross lands owned by various public entities as they progress towards the Loxahatchee River and join it, whether by boat or on trails. The bridges and portages together form a continuous trail of greater value to the user than separate disconnected segments.

Project features built for the flow ways will be enhanced as possible with portages to also function as bridges, and fishing locations. A storage area will utilize public access sites that will also act as trailheads for the public to follow the flow ways to the Loxahatchee River. Staging areas for construction will be reviewed for the possibility of leaving in place to be enhanced as parking areas. The locations and designs of recreation facilities will change as necessary when the project features locations change as needed by the project.

F.3 Recreation Facilities Management Overview

The SFWMD will be responsible for 100% of the recreation operations, maintenance, repair, rehabilitation and replacement (OMRR&R) as outlined in ER 1105-2-100, Apr 2000, page E-286, the Agreement of May 2000 and the 29 Sept 2005 OMRR&R Corps Memorandum.

Through their rulemaking authority, the NFS, SFWMD, has established, in the Florida Administrative Code (F.A.C.) Chapter 40E-7 the ability to identify enforcement provisions which can be implemented by Florida Fish and Wildlife Conservation Commission (FWC) officers or other law enforcement officers. This rule has general language applicable to all SFWMD lands as well as specific provisions that are applicable to different types of land. Rules allow SFWMD to address hours of public access, the ability to allow or prohibit certain types of activities in different areas or at various times and the overall ability to close public access at any time in response to emergencies, pending storms or routine operations and management needs or ongoing protection of the land itself.

Chapter 40E-7.5384 F.A.C., Special Provisions for Impoundment Areas of the District Open to the Public, has further language that expressly applies to the operational specifications with respect to the use of boats within the impoundments. The rule allows SFWMD to specify which boat types, engine types and sizes, operating speeds and areas of operation are acceptable. Personal watercraft are specifically prohibited while air boats may be allowed if so designated. The rules can be adjusted through the posting of signs. This allows SFWMD to modify procedures as necessary to ensure that

the projects' intended purposes are served, to manage conflicts between users, to adjust public use in accordance with operational levels, or for various other factors. This set of rules allows SFWMD to adjust the boating controls at each impoundment so that the different character of each water body can be enjoyed in a proper manner by the public. The rules are posted on the SFWMD web site through this link:

https://www.sfwmd.gov/sites/default/files/documents/40e_7_511_rule_public_access.pdf

F.4 Benefit Categories

F.4.1 Study Area Recreation Background

The study area for the recreation benefit analysis for this project includes northern Palm Beach County and southern Martin County; approximately the same geographical extent as Central East and South East Region of the 2013 Statewide Comprehensive Outdoor Recreation Plan (SCORP). The 2013 SCORP was utilized to identify the recreation baseline for CERP recreation planning. Recreation deficits identified by the SCORP for this region include biking, hiking, equestrian, canoeing/kayaking, wildlife viewing, bank fishing and nature study. A statewide needs assessment through 2013 identifies these deficits and the unit need for each (miles of trail, campsites, etc.) is provided in SCORP 2013. The SCORP deficits for these activities are considerations for the LRWRP proposal.

The population growth of south Florida will only add to the calculated existing recreation deficits. The proposed recreation study also typically considers outside study influences from surveys and other documented and respected sources. **Table F-1** presents projected county and State population growth per Census 2010.

Table F-1. Study Area Population and Annual Growth Rates Through Year 2070

Census 2010 Counties Population & Annual Growth Rate for Years Specified	Census 2010	2020	2030	2040	2050	2060	2070	2010-2070 difference	% Change
Palm Beach County Population	1,320,134	1,463,900	1,615,100	1,736,500	1,891,244	2,037,322	2,177,401	857,267	65%
Palm Beach County Annual Growth Rate	---	1.09%	1.03%	0.75%	0.89%	0.77%	0.69%	---	N/A
Martin County Population	146,318	157,300	170,200	179,800	192,686	204,439	216,192	69,874	48%
Martin County Annual Growth Rate	---	0.75%	0.82%	0.56%	0.72%	0.61%	0.57%	---	N/A
Florida Population	18,801,332	21,235,400	23,872,500	26,081,400	28,728,603	31,225,215	33,721,828	14,920,496	79%
Florida Annual Growth Rate	---	1.29%	1.24%	0.93%	1.01%	0.87%	0.80%	---	N/A
Study Area % of Florida Population	7.80%	7.63%	7.48%	7.35%	7.25%	7.18%	7.10%	6.21%	N/A

Source: Bureau of Economic and Business Research (BEBR), UF, Florida Statistical Abstract 2017

F.4.2 Existing Recreation Resources

Existing recreational facilities within the SCORP Southeast and Central East Regions provide ideal recreational resources for linkages and bundling with the proposed LRWRP project. Recreation facilities within the LRWRP and two-county area include: Palm Beach County's Cypress Creek, Pine Glades, Hungryland Slough, Pond Cypress, Sweetbay, and Loxahatchee Slough Natural Areas, and Riverbend Park; the Florida Fish and Wildlife Conservation Commission's J.W. Corbett Wildlife Management Area (Corbett WMA) and John C. and Mariana Jones Hungryland Wildlife and Environmental Area (Hungryland WEA); Martin County and SFWMD's, Palmar East (also known as Nine Gems) and Loxahatchee River/Cypress Creek Management Area (Cypress Creek MA); and SFWMD's DuPuis Management Area; and Jonathan Dickinson State Park (JDSP). All of these properties lie within the historic watershed of the Loxahatchee River. The Northwest Fork of the Loxahatchee River (NWFLR), extends a distance of approximately 16 miles from Riverbend Park to Jupiter Inlet. The 7.6-mile upstream portion of the NWFLR is one of only two rivers in the State to be designated a National Wild and Scenic River. It is currently a popular destination for paddlers. Current recreational access to the wild and scenic portion of the river is available only from Riverbend Park near the river's upstream origin and from JDSP at the downstream terminus of the Wild and Scenic designation.

The recreational potential of the 680-acre Riverbend Park[1] lies not only in its ability to provide resource-based outdoor recreational opportunities, but because it serves as a hub for recreational access to many of the other recreation resources noted above. The Park provides an ideal setting for passive recreation such as picnicking, canoeing, fishing, biking, hiking, birding, camping, nature study, photography, and archeological cultural and historical interpretation. It also serves as a starting point for six of Palm Beach County's Wildways Jesup Trail (Northern Everglades Natural Area, or NENA) recreational trails: four multi-use land trails, the Florida Trail Association's (FTA) Ocean to Lake (OTL) Hiking Trail, and the Loxahatchee Blueway paddling trail. The multi-use land trails are open to hiking, bicycling, and horseback riding. Loxahatchee Blueway is non-motorized boat access to the Loxahatchee River. Road access to Riverbend Park is excellent.

The recreational potential of the 11,383-acre JDSP lies not only in the access it provides to the wild and scenic river, but in the extensive resource-based outdoor recreational opportunities offered within its boundaries and through programing provided at the Elsa Kimbell Environmental Education and Research Center. In the far eastern portion of the park river access is provided by public boat ramps for launching private boats, a canoe/kayak rental concession, and a 44-passenger boat for tours upstream towards the west end to Trapper Nelson's homestead. Recreation opportunities include picnicking, swimming, canoeing, fishing, biking, hiking, birding, camping (tent, recreational vehicle and cabin), nature study, and photography. Access to a section of the OTL Hiking Trail are provided by the park, including two primitive camping sites along that backpacking trail. Road access to JDSP and down

[1] Riverbend Park and Loxahatchee River Battlefield Park for practical purposes are operated and maintained as a single regional park. Together, both properties total 674 acres (611 acres at Riverbend Park and 63 acres at Loxahatchee River Battlefield Park). Loxahatchee River Battlefield Park was originally part of Riverbend Park and was renamed in 2010. For purposes of describing the existing and FWO LRWRP conditions, both parks will be referred to as Riverbend Park.

to the river within the Park, are excellent. The LRWRP recreation will provide much needed consistent access to the western edges of the JDSP.

