SEMINOLE TRIBE OF FLORIDA

CHERISE MAPLES
Environmental Resource Management Department Director

6365 Taft Street, Suite 3008
HOLLYWOOD, FLORIDA 33024
PHONE (954) 965-4380 x10632
E-MAIL: cmaples@semtribe.com

WEBSITE: http://www.seminoletribe.com

MEMORANDUM

TO: **Ingrid Bond, Project Manager Forward, Herbert Hoover Dike Project**

FROM: **Kathryn Colbert, Environmental Protection Specialist III**

RE: **HP2 and HP3 replacement, Brighton Reservation**

DATE: **February 12, 2015**

In accordance with Tribal development policies, procedures, ordinances and regulations, ERMD has reviewed the referenced project for environmental compliance. This permit is in response to your inquiries regarding the replacement and realignment per the attached plans of the HP2 and HP3 culvert structures. The replacement structures will consist of installing a 7-foot by 7-foot gated culvert, approximately 98 feet long. The embankment levee will be reconstructed to a reduced elevation of 32 feet (from 36 feet). Rip Rap will be installed along the lakeside embankment face and a control building will be installed at the landside work platform. The work includes demolition and removal of the existing culvert and construction of a new, in-kind water control structure S-287 and S-286. The demolition and construction required the installation of a cofferdam, either sheet pile or earthen, or a combination thereof, at the entrance channels of the culvert in order to dewater the construction site. The structure will include cast-in place reinforced concreate foundation, a culvert barrel, and headwalls. A combination flap/slide gate will be installed at the lakeside headwall structure. An Environmental Assessment was completed for this project by the Army corps of engineers and is attached to this document. Based on the project details, ERMD has compiled this Environmental Compliance Review package to include the necessary environmental reviews and backup documentation noted in the following checklist. This concludes the environmental review process and work may proceed in accordance with conditions and mitigation measures listed below, and as referenced in the attached clearance documents. This document shall be given to all personnel conducting work on the site.

Please note that 7-10 days prior to the commencement of construction the ERMD Inspector must be notified with a project schedule and details for the project “kick off” meeting. Please forward all project details to ERMDRequest@semtribe.com At this time the STOF Public Works Department must also be contacted at digpublicworks@semtribe.com to ensure that all existing utilities are located and cleared before any ground disturbance occurs.

If changes in the project, scope of work, or location occur please contact ERMD for additional assistance.

KC:kc

Cc: File, Cherise Maples, ERMD Director

Attachments:
Environmental Compliance Review Checklist
Army Corps of Engineers Environmental Assessment
THPO Clearance
Threatened and Endangered Species Review
ERMD Wetland Memorandum
Seminole Water Commission Permit
Care Control and Diversion Plan for HP2 and HP3
Dewatering Plan
Brochure: How do I apply for a NPDES Permit?

ENVIRONMENTAL COMPLIANCE REVIEW CHECKLIST

Required Documentation

A. National Environmental Policy Act (NEPA)

☑ Required ☐ Not Required

☐ Categorical Exclusion
☒ Environmental Assessment

Conditions:

- The NEPA documentation was completed by the Army Corp of Engineers.

B. Historical Preservation Act – Section 106 (THPO)

☑ Required ☐ Not Required

THPO Project #: 2014-006

☒ Cleared – No archeological sites within the Area of Potential Effect (APE)
☐ Not Cleared – Archeological Site found within the Area of Potential Effect.

Conditions:
If an inadvertent discovery of archeological materials or human remains is made, all work should stop and the discovery must be reported to THPO. In the case of human remains please notify the Seminole Police Department immediately, then call the Office of the THPO.

C. Endangered Species Act – Section

☑ Required ☐ Not Required

☐ Cleared – No listed species and/or designated critical habitat is present in APE
☒ Cleared – Listed species and/or designated habitat is present in the APE but appropriate mitigation measures have been obtained. Consultation Code: 41420-2011-CPA-0095 (USACOE)
☐ Not Cleared – Listed species and/or designated habitat is present in the APE and the project cannot proceed without additional work.

Conditions:
All personnel involved in the site preparation and construction will be required to participate in the Tribe's Standard Wildlife Education measures which include but are not limited to watching a wildlife information video, having species brochures on hand during construction and complying with all guidelines identified in the video and brochures.

Audubon's Crested Caracara
The proposed project is within a secondary nesting zone. The US Fish and Wildlife Service (USFWS) determined that the area had been properly surveyed in the 2013/2014 survey season and ERMD will continue surveying in the 2014/2015 nesting season. Since the project may produce noise above ambient levels, the Corps is required to use mufflers and sounds dampening equipment during construction. As caracara nests move every nesting season, please contact ERMD just prior to construction to obtain the newest nesting data.

Eastern Indigo Snake

The eastern indigo snake is federally listed as a threatened species under the ESA. Frequently associated with gopher tortoise burrows, the indigo snake may inhabit a variety of habitats in southern Florida. The survey of the project area identified suitable underground refuge for eastern indigo snake utilization. The Corps is required to conduct preconstruction survey prior to construction and must have monitors on site during all phases of construction. The construction crew must be educated on identifying indigo snakes and precautions to prevent impacts to the indigo snake. On site gopher tortoise burrows will be protected during construction. The ERMD requires that Standard Protection measures for the eastern indigo snake are used during site preparation and project construction.

STANDARD PROTECTION MEASURES

The Seminole Tribe of Florida is required by the Federal Endangered Species Act to abide by standard measures adopted to protect this endangered snake:

1. An Eastern indigo snake protection/education plan has been developed which requires training for all construction crews.
2. A qualified observer/biologist will be on-site for notification by construction personnel if a potential indigo snake is sighted.
3. If an indigo snake is found on the construction site, all activity must cease immediately, the qualified observer must be notified, and the snake allowed to move away from any dangerous area on its own.

Wood Stork

Wood Storks are large wading birds which inhabit wetland habitats within Florida. Wood Storks forage in a wide variety of wetland types where prey are available to them and the water is shallow enough and open enough to easily hunt.

The Corp is required to conduct preconstruction surveys prior to any work. Since the project may product noise above ambient levels, the Corps is required to use mufflers and sound dampening equipment during construction. Wood Storks must be monitored during nesting season from January to June.

Everglades Snail Kite

Snail Kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes where apple snails can be found. Snail Kites require foraging areas relatively clear and open in order to visually search of apple snails. The breeding season in Florida varies widely from year to year in relation to rainfall and water levels. Ninety-eight percent of the nesting attempts are initiated from December through July.

The Corps will monitor snail kites during nesting season from January to June. A 1640 foot buffer zone will be established around active nests.

☑ Required ☐ Not Required

D. Wetlands

☒ Cleared – No wetlands identified within project APE
☐ Cleared – Wetlands identified with project APE but appropriate mitigation or avoidance has been conducted. Permit #: _____
☐ Not Cleared – Wetlands have been identified within the APE and the project cannot proceed without additional work.

Conditions:
Silt fence is required as the attached specifications to prohibit sediment runoff into waters of the US from associated construction activities. Construction activities require a 200 foot set back from wet detention ponds and a 15 foot minimum to 25 foot average set back from wetlands. Implementation of best management practices is required to minimize the adverse impact of soil erosion and sedimentation to the downstream water bodies. Construction sites are to establish maintenance areas for activities, which are capable of causing migration of pollutants, away from water bodies. Such activities are fuel and maintenance staging areas, mixing areas for pesticides, herbicides and fertilizers. Effective minimization and control of erosion surrounding water bodies are ensured by scheduling grading and construction activities to minimize soil exposure, retaining existing vegetation when applicable, stabilization immediately following final grading (mulching, vegetating, and sodding), controlling runoff and erosion, installation of sediment traps (silt fences, turbidity curtains, perimeter dikes, and inlet protections), and regular inspections of the implemented control measures.

E. National Pollutant Discharge Elimination System ☑ Required ☐ Not Required

☒ Notice of Intent (NOI) under Construction General Permit
☐ Individual NPDES permit

Conditions:
Construction contractor is required to file a NOI for the NPDES Permit to the EPA (see attached brochure for more information). The ERMD requires a copy of the NOI and receipt from the EPA for construction to proceed. The contractor is responsible for providing the appropriate 14 day notice of construction as required by permit.

F. Seminole Water Commission ☑ Required ☐ Not Required

☐ Well Construction\Abandonment Permit Required [*Permit #:*_____]
☒ Storm Water Management Permit Required
☒ Seminole Water Commission
Permit #: ERMD-14-082 *Approval Date:* 7/24/2014

Conditions:
Permits issued by the Seminole Water Commission are subject to the following requirements and impose the following conditions as fully identified in the Tribal Water Code of the Seminole Tribe of Florida, Subtitle A, Beneficial Use and Conservation of Water Resources:

- The Commission may impose conditions on any permit, to assure that the proposed activity is consistent with the overall objectives of this Code and will not harm the water or water resources of the reservation or Tribal Trust Land.
- Employees of the Department area authorized to enter the site of any permitted activity to inspect, monitor or enforce permit conditions.
- A permit issued under this Code constitutes a tribal license to use, drain or divert water, subject to all conditions of the permit and the provisions of this Code. Such permit does not convey any ownership interest in the water or water resources of the Tribe.
- Any permit issued under the provisions of this Code may be revoked by the Commission, on the recommendation of the Director, on the following conditions:

- The commission finds that the permittee has violated the provisions of this Code, the Compact or the Manual; or
- The Commission finds that the permittee has violated or failed to comply with the conditions of this permit: or
- The permit is in force, but the Commission finds that the permittee has not proceeded in a timely fashion to construct facilities authorized under the terms of the permit, if required, and more than one year has elapsed since the permit was issued.

- Applications to modify any activity licensed under this Code may be made by letter to the Department, providing sufficient information so that the Director may determine that the modification does not:
  - Substantially alter the permitted activity:
  - Increase the authorized off site discharge;
  - Alter the environmental features of the project;
  - Decrease the required flood control elevations for roads or buildings;
  - Decrease the required retention/detention; or
  - Decrease the pollution removal efficiency.

G. Spill Prevention Control & Countermeasure (SPCC) ☐ Required ☑ Not Required

☐ Self-Certified SPCC Plan (< 10,000 gallons)
☐ PE sealed SPCC Plan (> 10,000 gallons)

Conditions:
If petroleum (gas, diesel, oils, etc.) storage including tanks or drums (55 gallons or greater) is greater than 1320 gallons an SPCC plan will be required and must be submitted to ERMD prior to the start of the project.

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA
AH-TAH-THI-KI MUSEUM

30290 JOSIE BILLIE HWY
PMB 1004
CLEWISTON, FL 33440

PHONE: (863) 983-6549
FAX: (863) 902-1117

June 17, 2014

Maureen Mahoney, M.A., R.P.A.
Tribal Archaeologist
Seminole Tribe of Florida

Re: HP 2 & HP3, Brighton Reservation, THPO# 2014-006.

Dear Ms. Mahoney:

As of October 3, 2006, the Tribal Historic Preservation Officer (THPO) of the Seminole Tribe of Florida (STOF) has assumed duties previously performed by the State Historic Preservation Officer (SHPO) in reviewing projects occurring on STOF tribal lands for compliance with section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and implementing regulations issued by the Advisory Council on Historic Preservation (36 C.F.R. part 800). This assumption of duties is recorded in a "Memorandum of Agreement Between the Seminole Tribe of Florida and the National Park Service Relating to the Implementation of a Historic Preservation Plan on Tribal Lands" and is authorized by Tribal Council Resolution No.C-280-06. Accordingly, the THPO has reviewed the project referenced above for compliance with the National Historic Preservation Act section 106 and the implementing regulations.

The THPO has reviewed your report and concurs with your determination 1) that there will be no historic properties affected (36CFR 800.4(d) (1)) because none are present within the surveyed Area of Potential Effect (APE) and 2) no cultural resource affected under the STOF Cultural Resource Ordinance. This clearance applies to the area of potential effects (APE) as described. Should that change a new survey may be required.

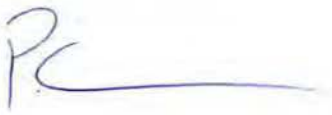
If an inadvertent discovery of archaeological materials or human remains is made, all work should stop and the discovery must be reported to the THPO. Archaeological resources located on Indian lands are subject to the provisions of the Archaeological Resources Protection Act (16 U.S.C. §469aa et seq.), and the unauthorized excavation of, or damage to, archaeological resources may be subject to criminal or civil penalties.

Native American human remains and cultural items on tribal lands are subject to the Native American Graves Protection and Repatriation Act (25 U.S.C. § 3013 et seq.), and such items may not be removed from the ground except in accordance with that federal law. In the case of human remains please notify the Seminole Police Department immediately, then call the Office of the THPO.

A copy of this clearance will be posted in the "public folders" section of "Outlook", under "Public THPO".

If you have any question about these or other projects please feel free to contact me at 863-983-6549 (work) or 863-228-3793 (cell); or email me at paulbackhouse@semtribe.com

With consideration,



Paul N. Backhouse, Ph.D.
Tribal Historic Preservation Officer
Seminole Tribe of Florida

Seminole Tribe of Florida

HP2 and HP3 (THPO Project Number 2014-006)

Brighton Seminole Indian Reservation, Glades County, Florida

HP2 and HP3 APE

Roads & Streets

Brighton Boundary

Coordinate System: UTM Zone 17N
Datum: North American 1983

Data Source:
Base Map Data, STOF-GIS Dept. [2014]
[1940] Aerial Imagery,
STOF-GIS Department [2014]

Created By:
Seminole Tribe of Florida
Tribal Historic Preservation Office
Tribal Archaeology Section
Matthew G. Fenno

Map Date:
March 12, 2014

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SEMINOLE TRIBE OF FLORIDA

Cherise Maples
Environmental Resource Management Department Director

6300 STIRLING ROAD
HOLLYWOOD, FLORIDA 33024
PHONE (954) 965-4380
FAX (954) 962-8727
E-MAIL: cmaples@semtribe.com
WEBSITE:
http://www.semtribe.com

MEMORANDUM

TO: **Kathryn Colbert, Environmental Protection Specialist III**

FROM: **Pauline Haas, Wildlife Biologist**

RE: **Wildlife Findings and Recommendations for (ERMD-14-082) HP2 and HP3 Culvert Replacement in Brighton**

DATE: **February 4, 2015**

CC: **FILE, Whitney Sapienza, Environmental Protection Specialist III**

This memorandum is in response to your inquiry on potential impacts to federally listed wildlife as a result of the replacement of the HP-2/HP-3 culverts on the C-41 Canal. The proposed project is located west of the Reservation Road near the Reservation boundary within the Brighton Reservation Glades County (Township 40 S, Range 32 E, Section 01) (Map A).

The Endangered Species Act of 1973 (ESA) requires that all federal actions conduct Section 7 Consultation to assess potential impacts to any federally listed species and/or critical habitat as defined in 50 CFR §402.02. The Environmental Resource Management Department's (ERMD) wildlife staff has reviewed the proposed project and found that it will be classified as federal action and therefore requires Section 7 Consultation. The U.S. Army Corps of Engineers (USACOE) Requested consultation with the U.S. Fish and Wildlife Service (Service) and received a concurrence letter (Consultation Code: 41420-2011-CPA-0095) on February 10th, 2011 which fulfills the requirements for a Section 7 of the Act and no further action is required.

The project will involve approval for the replacement of culvert HP-2/HP-3 with an in-kind structure to be renamed S-286 at the existing location of HP-2/HP-3 respectively and will consist of one, 7-foot by 7-foot gated culvert, approximately 98 feet long. The embankment levee will be reconstructed to a reduced elevation of 32 feet from the existing crest elevation of 36 feet. Riprap will be installed along the lakeside embankment face and a control building will be installed at the landside work platform. All construction work will take place within the Federal Right of Way.

The Corps has developed conservation measures and is responsible for minimizing and mitigating potential adverse effects on the following listed species.

Audubon's crested caracara *(Polyborus plancus audubonii)*

Audubon's crested caracara is federally listed as a threatened species under the ESA. This species prefers to nest in cabbage palms (*Sabal palmetto*) that occur in improved to semi-improved pasture habitat with low density of tall or shrubby vegetation[1].

Caracara surveys within BRSIR are conducted semiweekly by ERMD staff. Surveys commence in November and end in May, or when all caracara juveniles have fledged from known nests. The proposed project is within a secondary nesting zone (Map B). ERMD will continue to survey these areas in the 2014/2015 survey season and will report any new nests in the area if they occur. Since the project may produce noise above ambient levels, the Corps is required to use mufflers and sound dampening equipment during construction. Caracara must be monitored during the nesting season from January to May. Based on this information the service recommends a *may affect, not likely to adversely affect* finding for the Audubon's crested caracara.

Eastern indigo snake *(Drymarchon corais couperi)*

The eastern indigo snake is federally listed as a threatened species under the ESA. Although most frequently associated with gopher tortoise (*Gopherus polyphemus*) burrows, the indigo snake may inhabit a variety of habitats in southern Florida, with or without gopher tortoise presence, provided the habitat is relatively undeveloped and provides adequate underground refuge[2] [3].

The Corps is required to conduct a preconstruction survey prior to construction and must have monitors on site during all phases of construction. The construction crew must be educated on identifying indigo snakes and precautions to prevent impacts to the indigo snake. On site gopher tortoise burrows will be protected during the construction. Based on this information, the Service recommends a *may affect, not likely to adversely affect* finding for the eastern indigo snake provided the Services' "Standard Protection Measures for the Eastern Indigo Snake" and recommended monitoring methods are used during project site preparation and project construction.

