

**APPENDIX F
RECREATION**

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Table of Contents

F	RECREATION PLAN	F-1
F.1	Authorization	F-1
F.2	Introduction	F-1
F.3	Benefit Categories	F-2
	F.3.1 Study Area	F-2
	F.3.2 Site A Wetland Attenuation Feature Boat Ramp	F-4
	F.3.3 Sites B, C, D, E Wetland Attenuation Feature, Spillway, Portage, and Trail Shelter Sites	F-5
	F.3.4 Sites F, G, H, I Wetland Portages at Structures	F-6
	F.3.5 Total Planning-Level Construction Cost Estimate	F-7
F.4	Recreation Benefits	F-7
	F.4.1 Determining Value per Visit	F-7
	F.4.2 Estimating Visitation	F-11
F.5	Economic Justification of Recreation	F-14
F.6	Sensitivity Analysis	F-15

List of Tables

Table F-1. Planning-level cost estimate for Site A recreation features (FY18 dollars).	F-5
Table F-2. Planning-level cost estimate for Site B, C, D, and E recreation features (FY18 dollars).	F-6
Table F-3. Planning-level cost estimate for Sites F, G, H, I recreation features (FY18 dollars).....	F-7
Table F-4. Summary of planning-level cost estimates for all recreation features (FY18 dollars), rounded.	F-7
Table F-5. Guidelines for assigning points for general recreation.	F-8
Table F-6. Unit Day Value (UDV) point conversion.	F-10
Table F-7. SCORP carrying capacity guidelines.	F-11
Table F-8. LOWRP recreation study area by county and SCORP region.	F-12
Table F-9. LOWRP recreation household participation estimation.	F-13
Table F-10. LOWRP recreation average daily visitation estimation.....	F-14
Table F-11. USACE certified cost estimate – benefit-to-cost summary (FY20 dollars).	F-15
Table F-12. USACE certified cost estimate – benefit-to-cost summary.	F-16

List of Figures

Figure F-1. Conceptual locations of the boat ramp, portages, and trail shelters at the spillway sites.	F-3
Figure F-2. Example of an articulated block boat ramp.	F-4
Figure F-3. LOWRP recreation study area.....	F-13

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F RECREATION PLAN

This appendix outlines the proposed recreation plan.

F.1 Authorization

The Comprehensive Everglades Restoration Plan (CERP), authorized in the Water Resources Development Act of 2000 (WRDA 2000), will involve modifying the Central and Southern Florida (C&SF) Project, which was constructed with extensive congressional authorizations from the 1944 Flood Control Act to the Water Resources Development Act of 1996. The Federal Water Project Recreation Act (P.L. 89-72) and the Water Resources Development Act of 1986 (P.L. 99-662) provide additional guidance. Further specific CERP design guidance was signed on May 12, 2000, in the form of the Department of the Army and South Florida Water Management District (SFWMD) Design Agreement for Everglades and South Florida Ecosystem Restoration Project.

Additional authorization and guidance for the proposed ancillary recreation resources development is contained in CECW-AG, 11 June 1998 Memorandum, Policy Guidance Letter No. 59, Recreation Development at Ecosystem Restoration Projects and EP 1165-2-502. Despite austere budgets and policy requirements, recreational developments can and do contribute to community health and well-being (CECW 1998). The recreation resources that are being proposed as part of the Lake Okeechobee Watershed Restoration Project (LOWRP) comply with the philosophy and inclusion of the CESAD-PD-J 15 SEP 2004 Memorandum, are economically justified, and fall within the ten percent rule.

Additional supporting documentation for public access and recreational opportunities is found in the Presidential Memorandum - America's Great Outdoors (April 2010) and the subsequent report published jointly by the major federal land management agencies, America's Great Outdoors Report (February 2011). The documents recommend that land managers maintain or improve public access and recreational opportunities on government-owned lands and waters.

F.2 Introduction

This appendix contains a description of the conceptual recreation plan that is being proposed for the LOWRP at multiple sites in the wetland attenuation feature (WAF) and wetlands along the Kissimmee River. This analysis will determine the net benefits for the recreation sites proposed within the Recommended Plan features. Recreation features are being included in the LOWRP as an incidental project benefit and were not used in the justification of the Recommended Plan. Due to the incidental effect of the recreation elements, a determination of acceptable design to meet U.S. Army Corps of Engineers (USACE) standards has not been completed during the study phase. For the preliminary analysis, planning-level recreation feature construction costs by site were developed, amounting to \$ 1,987,700 in fiscal year (FY) 2018 dollars.