While recreational facilities at both ends of the Loxahatchee River are well developed and easily accessed, minimal recreational facilities exist within the SFWMD/Martin County Loxahatchee River/Cypress Creek Management Area. Two ditches that empty into the Loxahatchee River, pass through this conservation property and are the subject of proposed modification in various LRWR Project Alternatives. The Wildway's Jesup Trail passes through this property. The management area offers natural surfaced trails for hiking, biking and equestrian users, but no developed water access, camping or trail amenities. Road access is limited to permit only entry through a gate across a shell rock road leading to two grassed parking areas.

Palm Beach County's Wildways program interconnects most of the conservation lands lying within the LRWRP boundary. It includes the OTL Hiking Trail which is 63 miles long and offers a multi-day wilderness backpacking experience unmatched in the region. This trail exists primarily as a natural surface trail that utilizes some segments of the Wildway's Pântano and Jesup Trails. It is currently missing or requires improvements to the following sections, listed from west to east: Lake Okeechobee Scenic Trail (LOST) to DuPuis Management Area entry, Hungryland Slough to Sweetbay Natural Area, Sweetbay Natural Area to Loxahatchee Slough Natural Area, and the Hobe Grove ditch crossing. Four multi-use land trails: Bluegill, Pântano, Historic Jupiter-Indiantown and Jesup Trail serve hiking, biking and equestrian users. The amenities along these trails vary with the conservation land being crossed by them. The Loxahatchee Blueway includes the Loxahatchee Wild and Scenic River. The portion upstream of Trapper Nelson's is closed to motorized boating.

Each of the County natural areas, and the SFWMD and FWC management areas can be separately accessed by excellent to moderate quality roads. Each offers recreational opportunities within its boundaries.

F.5 Proposed Recreation

The majority of the Future Without Project (FWO) recreation facilities are proposed to be developed on the C-18 and C-18 West canals, and within the Loxahatchee Slough. Proposed public use facilities include a portion of the proposed Loxahatchee Blue-way, a canoe/kayak trail that is intended to link canoe trails in the City of West Palm Beach Grassy Waters Preserve, the Loxahatchee Slough Natural Area and the Loxahatchee River. There is water flow between Grassy Waters and the Loxahatchee Slough Natural Area under the CSX Railroad and SR 710 and under PGA Boulevard. However, the Loxahatchee Slough Natural Area is fragmented by the C-18W and C-18 canals. Proposed facilities to accommodate the Loxahatchee Blue-way include portages between the portion of the paddling trail in the slough to the C-18W Canal and from the C-18 into South Indian River Improvement District's Canal 14 which empties directly into the Loxahatchee River.

The FWO facilities for the Pond Cypress Natural Area at this time offer only walk-in access and no marked trails. Entrance to all of these facilities is free. While access gates are closed at night, the access is not monitored and data with respect to current use is unavailable. No parking is provided at this natural area. The recreation concept map is shown in **Figure F-1.**

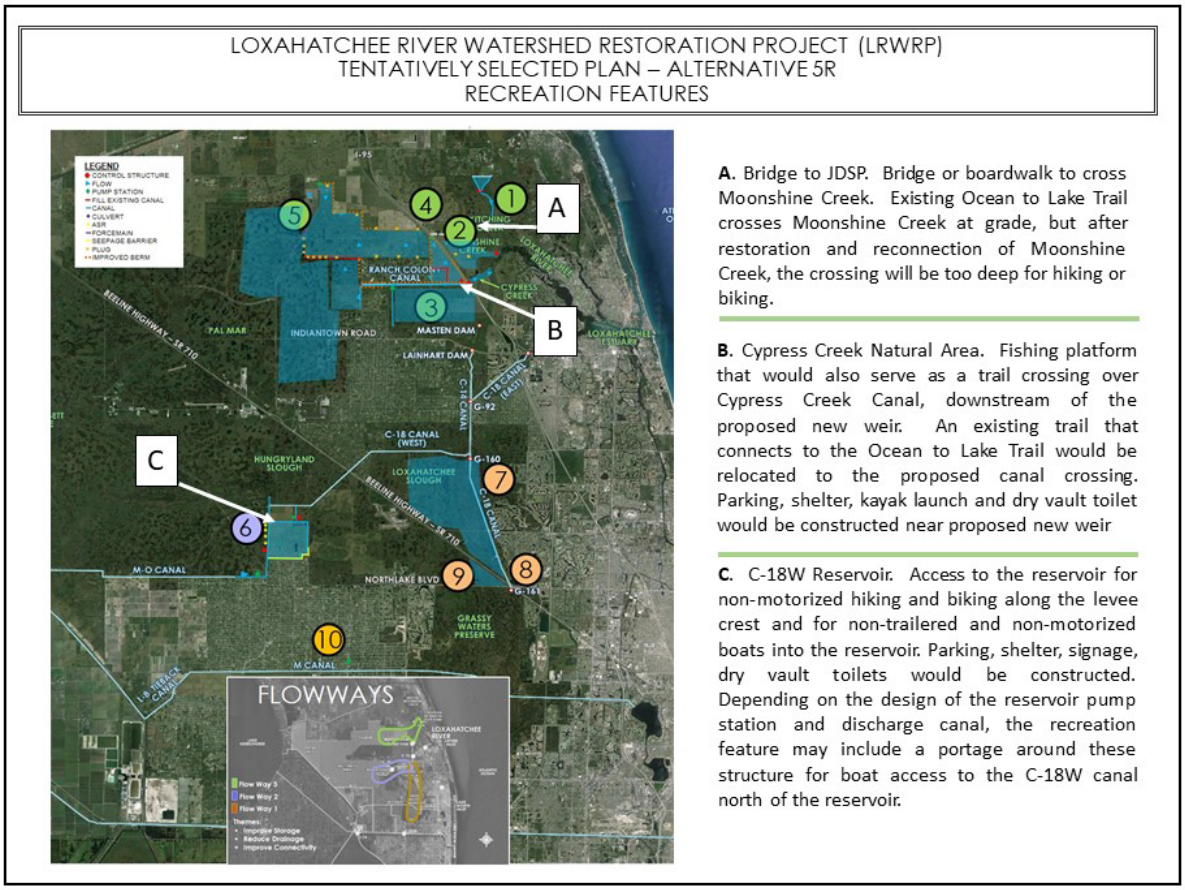

Figure F-1. Recreation Facilities

F.5.1 'Site A' Ocean to Lake Trail Bridge to Jonathan Dickinson State Park Recreation Features

The OTL Trail is a multiuse trail for hiking, biking, and equestrian use. It meanders from the ocean through Jonathan Dickinson State Park to Lake Okeechobee. This trail currently has an existing wet crossing upon entering JDSP, in the Moonshine Creek area, shown as Site A in **Figure F-2**. In this area, a project features include the design and construction of a weir within the existing Hobe Grove Ditch and scraping the adjacent area to reconnect and rehydrate the historic Moonshine Creek channel. This feature is expected to create a wider and deeper wet crossing. While this is a seasonal effect, the existing wet crossing is often not passable due to water depth. To ensure trail connectivity a dry crossing will be created using an individual feature or some combination of a bridge, boardwalk, or potentially the weir itself. Once design is initiated, the definitive location of the weir and the forecast stage and duration of the hydroperiod will be determined.