Wood Stork (*Mycteria americana*)

Wood storks are a large wading bird which inhabits wetland habitats within Florida. This bird was listed and endangered under the Endangered Species Act in 1984. Wood storks nest colonially, often in conjunction with other wading bird species, and generally occupy the large-diameter trees at a colony site[4]. Wood storks forage in a wide variety of wetland types, where prey are available to storks and the water is shallow and open enough to hunt successfully[5].

The Corps is required to conduct pre construction survey prior to any work. Since the project may produce noise above ambient levels, the Corps is required to use mufflers and sound dampening equipment during construction. Wood storks must be monitored during the nesting season from January to June. Based on this information, the Service recommends a *may affect, not likely to adversely affect* determination.

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[1] Humphrey, S.R. and J.L. Morrison. 1997. Habitat associations, reproduction and foraging ecology of the Audubon's crested caracara in south-central Florida. Final report to Florida Game and Fresh Water Fish Commission for Project No. NG91-007. Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.

[2] Kuntz, G.C. 1977. Endangered species: Florida Indigo. Florida Naturalist: 15-19.

[3] Layne, J.N., and T.M. Steiner. 1996. Eastern indigo snake (*Drymarchon corais couperi*): summary of research conducted on Archbold Biological Station. Report prepared under Order 43910-6-0134 to the U.S. Fish and Wildlife Service; Jackson, Mississippi.

[4] Rodgers, J.A., Jr., S.T. Schwikert, and A. Shapiro-Wenner. 1996. Nesting habitat of wood storks in north and central Florida, USA. Colonial Waterbirds 19(1):1-21.

[5] Ogden, J.C. and S.A. Nesbitt. 1978. Recent wood stork population trends in the United States. Wilson Bulletin. 91(4): 512-523.

Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*)

A subspecies of the everglades snail kite was listed as endangered pursuant to the Endangered Species Act in 1967. Critical habitat for the Everglade snail kite was designated in 1977[6]. Snail kite habitat consists of freshwater marshes and the shallow vegetated edges of lakes (natural and manmade) where apple snails can be found. Snail kites require foraging areas relatively clear and open in order to visually search for apple snails. Therefore, dense growth of herbaceous or woody vegetation is not conducive to efficient snail kite foraging or for apple snails. The breeding season in Florida varies widely from year to year in relation to rainfall and water levels. Ninety-eight percent of the nesting attempts are initiated from December through July[7].

The Corps will monitor snail kites during the nesting season from January to June. A 1640ft buffer zone will be established around active nests. Based on this information the Service recommends a *may affect, not likely to adversely affect* determination.

Additionally, ERMD recommends any personnel involved in the project watch a Best Management Practices video for wildlife and have wildlife brochures on hand during construction. The video and brochures are available from ERMD upon request.

Should you have any questions at all regarding this matter or to obtain additional educational material, please do not hesitate to contact me at extension 13411. Thank you.

Sincerely,

Pauline Haas, Wildlife Biologist
Seminole Tribe of Florida
Environmental Resource Management Department

PH:ph

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[6] U.S. Fish and Wildlife Service. 1977. Federal Register for Determination of Critical Habitat for Six Endangered Species. Vol. 42 No. 155.

[7] Sykes, P.W., Jr. 1987a. The feeding habits of the snail kite in Florida, USA. Colonial Waterbirds 10(1):84-92.

Map A


BULL PROJECT RD
RESERVATION RD
Map Legend
USACOE_HP2_HP3
Reservation Boundary
Brighton Reservation
HP2 and HP3 culvert replacement
Print Date

WHAT ARE THE STANDARD PROTECTION MEASURES THAT ARE REQUIRED?

The Seminole Tribe of Florida is required by the Federal Endangered Species Act to abide by standard measures adopted to protect this endangered falcon:

1. A caracara protection/education plan has been developed which requires training for all construction crews.

2. A qualified observer/biologist will be on- site for notification by construction personnel if a caracara is sighted.

3. If a caracara is found on the construction site, all activity must cease immediately, the qualified observer must be notified, and the bird allowed to move away from any dangerous area on its own.

WHO DO YOU CONTACT IF YOU SEE A CARACARA ?

CONTACT YOUR DIRECT SUPERVISOR

You may also contact::

Seminole Tribe of Florida's
Wildlife Biologist
Office: (863)902-3200 x13411
Cell: (954)410-7073
Email: ermdwildlife@semtribe.com

Seminole Tribe of Florida
Environmental Resource Management Department

Audubon's Crested Caracara

Protecting Tribal Resources

WHAT IS A CARCARA?

The caracara is the most terrestrial bird in the falcon group. It spends a great deal of time on the ground.

It prefers open habitats, typically grassland, prairie, or pastures with scattered taller trees, particularly cabbage palms, to nest in. May use sparsely wooded areas and brushland if patches of trees are interspersed with expanses of open grassland.

Caracaras usually feed on carrion (dead animals) but they will take advantage of any food opportunity. Caracaras also hunt live food on the ground or take food from other birds.

CARACARAS ARE LISTED AS A THREATENED SPECIES FEDERALLY AND BY THE STATE OF FLORIDA

HOW CAN YOU IDENTIFY A CARACARA?

* Males and females look the same

Immature (left):

- Brown back
- Pale buff neck and throat
- Pale breast streaked with dark brown

Adult (right):

- Black back and belly
- Breast and upper back marked by fine, dark bars
- Black cap with slight crest at rear of head
- White tail with black barring and thick terminal band
- Long yellow legs
- Long neck, especially apparent in flight
- Medium-sized, broad-winged, long-tailed
- Thick, gray hooked beak, with reddish, bare facial skin around eye

WHAT DO THEIR NESTS LOOK LIKE?

Stick nests are built in tops of cabbage palms more typically, but may also be found in pine trees and shrubs. The nests are very concealed and are not generally noticeable.

WHY ARE CARACARAS IMPORTANT?

Caracaras, like vultures, feed on dead animals and also help eliminate road kill throughout communities. Because populations of birds of prey are declining across the nation, it is important to secure our local populations.

WHAT SHOULD YOU DO IF YOU SEE A CARACARA?

If you encounter a caracara, avoid all contact with it. If you are driving a vehicle or heavy equipment, stop, cease operation and allow the bird to fly out of the area. Do not harm or harass the bird in any way. Please contact your supervisor or the number at the back of this pamphlet and report the location and circumstances.

WHAT ARE THE STANDARD PROTECTION MEASURES THAT ARE REQUIRED?

The Seminole Tribe of Florida is required by the Federal Endangered Species Act to abide by standard measures adopted to protect this endangered snake:

1. An Eastern indigo snake protection/ education plan has been developed which requires training for all construction crews.

2. A qualified observer/biologist will be on-site for notification by construction personnel if a potential indigo snake is sighted.

3. If an indigo snake is found on the construction site, all activity must cease immediately, the qualified observer must be notified, and the snake allowed to move away from any dangerous area on its own.

WHO DO YOU CONTACT IF YOU SEE AN INDIGO SNAKE?

CONTACT YOUR DIRECT SUPERVISOR

You may also contact::

Seminole Tribe of Florida's
Wildlife Biologist
Phone: 863-902-3200 x13411
Cell: 863-228-1816

Seminole Tribe of Florida
Environmental Resource
Management Department

Eastern Indigo Snake

Protecting Tribal Resources

WHAT IS AN INDIGO SNAKE?

The eastern indigo snake (above) is the longest non-poisonous snake in North America, reaching a maximum length of 8.6 feet. More typically adult indigo snakes are about six feet in length.

This snake is classified as a threatened species by both the U. S Fish & Wildlife Service and the Fl. Fish & Wildlife Conservation Commission

BE AWARE THAT ANY DARK SNAKE, EITHER LARGE OR SMALL MAY BE AN INDIGO AND SHOULD NOT BE HARASSED IN ANY WAY

HOW CAN YOU IDENTIFY AN INDIGO SNAKE?

- Adult indigo snakes are large and slow-moving
- Juveniles have a reticulated pattern of light brown markings on a brownish background
- Shiny, iridescent, bluish-black body
- Chin is either reddish or cream colored and the scales are large and smooth

HOW ARE BLACK RACERS DIFFERENT?

- Black racers (above) are slender, fast-moving snakes
- Dull black or gray color with a typically white chin
- Vibrate their tail when threatened simulating a rattlesnake

WHERE DO INDIGO SNAKES OCCUR?

Indigo snakes are found in virtually any habitat type, from dry hardwood hammocks, to pine flatwoods, to the vicinity of wetlands. They have been observed all across the Big Cypress Reservation and may be encountered anywhere. They are not limited to the vicinity of gopher tortoise burrows as is sometimes thought.

WHAT SHOULD YOU DO IF YOU SEE AN INDIGO SNAKE?

If you encounter a snake that resembles an indigo snake, avoid all contact with it. If you are driving a vehicle or heavy equipment, stop, cease operation and allow the snake to pass before resuming construction. Do not touch the snake or harass it in any way. Please contact your supervisor or the number at the back of this pamphlet and report the location and circumstances.

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WHAT ARE THE STANDARD PROTECTION MEASURES THAT ARE REQUIRED?

The Seminole Tribe of Florida is required by the Federal Endangered Species Act to abide by standard measures adopted to protect this threatened tortoise:

1. A gopher tortoise protection/education plan has been developed which requires training for all construction crews.

2. A qualified observer/biologist will be on-site for notification by construction personnel if a potential gopher tortoise is sighted.

3. If a gopher tortoise is found on the construction site, all activity must cease immediately, the qualified observer must be notified, and the tortoise allowed to move away from any dangerous area on its own.

WHO DO YOU CONTACT IF YOU SEE A GOPHER TORTOISE ?

CONTACT YOUR DIRECT SUPERVISOR

You may also contact::

Seminole Tribe of Florida's
Wildlife Biologist
Phone: 863-902-3200 x13411
Cell: 954-410-7073

Seminole Tribe of Florida
Environmental Resource Management Department

Gopher Tortoise

Protecting Tribal Resources

WHAT IS A GOPHER TORTOISE?

- Land turtle
- Herbivore; eats only vegetation
- Averages 9-11 inches in length
- Characteristic stumpy, elephant-like hind feet and flattened, shovel-like forelimbs adapted for digging
- Oblong shell; generally a tan, brown, or gray color
- Live in sandy dry upland areas
- Dig burrows up to 15 feet long which are also used by other species

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Gopher tortoises are listed as a threatened species by the State of Florida due to the rapid decline in numbers resulting from development and loss of habitat.

WHAT DO THEIR BURROWS LOOK LIKE?

Frequently the tortoise itself will not be seen, however, you may tell if a gopher tortoise lives in the area by identifying their burrows.

- Mound of lighter colored sand at the entrance created when the tortoise excavates its burrow
- The top of the burrow will have a half moon appearance and the bottom may be flat which is also the shape of the tortoise
- Debris can often cover the entrance to an active burrow
- Burrows can be well hidden: under roots of vegetation and among vines

WHY ARE GOPHER TORTOISES IMPORTANT?

Gopher tortoise burrows provide homes for over 360 various species, including the Federally threatened Eastern indigo snake. Additionally the gopher tortoise is a culturally important species to the Seminole Tribe of Florida and is therefore identified as a species that is to be conserved under their wildlife management plan.

WHAT SHOULD YOU DO IF YOU SEE A GOPHER TORTOISE OR AN INDIGO SNAKE?

If you encounter a tortoise, burrow, or indigo snake, avoid all contact. If you are driving a vehicle or heavy equipment, stop, cease operation and allow the snake and/or tortoise to move out of the area. Do not harass the snake or tortoise in any way. If you encounter an indigo snake, gopher tortoise or burrow please contact your supervisor or the number at the back of this pamphlet and report the location and circumstances.

WHAT ARE THE STANDARD PROTECTION MEASURES THAT ARE REQUIRED?

The Seminole Tribe of Florida is required by the Federal Endangered Species Act to abide by standard measures adopted to protect this endangered kite:

1. All construction personnel watch the Wildlife Education Workshop video which includes information on the snail kite and be able to identify a snail kite and have brochures onsite.

2. A qualified observer/biologist will be on-site for notification by construction personnel if a snail kite is sighted.

3. If an snail kite is found on the construction site, all activity must cease immediately, and the kite allowed to move away from any dangerous area on its own.

WHO DO YOU CONTACT IF YOU SEE A SNAIL KITE?

Contact your direct supervisor

You may also contact:

Seminole Tribe of Florida's Wildlife Biologist

Phone: 863-902-3200 x13411
Cell: 954-410-7073

Seminole Tribe of Florida
Environmental Resource Management Department

Snail Kite

Rostrhamus sociabilis plumbeus

Protecting Tribal Resources

WHAT IS A SNAIL KITE?

The snail kite has been federally listed as endangered since 1967 and was included on the Endangered Species Act as it was established in 1973.

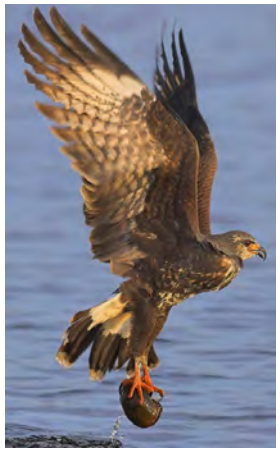
Snail kites have a highly specialized diet of apple snails, therefore their habitat is restricted to watersheds in central and south Florida. Their beaks are evolutionarily adapted to feed on apple snails.

WHY IS THE SNAIL KITE ENDANGERED?

- Loss of wetland habitat by drainage and development resulting in eliminated shallow or freshwater habitat

- Runoff from fertilizers causing euthrophication leading to growth of invasive species such as water hyacinth, which restricts ability to feed on apple snails

HOW CAN YOU IDENTIFY A SNAIL KITE?



Adult Male (above-left):

- Dark blue-gray plumage
- Talons and beak are red-orange with black tipped beak
- Eyes are red

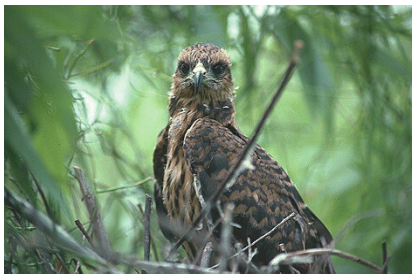
Female (above-right):

- Dark brown above with streaked white and brown under parts
- Talons and beak are red-orange with black tipped beak
- Eyes are red

*Juveniles resemble female (below)

WHAT DO THEIR NESTS LOOK LIKE?

Snail kites breed from December to August and build bulky nests over water to avoid predation. They nest in wetland trees, shrubs, and emergent vegetation.



HOW CAN YOU IDENTIFY A SNAIL KITE IN FLIGHT?

The snail kite flies slowly and flaps its wings in flight with its head facing down in search of apple snails.
The snail kite has a distinctive white patch at the base of its tail ending in a dark band with a thin white edge (above).

WHAT SHOULD YOU DO IF YOU SEE A SNAIL KITE?

If you encounter a snail kite, avoid all contact with it. If you are driving a vehicle or heavy equipment, stop, cease operation and allow the kite to pass before resuming construction. Do not touch the kite or harass it in any way. Please contact your supervisor or the number on the back of this pamphlet to report the location and circumstance of all sightings.

WHAT ARE THE STANDARD PROTECTION MEASURES THAT ARE REQUIRED?

The Seminole Tribe of Florida is required by the Endangered Species Act to abide by standard measures adopted to protect this endangered stork:

1. All construction personnel watch the Wildlife Education Workshop video which includes information on the wood stork and be able to identify a wood stork and have brochures onsite.

2. A qualified observer/biologist will be on-site for notification by construction personnel if a wood stork is sighted.

3. If an wood stork is found on the construction site, all activity must cease immediately, and the stork allowed to move away from any dangerous area on its own.

WHO DO YOU CONTACT IF YOU SEE A WOOD STORK?

Contact your direct supervisor

You may also contact:

Seminole Tribe of Florida's Wildlife Biologist

Phone: 863-902-3200 x13411
Cell: 954-410-7073

Seminole Tribe of Florida
Environmental Resource Management Department

Wood Stork

Mycteria americana

Protecting Tribal Resources

WHAT IS A WOOD STORK?

The wood stork (above) is the only native stork species found in North America. It has been federally listed as an endangered species since 1984 under the Endangered Species Act.

WHY IS THE WOOD STORK ENDANGERED?

Loss of habitat resulting in:

- Loss of main food source
- Loss of suitable nesting sites

HOW CAN YOU IDENTIFY A WOOD STORK?

Males and females look the same, though males tend to be larger

Adult (above-left):

- All white plumage except for black feathers along the tips of wing and tail
- Large, curved at tip, black beak with some brown coloration
- Face contains no plumage and is covered with blackish, rough and scaly skin

Immature (above-right):

- Duller version of adult

In flight they can be distinguished by an extended neck and black tip running all along bottom of plumage (bottom-left).

WHERE DO THEY OCCUR?

Wood storks can be found in a variety of habitats throughout Florida but they are most commonly observed wading in shallow water feeding on small fish.

Storks nest in large trees surrounded by open water to avoid predation (bottom-right). As many as 500 stork have been documented nesting within one colony!

HOW TO DISTINGUISH FROM THE EXOTIC SACRED IBIS?

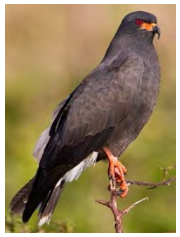
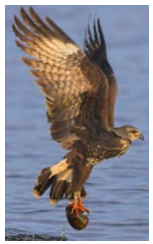
The sacred ibis (below) is an invasive species native to Africa, Iraq, and Egypt.