In accordance with Engineering Regulation (ER) 1105-2-100, the recreation feature benefit-to-cost ratio analysis was based on costs provided in the LOWRP Total Project Cost Estimate certified by the Walla Walla Cost Engineering Center of Expertise in April 2019. The USACE certified estimate of LOWRP recreation features calculates costs at \$2,669,000 in FY20 dollars. Recreation Planning, Engineering, and Design (PED) and Construction Management (CM) costs were estimated by contract based on the proportions of recreation feature construction costs out of total construction costs, which were applied

to each contract's total PED and CM costs and then summed. Using this method, total project recreation PED and CM are estimated to be \$425,830 and \$270,369, respectively, in FY20 dollars.

The adjacent Lake Okeechobee, Kissimmee River, and Water Management Areas currently receive visitors from all over the state and nation. The LOWRP will experience increased visitation rates through its geographic proximity to these areas and due to the large public interest in resource-based outdoor recreation opportunities.

The proposed features of the LOWRP recreation plan will not require additional real estate acquisition. All features will be compatible with the environmental purposes of the project and may increase socioeconomic benefits being generated by the project. The activities that will be permitted in the project include bicycle riding, nature study, wildlife viewing, walking, hiking, boating, canoeing, kayaking, fishing, and hunting. These activities are all well suited to the environmental purposes of the project.

The LOWRP provides two major features for recreation. The levee top around the WAF would provide approximately 33 miles of trails that will form 3 loops using the internal embankments. The wetland areas will offer approximately 26 river miles accessible by small boats from the C-38 canal or the WAF. Small boat portage sites will serve as levee trail features and enhance the boat connections between the wetland areas, WAF, and adjacent waterways. The levees will provide many recreational activities to include in Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP).

The recreation appendix considers the planned structures with levees and strives to maintain existing access. The new structures envisioned will accommodate public access across these features or provide a means to reach the same destinations as much as reasonably possible. While these structure types may change in future designs, access across or a reasonable route will be maintained to the extent possible.

F.3 Benefit Categories

This section outlines the benefit categories.

F.3.1 Study Area

The 2013 Florida SCORP divides the state into eight planning regions to assess the demand and need for outdoor recreation. In south Florida, four of these regions essentially meet on the shores of Lake Okeechobee and the Kissimmee River. This project will serve the needs of these four regions, including the region identified to have the greatest need for outdoor recreation opportunities. User-oriented recreation activity deficits identified by the SCORP for these regions include multiple resource-based outdoor activities. The population growth of south Florida will only add to the existing recreation deficits.

Figure F-3 provides the conceptual locations for the proposed LOWRP recreational features. Approximately 33 miles of levee would provide access for biking, hiking, jogging, hunting, fishing, nature study, and wildlife viewing. Approximately 26 additional river miles would wind through the connected wetlands. National recreation trends of walking, paddle sports, and wildlife-related recreational activities could also be accommodated.