The Bridge into JDSP remedies existing and any future flooding of the trail due to the project. Therefore the project with the recreation plan in place does not cause negative effects to the trail. The bridge will substantially increase the use of the trail. The recreation with JDSP occurs primarily much farther downstream on the eastern side of the state park.

With this more detailed information, the best combination of recreation features and alignment to maintain this trail connection can be determined. This location is not anticipated to provide parking

or act as a trailhead but is likely to be a resting spot along the trail. Other features such as a trail shelter, picnic tables, and signboard are secondary to the function of a dry crossing.

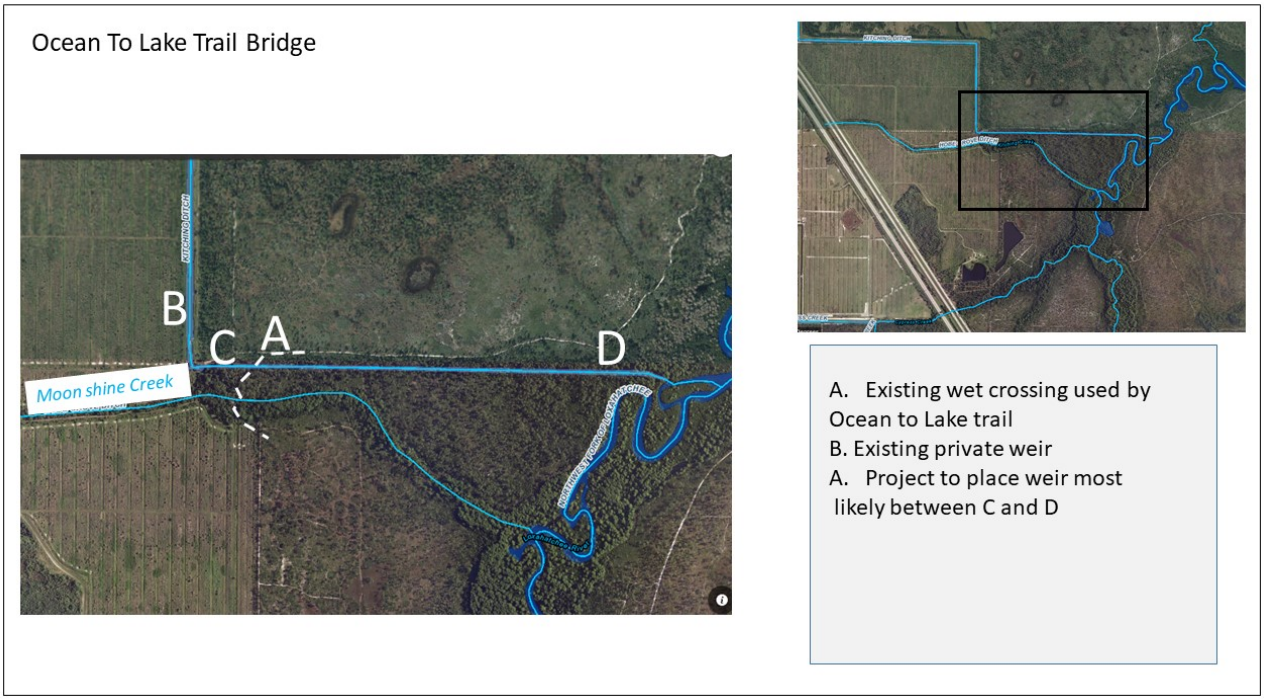

Figure F-2. Ocean to Lake Trail Bridge.

The cost to construct the OTL Trail Bridge for hiking, biking, equestrian use, and the surrounding recreation area is estimated at $925,000 as shown in **Table F-2**.

Table F-2. 'Site A' OTL Trail Bridge to JDSP Recreation Features

Feature	Cost FY20 dollars
Bridge	$202,000
Foundation	$54,000
Delivery & install	$82,000
Board walk (100 ft. at $740 per foot)	$76,000
Nature Study Signage with a roofed sign board	$7,000
Shelter 18x 24	$49,000
Picnic tables	$2,000
Engineer Cost	$453,000
Total Cost Estimate	$925,000

F.5.2 'Site B' Cypress Creek Recreation Features

At this general location a project water control structure will be built to replace an existing and ineffectual weir in the Cypress Creek Canal (**Figure F-3**). The existing weir elevation is so low as to compromise groundwater levels throughout the area. The new structure will improve groundwater conditions and effect control of flows into Cypress Creek, which is tributary to the Loxahatchee River. Flow through the existing weir joins Cypress Creek near the east edge of this area.

This structure will be designed to function as a recreational feature that will allow its use as a fishing pier, multi-use trail bridge and will incorporate a kayak launch. There are no salinity structures beyond this point and snook are known to approach the existing weir. A fishing platform across the width of the new structure is proposed. The SFWMD/Martin County Cypress Creek property is just south of this point and hiking, biking and equestrian the canal west of the existing weir at a vehicular bridge. These trail would be re-routed to use the structure to cross the Cypress Creek Canal instead of the vehicle bridge. The outdoor trail experience would be enhanced, as hikers will travel through the adjacent southern wooded area and avoid the road. From this location the Cypress Creek enters JDSP and joins the Loxahatchee River 0.2 miles down-stream of Trapper Nelson's. The design and location of the structure will affect the design of the portage and launch facilities.

Access to this site is by hiking, biking, and equestrian and could be enhanced for public vehicle use controlled by SFWMD Special Use licenses.