- Smaller bird with thinner beak
- Pure black head and neck
- Extra black plumage on rump

If you suspect that you have seen a sacred ibis please call the number on the back of the brochure immediately!

WHAT SHOULD YOU DO IF YOU SEE A WOOD STORK?

If you encounter a wood stork, avoid all contact with it. If you are driving a vehicle or heavy equipment, stop, cease operation and allow the stork to pass before resuming construction. Do not touch the stork or harass it in any way. Please contact your supervisor or the number on the back of this pamphlet to report the location and circumstance of all sightings.

Federally Threatened and Endangered Species within the Brighton Reservation			
Bald Eagle (*Haliaeetus leucocephalus*) Aguila Cabez Blanca (*Haliaeetus leucocephalus*)		Gopher Tortoise (*Gopherus polyphemus*) Tortuga de Tierra (*Gopherus polyphemus*	
Northern Crested Caracara (*Caracara cheriway*) El Caracara de Audubon (*Caracara cheriway*)		Florida Panther (*Puma concolor coryi*) Pantera de la Florida (*Puma concolor coryi*)	
Eastern Indigo Snake (*Drymarchon couperi*) Serpiente Anil Oriental (*Drymarchon couperi*)		Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*) Caracolero (*Rostrhamus sociabilis plumbeus*)	 
Wood Stork (*Mycteria americana*) Ciguena de Madera (*Mycteria americana*)		A quién debe contactar en caso de que vea esta especie? A Su supervisor directo Puede llamar también a: Tribu Seminole de la Florida Bióloga de Animales Teléfono: 863-902-3200 x13411 Celular: 954-410-7073	Who do you contact if you see any of these species? Contact your direct supervisor You may also contact: Seminole Tribe of Florida's Wildlife Biologist Phone: 863-902-3200 x13411 Cell: 954-410-7073

SEMINOLE TRIBE OF FLORIDA

CHERISE MAPLES
Environmental Resource Management Department Director

6365 Taft Street, Suite 3008
HOLLYWOOD, FLORIDA 33024
PHONE (954) 965-4380 x10632
E-MAIL: cmaples@semtribe.com

WEBSITE: http://www.seminoletribe.com

MEMORANDUM

Date: **February 5th, 2015**

To: **Whitney Sapienza, Environmental Protection Specialist III**

From: **James Phillips, Environmental Protection Specialist**

Subject: **ERMD-14-082 HP 2 and HP 3 Culvert Replacement, Brighton Reservation**

The above referenced site/project has been reviewed in accordance with Tribal development policies, procedures, ordinances and regulations as they apply to the Environmental Resource Management Department. Should you have any questions or concerns, please contact me at (863)902-3200 extension 13417.

☐ **Wetland Impacts** ☒ **No Wetland impacts**

COMMENTS:

The project boundary for ERMD-14-082 HP 2 and HP 3 Culvert Replacement is located within the Brighton Seminole Indian Reservation east of Bull Project Road and west of C-41 Canal in Sections 01, and 12, Township 40 South, Range 32 East. Proposed project is for the necessary replacement of two culverts within the Herbert Hoover Dike (HHD). All work is to take place within the Federal Right of Way. This project is part of a larger USACE Project to rehabilitate the HHD including replacement and removal or culverts.

Environmental Resource Management Department staff (ERMD) have reviewed the NEPA documentation completed by the USACE. The USACE Environmental Assessment resulted in a Finding of No Significant Impact. No impacts to jurisdictional waters of the United States or Water Rights Compact jurisdictional wetlands are anticipated for this project if best management practices are followed. This clearance applies to areas within the identified project boundary that satisfy the stated conditions.

CONDITIONS:

Required Best Management Practices Surrounding Bodies of Water
Silt fence is required as per the attached specifications to prohibit sediment runoff into Waters of the U.S. from associated construction activities. Construction activities require a 200 foot set back from wet detention ponds and a 15 foot minimum to 25 foot average set back from wetlands. Implementation of best management practices is required to minimize the adverse impacts of soil erosion and sedimentation to the downstream water bodies. Construction sites are to establish maintenance areas for activities, which are capable of causing migration of pollutants, away from water bodies. Such activities are fuel and maintenance

staging areas, mixing areas for pesticides, herbicides and fertilizers. Effective minimization and control of erosion surrounding water bodies are ensured by scheduling grading and construction activities to minimize soil exposure, retaining existing vegetation when applicable, stabilization immediately following final grading (mulching, vegetating, and sodding), controlling runoff and erosion, installation of sediment traps (silt fences, turbidity curtains, perimeter dikes, and inlet protections), and regular inspections of the implemented control measures.

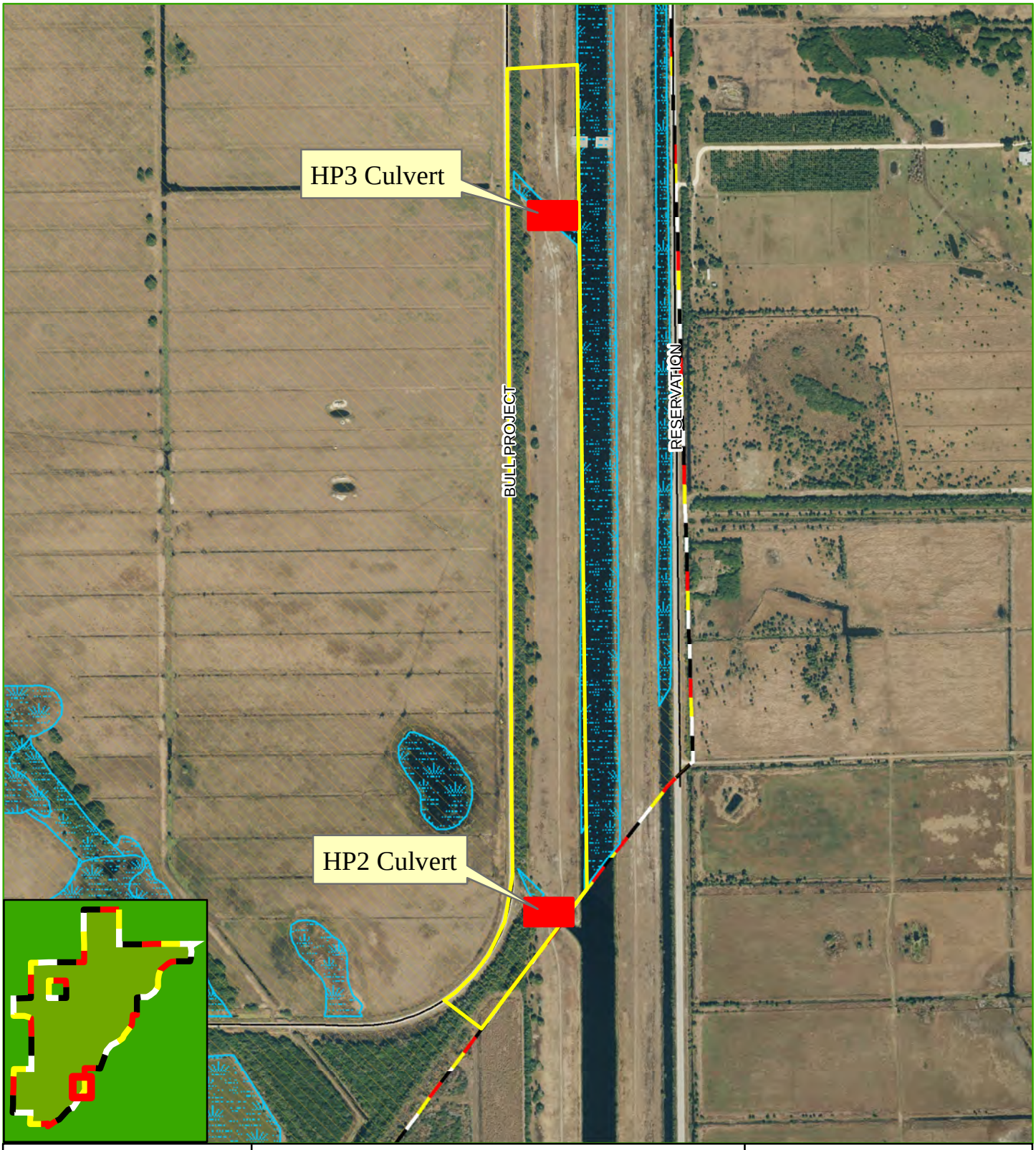
☐ **Cleared** ☒ **Conditions Required for Approval** ☐ **Not Cleared**

X:\ERM\Environmental Compliance Log\FY2014\ERMD-14-082 HP2 and HP3-BR\wetlands

Attached:

Wetland Aerial Review

Silt Fence Installation Cross Section



N
W E
S

0 0.05 0.1 0.2
Miles

Seminole Tribe of Florida Brighton Reservation

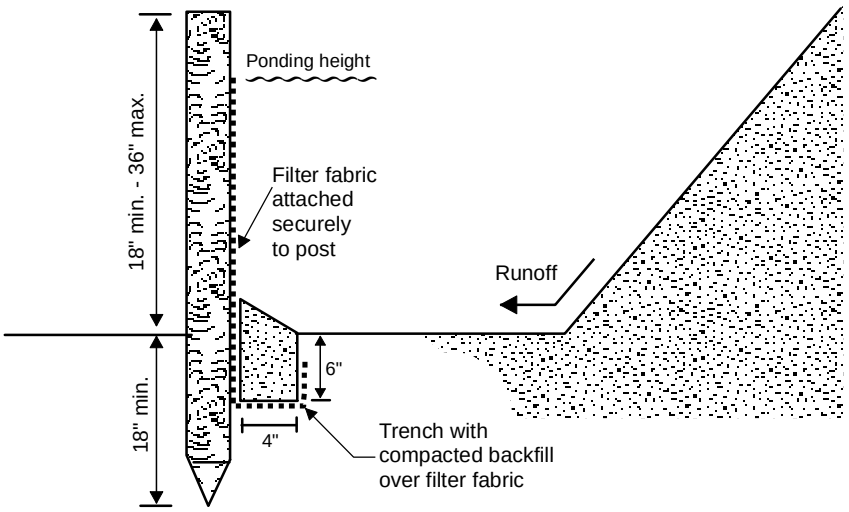
ERMD-14-082 HP2 & HP3 Culvert Replacement
Wetland Aerial
Section 01,and 12, Township 40 S, Range 32 E

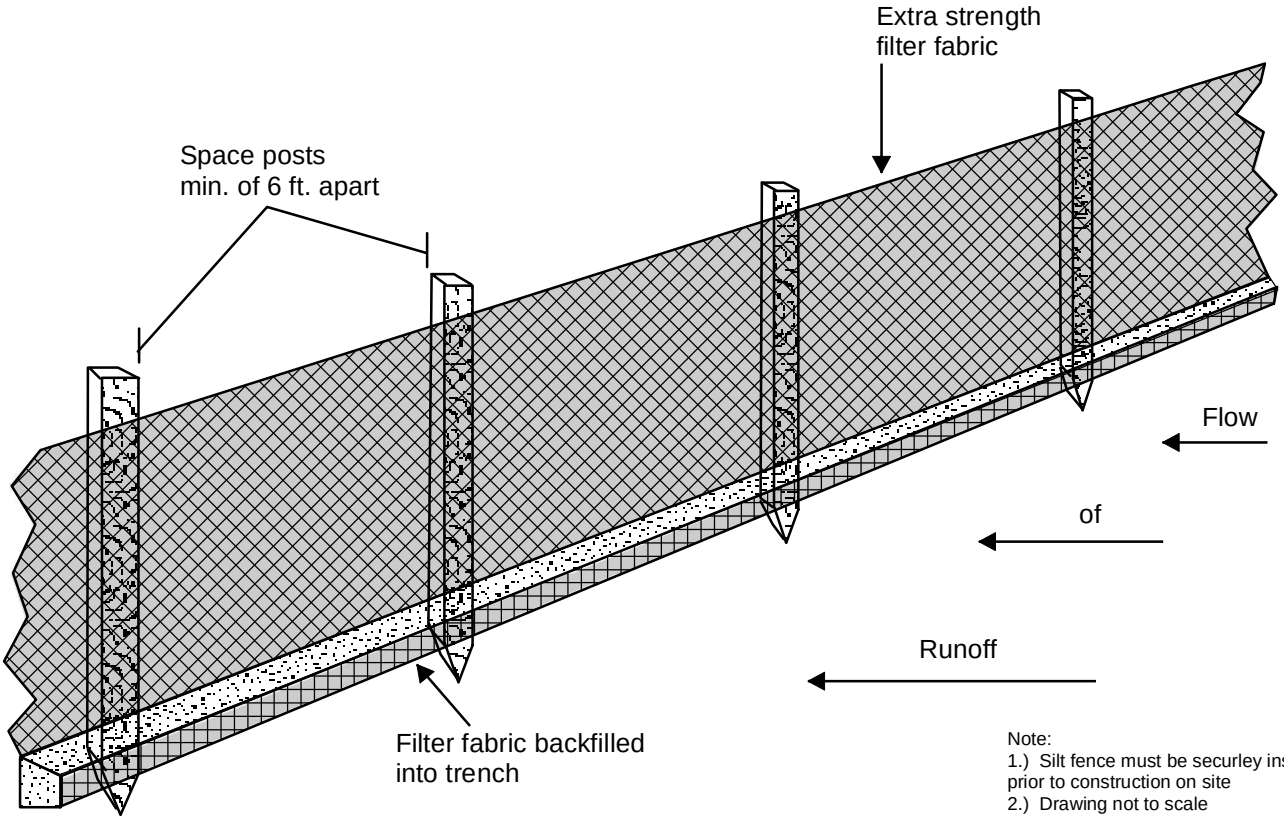
Map created by James Phillips, Environmental Resource Management Department
2/05/2015; Scale 1:9,000; 2012 True Color Aerial

Legend

- Project Boundary
- Wetlands
- Hydric Soils
- BR Streets
- Brighton Boundary

Silt Fence Design





Note:
1.) Silt fence must be securley installed prior to construction on site
2.) Drawing not to scale

	Seminole Tribe of Florida Environmental Resource Management Department Wetland BMP Condition Silt Fence Design Cross Section Map & cross section designs created by Elizabeth Letts, Environmental Resource Management Department 1/13/2012	Cross Sections *Silt Fence Installation Design *Post Placement & Spacing

Map B

Brighton Seminole Indian Reservation

ERMD-14-082

HP2 & HP3 Culvert

Crested Caracara

Consultation Area

Map Created by Pauline Haas, Environmental Resource Management Department
2/5/2015; 2013 True Color Aerial; 2014/2015 Caracara data provided by ERMD STOF

N

W E

S

Miles

0 0.125 0.25

Legend

Project Location

Active

Primary Zone

Secondary zone

Streets

BR Boundary

HERBERT HOOVER DIKE MAJOR REHABILITATION GLADES, HENDRY, MARTIN, OKEECHOBEE AND PALM BEACH COUNTIES

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

HERBERT HOOVER DIKE CULVERT REPLACEMENT AND REMOVAL

U.S. Army Corps of Engineers
Jacksonville District

May 2011

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FINDING OF NO SIGNIFICANT IMPACT
HERBERT HOOVER DIKE MAJOR REHABILITATION CULVERT REPLACEMENT AND REMOVAL
GLADES, HENDRY, OKEECHOBEE, PALM BEACH, AND MARTIN COUNTIES, FLORIDA

Based on the information analyzed and presented in the Environmental Assessment (EA) attached hereto, dated May 2011, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are, in summary:

a. The proposed action would occur within the existing Federal right-of-way. The proposed action is considered maintenance on an existing Federal project.

b. The goal of the rehabilitation of the Herbert Hoover Dike (HHD) is to reduce risk to public safety and health. Embankment seepage and stability have a direct effect on the capability of the Dike to provide the authorized protection. The Flood Control Act of 1948 authorized the U.S. Army Corps of Engineers (USACE) to operate and maintain the HHD and the Federal culverts. Replacement or removal as proposed is an immediate maintenance risk reduction strategy to ensure the HHD meets safety standards.

c. This EA was circulated with a Proposed Finding of No Significant Impact (FONSI) for public and agency review and coordination in compliance with the National Environmental Policy Act by letter dated 16 February 2011. Public meetings were held in Okeechobee (8 March 2011) and Clewiston (10 March 2011). All public and agency comments have been addressed in the revised EA upon completion of the public comment period.

d. Adverse impacts to protected species are not anticipated. Special measures will be incorporated during project construction to avoid or minimize adverse effects to any listed endangered, threatened, or species of special concern that may be present (see Environmental Compliance and Commitments in Section 5). Adjacent to the dike, in the southwestern littoral zone of Lake Okeechobee, there is designated Critical Habitat for the *Rosthrhamus sociabilis plumbeus* (Everglade snail kite), however, there will be no permanent adverse modification of this habitat as a result of this project. The USACE agrees to maintain an open and cooperative informal consultation process with the U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FFWCC) throughout the design, construction, and operation of this culvert replacement and removal project. The USACE received a concurrence letter with the USACE determination of may effect, not likely to adversely affect from the USFWS on February 10, 2011 (Appendix E).

e. Wetlands immediately adjacent to the culverts will be temporarily impacted through construction of a cofferdam during the replacement or removal process. Upon completion of the culvert removal or replacement process, emergent wetland vegetation would be restored to preconstruction conditions through planting of emergent vegetation and natural recruitment.

f. The USACE is coordinating a consistency determination under the guidelines of the Coastal Zone Management Act (CZMA) through the circulation of this EA. The USACE has determined that the proposed action is consistent with the State's CZMA programs. The Florida CZMA Evaluation can be referenced in Appendix D of this report.

g. The proposed action has been coordinated with the Florida State Historic Preservation Officer (SHPO) in accordance with the National Historic Preservation Act and the Archaeological and Historic Preservation Act. The USACE has determined that the removal and replacement of the culverts has been adequately mitigated by documentation in a cultural resources assessment report (available upon request) of the HHD. The USACE deems the documentation sufficient to mitigate the removal and replacement of the culverts. Consultation with the SHPO was initiated December 2010 for the proposed culvert removal and replacement and SHPO concurred on March 1, 2011. The project will not have an adverse effect on any historic properties included in, or potentially eligible for inclusion in, the National Register of Historic places. Conditions to protect undiscovered resources will be implemented as follows: language will be included in construction contract specifications outlining the steps to be taken in the event that undiscovered historical properties are encountered. An informational training session, developed by a professional archaeologist, will be conducted for the contractor's personnel to explain the types of archaeological/cultural materials that may be encountered during construction, and the steps to be taken in the event these materials are encountered. A professional archaeologist will conduct periodic monitoring of the project area during construction to determine if activities are impacting unanticipated cultural resources. The proposed action is consistent with both the National Historic Preservation Act and the Archaeological and Historic Preservation Act.

h. The project is in compliance with the Clean Water Act. A Water Quality Certificate for the replacement or removal of some of the Federal culverts will be acquired during plans and specifications phase from Florida Department of Environmental Protection (FDEP). All State water quality requirements will be followed. Refer to Section 1.7, Permits, Licenses, and Entitlements for a list of Water Quality Certificates obtained by the USACE.