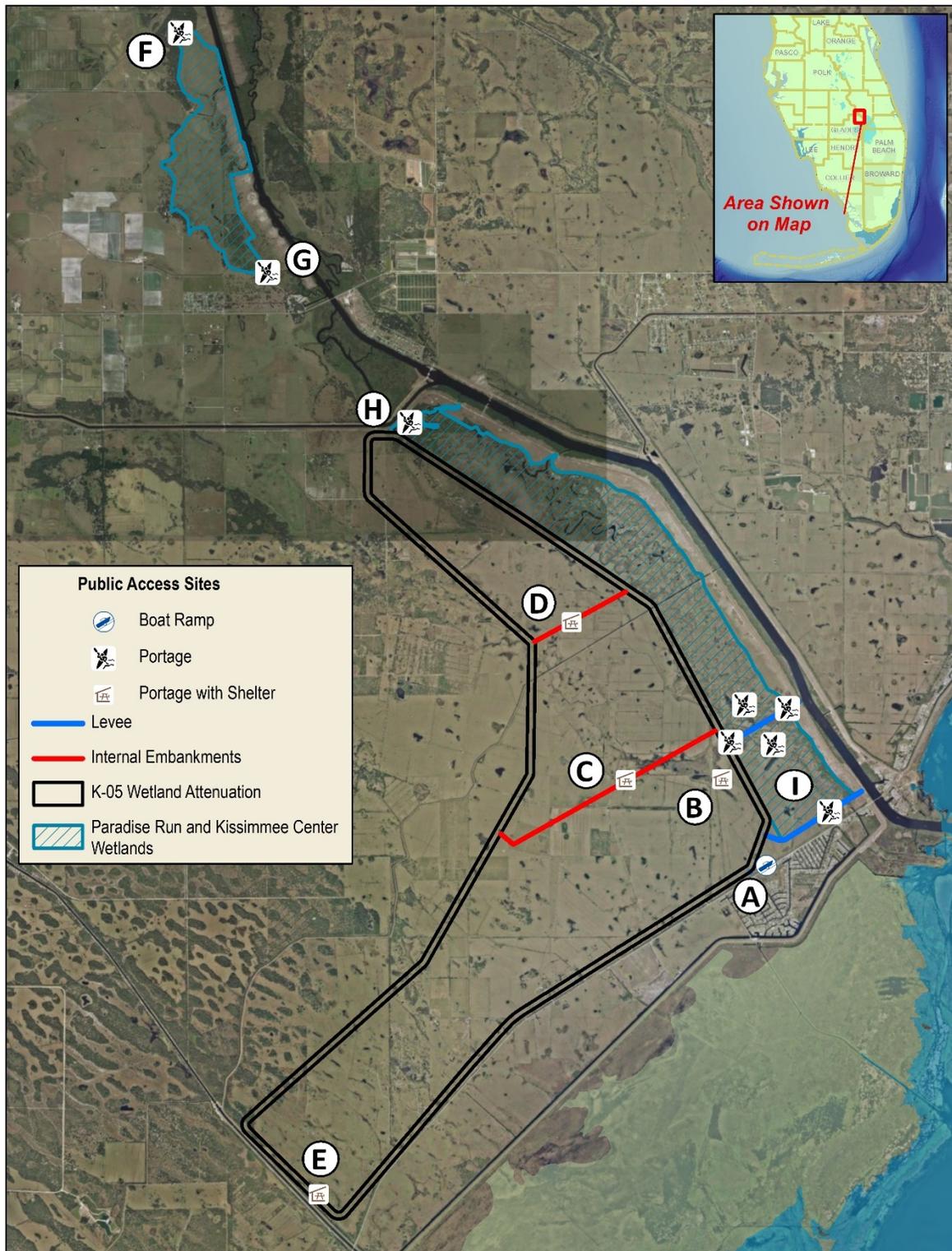


Figure F-1. Conceptual locations of the boat ramp, portages, and trail shelters at the spillway sites.

The WAF will have a boat ramp capable of serving motorized and non-motorized boats to enter the south cell. An example of a typical articulated block boat ramp is shown in **Figure F-2**. It would be accessed by vehicle ramps up the levee with limited parking at crest elevation and sufficient parking near, but not at the crest elevation of the levee. During design, areas will be identified for potential additional public parking that could be expanded outside the levees as necessary.



Figure F-2. Example of an articulated block boat ramp.

During project design, earthwork needed to provide the locations for public access facilities will be incorporated. Retaining construction staging areas and sharing boat ramps with staff are strategies used during project design to efficiently provide for recreation. These strategies are consistent with the planning approach in other restoration projects.

The recreation planning for the WAF and the wetlands would incorporate an adaptive management strategy to address the uncertainty regarding what vegetation will occur within the cells. The vegetation types and resulting wildlife that are found in different habitats greatly change the resource-based recreational interests. The project will also provide for blueways and greenways to circulate on the project levees and canals, and form connections between adjacent lands and water.

F.3.2 Site A Wetland Attenuation Feature Boat Ramp

Site A provides a point of access to the water for both staff and the public into the southernmost of the three WAF cells. Access to the site will be provided from highway SR-78. A 24-foot two-lane gravel road from an asphalt public road to the recreation facility is required. The boat ramp facility will also act as a trailhead to the levee for the multi-use trail, providing accessible parking at crest elevation and nearby public parking for vehicles and trailers. The perimeter of the parking area will have a board fence unless a perimeter is along a deep canal, where guardrail would be used. The parking surface will be shell rock or gravel and entrances to tops of levees will be controlled by standard vehicle gates and pedestrian pass-throughs. Other features include a dual-gender vault toilet, bike racks, an informational kiosk, and interpretive signage.

Site A may also serve as a boat and trail connection to the Paradise Run wetland feature for walk-in or small non-motorized boat access. Project design should not inhibit public access to circumnavigate the

impoundment levees as pedestrians. Structures and pumps will incorporate pedestrian bypass routes as much as possible. The recreation program will control access.

The WAF component is not envisioned to have motorboats per the shallow impoundment description in the SFWMD Recreation Management and Partnership Plan. Typical boats would be smaller non-motorized boats with the potential exception of allowing electric trolling motors. Locating the public boat ramp into the south cell would leave the two northern cells available via portages. The SFWMD would own fee title to this site. The planning-level costs for Site A recreation features are provided in **Table F-1**.

Table F-1. Planning-level cost estimate for Site A recreation features (FY18 dollars).