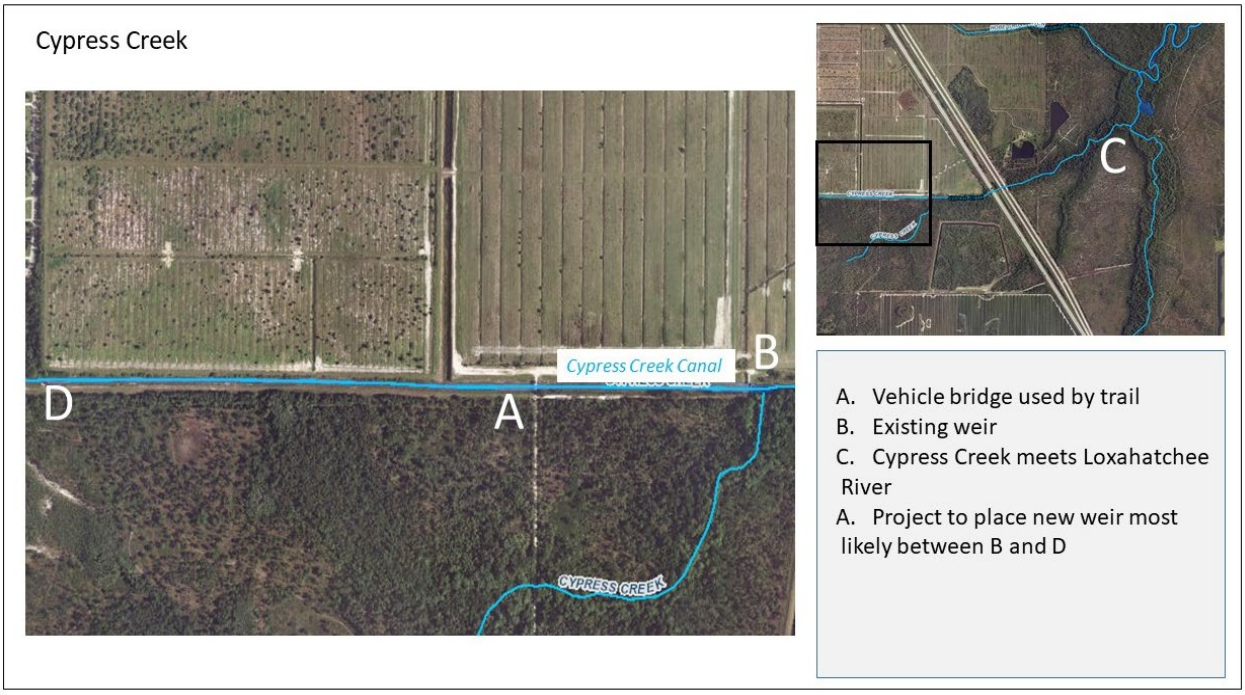

Figure F-3. Cypress Creek Recreation Features.

The location of the structure, east, or west of the existing bridge may make a difference as well. If west of the bridge the kayak launch facility would be built east of the bridge allowing launching down-stream of the bridge. The existing bridge serves equestrian use as part of OTL. The public and private lands upstream of this location could contribute kayak access to the upstream side of the weir. The

hiking trail could be rerouted to the structure whether east or west of the bridge. **Table F-3** presents the cost to construct the Cypress Creek Recreation Features, which is estimated at $1,163,000.

Table F-3. 'Site B' Cypress Creek Recreation Features

Feature	Cost FY20 dollars
Road improvements parking area shell	$54,000
Fishing pier, may be a part of weir with concrete and railings or wood	$82,000
Kayak launch and portage around the weir, steep side and wood staircase	$109,000
Shelter 18 X 24	$54,000
Guard rail 100'	$22,000
Nature Study Signage with a roofed sign board	$7,000
Nature study signs	$2,000
Board and post parking fence 200'	$4,000
Dry vault 2 gender toilet	$41,000
Engineer Cost	$788,000
Total Summary	$1,163,000

F.5.3 'Site C' C-18W Reservoir

This site would have parking and access off Seminole Pratt Whitney Road into a parking area on the reservoir site (**Figure F-4**). The parking would allow non-motorized access onto the levee for hiking and biking and launching of non-trailered and non-motorized boats into the reservoir. The reservoir itself could serve as a center of activity for fishing and hunting as well as access around the levee. Access around the levee maybe also be used by the public as an exercise route due to proximity of residences.

For kayaks and other non-motorized boats in the reservoir and connection to the C-18W Canal on the discharge side or a portage across Palm Beach County land or directly into the C-18 canal would allow a connection between the C-18W and C-18 Canal that then eventually connects to the Loxahatchee River through the River Bend Park and over the Lainhart and Masten dams. Locations of parking and canoe/kayak launch or portages to C-18 will be determined during design as project features are located.

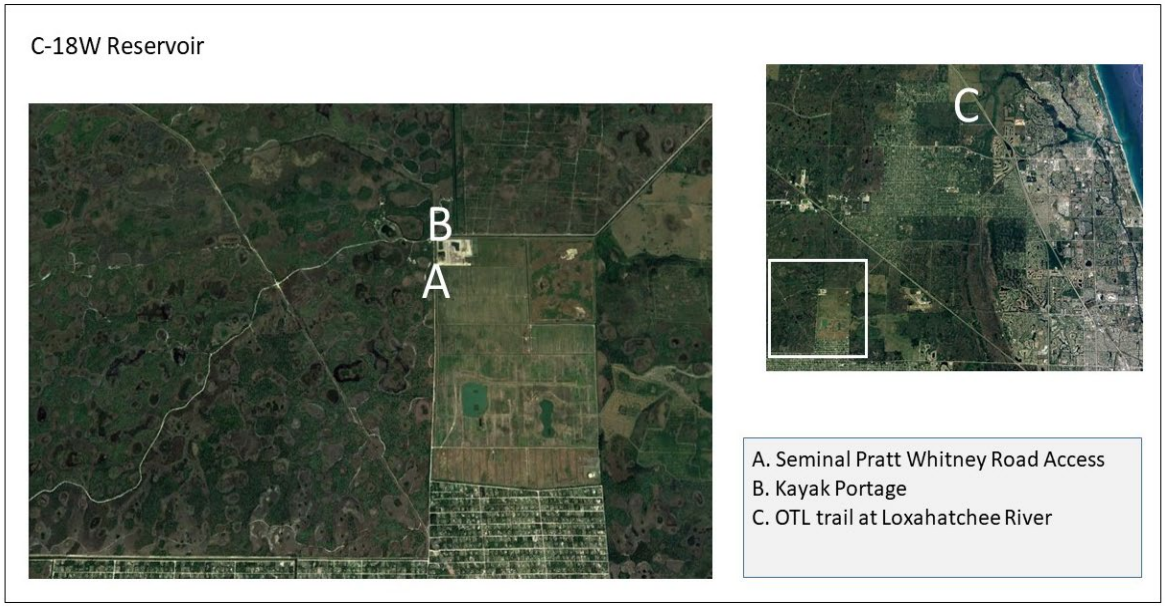

Figure F-4. C-18W Reservoir.

Table F-4 presents the cost to construct the C-18W Reservoir connections.

Table F-4. "Site C" C-18W Reservoir

Feature	Cost FY20 dollars
Road improvements parking area shell	$54,000
Kayak launch and portage around discharge structure	$109,000
Shelter 18 X 24	$54,000
Signage with a roofed sign board	$7,000
Board and post parking fence 200'	$4,000
Dry Vault 2 gender toilet	$41,000
Nature study signs	$2,000
Engineer Cost	$570,000
Total Cost Estimate	$842,000

F.5.4 Alternative Sites Considered

During the development of the recreation plan multiple recreation features were considered. Multiple sites along trails for shelters, camping areas, portages or crossings were evaluated. Most were eliminated due to difficulties associated with land ownership or because other similar features were near in proximity. The features chosen and outlined in the above sections do not compete with nearby features and contribute to the cohesiveness of recreation in the Loxahatchee Planning Area.

The bridges proposed at Sites A and B were located after evaluating alternative routes and bridge sites. These other sites were eliminated due to lack of land ownership rights or because wider canals would require a greater span along the route and would thus be more costly. The proposed Site A bridge is located on the existing OTL trail where a project feature will increase the depth and duration of water along the trail. This feature serves to remedy that and provide continued access. Site B and C are recreation features that focus on the opportunities created by project features (the C-18W Reservoir and the Cypress Creek Weir). The location of these proposed recreational features was driven by the location of project features themselves. Within the planning area the number and type of recreation features were screened and minimized to most efficiently support recreational opportunities.

F.6 Recreation Benefits

F.6.1 National Perspective

The national economic development (NED) benefit evaluation procedures contained in ER 1105-2-100 (22 Apr 00), Appendix E, Section VII, include three methods of evaluating the beneficial and adverse NED effects of project recreation: travel cost method (TCM), contingent valuation method (CVM), and unit day value (UDV) method.