In view of the above, and after consideration of public and agency comments received on the project, I have concluded that the proposed action for the rehabilitation of HHD will not result in a significant adverse effect on the human environment. This Finding incorporates by reference all discussions and conclusions contained in the EA attached hereto.

FOR BARKER, B.C. LTC, EN DEPUTY CDR

Alfred A. Pantano, Jr.
Colonel, U.S. Army
District Commander

13 MAY 11
Date

ENVIRONMENTAL ASSESSMENT
ON
HERBERT HOOVER DIKE CULVERT REPLACEMENT AND REMOVAL

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1 PROJECT PURPOSE AND NEED

The Herbert Hoover Dike (HHD) was constructed around Lake Okeechobee, a 724-square-mile freshwater lake in south central Florida, for the purposes of flood protection, navigation, agricultural and municipal water supply, prevention of saltwater intrusion, recreation, and the enhancement of environmental resources (Figure 1). The U.S. Army Corps of Engineers (USACE), Jacksonville District, has operated and maintained the dike for 75 years, its highest priority being the continued safety of the communities surrounding the dike.

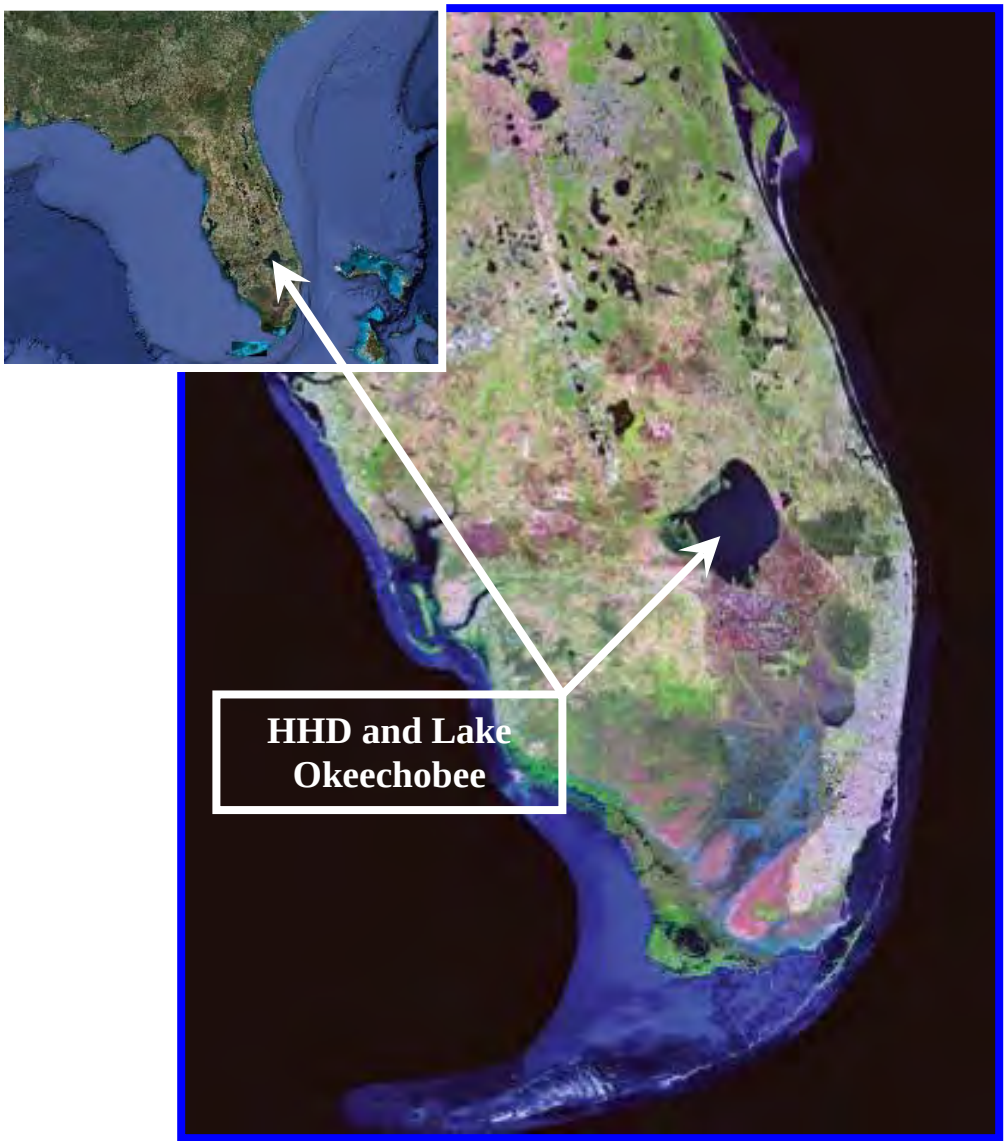

Figure 1. Project Location

Original construction of the HHD began in the 1930s and continued into the 1960s. USACE is responsible for the operation and maintenance of 32 culverts. Twenty eight culverts are currently in use and four are inactive due to changes in operations and local needs. The purpose of the culverts is for flood control and agricultural irrigation. The USACE is

committed to ensuring that continued drainage and irrigation capabilities will be provided to South Florida Water Management District (SFWMD) permitted users of the culverts. A systematic investigation of culvert usage is currently underway with participation from SFWMD's adjacent 298 Districts and SFWMD permitted users.

From a structural integrity perspective, the culverts present challenges to dike stability. The culverts within the HHD pose an immediate and significant risk of failure due to the loss of embankment material into and along the culverts. During a large storm event, concentrated seepage could begin to move large amounts of material through the embankment. Erosion would progress upstream, potentially leading to a progressive breach of the embankment. Action is required as an immediate risk reduction strategy, in conformance with dam safety requirements, to reduce the risk of catastrophic failure. According to USACE Dam Safety guidance, these risk reduction maintenance actions are required to reduce this unacceptable risk due to the high probability of culvert failure, and eventually dike failure with potential associated loss of life. The four inactive culverts will be removed and the twenty eight active culverts necessary for operations will be replaced.

This Environmental Assessment (EA) assesses the environmental effects of replacing or removing the Federal culverts within the existing Federal right-of-way. The replacement and removal of culverts, as discussed in this EA, are immediate risk reduction measures needed to be implemented within the Federal right-of-way. Additional real estate acquisition would not be required. Should a culvert fail, inducing breaching or failure of the dike, the level of flood protection would be compromised, resulting in a high risk to human safety and potential devastating economic and environmental damages.

1.1 PROJECT AUTHORITY

The HHD is a component of the Central and Southern Florida (C&SF) Project for Flood Control and Other Purposes. It is generally understood that the birth of the C&SF Project began with the Flood Control Act of 1948; however, Federal participation in local flood control efforts in the Lake Okeechobee area started much earlier in response to the disastrous hurricanes of 1926 and 1928. The Rivers and Harbors Act of 1930 authorized the construction of levees, for protection from storm surge-induced flooding, along the north and south shores of Lake Okeechobee. The 1948 Act created the C&SF Project and included authorization for enlargement of the existing levees and construction of additional levees along the northeast and northwest shores. The Flood Control Act of 1960 authorized the levees around the shore of Lake Okeechobee to be named "Herbert Hoover Dike", in honor of the former President and his role in implementing levee construction.

1.1.1 Rivers and Harbors Act of 1930

The Rivers and Harbors Act of 1930 authorized the construction of approximately 84 miles of levees along the north and south shores of Lake Okeechobee.

1.1.2 Rivers and Harbors Act of 1935

The Rivers and Harbors Act of 1935 authorized the construction and Federal payment for 21 culverts within the approximately 84 miles of levees. The act also authorized the USACE to

operate and maintain the levees and the 21 culverts. The purposes of these culverts included flood control (drainage) and irrigation of adjacent farm lands.

1.1.3 Flood Control Act of 1948

The Flood Control Act of 1948 created the C&SF Project and authorized the first phase of the C&SF project which included enlargement of the existing levees and construction of additional levees along the northeast and northwest shores.

1.1.4 Flood Control Act of 1954

The Flood Control Act of 1954 authorized the entire C&SF Project and specifically recognized that the plan of improvements would require additional refinements and modifications within the scope and purpose of the authorization which could be made at the discretion of the Chief of Engineers.

1.1.5 Flood Control Act of 1958

House Document 186, 85th Congress, 1st Session removed the monetary cap on local sponsor contributions set in the 1948 authorization. It established local share or project costs for 1954 construction and supervision and administration (S&A) costs plus Lands, Easements, Rights of Way, Relocations and Disposal (LERRD) plus Operations and Maintenance (O&M) responsibilities. The USACE is responsible for the O&M of Lake Okeechobee outlets.

1.1.6 Flood Control Act of 1960

The Flood Control Act of 1960 authorized the name of all levees around the shore of Lake Okeechobee to be “Herbert Hoover Dike”.

1.1.7 Flood Control Act of 1968

The Flood Control Act of 1968 modified the C&SF Project to include the water resources plan for central and southern Florida. This plan included raising the levee to provide an increase to the Lake Okeechobee regulation range either four feet above prior authorized levels or from 19.5 to 21.5 feet (National Geodetic Vertical Datum of 1929 (NGVD29)). Most of the features authorized by the Flood Control Act of 1968 were never constructed.

1.2 PROJECT LOCATION AND DESCRIPTION

The HHD is approximately 143 miles long and surrounds Lake Okeechobee. Lake Okeechobee and the HHD are located in south central Florida, in or adjacent to the counties of Okeechobee, Martin, Palm Beach, Hendry, and Glades (Figure 1). The 32 Federal culverts to be replaced or removed are within the HHD and the Federal right-of-way. Lake Okeechobee is a multi-purpose reservoir in the C&SF Project. The authorized project purposes for Lake Okeechobee include: flood protection, irrigation, agricultural and municipal water supply, enhancement of fish and wildlife, navigation, prevention of saltwater intrusion, recreation, and water supply to the Everglades National Park.

1.3 PROJECT NEED OR OPPORTUNITY

The purpose of this project is to improve dam safety along, around and within the HHD per external review recommendations and current dam safety regulations. The Federal culverts

pose an immediate and significant risk of failure due to the loss of embankment material into and along the culverts. During a large storm event, concentrated seepage could begin to move large amounts of material through the embankment. Erosion would progress upstream, eventually leading to a potential breach of the embankment. Action is required as an immediate maintenance risk reduction strategy, in conformance with dam safety requirements, to reduce the risk of catastrophic failure of the HHD system. These maintenance actions are required to reduce this unacceptable risk due to the high probability of failure and associated potential loss of life.

The HHD system includes 28 Federal culverts in the HHD system which are in critical need of replacement and four Federal culverts that will require removal (Figure 2). Of the culverts recommended for removal, three were previously abandoned and buried, while the fourth was determined to no longer be required. The HHD, the subject culverts, and the major outlets of Lake Okeechobee, are operated and maintained by the USACE, Jacksonville District. The SFWMD operates and maintains other inlet structures, pump stations and locks around Lake Okeechobee which also penetrate the HHD embankment.

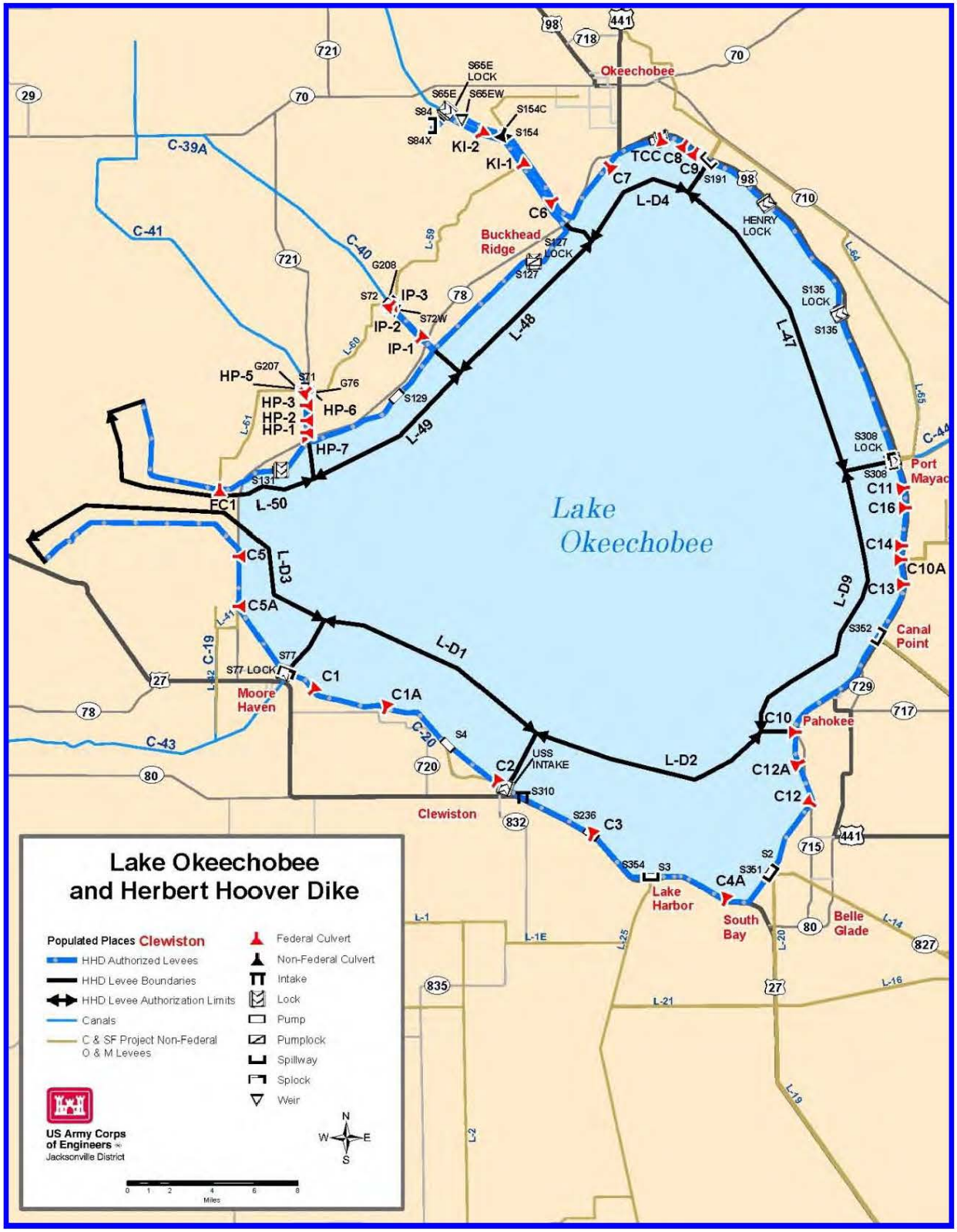

Figure 2. HHD Culvert Locations

The HHD was originally constructed to provide local flood protection. Seepage and sand boils have been observed along levee designation (L-D) L-D1, L-D2, and L-D9 of the HHD. Due to the existing condition of the Federal HHD culverts, this seepage and boil process is suspected along and into the culverts themselves. During dewatering inspections of the deteriorated culverts, some boiling has been observed. These processes are known to compromise the integrity of the dike. Sand boils are indicators of the initiation of piping (underground flow paths for water caused by erosion), which can lead to dike instability or erosion of dike materials through internal channels as well as into and along culverts. Increased rate and magnitude of occurrences suggest that maintenance actions are necessary. The imperative objective is to reduce the probability of catastrophic failure and associated consequences to the extent reasonably possible.