Feature	Quantity	Unit Cost	Total Cost
Vehicle/ Pedestrian Gate	3	\$5,000	\$15,000
Kiosk Shelter 12'x16'	2	\$30,000	\$60,000
Picnic Tables	4	\$500	\$2,000
Roofed Sign Board 4x4' and signs	2	\$2,000	\$4,000
Signs	1	\$2,000	\$2,000
Bike Rack	2	\$1,000	\$2,000
Vault Toilet, 2 gender	1	\$40,000	\$40,000
Improved Vehicle Access Road (Shell Rock/Gravel) up to 1/4 mile = 25'x2'x1320 = 2444 cubic yards	2,444 cy	\$20	\$48,880
Post and Board Fence	1000	\$20	\$20,000
Guard Rails in Parking Area	200	\$200	\$40,000
Boat Ramp	1	\$100,000	\$100,000
Fishing Pier	325 feet	\$700	\$227,500
Deceleration and left turn lanes			\$500,000
TOTAL			\$1,061,380

F.3.3 Sites B, C, D, E Wetland Attenuation Feature, Spillway, Portage, and Trail Shelter Sites

Sites B, C, D, and E would be accessible by hiking or biking on the levee of the WAF or by boat internally. Site B, C, and D will be located at a spillway of a cell and will incorporate facilities to support fishing. Site B will be closest to the public access in the south and will have a greater portion of the facilities. Site E is not a spillway site and will be just a portage. Three of these four sites (B, C, and D) will have fishing piers or platforms. Fishing piers or platforms will be coordinated with the designs of the spillway structure. The fishing features may be from the bridge deck, along the wing walls, or extending into WAF areas as feasible. It may be found during design that concrete walkways in certain portions of the area will be better than wood platforms. At Site B, the fishing platform may extend into the wetland area. Spillway structures are built with a high bike rail picket railing as a safety feature when the structure is in an area open to the public.

All sites will have boat portages, information kiosk shelters, bike racks, and picnic tables. This provides shelter from weather and a resting place. A staff boat ramp or airboat crossing may be requested by

Operations & Maintenance and, if located at a portage site, the Operations & Maintenance features may act as a substitute for the filled-cell articulated block portage features. The SFWMD would own fee title to these sites. The planning-level cost estimates for Site B, C, D, and E recreation features are provided in **Table F-2**.

Table F-2. Planning-level cost estimate for Site B, C, D, and E recreation features (FY18 dollars).

Feature	Quantity	Unit Cost	Total Cost
Kiosk Shelter 12'x16', Site (Quantity) B(2), C(1), D(1), E(1)	5	\$30,000	\$150,000
Picnic Tables, Site (Quantity) B(4), C(2), D(2), E(2)	10	\$500	\$5,000
Signs, all sites	4	\$2,000	\$8,000
Bike Racks, all sites	4	\$1,000	\$4,000
Small boat portage to cross levee, articulated filled block pathway on each side, all sites	4	\$10,000	\$40,000
Widen levee near spillway for shelters 10 feet high, 20 feet wide, 30 feet plus slope on ends = 444 cy X 4 (Sites B, C, D, and E)	1,776	\$20/CY	\$35,520
Linear feet of fishing pier or platforms (B 400'), (C 300'), (D 150')	850	\$700/ft	\$595,000
TOTAL			\$837,520

F.3.4 Sites F, G, H, I Wetland Portages at Structures

These portage will be sited during design to provide small boat access from the north to the south areas of both the Kissimmee River-Center and Paradise Run wetland features as reasonably feasible. This allows portages to be placed at appropriate locations depending on design decisions regarding operations, the structures designs, and actual locations. The culvert structures for portages are: Site G in southern Kissimmee River-Center at structure S-736, and Site I in southern Paradise Run at potentially all five structures (S-728, S-729, S-730, S-731, S-732). The pump stations for each wetland, Site F (S-735) in Kissimmee River-Center, and Site H (S-721) in the Paradise Run wetland are also potential portage locations. While kayak and canoe use would benefit from access in the north, pumps do not lend themselves well to small boat traffic. Portages should be located away from pump stations. Points near roads, the Kissimmee River, or along the WAF would facilitate an appropriate access point. Portages will be incorporated where acceptable to pump operations, yet useful to the public. No motorboat launch ramps are intended for these portage sites. The SFWMD would own fee title to these sites. The planning-level cost estimates for Sites F, G, H, and I recreation features are provided in **Table F-3**.

Table F-3. Planning-level cost estimate for Sites F, G, H, I recreation features (FY18 dollars).

Feature	Quantity	Unit Cost	Total Cost
Signage	8	\$1,000	\$8,000
Small boat portages to cross levee, articulated filled block pathway on each side, all sites	8	\$10,000	\$80,000
TOTAL			\$88,000

F.3.5 Total Planning-Level Construction Cost Estimate

The construction cost estimates for recreation features presented throughout **Section F.3** constitute a preliminary planning-level analysis conducted in coordination with SFWMD. These costs are totaled in **Table F-4**.