The unit day value (UDV) method was selected for estimating recreation benefits associated with the creation of the Loxahatchee River Watershed Restoration Project. The UDV approach in recreation benefit analysis consists of two parts: determining value per visit based on a willingness to pay approximation and estimating visitation. The benefits of recreation features are measured through approximation of visitors' willingness to pay (WTP) for the recreation resource. Willingness-to-pay is assumed to represent the economic value, in dollars, that a visitor places on a recreation resource. Measuring the economic value of the recreation resource without a project, then again with the project in place, allows the calculation of net recreation benefits due to construction of the recreation alternative. The Unit Day Value (UDV) method was selected as the appropriate valuation method based on the characteristics of the LRWRP.

F.6.2 Determining Value per Visit

When the UDV method is used for economic evaluations, planners will select a specific value based on a series of criteria applied to the various recreation facilities and opportunities provided by the project. The criteria and point values for this analysis are derived from Economic Guidance Memorandum (EGM) 19-03[2], which is updated annually to reflect any increases or decreases in estimated willingness to pay for general recreation features. Application of the selected value to estimate annual use over the project life, in the context of with and without-project framework of analysis, provides the estimate of recreation benefits.

The without project condition described site by site for this analysis have minimal current recreation value as the proposed Loxahatchee River recreation facilities do not exist. The two sites,

[2] EGM 20-03, the update for FY20.

impoundment (Site C) and Kayak Launch (Site B) are new and have no prior use. The OTL trail is an established trail using a wet crossing and current use is minimal compared to the expectations of having a bridge that eliminates the wet crossing. No specific count was attempted to define the difference between trail users that exist now and new trail users. This visitation count is for the future new trail user. It is presumed that the proposed facilities must be opened to the public in order to realize the recreation benefits being claimed. The future with-project will be the expected value of recreational activity based on the UDV method.

Table F-5 illustrates the method of assigning a point rating to a particular general recreation activity. The table also shows the point values assigned based on measurement standards described for the five criteria: Recreation Experience, Availability of Opportunity, Carrying Capacity, Accessibility, and Environmental.

Table F-5. Guidelines for Assigning Points for General Recreation

Criterion	Judgment factors				
Recreation experience Total Points: 30	Two general activities	Several general activities	Several general activities: one high-quality value activity3	Several general activities; more than one high-quality activity	Numerous high-quality value activities; some general activities
Point Value: 27	0-4	5-10	11-16	17-23	24-30
Availability of opportunity Total Points: 18	Several within 1 hr. travel time; a few within 30 min. travel time	Several within 1 hr. travel time; none within 30 min. travel time	One or two within 1 hr. travel time; none within 45 min. travel time	None within 1 hr. travel time	None within 2 hr. travel time
Point Value: 15	0-3	4-6	7-10	11-14	15-18
Carrying capacity5 Total Points: 14	Minimum facility for development for public health and safety	Basic facility to conduct activity(ies)	Adequate facilities to conduct without deterioration of the resource or activity experience	Optimum facilities to conduct activity at site potential	Ultimate facilities to achieve intent of selected alternative
Point Value: 7	0-2	3-5	6-8	9-11	12-14
Accessibility Total Points: 18	Limited access by any means to site or within site	Fair access, poor quality roads to site; limited access within site	Fair access, fair road to site; fair access, good roads within site	Good access, good roads to site; fair access, good roads within site	Good access, high standard road to site; good access within site
Point Value: 10	0-3	4-6	7-10	11-14	15-18
Environmental Total Points: 20	Low esthetic factors that significantly lower quality7	Average esthetic quality; factors exist that lower quality to minor degree	Above average esthetic quality; any limiting factors can be reasonably rectified	High esthetic quality; no factors exist that lower quality	Outstanding esthetic quality; no factors exist that lower quality
Point Value: 8	0-2	3-6	7-10	11-15	16-20
Sum points 67					

Point value assignments for **Table F-5** above are based on Economic Guidance Memorandum (EGM) 19-03: Unit Day Values for Recreation for Fiscal Year 2019**Error! Bookmark not defined.**. The Criteria and Judgment Factors for General Recreation were specifically used as the basis of the estimated point values for the proposed recreation area. Judgment factors were reviewed after conducting site

visits and coordination with local agencies. The following selection factors were used for the criteria outlined in **Table F-5**.

The Loxahatchee River Watershed Restoration Project proposed recreation resources would provide an area specific, unique recreation opportunity afforded by the project setting which includes over 165, 000 acres of public land, interconnecting trails and the presence of one of only two National Wild and Scenic Rivers in Florida. This creates opportunities for a high diversity of common activities (e.g., picnicking; camping; hiking; jogging; riding; cycling; kayaking/canoeing; and fishing, hunting, stargazing, wildlife viewing and photography of normal quality) as well as high quality, high value activities (e.g., kayaking/canoeing, endurance running/racing and high-quality hunting within two State WMAs). The site offers solitude and panoramic views outside a growing metropolitan region and would provide specific recreation amenities (as outlined) for expanding regional population. The point value rating is estimated at the high end of the scale because of the high-quality value activities and numerous general activities.

The availability of opportunity rating is based upon the presence of large conservation lands to both the north and south of the project that offer similar common activities but are not within the 30-minute time frame for the majority of the population. LRWRP offers three recreation activities that are rare in South Florida: the Ocean-to-Lake Hiking trail provides opportunity for wilderness backpacking not otherwise available except on the Florida National Scenic Trail; this is one of only two Wild and Scenic Rivers in Florida; and the rare species provide photographic opportunities that are hard to encounter. Alternative facilities do not exist for backpacking, and nothing provides the connectivity that the river provides. Scores for this judgment factor are therefore expected to be on high scale.

The proposed LRWRP recreation resources carrying capacity point values are estimated to improve with the recreation component construction. Currently some facilities experience heavy use and others very little; a situation that could be alleviated by development of new access facilities. Good water resources and access to them for bank fishing, multi-use trail and environmental observation comprise a balanced use of the proposed recreation resource use. Adequate facilities will be constructed to conduct these activities without deteriorating the resources or activity experience.

The accessibility rating is based upon the availability of local highways, roads and streets in good condition that would provide access to the proposed recreation facilitates. Direct routes from the east on paved roads provide good access.

The environmental quality rating is based upon the existing aesthetic values of the proposed Loxahatchee River Watershed Restoration Project recreation resource facilities and the ease of correcting any limiting aesthetic factors. The proposed site would possess panoramic views. The best aesthetics of the proposed project area are views from the Loxahatchee River Watershed Restoration Project to the west during a sunset.

The value of a day of general recreation at the proposed Loxahatchee River Watershed Restoration Project was determined for each project activity using the guidelines for Assigning Points for the General Recreation in **Table F-5**. The points were then converted to dollar values using conversion factors included in the Economic Guidance Memorandum 20-03, Unit Day Values for Recreation, 2020, which is based on ER 1105-2-100.

Table F-6 displays the point value conversion to a UDV FY2020 dollar amount. Using linear interpolation the total point value for the recreation sites was determined to be 67. The user day value conversion equivalent is $10.09. Estimation of the annual use over the project life is next.