Consistently, throughout the past 12 years, panels of internationally recognized experts in the field of dam safety have acknowledged unacceptably high project risk when the lake exceeds an elevation of 20 feet (NAVD88) approximately corresponding to a 1 in 100 year event. According to external review teams consisting of nationally recognized experts in the field of dam safety, HHD has passed the initiation phase on the seepage and piping failure continuum at certain locations, and is now in the continuation phase with erosion moving up-gradient toward the water source (USACE, 2010). The rate at which piping is primarily occurring is dependent on lake level. It is clear that the seepage volume and distress indicators in certain levee designations of the structure at reservoir levels above elevation 17.5 feet (NAVD88) are cause for concern. Failure is considered very likely when operating at or above these levels for any significant time. The higher the lake level, the shorter the time required for failure to occur. In this context, “failure” means an uncontrolled release of water resulting from a catastrophic breach of some portion of the HHD system.

An unreliable embankment system could result in failure of the system to contain lake waters. The condition, age, and prior construction methods of the culverts contributes to the risk of embankment failure. Some of the current defects within the culverts are a result of erosion, corrosion and weathering (Figure 3 and Figure 4). Such a failure could be devastating, resulting in human suffering, loss of life, immense property damage (including residential, commercial and agricultural) and destruction of the natural habitat (HHD, 2007).

Figure 3. Culvert 10A - Concrete Wing Wall Heavily Pitted with Exposed Rebar

Figure 4. Culvert FC-1 – Corrosion through Barrel, Exposing Cobble Layer of Embankment

1.4 AGENCY GOAL OR OBJECTIVE

The objective of this Environmental Assessment is to assess the environmental effects of removing or replacing Federal culverts within the existing Federal right-of-way. Removal and replacement of culverts will aid in achieving risk reductions by remediating the Federal culverts which are the highest contributors to risk in the HHD system. These culverts pose a high risk of failure to the embankment due to the piping of material into and around the culverts. These maintenance actions are required to reduce the unacceptable risks due to the high probability of failure and associated potential loss of life. This EA identifies the 32 Federal culverts in need of risk reduction actions, including the replacement of 28 culverts and the removal of four inactive or abandoned culverts (see Figure 2 above).

1.5 RELATED ENVIRONMENTAL DOCUMENTS

Several Categorical Exclusions have been completed to allow repair to other culverts and to remove trees and clear the toe ditch within the Federal right-of-way. These Categorical Exclusions include:

- Categorical Exclusion for Tree Removal and Ditch Clearing Within Right-of-way in Reach 2 of HHD, 07 March 2008
- Categorical Exclusion for Repair or Removal of Culvert 15 in Levee D-2 of the HHD, 04 April 2008
- Categorical Exclusion for Construction of Access Road within Existing Right-of-way of L-D1 and L-D2 of the HHD, 30 April 2008.
- Categorical Exclusion for Replacement of Culverts FC-1 and HP-7 in Reach 6 of the HHD, 05 November 2009
- Categorical Exclusion for Repair of Culverts 5 and 5A in Reach 4 of the HHD, 02 December 2009

The following table (Table 1) includes a complete list of related NEPA, design, and planning documents completed for the HHD Rehabilitation.

Table 1. Complete list of related NEPA, design and planning documents completed for HHD Rehabilitation to date

Type	Project	Title	Recommended Action	Decision
DEIS	Reach 1	DEIS for the Major Rehabilitation Report, HHD, Reach 1 (USACE, 2000)	Installation of a seepage berm with relief trench along the landward toe of the embankment.	Approved in 2000 contingent on economic revisions.
FSEIS	Reach 1	FSEIS for the HHD Major Rehabilitation Report, Reach 1 (USACE, 2005)	Installation of a seepage cutoff wall on the landward side of the dike slope and a relief trench and relief berm at the toe of the dike, all within the current right-of-way.	Record of Decision signed on September 23, 2005.
DEIS	Reaches 2 and 3	DEIS for the Major Rehabilitation Report, Phase 1, HHD Reaches 2 and 3 (USACE, 2006)	Installation of a partial cutoff wall at crest of dike and construction of a seepage berm within existing right-of-way.	The project was put on hold after it was coordinated with the public.
EA	Reaches 1, 2, and 3	EA of Modified Design in Reach 1 and Priority Toe Ditch Repairs in Reaches 1, 2, and 3 (USACE, 2007c)	(1) Installation of a cutoff wall at crest of dike, a partial seepage berm within existing right-of-way, and a drainage swale at toe of berm. (2) Backfill toe ditch for immediate repairs in the most critical areas. This document only assessed impacts within the existing right-of-way. A future NEPA document would assess impacts of the full seepage berm, which would extend outside of the existing right-of-way.	Finding of No Significant Impact, January 12, 2007.
EA	Reach 1 and Sub-reach 1A	EA of Reach 1 Seepage Berm and Reach 1A Test Cutoff Wall (USACE, 2007e)	Installation of a demonstration cutoff wall at the crest of the dike in Reach 1A and a partial seepage berm within the existing right-of-way. A future NEPA document would assess impacts of the full seepage berm.	Finding of No Significant Impact, May 3, 2007.
EA	Reach 1 and Sub-reaches 1B, C, and D	EA of Reach 1 Cutoff Wall with Addendum (Quarry) (USACE, 2008a)	Installation of a cutoff wall at crest of dike in Reach 1B, C, & D.	Finding of No Significant Impact, February 11, 2008.
EA	Reaches 1 and 2	EA for Partial Reach 1 and 2 Ditch Backfill and Culvert 14 Removal (USACE, 2008b)	In Reach 1, assesses the impacts of removing Culvert 14 and filling the toe ditch in Focus Areas 1 and 6. In Reach 2, assesses impacts of filling in 9.5 acres of toe ditch.	Finding of No Significant Impact, August 28, 2008.
EIS	Reach 1A	DSEIS for the Major Rehabilitation Project, HHD Reach 1A (USACE, 2010)	Installation of a seepage berm, drainage swale, and relief wells outside of the existing right-of-way. Removal of Culvert 11 and replacement of Culvert 16.	Pending.

1.6 DECISIONS TO BE MADE

The recommendations discussed in this document are compatible with the recommendations from the Quality Control and Consistency (QCC) review by the Risk Management Center (RMC) to reduce the risk of failure at the culverts in the HHD system. The RMC has identified the culverts as the highest single points of potential failure in the HHD system. Maintenance is required to reduce the unacceptable risks due to the high probability of failure and associated potential loss of life.

The recommendations of this Environmental Assessment are for the approval to proceed with immediate risk reduction measures to the culverts in the HHD system. The risk reduction measures recommended by this report include:

1) The replacement of the 28 Federal culverts, which have been identified as single points of high risk, with the highest probable mode of failure in the HHD system, at a 100% Federal approximate cost consistent with authorization. The culverts will continue to perform the current operational functions.
2) The removal of four Federal culverts that have been abandoned and no longer perform an operational function, at a 100% Federal cost consistent with authorization.

This EA will evaluate the environmental impacts of removing and/or replacing the Federal HHD culverts within the Federal right-of-way as a means of improving the structural integrity of the HHD.

1.7 PERMITS, LICENSES, AND ENTITLEMENTS

The proposed HHD culvert replacement and removal are subject to Section 401 of the Clean Water Act and could require Water Quality Certification (WQC) from the FDEP. The proposed work also requires a Coastal Zone Management Act (CZMA) consistency determination (Appendix D). The project may require dewatering permits and National Pollution Discharge Elimination System (NPDES) permits. These permits will be acquired prior to construction activities for each culvert replacement or removal as needed. Refer also to Section 5, Environmental Compliance and Commitments.

1.8 SCOPING

Numerous public meetings and information sessions have been held concerning the rehabilitation of the HHD. The Jacksonville District of USACE maintains a public outreach program meant to keep the public informed of rehabilitation activities. Public meetings were held on March 8, 2011 in Okeechobee and March 10, 2011 in Clewiston to talk about the culvert replacement and removal. Copies of presentations previously given to the communities surrounding the HHD and information fact sheets can be found on the Jacksonville District website:
http://www.saj.usace.army.mil/Divisions/Everglades/Branches/HHDProject/HHD.htm

2 ALTERNATIVES

This section describes in detail the no-action alternative, the proposed action, and other reasonable alternatives that were studied in detail for the HHD.

2.1 DESCRIPTION OF ALTERNATIVES

The USACE is presenting the replacement or removal of the Federal culverts in a single document within this EA. The proposed activity is considered a part of the operations and maintenance of an existing Federal project. The USACE considered several options for this maintenance plan as described below.

2.1.1 Alternative 1 - No Action Alternative

Evaluation of the No Action Alternative, also known as the future-without-project condition, is a requirement of NEPA regulations. The No Action Alternative is defined as not taking actions or making physical alterations to improve or repair the HHD. The No Action Alternative would not reduce risk of failure in the HHD system in accordance with current Tolerable Risk Guidelines to a level considered acceptable to the public, neither individual or societal risk acceptance. Under this alternative, the continued occurrence of seepage and piping with culverts in their current condition would pose an unacceptably high likelihood of culvert failure, leading to potential failure of the dike.

This alternative does not provide a long-term solution to the seepage and culvert stability problems within the HHD system. In addition, the No Action Alternative was eliminated as a viable option because of factors such as exceeding design life, unknown and unreliable construction practices when installed, and the high risk of being a source of breach.

2.1.2 Alternative 2 - Removal of All Culverts

This alternative is defined as the removal of all the Federal culverts that penetrate the dike. Thirty-two Federal culverts, including active and abandoned culverts, have been identified for consideration under this EA (Table 2). This alternative would remove all of the existing Federal culvert dike penetrations which are considered failure points for the dike that have the highest probability of occurring. This option would require construction of a temporary substitute flood protection system that would likely include an earthen or driven pile cofferdam. The project area would be dewatered to allow the culvert body and intake and discharge walls to be uncovered and removed. The embankment would then be restored with slopes matching the existing dike using select fill and compacted as required. Construction equipment would include standard material-handling and earthwork equipment. Recovered culvert materials (steel, concrete) would be disposed of locally. The expected concrete debris (headwalls and grout between the original culvert and the elliptical liner) is estimated to be 200 to 400 cubic yards per culvert.

Table 2. Thirty-two Federal Culverts Summary

Construction Feature	Location	Barrels	Size (ft)	Pipe Length (ft)	Original barrel type	Solution	Estimated Duration of Construction (in months)
Culvert 11	L-D9	1	10	95	CMP	Replace	10.5*
Culvert 16	L-D9	1	10	96	CMP	Replace	10.5*
Culvert 10A	L-D9	5	10	76	CMP	Replace	8.0
Culvert 13	L-D9	1	10	95	CMP	Replace	11.0
Culvert 10	L-D9	2	10	111	CMP	Replace	12.5
Culvert 12A	L-D2	1	7	86	Concrete	Replace	10.0
Culvert 12	L-D2	3	10	91	CMP	Replace	14.0
Culvert 4A	L-D2	1	10	177	CMP	Replace	11.0*
Culvert 3	L-D2	2	10	105	CMP	Replace	12.5*
Culvert 2	L-D2	6	10	105	CMP	Replace	16.0
Culvert 1A	L-D1	3	7	172	CMP	Replace	11.0*
Culvert 1	L-D1	2	10	115	CMP	Replace	12.5*
Culvert 5A	L-D3	3	10	160	CMP	Replace	14.0
Culvert 5	L-D3	3	10	160	CMP	Replace	14.0
Culvert 8	L-D4	3	10	151	CMP	Replace	14.0
Culvert FC-1	L-50	2	9	118	CMP	Replace	12.0
Culvert HP-1	L-50	1	2.5	94	CMP	Replace	10.0
Culvert HP-2	L-50	1	7	94	CMP	Replace	10.0
Culvert HP-3	L-50	1	9	94	CMP	Replace	11.0
Culvert HP-5	L-50	2	9	96	CMP	Replace	12.5
Culvert HP-6	L-49	2	7	94	CMP	Replace	10.0
Culvert HP-7	L-49	1	5	94	CMP	Replace	9.0
Culvert IP-1	L-49	1	5	94	CMP	Replace	9.0
Culvert IP-2	L-49	2	7	80	CMP	Replace	10.0
Culvert IP-3	L-48	2	6	80	CMP	Replace	10.0
Culvert KI-1	L-48	3	6	145	Concrete	Replace	11.0
Culvert KI-2	L-48	1	6	145	Concrete	Replace	9.0
Culvert 6	L-D4	1	10	151	CMP	Replace	11.0
Culvert 7	L-D4	3	10	151	CMP	Remove	8.0
Taylor Creek (TCC)	L-D4	8	10	71	CMP	Remove	10.0
Culvert 9	L-D4	-	-	151	CMP	Remove	11.0
Culvert 14**	L-D9	1	10	96	CMP	Remove	6.0*

Notes:

*An actual construction schedule was developed as preliminary design information was available. Estimated construction duration for the other culverts was estimated by interpolating and extrapolating information from existing design information. Actual site conditions may increase or decrease construction time by approximately 15 percent.

**Culvert 14 removal is covered in Partial Reach 1 and 2 Ditch Backfill and Culvert 14 Removal EA, July 2008.

This alternative provides an opportunity to reconstruct a portion of the HHD in concurrence with the current Dam Safety community of practice standards, with limited or no uncertainties. Concerns regarding potential seepage paths along the exterior of the culvert body would be eliminated, and future required maintenance of the culvert would be precluded. Though this alternative would remove many penetrations (i.e. culverts) from the HHD and thereby increase dike reliability, the HHD would not provide the same flood protection or water use functions that are currently in place for the surrounding communities.

Additionally the current users of these culverts would have to obtain agricultural irrigation and freeze protection from other sources.

2.1.3 Alternative 3 - Replacement of All Culverts

This alternative is defined as replacing all 32 of the Federal culverts penetrating the dike (Table 2 above). This alternative includes replacing the in use and abandoned or non functioning culverts. This process would provide a risk of failure reduction by bringing all of the existing Federal culverts up to existing design standards thereby reducing the risk of failure at these penetrations. This option would require construction of a temporary substitute flood protection system at each culvert that would likely include an earthen or driven pile cofferdam. The project area would be dewatered to allow the culvert barrel and intake and discharge walls to be uncovered, removed, and replaced with concrete cast-in-place box culverts. The embankment would then be restored with slopes similar to the existing dike using select fill and compacted as required. Construction equipment would include standard material-handling and earthwork equipment. Current operations will be maintained during replacement as justified on a temporary basis to prevent significant economic hardships. Periodic closings may occur during maintenance of the culverts but current operation of procedures would continue post construction.

2.1.4 Alternative 4 - Replace and Remove Culverts (Preferred Alternative)

This alternative is defined as the replacement of the 28 active Federal culverts and the removal of the four abandoned or not in use Federal culverts. This alternative would remove the risk of failure associated with the four Federal culverts that are presently abandoned or not in use in place within the dike. This alternative would also replace the 28 existing active culverts with structures designed of present day standards with materials to reduce the risk of failure associated with the existing Federal culvert structures. Current operations will be maintained during replacement as justified on a temporary basis to prevent significant economic hardships and construction is estimated to last an average of 12 months per culvert (Table 2 above). Periodic closings may occur during operations but current operation procedures would continue post construction.

This option would require construction of a temporary substitute flood protection system at each culvert that would likely include an earthen or driven pile cofferdam. The project area would be dewatered to allow the culvert barrel and intake and discharge walls to be uncovered, removed, and replaced with concrete cast-in-place box culverts (as described in Section 2.1.3). Culverts to be removed would be removed as described in Section 2.1.2. The embankment would then be restored with slopes matching the existing dike using select fill and compacted as required. Construction equipment would include standard material-handling and earthwork equipment.

It is estimated that the maximum 4 acres of wetlands may be impacted during the work associated with this alternative. Individual culvert location impacts should be much less than this acreage.

2.2 ISSUES AND BASIS FOR CHOICE

The replacement and removal of the culverts are needed to lower the unacceptable risk posed by these components in the system. This action is for immediate maintenance and risk reduction strategies that will be utilized in the rehabilitation of the dike system. A system wide Dam Safety Modification (DSM) Report will systematically address all components of the project.

Total rehabilitation objectives include eliminating as many defects in the HHD system as practical to achieve the overall goal of reducing the project risk due to the high probability of failure and associated potential life loss. Each replacement or removal of culverts with an operational function and removal of abandoned or already determined not in use culverts effectively reduces a high risk point in the HHD system.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

Though preferred from a dam safety perspective, the complete removal of all culverts (Alt 2) has a high probability of not allowing for continued flood control and irrigation of current operations and therefore is not a viable option. To replace culverts that are currently abandoned (Alt 3) is not a reasonable financial option as it would incur extra cost to replace culverts that are currently abandoned and buried, rather than remove them. Replacing culverts currently abandoned would also not increase dike stability and will therefore not be considered. Therefore, the No Action (Alt 1) and Preferred Action (Alt 4) will be fully analyzed throughout this document.

2.4 PREFERRED ALTERNATIVE(S)

The Preferred Alternative is Alternative 4, Replace and Remove Culverts. Removing culverts already abandoned and not in use, as well as replacing needed culverts to current design standards, increases the stability of the embankment and allows continued use of culverts for irrigation and flood control. The No Action Alternative does not address the imminent need for public safety according to current dam safety standards.

2.5 ALTERNATIVE AND PREFERRED PLAN

Table **3** compares the impacts of the Preferred Plan (Alt 4) to the impacts of the No Action Alternative (Alt 1). Section 4, Environmental Effects, compares the impacts of the two alternatives in more detail.