Table F-4. Summary of planning-level cost estimates for all recreation features (FY18 dollars), rounded.

Site	Cost
Site A Recreation Features	\$1,061,000
Site B, C, D, and E Recreation Features	\$838,000
Site H, I, J, and K Recreation Features	\$88,000
Total Planning-Level Construction Cost Estimate	\$1,987,000

In accordance with ER 1105-2-100, the recreation feature benefit-to-cost ratio analysis was based on costs provided in the LOWRP Total Project Cost Estimate certified by the Walla Walla Cost Engineering Center of Expertise in April 2019 (**Section F.6**).

F.4 Recreation Benefits

The national economic development (NED) benefit evaluation procedures contained in ER 1105-2-100 (22 Apr 2000), 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 UDV method was selected for estimating recreation benefits associated with the creation of the LOWRP. The UDV approach in recreation benefit analysis consists of two parts: determining value per visit and estimating visitation.

F.4.1 Determining Value per Visit

When the UDV method is used for economic evaluations, planners will select a specific value from the range of values provided annually. Application of the selected value to estimate annual use over the project life, in the context of the with- and without-project framework of analysis, provides the estimate of recreation benefits.

The future without project (FWO) condition in the Lake Okeechobee portion of this analysis has little recreation value since the lands inside the LOWRP WAF footprint are not open to the public. It is presumed that the impoundment would be open to the public in order to realize the recreation benefits being claimed. The FWO condition for the Paradise Run area does currently offer minimal recreational opportunities as a small and separated part of the Kissimmee River area. To capture additional recreation benefits from this project area we must look at existing visitation and subtract that from projected visitation claimed by the additional proposed recreation features. The future with project (FWP) condition will be the expected value of the recreational activity based on the UDV method.

Table F-5 illustrates the method of assigning a point rating to a particular 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.

Criteria	Judgment Factors				
Recreation experience (Total Points: 30)	Two general activities	Several general activities	Several general activities; one high quality value activity	Several general activities; more than one high quality activity	Numerous high quality value activities; some general activities
	0-4	5-10	11-16	17-23	24-30
Recreational Point Value Assigned: 21					
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
	0-3	4-6	7-10	11-14	15-18
Availability of Opportunity Point Value Assigned: 3					
Carrying capacity (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 activities
	0-2	3-5	6-8	9-11	12-14
Carrying Capacity Point Value Assigned: 7					
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
	0-3	4-6	7-10	11-14	15-18
Accessibility Point Value Assigned: 3					
Environmental (Total Points: 20)	Low aesthetic factors that significantly lower quality	Average aesthetic quality; factors exist that lower	Above average aesthetic quality; any limiting factors can be reasonably rectified	High aesthetic quality; no factors exist that lower quality	Outstanding aesthetic quality; no factors exist that lower quality

Criteria	Judgment Factors				
		quality to minor degree			
	0-2	3-6	7-10	11-15	16-20
Environmental Point Value Assigned: 10					
SUM OF ALL POINTS: 54					

Point value assignments shown above are based on Economic Guidance Memorandum (EGM) 19-03. The Criteria and Judgment Factors for General Recreation were specifically used as the basis of the estimated point values for the proposed recreation areas. Judgment factors were based on site visits and coordination with local agencies. The following selection factors were used for the criteria outlined in **Table F-5**.

The proposed LOWRP recreation features would provide several general activities that would be afforded by the project setting and the project levees. The proposed LOWRP site offers solitude and panoramic views in a growing metropolitan region and would provide specific recreation amenities (as outlined in **Table F-1**. Planning-level cost estimate for through **Table F-3**) for expanding local populations and increasing recreation demands. The environmental restoration component (dense marshlands, water storage and release) could help to provide an increase of quality freshwater boat and bank fishing for the region on project lands. The boat ramp, shelters, portages, fishing piers, and multi-purpose trail experiences would be enhanced by panoramic views and wildlife viewing opportunities.

The proposed recreation sites would provide several general recreation activities and more than one high quality activity. The perimeter to area ratio will provide excellent alligator hunting opportunities with anticipated catch rates similar to the stormwater treatment areas (STAs) where the access by vehicle exceeds that of using an airboat. The controlled water levels and presence of vegetation will provide ideal conditions for quality waterfowl hunting and bass fishing.