Table F-6. Conversion of Points to Dollar Values

General Recreation Point Values	General Recreation Dollar Values
0	$4.21
10	$5.00
20	$5.53
30	$6.32
40	$7.90
50	$8.95
60	$9.74
70	$10.27
80	$11.32
90	$12.11
100	$12.64

F.6.3 Estimating Visitation

F.6.3.1 State of Florida Perspective

The State of Florida's Department of Environmental Protection (FDEP), Division of Recreation and Parks, developed the Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2013. The SCORP was used to obtain state regional recreation participation rates. The SCORP also provides recreation user day guidelines for resource based outdoor recreation activities listed in **Table F-7**. These guidelines are based on maximum carrying capacity levels developed by FDEP. The LRWRP is a geographically large inland body of freshwater in an area of the state where state based recreation resources are mainly environmental/ecological or riverine in nature. The 2013 changed the format

In many areas, even where water bodies are accessible, they are unusable due to the lack of facilities. As previously noted, the regional-level needs assessments in this plan (SCORP) are not capable of identifying local needs. Nonetheless, it is well known that there is a need to fund development of access facilities such as boat ramps, canoe launches, docks, catwalks and piers, as well as support facilities such as bathhouses, restrooms, and parking areas.[3] Federal, state and local governments should work together to fund construction of these facilities in all areas where there is sufficient access to water bodies suitable for recreation (SCORP, 2013).

[3] Draft Caloosahatchee River (C-43) West Basin Storage Reservoir PIR and EIS, pg. H-13, April 2007

F.6.3.2 Regional Perspective

The current SCORP indicates regional recreation demands not met for the year 2013 for seven activities associated with the proposed LRWRP recreation. In the current or FWO condition miles of biking, hiking, equestrian, canoeing/kayaking, wildlife viewing, bank fishing and nature study are needed to fill projected regional demand in the Southeast region. If viewing this as a region not all these are confirmed for need in the Central East. However, as the SCORP explains above the Regional needs are not able to fully identify the local needs. Further, SCORP calls upon Federal and local cooperation to fund access to water bodies without facilities. The Federally designated Wild and Scenic Loxahatchee River, at the heart of this project, needs facilities to support the trail systems within the Watershed. We have determined that there is sufficient need in each of the seven activities used in the Central East and Southeast to satisfy the need for economic justification. The predominant part of the trail is on the SE region, which falls within the larger portion of the watershed. A portion of the facilities needed for the trail are immediately in the Central East region. A portion of the existing trail in the Central East region is being negatively impacted by the project as the project features will raise the water levels making the existing wet crossing less often available. Specifically, the project itself is creating need for the bridge into JDSP.

The carrying capacity guidelines established by the SCORP of 2008 (Table F-7) are presented below. These guidelines are based on maximum levels of carrying capacity developed by the Division of Recreation and Parks for use and protection of state park resources. In every case, LRWRP average daily visitation was estimated to be substantially lower than the SCORP's published carrying capacity guidelines.

Table F-7. SCORP Carrying Capacity Guidelines

Activity	Units Provided	SCORP Maximum Area Requirements	SCORP Turnover Rates	SCORP Capacity Guidelines
Bicycling	12 miles / 4 utilized	10-20 users Per Mile	4/day	40-80 users per mile per day
Hiking	29 miles of trail	10-20 users per mile	4/day	40-80 users per mile per day
Equestrian Trails	12 miles / 4 utilized	2-8 groups/ mile – 4/ group	3/day	24 – 96 equestrians/ trail mi/ day
Canoeing / kayaking	12 miles of canals and Impoundment	1-2 users per canoe	2/day	1-2 canoes per acre or mile
Wildlife Viewing	2 – double-lane paved boat-ramp	N/A	2/day	I
Bankfishing	50 mi of canal & reservoir banks	1 fisherman/20 linear feet	2/day	528 users per mile/day
Nature Study (Interpretative Signs)	12 miles / 4 utilized	5-20 groups per mile	4/day	40-160 users per mile of trail/day

These activities are planned in the LRWRP Recreation Proposal because they are compatible activities and are anticipated to have greater state deficits as the population nearly doubles by the year 2050.

With ensuing development in the immediate area and region, and the increase in population projections for the State of Florida, the study team believes there would be ample use of the proposed recreation facilities and by 2070 fully expects a continued shortage in some of the existing activities in this area

User visitation rates were estimated using relevant results from the SCORP 2016-2017 Participation Study, which catalogued over 4,000 completed surveys from Florida residents representing each of the state's 67 counties. The SCORP 2016-2017 Participation Study identifies what activities Florida residents have participated in during the last 12 months and where they participated. The research also analyzes frequency of participation and calculates resident and tourist demand indices for activities which simultaneously account for both volume and frequency of demand. SCORP research projects typically analyze data at a statewide level and sometimes at the regional-level within a state. County-specific results are not usually offered because county-level sample sizes are often too small to be interpreted with adequate confidence.

Due to the LRWRP's relatively rural location and rustic/minimal recreation features proposed, it was determined that an extremely conservative usage rate would be projected. For the purposes of this analysis, regional and statewide participation rates were applied to a study area including only the census block directly bordering the project area (**Table F-8** and **Figure F-5**). It is commonly known that people travel from outside these census blocks to visit the adjacent public lands in the area.

Table F-8. LRWRP Recreation Study Area by County and SCORP Region

	SCORP Region		
	Central East (Martin County)		Southeast (Palm Beach County)
Loxahatchee Recreation Sites	Site A	Site B	Site C
Census Blocks	16021033	17003044	79081112
	16021066	17003047	79081113
	16021067	17003051	79081126
			79081127
Total Households	107	63	34

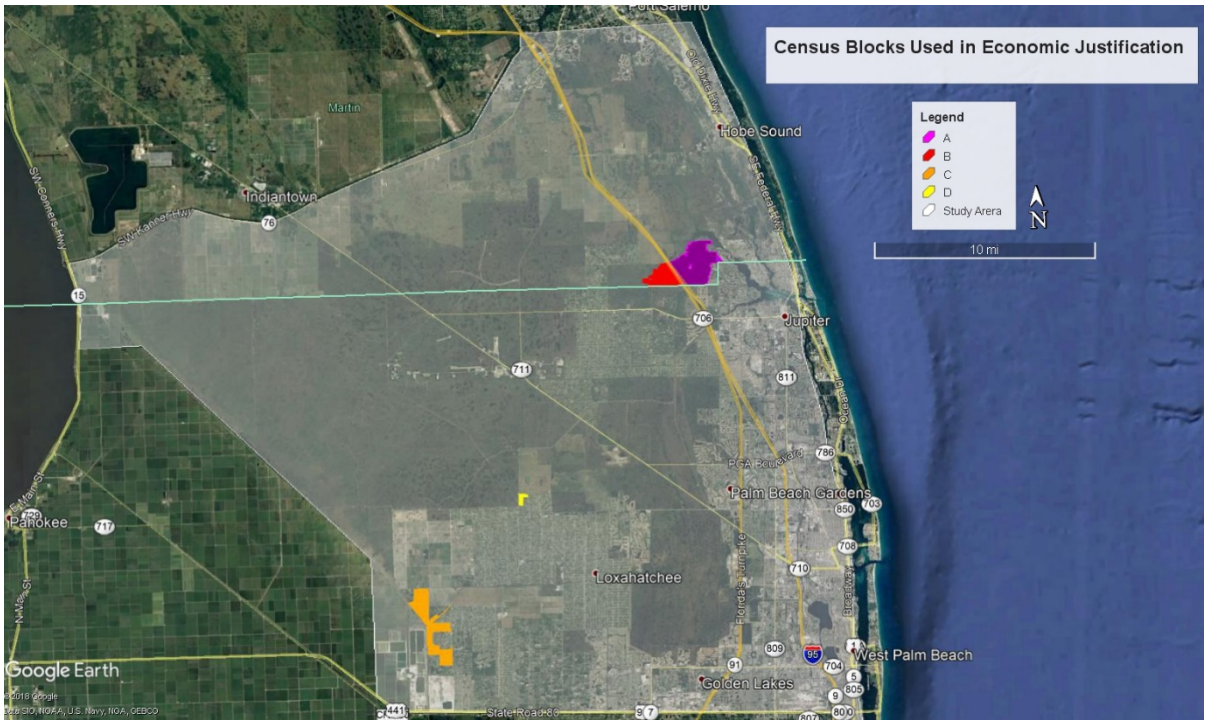

Figure F-5. Census Blocks Directly Bordering Recreation Sites

The following steps were taken to express total recreation participation of the market on a daily basis:

- SCORP regional household participation estimates were applied to the LRWRP recreation study area (**Table F-9**) to estimate the number of households participating in a given recreational activity per year **(Table F-10)**.