Table 3. Summary of Direct and Indirect Impacts

ENVIRONMENTAL FACTOR	NO ACTION	REPLACE & REMOVE CULVERTS (PREFERRED ALT)
Vegetation	Vegetation (tree & shrub) will continue to be removed within 50 feet (ETL 1110-2-571) away from the toe of embankment (but within the Federal right-of-way) as directed by dam safety regulations as part of normal operations and maintenance.	Vegetation (tree & shrub) will be removed within 50 feet (ETL 1110-2-571) away from the toe of embankment (but within the Federal right-of-way) as directed by dam safety regulations. Grassy vegetation will be reseeded upon completion of culvert replacement or removal.
Threatened and Endangered Species	There would be no adverse effects on endangered species with No Action. If the dike failed, there would be adverse effects on species and habitats directly on the dike and within the path of water.	The USACE has determined that all threatened and endangered species are not likely to be adversely affected by the Preferred Alternative. Culvert construction activities would result in species needing to temporarily forage in abundant wetland areas adjacent to construction footprint.
Wetlands	A failure of the dike would result in negative impacts to wetlands landside of the HHD.	Construction activities would result in temporary impacts to wetlands; however, native emergent wetland vegetation will be restored to preconstruction condition through planting emergent vegetation and also through natural recruitment.
Essential fish habitat	There is no designated EFH within the project footprint.	There is no designated EFH within the project footprint.
Water use and hydrology	The capability to discharge floodwaters from the lake is currently constrained by current structural capacity. The No Action would retain this same capacity.	Current operations will be maintained during replacement as justified on a temporary basis to prevent significant economic hardships. Upon replacement, water use and hydrology capabilities will continue as originally authorized.
Hydraulics	The No Action Alternative would not change the hydraulics of the HHD culverts.	Culverts proposed to be removed are already abandoned and replacement culverts will function as currently authorized.

ENVIRONMENTAL FACTOR	NO ACTION	REPLACE & REMOVE CULVERTS (PREFERRED ALT)
Water quality	The No Action Alternative will have no effect of water quality. However, if a breach in the dike occurs, potential pollutants and sediment could be transported to nearby waterways.	Little to no impact on water quality is expected as the operational use of culverts would not be changed as a result of the preferred alternative.
Air quality	The No Action would not affect air quality.	Minor short-term air quality effects would be from dust or airborne particulates from earthwork, equipment exhaust and unpaved roads accessed for the project. This would only occur during construction.
Hazardous, toxic and radioactive waste	If there is a breach in the dike, some lands adjacent to the dike breach may be subject to HTRW contamination as a result of the dispersal of otherwise contained pollutants on private lands.	The removal or replacement of culverts is not expected to result in the discovery or generation of HTRW materials. If discovered, contractors will be instructed to rectify the situation in accordance with applicable state & Federal laws.
Noise	No changes to current noise levels would result.	Heavy machinery associated with construction would increase noise levels temporarily and would be limited to each culvert area under construction.
Aesthetics	Short-term impacts to aesthetics are anticipated, as patches and temporary emergency construction would be necessary to repair ongoing piping and boils.	Temporary, short-term impacts to localized areas would result from construction activities and the movement of construction equipment through lands designated for staging and construction. The LOST trail for viewing Lake Okeechobee from the top of the dike would be closed adjacent to the culverts during construction activities.
Socioeconomics	The No Action Alternative could have adverse effects to urban and agricultural areas if there is a breach in the dike. This could result in loss of property, life and businesses.	Temporary effects could include increased traffic congestion and some reduction of tourism during construction. However, local residents could benefit by creation of construction jobs during the project.

ENVIRONMENTAL FACTOR	NO ACTION	REPLACE & REMOVE CULVERTS (PREFERRED ALT)
Recreation resources	Short-term impacts to recreation are anticipated, as patches and temporary emergency construction would be necessary to repair ongoing piping and boils. Affected areas would be closed during construction.	There will be temporary impacts to the LOST trail during construction activities. However, there are multiple access points to enter and exit the trail and closings will be coordinated with the FDEP and the Office of Greenways and Trails.
Public safety	There is a high probability of failure at the culverts which could result in potential life loss should a catastrophic breach occur.	Public safety would be improved by the Preferred Alternative.
Historic properties	Adverse effects to the HHD and other historic properties in close proximity to the HHD could occur as a result of a breach in the dike.	Removal and replacement of culverts will not adversely affect the eligibility of Herbert Hoover Dike for listing on the National Register of Historic Places.

3 AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected on the HHD if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or be affected by the alternatives if they were implemented. This section, in conjunction with the description of the No Action Alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives. This report presents affected environments assuming all the culverts are the same, since they will either be replaced in-kind or removed due to current inactive or abandoned status.

3.1 GENERAL ENVIRONMENTAL SETTING

Water resources, wetlands, threatened and endangered species, state listed species, socio-economics, cultural resources, recreation, hazardous, toxic and radioactive wastes, noise, air quality and aesthetics are discussed in this section. It is anticipated that the project's impacts will be limited to these environmental resources.

3.2 VEGETATION

The vegetation within the Lake Okeechobee region has been greatly altered during the last century. Historically, the natural vegetation was a mix of freshwater marshes, hardwood swamps, cypress swamps, and pine flatwoods. Although some of these natural areas still exist, the introduction of controlled drainage for agriculture and land development has resulted in a significantly different set of cover types.

Landward of the HHD, sugar cane plantations, improved pasture, row crops, and urban lands now prevail. The exotic invasive plants melaleuca (*Melaleuca quinquenervia*), Australian pine (*Casuarina* sp.), and Brazilian pepper (*Schinus terebinthifolius)* are found throughout the area. In the toe ditch and the network of canals, nuisance vegetation exists, including species such as water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), hydrilla (*Hydrilla verticillata*), cattails (*Typha* sp.), and bamboo (*Arundinaria* sp.).

The major cover types lakeward of the HHD include open water and freshwater marshes. A 98,000-acre (154-square-mile) littoral zone is found along the lake's western edge and on the islands in its southern shore (Kraemer Island, Torry Island and Ritta Island, which together encompass 4,000 acres). The littoral zone supports more than 50 plant species and is composed of a mosaic of emergent and submergent plant species, along with floating-leaf plants. Emergent vegetation within the littoral zone is dominated by cattail, spike rush (*Eleocharis* sp.), and torpedo grass (*Panicum repens*). Submerged vegetation is abundant along the shores of Lake Okeechobee.

The HHD itself is covered with mixed grasses that are mowed on a regular basis with some shrubs, trees, and wetland vegetation on the southern and western edge of the project area at the toe of the embankment of the HHD.

3.3 THREATENED AND ENDANGERED SPECIES

The USFWS and the State of Florida have designated certain species of amphibians, invertebrates, reptiles, birds, mammals, gastropods, and plants and lichens in Glades, Hendry, Okeechobee, Palm Beach and Martin counties as threatened or endangered (Table 4). The 2001 Fish and Wildlife Coordination Act Report (FWCAR) for Reach 1 cites the following federally listed species as having been observed along the HHD: wood stork (*Mycteria americana*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), eastern indigo snake (*Drymarchon couperi*), Okeechobee gourd (*Cucurbita okeechobeensis)*, and Audubon's crested caracara (*Polyborus plancus audubonii).* Bald eagles and bald eagle nests were also cited in the report as having been observed near the HHD. Although no longer listed as threatened or endangered, bald eagles are protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In addition, the FWCAR states the West Indian manatee is known to inhabit Lake Okeechobee.

Table 4. Federal and State Listed Land Plant and Animal Species Occurring in Glades, Hendry, Martin, Okeechobee, and Palm Beach Counties, Florida

Scientific Name	Common Name	Federal Status	State Status
Amphibians			
Rana capito	Gopher frog	Not listed	S*
Reptiles			
Alligator mississippiensis	American alligator	SAT**	S
Caretta caretta	Loggerhead sea turtle	Threatened	Threatened
Chelonia mydas	Green sea turtle	Endangered	Endangered
Crocodylus acutus	American crocodile	Threatened	Endangered
Drymarchon couperi	Eastern indigo snake	Threatened	Threatened
Eumeces egregius lividus	Bluetail mole skink	Threatened	Threatened
Gopherus polyphemus	Gopher tortoise	Not listed	Threatened
Pituophis melanoleucus mugitus	Florida pine snake	Not listed	S
Birds			
Ammodramus savannarum floridanus	Florida grasshopper sparrow	Endangered	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened	Threatened
Aramus guarauna	Limpkin	Not listed	S
Athene cunicularia	Burrowing owl	Not listed	S
Calidris canutus rufus	Red knot-migrant	Candidate	Candidate
Campephilus principalis	Ivory-billed woodpecker	Endangered (Historic)	Endangered
Charadrius melodus	Piping plover	Threatened	Threatened
Egretta caerulea	Little blue heron	Not listed	S
Egretta thula	Snowy egret	Not listed	S
Egretta tricolor	Tricolored heron	Not listed	S
Eudocimus albus	White ibis	Not listed	S
Falco sparverius paulus	Southeastern American kestrel	Not listed	Threatened
Grus Americana	Whooping crane	Endangered	S
Grus canadensis pratensis	Florida sandhill crane	Not listed	Threatened

Scientific Name	Common Name	Federal Status	State Status
Haematopus palliates	American oystercatcher	Not listed	S
Haliaeetus leucocephalus	Bald eagle	PS***	Not listed
Mycteria americana	Wood stork	Endangered	Endangered
Pandion haliaetus	Osprey	Not listed	S
Pelecanus occidentalis	Brown pelican	Not listed	S
Picoides borealis	Red-cockaded woodpecker	Endangered	S
Platalea ajaja	Roseate spoonbill	Not listed	S
Polyborus plancus audubonii	Audubon's crested caracara	Threatened	Not listed
Rostrhamus sociabilis plumbeus	Snail kite	Endangered	Endangered
Rychops niger	Black skimmer	Not listed	S
Sterna antillarum	Least tern	Threatened	Threatened
Invertebrates			
Anaea troglodyte floridalis	Florida's leafwing butterfly	Candidate (historical)	Not listed
Strymon acis bartrami	Bartram's hairstreak butterfly	Candidate (1974)	Not listed
Mammals			
Podomys floridanus	Florida mouse	Not listed	S
Puma concolor coryi	Florida panther	Endangered	Endangered
Puma concolor	Puma	Threatened	Endangered
Sciurus niger shermani	Sherman's Fox Squirrel	Not Listed	S
Trichechus manatus	Manatee	Endangered	Endangered
Ursus americanus floridanus	Florida black bear	Not Listed	Threatened
Gastropods (Snails and Allies)			
Orthalicus reses reses	Stock Island tree snail	Threatened	Endangered
Plants and Lichens			
Acrostichum aureum	Golden leather fern	Not Listed	Threatened
Argusia gnaphalodes	Sea lavender	Not Listed	Endangered
Asimina tetramera	Four-petal pawpaw	Endangered	Endangered
Calopogon multiflorus	Many-flowered grasspink	Not Listed	Endangered
Chamaesyce cumulicola	Sand-dune spurge	Not Listed	Endangered
Cladonia perforata	Perforate reindeer lichen	Endangered	Endangered
Coccothrinax argentata	Silver palm	Not Listed	Threatened
Cucurbita okeechobeensis	Okeechobee gourd	Endangered	Endangered
Dalea carthagenensis floridana	Florida prairie cover	Candidtate (1918)	Endangered
Dicerandra immaculate	Lakela's mint	Endangered	Endangered
Glandularia maritima	Coastal vervain	Not Listed	Endangered
Halophila johnsonii	Johnson's seagrass	Threatened	Threatened
Hypericum edisonianum	Edison's ascyrum	Not Listed	Endangered
Jacquemontia reclinata	Beach jacquemontia	Endangered	Endangered
Lantana depressa var. *floridana*	Atlantic Coast Florida lantana	Not Listed	Endangered
Lantana depressa var.*sanibelensis*	Gulf Coast Florida lantana	Not Listed	Endangered
Lechea cernua	Nodding pinweed	Not Listed	Threatened
Lechea divaricata	Pine pinweed	Not Listed	Endangered
Liatrus ohlingerae	Scrub blazing star	Endangered	Endangered
Linum carteri var. *smallii*	Carter's large-flowered flax	Not Listed	Endangered

Scientific Name	Common Name	Federal Status	State Status
Nemastylis floridana	Celestial lily	Not Listed	Endangered
Okenia hypogaea	Burrowing four-o'clock	Not Listed	Endangered
Ophioglossum palmatum	Hand fern	Not Listed	Endangered
Panicum abscissum	Cutthroat grass	Not Listed	Endangered
Paronchia chartacea	Papery whitlow-wort	Threatened	Endangered
Polygala lewtonii	Lewton's polygala	Endangered	Endangered
Polygala smallii	Tiny polygala	Endangered	Endangered
Pteris bahamensis	Bahama brake	Not Listed	Threatened
Pteroglassaspis ecristata	Giant orchid	Not Listed	Threatened
Sacoila lanceolata var. *paludicola*	Fahkahatchee ladies' tresses	Not Listed	Threatened
Schizaea pennula	Ray fern	Not Listed	Endangered
Tephrosia angustissima var. *cutissii*	Coastal hoary-pea	Not Listed	Endangered
Thelypteris serrata	Toothed maiden fern	Not Listed	Endangered
Tillandsia flexuosa	Banded wild-pine	Not Listed	Threatened
Tolumnia bahamensis	Dancing-lady orchid	Not Listed	Endangered
Warea carteri	Carter's mustard	Endangered	Endangered
Critical Habitat			
Rostrahamus sociabilis plumbeus	Everglade snail kite	Endangered	Endangered
Trichechus manatus	West Indian Manatee	Endangered	Endangered
Chelonia mydas	Green sea turtle	Endangered	Endangered
Halophila johnsonii	Johnson's seagrass	Threatened	Threatened

* Species of Special Concern (S) is a species, subspecies, or isolated population that is facing a moderate risk of extinction in the future.
** The American alligator is currently federally designated as *Similarity of Appearance to a Threatened Taxon (SAT).*
***The bald eagle is federally listed as PS—Proposed for listing as Species of Special Concern.
Source: USFWS; Florida Natural Area Inventory, September 2009.

Federally threatened or endangered species known to occur in the project area are listed below and nesting bird activity and critical habitat onsite are shown in Appendix A.

Audubon's Crested Caracara: The crested caracara is a unique raptor scavenger in the family Falconidae that reaches the northern limit of its geographic range in the southern U.S. In Florida, this raptor occurs as an isolated population in the south-central region of the state. Changes in land use patterns throughout central Florida have resulted in this population becoming a subject of concern. This raptor apparently now occurs almost exclusively on privately owned cattle ranches in the south-central part of the state.

Available evidence suggests that the most serious threat to Florida's caracara population is loss or degradation of nesting and feeding habitat. Such loss is most commonly due to conversion of pasture and other grassland habitats and wetlands to citrus, sugar cane, other agriculture, and urban development. Adult caracaras exhibit high site- and mate-fidelity; therefore, extensive loss of habitat within the home range, particularly of the nesting site itself, may cause the pair to abandon that home range, or at least the nesting site (Morrison, 2001).

The Audubon's crested caracara is known to occur in the vicinity of the HHD (USFWS, 2001).

Eastern Indigo Snake: The eastern indigo snake has been classified as a threatened species by the USFWS since 1978 and by the state since 1971. It is the largest non-venomous snake in North America, sometimes growing to a length of more than six feet. The range of the eastern indigo snake historically extended from South Carolina through Georgia and Florida to the Keys, and west to southern Alabama and Mississippi. The snake is now known to occur only in Florida and the Coastal Plain of southern Georgia.

The eastern indigo snake prefers drier habitats, but it may be found in a variety of habitats. In southern Florida, the snake can be found in wet prairies, mangrove swamps, and hydric hardwood hammocks (Schaefer and Junkin, 1990). Farther north, in winter it is found almost exclusively in sandy habitats of the Florida scrub communities, typically in association with gopher tortoises. From spring to fall, they can also be found in pine-hardwood forests, mixed hardwood forests, creek bottoms, and agricultural fields (USFWS, 1999; Hallam *et al*., 1998).

The species needs relatively large areas of undeveloped land to maintain populations. The main reason for its decline is habitat loss, conversion, and degradation due to development. Further, as habitats become fragmented by roads, indigos become increasingly vulnerable to highway mortality (Schaefer and Junkin, 1990).

The Eastern indigo snake is known to occur in the vicinity of the HHD (USFWS, 2001).

Everglade Snail Kite: The snail kite is listed as an endangered species by both the USFWS and the State of Florida. Although previously located in freshwater marshes over a considerable area of peninsular Florida, the range of the snail kite is now limited to several impoundments on the headwaters of the St. John's River, the southwest side of Lake Okeechobee, the eastern and southern portions of Water Conservation Areas (WCAs) 1, 2A and 3, the southern portion of WCA 2B, the western edge of WCA 3B, and the northern portion of Everglades National Park (USFWS, 1996).

The kite inhabits relatively open freshwater marshes that support adequate populations of apple snail (*Pomacea* sp.), upon which this bird feeds almost exclusively. Favorable areas consist of extensive shallow, open water such as sloughs and flats, vegetated by sawgrass (*Cladium jamaicense*) and spike rush. The areas are often interspersed with tree islands or small groups of scattered shrubs and trees that serve as perching and nesting sites. The water level must be sufficiently stable to prevent loss of the food supply through drying out of the surface.

The snail kite is threatened primarily by habitat loss and destruction. Widespread drainage has permanently lowered the water table in some areas. This drainage permitted development in areas that were once kite habitat. In addition to loss of habitat through drainage, large areas of marsh are heavily infested with water hyacinth that inhibits the kite's ability to see its prey (USFWS, 1996).