The availability of opportunity rating is based upon current local recreation facilities near the project area in the proposed recreation resource location. A 25-mile radius around the proposed project area includes the urban population of the town of Okeechobee and primarily agricultural lands and several Wildlife Management Areas. A 50-mile radius would include all of the urban areas on Lake Okeechobee, a portion of the US-27 urban corridor and a segment of the Florida east coast from Jupiter through Sebastian, more agricultural lands and several more Wildlife Management Areas, regional parks and greenways with similar resources occurring in the east urban setting. The proposed multi-use trail, freshwater bank fishing, boat launching and access from the Kissimmee River, and shelters and benches would provide unique opportunities in the proposed areas. The proposed recreation resources will help to provide facilities for current and projected statewide Central, Central East, Southeast, and Southwest regions identified in SCORP. There are similar recreation opportunities available within a one-hour travel time and a few within a 30-minute travel time.

The proposed LOWRP recreation resource carrying capacity values are based on the optimum use of the site potential, without overuse of the proposed recreation resources. Good water resources and access to them for boat and non-boat 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 resource or activity experience. Peak use is expected to occur during half of the calendar year.

The accessibility rating is based upon the availability of the local highways, roads, and streets in good condition that would provide access to the proposed recreation facilities. New access points will be developed for public and staff off SR-78 and SR-70; these would provide good access to the proposed sites. The levees would provide approximately 33 miles of good multi-use trail access on the wetland attenuation feature and within the wetlands. Project wetlands would provide approximately 26 river miles interconnected to the C-38 or accessible from the wetland attenuation feature levees via small boat portages.

The environmental quality rating is based upon the existing natural resources and aesthetic quality of the proposed project area. The proposed site of the wetland attenuation features possess poor aesthetic resources which would be dramatically improved with the LOWRP construction. These areas would provide panoramic views of open water and Everglades and Kissimmee River type landscape features. The best aesthetics of the proposed project areas are of views from the levee inward over the marsh lands within the wetland attenuation feature and wetlands connected to the Kissimmee River. Views from the LOWRP wetland attenuation feature levees to the north and west would be of the agricultural lands currently in cattle production.

The value of a day of general recreation at the proposed recreation sites for the LOWRP was determined 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 19-03, which is most-current as of the writing of this report. **Table F-6** was used to convert points to a UDV dollar value. Using linear interpolation, the total point value for the recreation sites was determined to be 54. The user day value conversion equivalent is \$9.11.

Table F-6. Unit Day Value (UDV) point conversion.

Point Values	General Recreation Values
0	\$4.14
10	\$4.92
20	\$5.44
30	\$6.21
40	\$7.77
50	\$8.80
60	\$9.58
70	\$10.10
80	\$11.13
90	\$11.91
100	\$12.43

F.4.2 Estimating Visitation

The State of Florida Department of Environmental Protection's Division of Recreation and Parks coordinated and developed the Florida SCORP in 2013 and prior years. The 2013 SCORP indicates low levels of service compared to other regions for all evaluated activities based on user participation surveys. Activities associated with lower levels of service associated proposed for LOWRP recreation activities are bicycling, hiking, nature study, and non-boat freshwater fishing. These low levels of service will likely continue as population is projected to increase in coming decades.

The Central, Central East, Southeast, and Southwest Regions share the shores of Lake Okeechobee and the Kissimmee River. These two resources draw the public from those regions. The LOWRP wetland attenuation feature would be a large inland body of freshwater marsh and the wetlands will be accessible from the Kissimmee River. Both project features are in an area of the state where Lake Okeechobee and the Kissimmee River are central to resource-based recreation.

The carrying capacity guidelines established by the SCORP of 2008 (**Table F-7**) were used to inform the visitation analysis. 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 LOWRP visitation rates were estimated to be substantially lower than the SCORP's published rates.

Table F-7. SCORP carrying capacity guidelines.

Activity	Units Provided	Maximum Area Requirements	Guidelines Capacity	Regions with Below Average levels of service
Hiking Unpaved Biking	33 miles of levee top	10-20 per mile	40-80 users per mile per day	Central Southeast
Boating (motorized & non)	26 river miles 20 canal miles 19 sq. miles of impoundment	1-2 users per boat	1-2 boats per square mile	Central Southwest Southeast
Nature Study	10 miles	5-20 groups per mile	40 -160 users per mile of trail/day	Central Southwest Southeast
Freshwater Bank Fishing	23,760 feet	10 linear feet of bank per person	5 linear feet of bank per user mile	Central Southwest Southeast

The use guidelines designated for biking, hiking, fishing, and nature study trails were based on carrying capacity guidelines adopted by the SCORP and used by the state park system. The bicycle trail use guidelines are 40-80 users per mile per day and assume 10–20 riders per mile per day with a daily turnover rate of 4. The use guideline for hiking trails is 4–20 hikers per mile per day with a daily turnover rate of 4. The LOWRP consists of approximately 33 miles of proposed levee top multi-purpose trails available for

use. These multi-purpose trails close to the community of Okeechobee will see use as urban exercising opportunities, as well as resource-based use. River miles were estimated as 1.75 times the line miles.