Table F-9. Recreation Household Participation Estimation

	Household Participation in Recreational Activities in FL in the Past 12 months by SCORP Region (Resident Survey Result)		Estimated Number LRWRP Recreation Study Area Household Participation per Year			
	Central East (Sites A & B	Southeast (Site C)	Site A	Site B	Site C	Total
Bicycling	45%	55%	115	68	48	231
Hiking	39%	34%	100	59	30	188
Equestrian	10%	20%	26	15	18	58
Canoeing/Kayaking+	26%	33%		39	29	68
Wildlife Viewing	62%	54%	159	93	48	299
Bank Fishing	33%	28%	84	50	25	159
Nature Study	31%	31%	79	47	27	153

+Canoeing and Kayaking are not calculated for site A as this bridge facilities does not substantially support participation in those activities.

- The mean SCORP statewide participation for households engaging in each respective activity were converted to yearly percentages. These yearly percentages were applied to the LRWRP estimated number households participating per year.
- Lacking-individual level participation data, the minimum number of participants that SCORP household data could represent was assumed and was multiplied by average household size for Martin County and Palm beach County. Converting at 2.59 persons per household for Palm Beach County and 2.39 persons for Martin County, this approach yields a total daily recreation participation of 62 persons for Site A, 41 persons for Site B and 25 persons for Site C; and a total of 127 persons for the entire project **(Table F-10)**.

Table F-10 LRWRP Average Daily Visitation Estimation

	Mean Days of Participation (FL Households with Participation >0)	Percent of Year Participating (FL Households with Participation >0)	Estimated Site A Average Daily Participation	Estimated Site B Average Daily Participation	Estimated Site C Average Daily Participation	Estimated LRWRP Average Daily Participation
Bicycling	40.1	11.0%	13	7	5	25
Hiking	16	4.4%	11	6	3	21
Equestrian	10.8	3.0%	3	2	2	6
Canoeing/Kayaking	9.3	2.5%	0	4	3	7
Wildlife Viewing	22.6	6.2%	17	10	5	33
Bank Fishing	12.8	3.5%	9	5	3	17
Nature Study	13.9	3.8%	9	5	3	17
Total			62	41	25	127

This visitation analysis utilized published SCORP methodology, Census data, CORPS economic guidelines and SFWMD local knowledge to develop these estimates. Table F-1 shows increasing population over 50 years. It was determined that the current visitation calculation was sufficient and no change in visitation was forecast. This is the most practical visitation estimate for justifying the proposed recreation features for the LRWRP.

F.7 Economic Justification of Recreation

The justification of incurring additional costs for recreation features is derived by utilizing a benefit to cost ratio. The tangible economic justification of the proposed project can be ascertained by comparing the equivalent average annual charges with the estimate of the equivalent average annual benefits, which would be realized over the period of analysis. These average annual recreation benefits and costs are summarized in **Table F-14**.

Engineering Regulation 1105-2-100 (The Planning Guidance Notebook) provides economic evaluation procedures to be used in all Federal water resources planning studies. The guidelines specified in the ER 1105-2-100 dated 22 April 2000 were observed in preparing this cost analysis. The federally mandated project evaluation interest rate of 2.75 percent, an economic period of analysis of 50 years and 2020 price levels were used to evaluate economic feasibility.

Total project recreation feature construction costs were estimated by the Engineers Cost Report MCACAE at $2,930,000 in FY20 dollars. Applying the costs for contingency, preconstruction engineering and design (PED), supervision and administration (S&A), and construction management cost yields a total recreation facilities cost of $4,980,000. Including an interest during construction (IDC) cost of $60,000; this amounts to an average annual cost of $209,000 over a 50 year period of analysis at the FY20 discount rate (2.750%). These figures are compared against the project recreation benefits of $464,000. **(Table F-12)**

Table F-11 Summary of Recreation Costs

Recreational Facility Original Budget Costs	Cost Estimate(FY20 Dollars)
Site A - OTL Trail Bridge to JD - Table Summary	$925,000
Site B - Cypress Creek - Table Summary	$1,163,000
Site C - C-18 Impoundment –Table Summary	$842,000
Summary of Recreation Features provided by Engineers Costs Report	$2,930,000

Table F-12. Benefit-to-Cost Summary

Summary of Costs and Benefits	Cost Estimate (FY20 dollars)
Recreation Construction Costs	$ 2,930,000
PED, S/A, & Construction Management (26.3%)	$ 769,000
Contingency (33%)	$ 1,221,000
Contract Cost Total	$ 4,920,000
Interest During Construction (12-month duration)	$ 60,000
Total Investment	$ 4,980,000
Amortized (50 year period of analysis)	$ 184,000
OMRR&R	$ 25,000
Average Annual Cost	$ 209,000
Unit Day Value	$ 10.09
Daily Use	127
Annual Use (127 users x 365 days)	$ 46,000
Average Annual Benefit	$ 464,000
Benefit to Cost	2.22
Net Annual Benefits	$ 255,000

This analysis leads to the conclusion that there are 2.22 times the benefits than the costs. The benefit-to-cost ratio for the recreation features is 2.22-to-1, with net annual benefits of $255,000.

A sensitivity analysis was conducted to further reinforce expected benefits and provide extra support for the justification of recreation features. **Table F-13** presents a sensitivity analysis which contains the expected average annual benefits from **Table F-12** and a worst-case scenario depicting the minimum number of annual visitors required for benefits to equal costs. As can be noted from this sensitivity analysis, a minimum average rate 58 users per day would be required to justify the proposed costs for recreation, and following the minimum guidelines from SCORP the expected minimum benefit from the site could be $4.8 million dollars. This economic analysis suggests there would be ample benefits to conservatively justify the proposed recreation facility construction for the Loxahatchee River Watershed Restoration project.

Table F-13 Sensitivity Analysis Using Multiple Scenarios

Scenario	Annual Users	Average Daily Users	Annual Benefits
Worst Case Scenario	21,170	58	$210,000
Projected Scenario	46,000	127	$464,000
SCORP Guidelines	500,000	1,370	$4,860,000

NOTE: Annual Benefits were derived by multiplying Annual Users by $10.09 point value.

F.8 Incremental Justification of Separable Recreational Features

The economic evaluation of recreation facilities consist of two parts. The first part concerns evaluating the entire project. The second part involves the evaluation of separable recreation features, those being 'Site-A' Ocean to Lake Trail Bridge to the Johnathan Dickinson State Park; 'Site-B' Cypress Creek Recreation Features; and 'Site-C' C-18W Reservoir.