Based on the description in the Federal Register (1977), snail kite critical habitat in Lake Okeechobee is located in the western parts of Glades and Hendry Counties, extending along the western shore to the east of the dike system and the undiked high ground at Fisheating Creek, and from the Hurricane Gate at Clewiston northward to the mouth of the Kissimmee River, including all the spike rush (*Eleocharis* sp.*)* flats of Moonshine Bay, Monkey Box, and Observation Shoal, but excluding the open water north and west of the northern tip of Observation Shoal north of Monkey Box and east of Fisheating Bay. Critical habitat for the snail kite includes the southwest and western shore of Lake Okeechobee from Clewiston to the Kissimmee River (excluding deep open water) (USFWS, 1996). In the project area, this critical habitat includes the area along the HHD in L-D1, L-D3, L-D50, L-49, and L-48 (Figure 5).

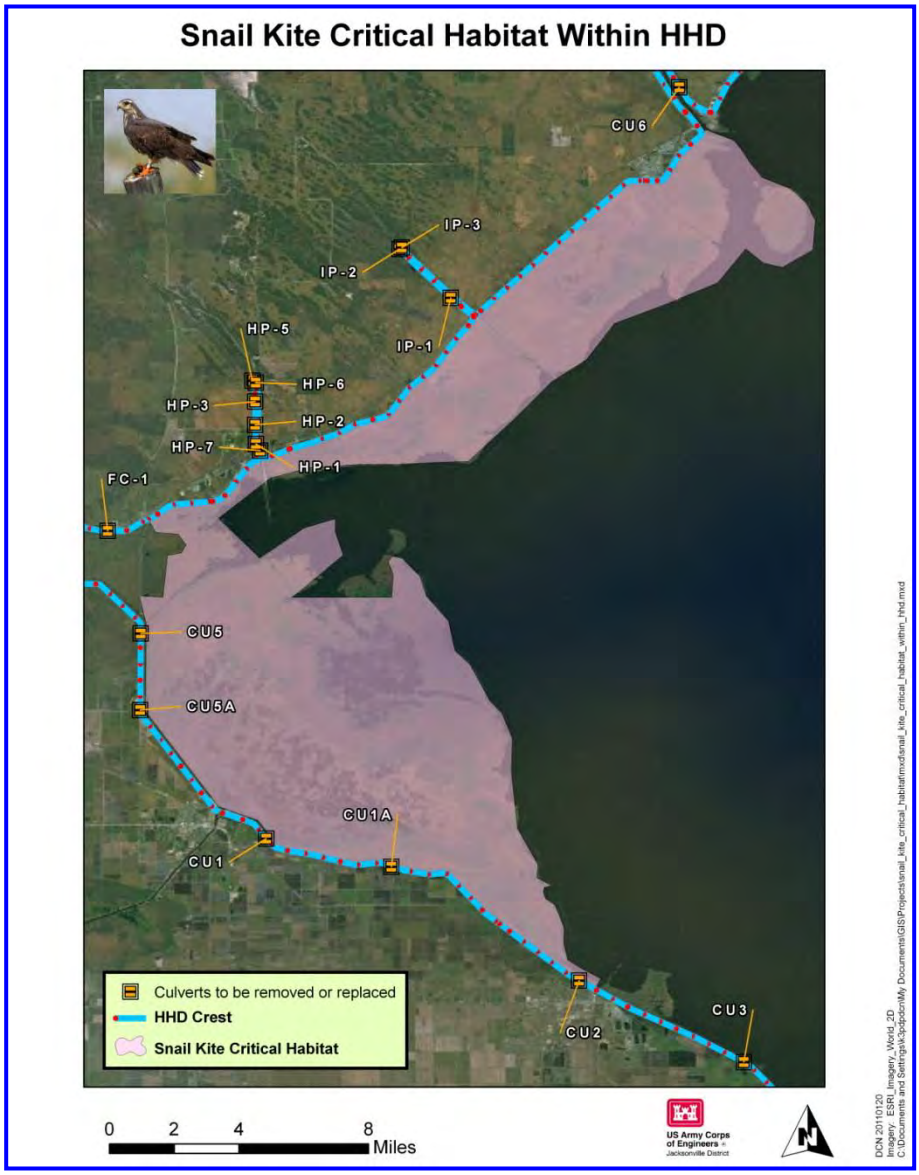

Figure 5. Snail Kite Critical Habitat

Okeechobee Gourd: The Okeechobee gourd is a vigorous annual vine, with a listed status of both federally and state endangered. Historically, this gourd was found on the southern shore of Lake Okeechobee, in Palm Beach County, and formerly in the Everglades. The Okeechobee gourd has been observed along the HHD.

West Indian Manatee: The manatee is currently listed as an endangered species by both the USFWS and the state. This large, plant-eating aquatic mammal can be found in the shallow coastal water, rivers, and springs of Florida. In general, Florida is the northern extent of the manatee's range, though manatees are occasionally reported farther north along the east coast and the Gulf of Mexico (FP&L, 1989). The manatee lives in freshwater, brackish, and marine habitats, and can move freely between salinity extremes. It can be found in both clear and muddy water. Water depths of at least three to seven feet are preferred, and flats and shallows are avoided unless adjacent to deeper water. During summer, manatees range throughout the coastal waters, estuaries, bays, and rivers of both coasts of Florida and are usually found in small groups. During winter, manatees tend to congregate in warm springs and outfall canals associated with electric generation facilities (FP&L, 1989).

In the past, the principal sources of manatee mortality have been opportunistic hunting and unusually cold winters. Today, poaching is rare, but high mortality rates from human-related sources threaten the future of the species. The largest single mortality factor is collision with boats and barges. Manatees also are killed in floodgates and canal locks, by entanglement or ingestion of fishing gear, and through loss of habitat and pollution (FP&L, 1989).

The manatee is known to inhabit Lake Okeechobee (USFWS, 2001).

Wood Stork: Wood storks are listed as an endangered species by both the USFWS and the State of Florida. It is the only stork occurring in the United States. In the U.S., the wood stork's range includes Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas. However, the only states where this bird is known to nest are Florida, Georgia, and South Carolina (Mazzotti, 1990). Wood storks are wetland dwellers and use fresh, brackish and saltwater habitats for feeding and nesting. Feeding takes place in shallow ponds, tidal pools, swamps and marshes. Nesting occurs in cypress, hardwoods and mangrove swamps. The dependence of the wood stork on naturally functioning wetlands makes it an excellent indicator of the health of wetland ecosystems (Mazzotti, 1990).

Until the last half century, the wood stork was a common sight in Florida wetlands. However, between the 1930s and 1960s, there was a serious decline in this species. One reason for the decline in population has been the changes in the hydrologic regime of the Everglades, which affected its foraging habitat and food production (Mazzotti, 1990).

The wood stork is known to occasionally feed in the toe ditch wetlands of the HHD. However, the principal habitat in the area for the wood stork is within the littoral zone of Lake Okeechobee (USFWS, 2001).

3.4 WETLANDS

Wetlands occur in the toe ditches around the HHD. Typical vegetation in the toe ditch wetlands includes baby bluestem (*Andropogon* spp.), rush fuirena (*Fuirena scirpoidea*), bald cypress (*Taxodium distichum*), begger's tick (*Torilis arvensis*), matchhead (*Phyla* sp.), alligator weed (*Alternanthera philoxeroides*), Brazilian pepper, common reed (*Phragmities austalis*), common hackberry (*Celtis occidentalis*), elderberry (*Sambucus nigra* subsp. *canadensis*), smartweed (*Polygonum* sp.), southern willow (*Salix caroliniana*), cabbage palms (*Sabal palmetto*), sweetscent (*Pluchea odorata*), day flower (*Commelina* sp.), pennywort (*Hydrocotyle* sp.), Australian pine, water hyacinth, cattails, and water lettuce. Although wetlands present on the landward side of the HHD (toe ditch) may not be considered high quality ecosystems, they host small fishes and invertebrates and provide usable foraging habitat for wading birds, alligators, and turtles. High quality wetland habitat can be found in the extensive littoral zone covering the western side of Lake Okeechobee. This habitat is outside of the proposed project footprint.

3.5 ESSENTIAL FISH HABITAT

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) works with the regional fishery management councils to identify the essential habitat for every life stage of each federally managed species using the best available scientific information. Essential fish habitat has been described for approximately 1,000 managed species to date. There is no essential fish habitat, as designated by the NMFS, within the project area.

3.6 WATER USE AND HYDROLOGY

The Federal culverts that will be replaced range from one to six barrels. Each culvert will be evaluated prior to replacement or removal as to its function, need, and permitted use. The SFWMD manages the surface water management and water use permitting processes within its boundaries under authority of Chapter 373, State Statutes, 40E, Florida Administrative Code (F.A.C.). A surface water management permit allows a user to discharge a specified amount of water from a surface water system. A water use permit allows a user to withdraw a specified amount of water, either from the ground, a canal, a lake, or a river. The water can be used for public water supply, for industrial processes, or to irrigate crops, nursery plants or golf courses. The USACE recognizes that some culverts have permitted users and these permitted users will be contacted during the design phase of this process. Permitted discharge and water use will be considered during construction. Bypass pumping, use of existing water control structures and systems, and/or other means of providing drainage and water supply during construction will be investigated during the design phase of this process.

The purpose of this section is to describe the general watershed characteristics for the 32 Federal culverts within the HHD system.

Inflow to the lake for drainage purposes and outflow for agricultural water supply and other purposes such as Lake Okeechobee regulated releases are made through a series of Federal, state, and local drainage district culverts that penetrate the HHD. The majority of inflow enters Lake Okeechobee through several major canals and control structures, but for the purpose of this section, the focus is on the culvert inflow. In general, excess runoff from the drainage basins are gravity fed to the canals and structures on the north, east, and west shores of Lake Okeechobee and pumped to the canals and structures on the south shore of the lake. The Lake Okeechobee drainage area, including the lake, is approximately 5,600 square miles.

Inflow enters from the north, east, and west of Lake Okeechobee through the following watersheds: Kissimmee River, Taylor Creek-Nubbin Slough, Fisheating Creek, Nicodemus Slough, and Istokpoga. Inflow enters from the south of Lake Okeechobee through mostly local water control districts in the watershed designated the 'South Shore' below. These basin discharges are generally pumped back into the lake for flood control purposes and in some cases pumped back into the lake through the culvert penetrations. In general, the culverts along the south shore have both surface water management permits for drainage to the lake and agricultural irrigation purposes for water supply from the lake.

The largest outlets of the lake include the St. Lucie Canal (C-44) and the Caloosahatchee River (C-43). Four major agricultural canals (West Palm Beach, Hillsboro, North New River, and Miami) drain to the south into the Water Conservations Areas (WCAs).

Figure 6 shows the major Lake Okeechobee hydrologic features including the contributing watersheds to the north, east, and west, and the local water control districts along the south shore of the lake. The following paragraphs describe the watersheds that serve the 32 culverts.

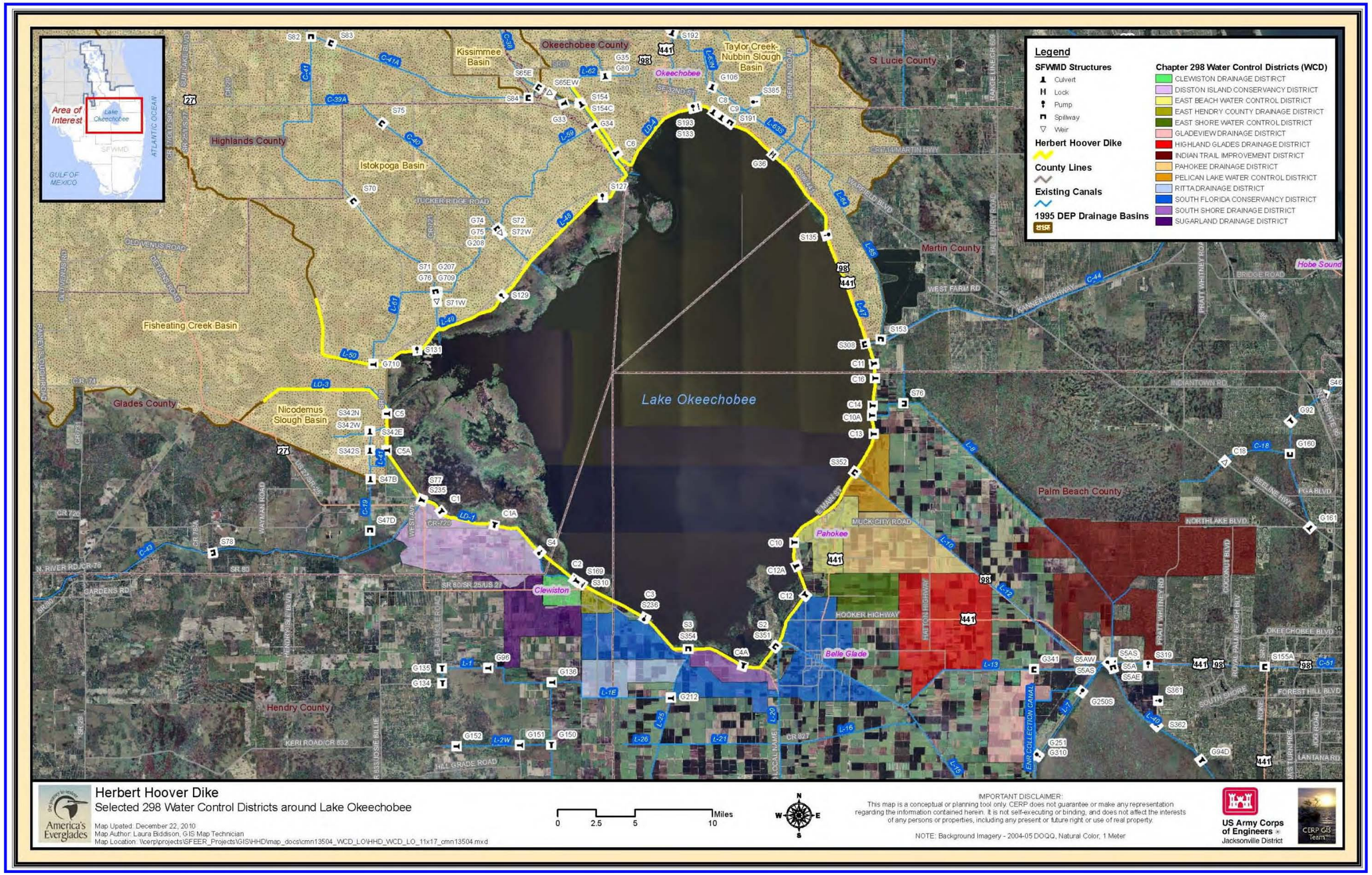

Figure 6. Major Lake Okeechobee Hydrologic Features and Watersheds

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Taylor Creek-Nubbin Slough
The Taylor Creek-Nubbin Slough drainage area bordering the north and northeast shores of Lake Okeechobee encompasses about 309 square miles and extends from the Kissimmee River (C-38) to the St. Lucie Canal (C-44). All inflow from this watershed is controlled. There are five culverts in the basin: 6, 7 (abandoned), 8, 9 (abandoned), and Taylor Creek Culvert (abandoned).

Kissimmee River
The Kissimmee River drainage basin encompasses about 2,260 square mile and extends from Orlando southward to Lake Okeechobee at the mouth of the Kissimmee River (C-38). The basin is the largest source of surface water flow to Lake Okeechobee with the inflow from C-38 controlled at SFWMD structure S-65E. There are two culverts that discharge into C-38 south of S-65E: KI-1 and KI-2.

Istokpoga
The Istokpoga drainage basin borders the northwest shore of Lake Okeechobee from C-38 to Fisheating Creek and encompasses about 1,070 square miles. Levees isolate the two main canals, Indian Prairie Canal (C-40) and Harney Pond Canal (C-41) from the watershed. There are three culverts that discharge into Indian Prairie Canal (C-40): IP-1, IP-2, and IP-3, six culverts that discharge into Harney Pond Canal (C-41): HP-1, HP-2, HP-3, HP-5, HP-6, and HP-7 and one culvert that discharges into the L-50 borrow canal (FC-1).

Nicodemus Slough
The Nicodemus Slough drainage basin borders the southwest shore of Lake Okeechobee extending from Fisheating Creek to Culvert 5A just north of the Caloosahatchee River watershed. The area encompasses about 39 square miles and normally drains to Lake Okeechobee. When lake levels are abnormally high, it is necessary to drain some of Nicodemus Slough south to the Caloosahatchee River. There are two culverts in the basin: 5 and 5A.

South Shore
The South shore of Lake Okeechobee extends from Moore Haven at the Caloosahatchee River to Port Mayaca at the St. Lucie Canal. The drainage areas associated with these culverts are local water control districts mostly contained within the Everglades Agricultural Area (EAA), but also include U.S. Sugar, Trucane, Lake Point and Five Smooth Stones. The EAA is divided into seven drainage basins and is comprised of a network of canals, structures, and levees that divide the area to provide for the removal of excess water to Lake Okeechobee and the WCAs to the south. The local drainage districts, also referred to as '298 Districts', have private pump stations that discharge to Lake Okeechobee or the EAA canals. There are 13 culverts in the basin: 1, 1A, 2, 3, 4A, 10, 10A, 11, 12, 12A, 13, 14, and 16.