It is assumed that 10 linear feet of LOWRP wetland attenuation feature shoreline is required for each person fishing at any given time. It is assumed that this space will be used twice per day and therefore the use guideline was established at 5 linear feet per person per day. It is assumed that bank fishing would be most popular adjacent to the inflow and outflow structures gated structures. It is also assumed bank fishing would occur up to 1/4 mile away from the structures on either side. Nine such structures are relatively close to the trailheads totaling 4.5 miles (23,760 linear feet) of bank fishing associated with the LOWRP wetland attenuation feature and wetlands for benefit estimation purposes.

These activities are planned in the LOWRP Recreation Appendix because they are compatible with the project and there are greater state recreation deficits anticipated 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 LOWRP'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 groups directly bordering the project area (**Table F-8.** and **Figure F-3**).

Table F-8. LOWRP recreation study area by county and SCORP region.

	SCORP Region		
	Central	Southwest	Central East
LOWRP County	Highlands	Glades	Okeechobee
Census Block Groups	961500-1	1-1 1-2	910101-2 910602-1
Total Households	213	941	1,012

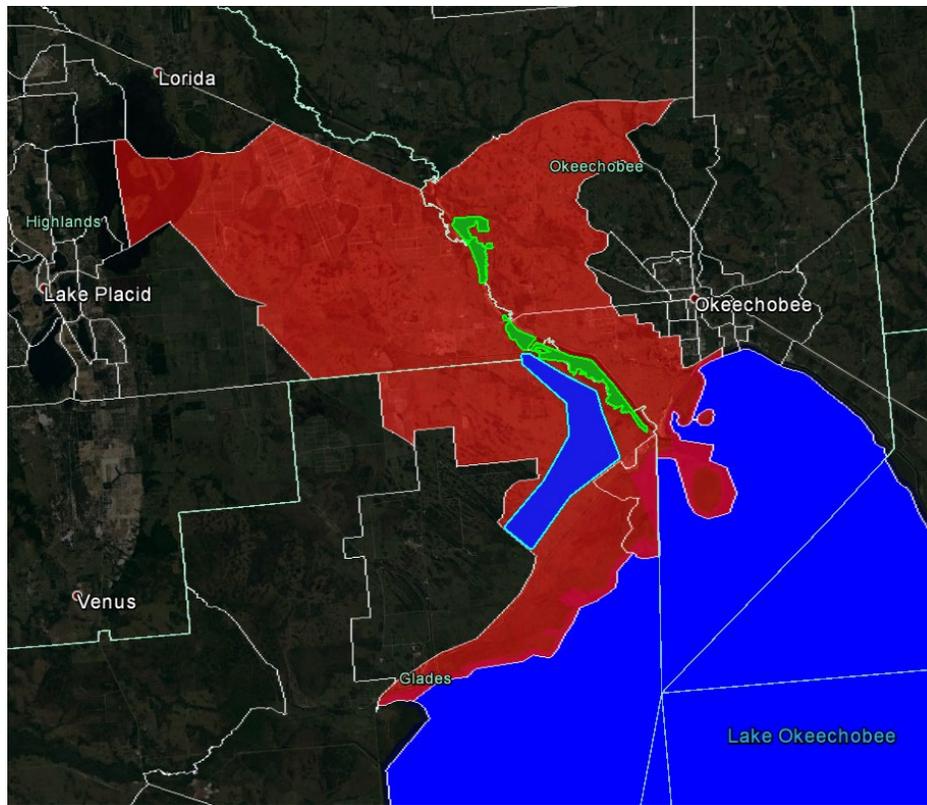


Figure F-3. LOWRP recreation study area.

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 LOWRP recreation study area to estimate the number of households participating in a given recreational activity per year (Table F-9).

Table F-9. LOWRP recreation household participation estimation.

	Household Participation in Recreational Activities in FL in Past 12 months by SCORP Region (Resident Survey Results)			Estimated Number LOWRP Recreation Study Area Households Participating per Year
	Central Region	Southwest Region	Central East Region	
Unpaved Bicycling	15.5%	13.2%	11.3%	271
Hiking	40%	39%	39%	847
Freshwater Boat Ramp	19%	13%	15%	315
Nature Study	25%	30%	31%	649
Freshwater Bank Fishing	19.5%	17.1%	21.1%	416
Canoe/Kayak/SUP	28%	32%	26%	624

- The mean SCORP statewide participation durations for households engaging in each respective activity were converted to yearly percentages. These yearly percentages were applied to the LOWRP estimated number households participating per year.
- Lacking individual-level participation data, the minimum number of participants that SCORP household data could represent was assumed. Converting at 1 person per household, this approach yields a total daily recreation participation of 134 persons (**Table F-10**).