Table F-14, below, summarizes the total average annual cost, total average annual benefits, the net average annual benefits, and the benefit to cost ratio for the three recreation sites taken from **Table F-12.**

Table F-14 Summary of Benefits and Costs for Recreation Features

	Average Annual Benefits (1)	Average Annual Cost (1)	Net Average Annual Benefits	Benefit/Cost Ratio
Total Project	$464,000	$209,000	$255,000	2.22

(1) FY20 Price Levels and 2.750-percent interest rate

As shown in **Table F-14**, the overall plan for Loxahatchee recreation features shows economic justification with a benefit-to-cost ratio of 2.22. Consideration must next be given to economic feasibility of the incremental recreational features; i.e. Ocean to Lake Trail Bridge to the Johnathan Dickinson State Park; Cypress Creek Recreation Features; and the C-18W Reservoir.

F.8.1 Incremental Justification of Project Features[4] –

Corps policy requires that separable project features of an alternative be incrementally justified, i.e., produce sufficient additional benefits to offset additional costs. Recreation features proposed for sites A, B, and C were developed by the SFWMD and with input from the Palm Beach County Parks and Recreation. It is required that the separable costs associated with the construction of the recreation feature be offset by sufficient benefits, produced by this feature, to economically justify its construction.

Addressing the evaluation of the separable construction features, the cost associated with OTL Trail Bridge to JDSP consists of construction items listed in **Table F-2**.

Table F-15 'Site A' - OTL Trail Bridge to JDSP: Incremental Cost and Benefit

Site A - OTL Trail Bridge to JD - Table Summary	
Recreation Construction Costs	$925,000
Contingency (33%)	$305,000
Total Recreation Construction	$1,230,000
PED & S/A (25.9%)	$323,000
Total Cost including Contingency, PED/SA	$1,553,000
Interest During Construction (12-month duration)	$19,000
Total Investment	$1,572,000
Amortized (50 year period of analysis)	$58,000
OMRR&R	$8,000
Average Annual Cost	$66,000
Unit Day Value	$10.09
Daily Use	62
Annual Use (62 users x 365 days)	22,561
Average Annual Benefit	$228,000
Benefit to Cost	3.45
Net Annual Benefits	$162,000

FY20 Price Levels and 2.75-percent interest rate

Including the proportionate amount of Contingency the total amount for the first cost of the OTL Trail Bridge to JDSP work amounts to $1,230,000. Including the proportionate amount of PED and Supervision and Administration costs, the total amount for the first cost amounts to $1,553,000. Including interest during construction and amortizing this value over the 50-year project life, and including proportionate Operation and Maintenance Cost, the average annual costs for the OTL Trail Bridge to JDSP work amounts to $66,000 **(Table F-15).**

[4] Incremental results may not sum to total due to rounding.

The cost associated with the Cypress Creek Recreation Features consist of construction items listed in **Table F-3**.

Table F-16. 'Site B' Cypress Creek: Incremental Cost and Benefit

Site B - Cypress Creek - Table Summary	
Recreation Construction Costs	$1,163,000
Contingency (33%)	$384,000
Total Recreation Construction	$1,547,000
PED & S/A (25.9%)	$407,000
Total Cost including Contingency, PED/SA	$1,954,000
Interest During Construction (12-month duration)	$24,000
Total Investment	$1,978,000
Amortized (50 year period of analysis)	$73,000
OMRR&R	$8,000
Average Annual Cost	$81,000
Unit Day Value	$10.09
Daily Use	41
Annual Use (41 users x 365 days)	14,853
Average Annual Benefit	$150,000
Benefit to Cost	1.85
Net Annual Benefits	$69,000

FY20 Price Levels and 2.75-percent interest rate

Including the proportionate amount of Contingency the total amount for the first cost of Cypress Creek amounts to $1,547,000. Including the proportionate amount of Engineering and Design, Supervision and Administration costs, and contingency, the total first cost of the Cypress Creek work amounts to $1,954,000. Including interest during construction and amortizing this value over the 50-year project life, and including proportionate O&M cost, the average annual cost for the Cypress Creek work amounts to $81,000 **(Table F-16)**.

Addressing the evaluation of the separable construction features, the cost associated with C-18W Impoundment consists of construction items listed in **Table F-4**.

Table F-17. 'Site C' C-18W Impoundment: Incremental Cost and Benefit

Site C - C-18W Impoundment –Table Summary	
Recreation Construction Costs	$842,000
Contingency (33%)	$278,000
Total Recreation Construction	$1,120,000
PED & S/A (25.9%)	$295,000
Total Cost including Contingency, PED/SA	$1,415,000
Interest During Construction (12-month duration)	$17,000
Total Investment	$1,432,000
Amortized (50 year period of analysis)	$53,000
OMRR&R	$8,000
Average Annual Cost	$61,000
Unit Day Value	$10.09
Daily Use	25
Annual Use (24 users x 365 days)	9,005
Average Annual Benefit	$91,000
Benefit to Cost	1.49
Net Annual Benefits	$30,000

FY20 Price Levels and 2.75-percent interest rate

Including the proportionate amount of Contingency the total first cost of C-18W Impoundment amounts to $1,120,000. Including the proportionate amount of Engineering and Design, Supervision and Administration costs, the total first cost of the C-18 Impoundment work amounts to $1,415,000. Including interest during construction and amortizing this value over the 50-year project life, and including Operation and Maintenance Cost, the total annual cost for the C-18W Impoundment work amounts to $61,000 **(Table F-17)**.

The average annual benefits attributed to the separate recreation features are presented in **Table F-18** as Total Annual Benefit for Separable Feature. The OTL Trail Bridge to JDSP will ensure trail connectivity and we assume daily use will be higher compared to other sites. The expected daily use is estimated as 62 which will yield an average annual benefit of $228,000. Improvements to the Cypress Creek Recreation features estimated daily use is 41 and yields a total annual benefits of $147,000. The estimated daily use for the C-18W Impoundment is 25, which results in benefits of the amount $91,000.

Table F-18. Incremental Justification of Recreation Features

Separable Feature	Total Annual Benefit for Separable Feature(1)	Total Annual Cost(1)	Average Daily Users(2)	B/C Ratio	Net Annual Benefits
Site A - OTL Trail Bridge to JDSP	$228,000	$66,000	62	3.45	$162,000

Site B-Cypress Creek	$150,000	$81,000	41	1.85	$69,000
Site C - C-18W Reservoir	$91,000	$61,000	25	1.49	$30,000

(1) FY20 Price Levels and 2. 75-percent interest rate
(2) Average daily use for each site is listed in Table F-10

The expenditures attributed to recreation features are justified using a benefit-to-cost ratio. The tangible economic justification of the proposed project can be determined by comparing the equivalent average annual costs with the estimate of the equivalent average annual benefits realized over the period of analysis. The Federally mandated project evaluation interest rate of 2.750 percent, an economic period of analysis of 50 years and 2020 price levels were used to evaluate economic feasibility. The benefit to cost ratio for the recreation features is 3.45 to 1 for Site A; 1.85 to 1 for Site B; and 1.49 to 1 for Site C **(Table F-18).**

As shown in **Table F-18***,* this analysis confirm that each recreation feature can stand alone, is incrementally justified, and its construction will not impact the economic feasibility of the rest of the project. The components for recreation features in sites A, B, and C are necessary to make the project operable, and maintainable and should all be included in the LRWRP.

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