Table F-10. LOWRP recreation average daily visitation estimation.

	Mean Days of Participation (FL Households with Participation > 0)	Percent of Year Participating (FL Households with Participation > 0)	Estimated LOWRP Average Daily Participation
Unpaved Bicycling	40.1	11.01%	30
Hiking	16	4.39%	37
Freshwater Boat Ramp	14	3.84%	12
Nature Study	13.9	3.82%	25
Freshwater Bank Fishing	12.8	3.51%	15
Canoe/Kayak/SUP	9.3	2.55%	16
TOTAL			134

The projected usage rates follow the resource needs and guidelines published by the SCORP, but in every case rates were estimated to be substantially lower than the SCORP's published rates. It is also anticipated that the water-based recreation opportunities could be reduced during the dry periods, and only several miles on either side of access points will be utilized to their potential. This the most practical scenario for justifying the proposed recreation features for the LOWRP.

F.5 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 ancillary recreation project component can be determined by comparing the equivalent average annual charges (facility costs) against the estimate of the equivalent average annual benefits, which would be realized over the period of analysis (project lifespan). These average annual recreation benefits and costs are summarized in **Table F-11**.

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 regulation were observed in preparing this cost analysis. The construction cost estimates for recreation features presented throughout **Section F.3** of this appendix constitute a preliminary planning-level analysis conducted in coordination with SFWMD. In accordance with ER 1105-2-100, the recreation feature benefit-to-cost ratio analysis will be based on costs provided in the LOWRP Total Project Cost Estimate certified by the Walla Walla Cost Engineering Center of Expertise in April 2019. Costs are presented at the FY20 price level. The federally mandated FY20 project evaluation interest rate of 2.75 percent was applied over a 50 year period of analysis. The results of this analysis are compared against the project recreation benefits (**Section F.4**) in **Table F-11**.

Table F-11. USACE certified cost estimate – benefit-to-cost summary (FY20 dollars).

Total Project Recreation Features (FY20 dollars)	
Construction	\$2,669,000
Lands & Damages	\$0
PED*	\$425,830
Construction Management**	\$270,369
Interest During Construction***	\$349,187
Total Investment	\$3,714,386
Amortized	\$137,584
OMRR&R	\$65,000
Average Annual Cost	\$202,584
Unit Day Value	\$9.11
Average Daily Users	134
Average Annual Users	48,990
Average Annual Benefits	\$446,301
Benefit to Cost Ratio	2.2
Net Annual Benefits	\$256,651

* Recreation Planning, Engineering, and Design (PED) costs presented here constitute estimate external to Total Project Cost Sheet. The proportion of total project recreation construction cost out of total project construction cost is applied to total project PED cost to estimate total project recreation Construction Management (CM) cost.

**Recreation CM costs presented here constitute estimate external to Total Project Cost Sheet. The proportion of total project recreation construction cost out of total project construction cost is applied to total project CM cost to estimate total project recreation CM cost.

***Recreation Interest During Construction (IDC) was calculated by contract and summed. Contract-by-contract recreation CM and recreation PED costs estimated using the methodology described above, substituting total project construction costs for contract-by-contract project construction costs and total project recreation construction costs for contract-by-contract project recreation costs as applicable. IDC calculated over the following Rough Order of Magnitude (ROM) schedule estimates by feature site and Civil Works Sub-Feature Description: C&CM (Paradise Run & Kissimmee River-Center - 12 months; WAF – 96 months) and PED (Paradise Run & Kissimmee River Center – 24 months; WAF – 48 months)

This analysis concludes that the Recommended Plan (Alternative 1BWR) incidental NED total project recreation features (TPCS contracts 6, 7, 8a) benefit to cost ratio is 2.4. FY20 average annual recreation NED benefits of \$446,301 and average annual costs of \$189,650 amount to net annual benefits of \$256,651 over a fifty-year period of analysis.

F.6 Sensitivity Analysis

A sensitivity analysis was conducted to further reinforce expected benefits and provide extra support for the justification of recreation features. **Table F-12** presents a sensitivity analysis which contains the expected average annual benefits from the above table and a worst-case scenario depicting the minimum number of annual visitors required for benefits to equal costs.

Table F-12. USACE certified cost estimate – benefit-to-cost summary.

Scenario	Annual Users	Average Daily Users	Annual Benefit
Projected	48,990	134	\$446,301
Minimum to match AAE Costs	22,238	61	\$0

A minimum average rate of 615 users per day would be required to generate enough average annual benefits justify the proposed costs for recreation.