3.7 WATER QUALITY

3.7.1 Surface Water
Lake Okeechobee has been designated by the FDEP as a Class I water body (drinking water supply). The surface water in the HHD toe ditch and nearby canals meets most Class III water quality standards (recreation and maintenance of healthy fish and wildlife populations).

However, the water in the lake and canals has elevated concentrations of nutrients (phosphorus and nitrogen). The Clean Water Act requires states to classify their surface waters according to designated uses and to develop water quality standards. If water bodies are not meeting the standards, states are required to develop Total Maximum Daily loads (TMDLs). TMDLs establish the maximum amount of a pollutant that a water body can assimilate without causing an exceedance of water quality standards. Nutrient loads within the Lake Okeechobee Basin are regulated under the Lake Okeechobee Protection Act (LOPA). Cooperating state agencies developed the Lake Okeechobee Protection Plan (LOPP) to outline strategies to reduce phosphorus loading to the lake and to meet the total phosphorus TMDL of 140 metric tons by 2015. The LOPP specifies the implementation of Best Management Practices and construction of large regional facilities to capture phosphorus. The plan contains a schedule for subsequent phases of phosphorus load reduction consistent with the TMDLs. A reduction in Lake Okeechobee phosphorus is desired, in part, to reduce the occurrence of blue-green algal blooms in the lake, and to reduce the adverse effects of phosphorus on downstream systems, including the Caloosahatchee River Basin and the St. Lucie River Basin. Because high lake stages during flood events compromise the integrity of the HHD, the lake level is reduced as rapidly as possible to make room for the next possible flood event. This requires harmful freshwater releases to the downstream estuaries.

3.7.2 Groundwater

The surficial groundwater aquifer in the vicinity of the eastern and southern portions of the HHD extends from the land surface (8.7 feet NAVD88) to a depth of -180 feet. The upper portion of this aquifer is potable to a depth of approximately -50 feet elevation. Rural houses and agricultural operations adjacent to the eastern and southern portions of Lake Okeechobee use shallow wells as a source of drinking and irrigation water. The groundwater below elevation -50 feet is not considered potable due to its high salt content.

3.8 AIR QUALITY

The U.S. Environmental Protection Agency's (EPA) AirData database contains measurements of air pollutant concentrations for the entire U.S. The measurements include both criteria air pollutants and hazardous air pollutants and are compared against the National Ambient Air Quality Standards (NAAQS) specified by the EPA. The AirData database was queried for air quality data between 2002 and 2006 within the project area. The data shows that Glades, Hendry, Martin, Okeechobee, and Palm Beach counties are currently in attainment for all six criteria air pollutants. The AirData database also provides annual summaries of Air Quality Index (AQI) values for counties or metropolitan areas. The AQI is an approximate indicator of overall air quality, because it takes into account all of the criteria air pollutants measured within a geographic area. The AQI summary values include both qualitative measures (i.e., days of the year having "good" air quality) and descriptive statistics (i.e., median AQI value). The AQI for Palm Beach County, the most developed portion of the study area indicates that air quality is generally good, with no periods when air quality is classified as unhealthy for sensitive groups. Of the six criteria air pollutants, ozone and particulate matter of 2.5 mm or less are most likely to occur within this county. However, the air quality is within NAAQS limits for these parameters.

3.9 HAZARDOUS, TOXIC AND RADIOACTIVE WASTES

Hazardous, toxic, and radioactive waste (HTRW) surveys have been conducted as part of EAs and EISs prepared as part of the prior HHD rehabilitation efforts. In December 2007, a HTRW survey of the HHD was conducted using aerial imagery and a contaminated site and petroleum storage site database compiled by the FDEP. A windshield survey was conducted to verify the findings of the desktop survey. The survey was updated in August 2009 for the Reach 1A SEIS (USACE 2010) and in February 2010 for L-D1 and L-D2. The purpose of the last two surveys was to preliminarily identify potential contamination sites within 500 feet of the HHD in L-D1, L-D2, and L-D9. The results of these surveys show that agricultural and rural residential development has resulted in HTRW contamination in areas adjacent to the HHD; however, no contaminated areas or materials were found within the Federal right-of-way.

3.10 NOISE

The predominant sources contributing to the overall ambient noise level include: vehicular traffic on road systems adjacent to the HHD, boat traffic along the rim canal, small industry (i.e., produce processing and distribution), urban activities in Moore Haven, Clewiston, and Belle Glade, agricultural equipment (tractors, trucks, etc.), and pumping stations.

Rural areas typically have noise levels of 35-55 decibels. Sound levels along transportation arteries are typically in the range of 70 decibels. According to the Florida Department of Transportation's (FDOT) State Environmental Management's Office, no known ambient noise monitoring has been conducted in the project area; consequently, no quantitative data on noise levels within the project area are available for analysis.

3.11 AESTHETIC RESOURCES

There are many public access points to view Lake Okeechobee from the elevated vantage point of the dike crest along the length of the HHD. In addition, the Lake Okeechobee Scenic Trail (LOST) runs atop the HHD around the entire lake, totaling approximately 110 miles.

The dike crest affords panoramic views of the flat agricultural (mostly sugarcane) fields and rim canal to the south, southwest, and southeast of the HHD. The extensive littoral zone on the west side of the lake's perimeter can be viewed from the HHD in L-D1.

There are several parks adjacent to the HHD. These parks include resources such as ponds, picnic areas, restrooms, grassy fields, boat ramps, and other amenities.

3.12 SOCIOECONOMICS

Agriculture, recreation and tourism all play an important role in the local economy. An estimated 742,668 acres of irrigated agricultural lands are located in the Lake Okeechobee Service Area and 447,000 acres in the Everglades Agricultural Area (EAA). These agricultural lands and associated activities employ hundreds of people and account for hundreds of millions of dollars in revenue annually.

The lake and its associated waterways, shoreline, and the LOST on top of the HHD provide a wide variety of water-based recreation activities for local residents and tourists, including: fishing, boating, picnicking, sightseeing, camping, swimming, birding, hunting, biking, horse-back-riding, rollerblading, air boating and hiking. Additionally, the lake supports an active commercial fishing industry. This includes several different types of commercial fishing operations and landside support activities, such as marinas and wholesale and retail distribution facilities. There are also commercial fisheries on Lake Okeechobee that harvest the American alligator. Alligators are harvested from the lake population to supplement the stock in alligator farming operations.

3.13 RECREATION RESOURCES

A variety of recreational resources are enjoyed year-round on Lake Okeechobee. Each year, more than six million people visit Lake Okeechobee and the Okeechobee Waterway. Recreational resources in close proximity to the HHD include the Lake Okeechobee Scenic Trail, fishing and boating opportunities, campgrounds, and park and recreation areas.

3.14 PUBLIC SAFETY

The HHD system is paramount to public safety. The dike provides flood protection not only to towns immediately adjacent to the dike, but to a vast agricultural area south of the lake. Due to signs of dike instability during high water stages in the lake after the 2004 and 2005 hurricanes in South Florida, the SFWMD contracted for an expert review panel of the stability and safety of the HHD. Particular emphasis was placed on the structural stability of the dike with regard to seepage and water pressures within the embankment and erosion and potential overtopping concerns during large storm events. The technical review concluded that the current condition of the HHD poses a high probability of risk to the people and the environment of South Florida (BCI, 2006).

The term “dike failure” implies a catastrophic breaching of some portion of the HHD system. This situation would result in widespread flooding as waters from Lake Okeechobee pass through the breach and onto adjacent lands. In the event of a total breach, significant effects to human life, agriculture, property, soils, vegetation, water resources, and habitat would result.

3.15 HISTORIC PROPERTIES

The Herbert Hoover Dike has been determined eligible for inclusion on the National Register of Historic Places. Consultation with the SHPO and other interested parties is in process as of January 2011. Consultation with the Florida SHPO and other interested parties will continue until completion of the project.

4 ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of alternatives for the HHD project. See Table **3** in Section 2, Alternatives, for a summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects. The duration of construction at each culvert installation is expected to last up to 12 months. Culvert replacement actions will begin in late 2011.

4.1 GENERAL ENVIRONMENTAL EFFECTS

Lake Okeechobee is a major hydrologic feature of south Florida and the Everglades ecosystem; therefore, its waters play a critical role in the protection and enhancement of environmental resources. Fish and wildlife species are numerous and utilize the many natural areas around the lake. Implementation of the proposed culvert removal and replacement would cause some temporary disturbances to, and displacement of, components of the human and natural environments. Minimal effects to existing water resources and foraging habitat for wading birds and listed species are expected as well.

4.2 VEGETATION

4.2.1 No Action Alternative

The No Action Alternative would not result in changes from current requirements. Per ongoing maintenance of dam features, removal of shrubs and trees is mandatory (ETL 1110-20571). Preconstruction surveys will be mandatory prior to any tree removal to assess nesting bird activity. The grassy vegetation would not be affected with the No Action Alternative, but if the dike were to fail, vegetation in the path of the water flow would be negatively impacted.

4.2.2 Replace and Remove Culverts (Preferred Alternative)

Vegetation such as trees and shrubs will be removed within 50 feet (ETL 1110-2-571) from the toe of the embankment of the HHD (within the Federal right-of-way) as directed by dam safety regulations. Preconstruction surveys will be mandatory prior to any tree removal to assess nesting bird activity. During the culvert removal or replacement process, grassy vegetation on the embankment of the HHD would be removed. Upon completion of the culvert removal or replacement, the embankment would be reseeded or sod would be used to replace grassy vegetation. Emergent wetland vegetation will be replanted and allowed to naturally recruit.

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 No Action Alternative

The No Action Alternative would not have adverse effects on protected species. If the dike were to fail, species and habitats directly on the dike and within the path of the water would be negatively impacted, and snail kite critical habitat could be negatively impacted due to lower lake levels.

4.3.2 Replace and Remove **Culverts** (Preferred Alternative)

The USACE has determined that the preferred alternative is not likely to adversely affect any of the federally listed species known to occur within the project area. USFWS concurred with the USACE determination in March 2011 (Appendix E for concurrence letter). Informal consultation with the USFWS began on 10 December 2010 and an initiation package has been reviewed. Because the construction of culverts will potentially span a 10-year period (see Table 2 for estimated construction durations), design plans have not currently been established for each culvert. Consultation will continue during the design phase for each set of culvert replacements or removals due to these design constraints. All monitoring and survey of endangered species onsite will be conducted in accordance with survey protocol from the USFWS South Florida Ecological Services Office and website. (http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=3&programID=73&ProgramCategoryID=3)

Audubon's Crested Caracara

Audubon's crested caracara have been documented to nest near the project area, specifically nests have been reported south of Port Mayaca outside of the Federal right-of-way. Additionally, it is possible that nests could be found in other areas within the project area. Surveys will be conducted prior to the initiation of construction and during construction at each site to determine if caracara is present in the project area. Monitoring for caracara during the nesting season (January through April) and adaptively managing action activities within 985-4920 ft of the nests will ensure the action would not increase noise above ambient levels within nest protection areas of active caracara nests. If the project area is within a 4920 ft buffer of the consultation area, this would also be surveyed for nests because of the established buffer zone. The action may produce noise above ambient levels, however, mufflers and sound dampening equipment would be required during construction.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect, the Audubon's crested caracara.

Eastern Indigo Snake

Eastern indigo snakes may be found along the embankment of the HHD. Preconstruction surveys would be completed in the project area, monitors would be on site during all phases of construction, and construction crews would be educated on identifying the indigo snake and the precautions to take to prevent impacts to the indigo snake. Eastern indigo snake Standard Protection Measures will be included in the environmental protection plan to provide guidance. Onsite gopher tortoise burrows would be protected to the extent possible to provide snake habitat during construction. The habitat that would be temporarily impacted would be seeded or replaced by sod and is expected to recover within a few months of project completion.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect, the eastern indigo snake.

Everglade Snail Kite

Snail kites are known to nest near the project area (see Figure 7 for known nesting locations) but not directly near culverts 1, 1A, 2, 5 and 5A. These culverts are noted because they are adjacent to the critical habitat. In addition, snail kites forage within the southwestern Lake Okeechobee littoral zone. The action may produce noise above ambient levels, however, mufflers and sound dampening equipment would be required during construction. Preconstruction surveys would be completed prior to the initiation of construction activities. Monitoring kites during the nesting season (January through June) and adaptively managing action activities within 1640 ft of active snail kite nests will ensure the action will not increase noise above ambient levels within nest protection areas of active snail kite nests (Figure 7).

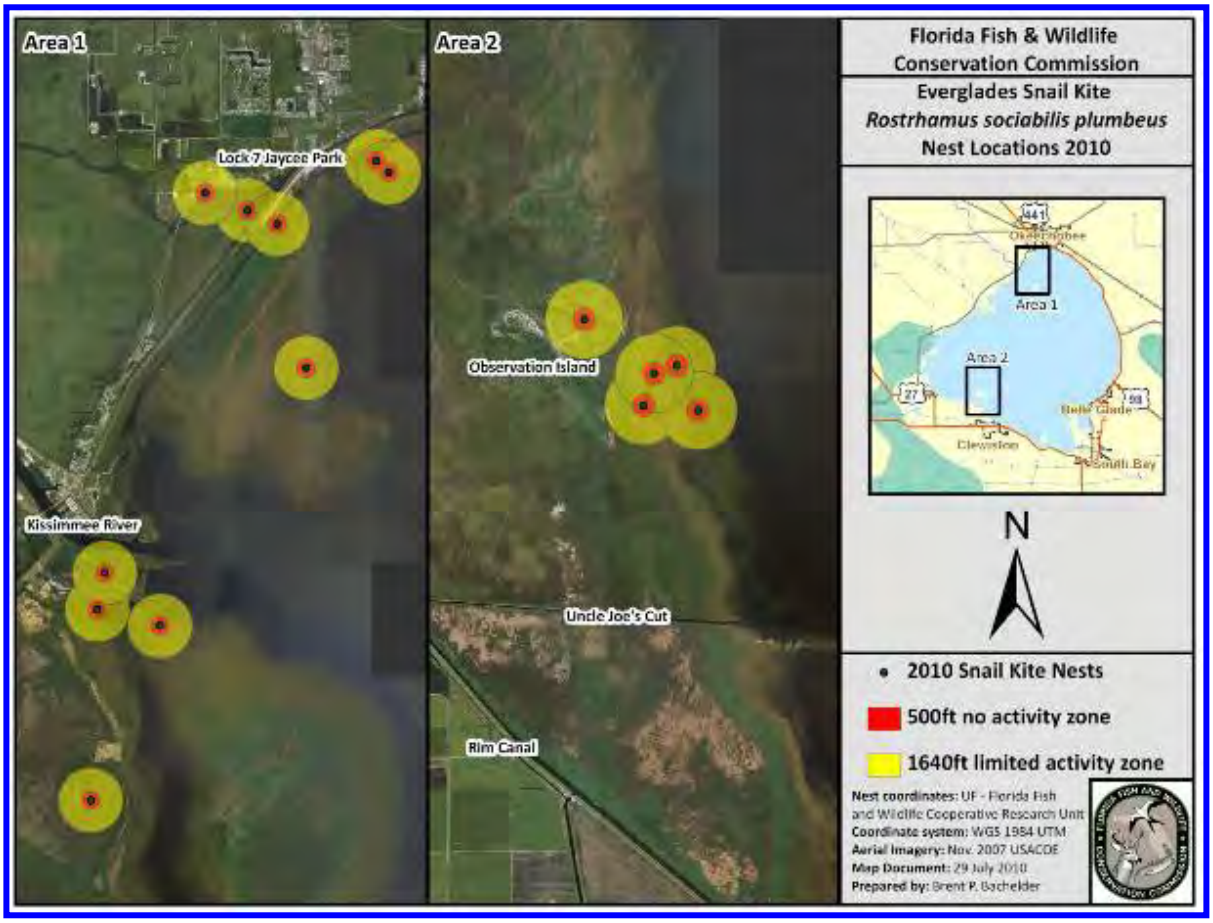

Figure 7. Everglade Snail Kite Nest Locations 2010

Portions of the toe ditch and the lake's edge within the cofferdam (the extent of construction) will be dewatered temporarily during construction, but foraging areas are available to the snail kite in other parts of Lake Okeechobee. In order to minimize impacts to the snail kite critical habitat, culverts within and adjacent (Culverts 1, 1A, 2, 5 and 5A) to the critical habitat (Appendix A) will use driven pile cofferdams which generally reduces the construction impact and footprint by approximately 50 percent. The construction footprint for Culverts 1 and 2 includes the grassy vegetation covering the HHD. The critical habitat (shapefile obtained from USFWS) is shown to extend onto the dike in this grassy vegetation. Upland grassy vegetation is not considered critical snail kite habitat. Therefore, the USACE does not expect the acreage amount of potential impact to be as large as depicted in Appendix A,

Figure 5. However, minimal temporary impacts may occur due to cofferdam placement and construction. The cofferdam will be removed upon completion of removal or replacement of the culverts. Disturbances to snail kite critical habitat will be temporary in nature due to construction activities, but would be restored to preconstruction conditions by replanting vegetation upon completion of construction to replenish the native seedbank. There would be no permanent loss of critical habitat.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect, the Everglade snail kite.

Okeechobee Gourd

The Okeechobee gourd is known to occur on the HHD. Preconstruction surveys would be completed to locate any plants within the construction footprint. If plants are found, the USFWS will be contacted to determine an appropriate course of action for removal and relocation of plants.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect the Okeechobee Gourd.

West Indian Manatee

Manatees are known to occur in Lake Okeechobee. The proposed action would produce noise above ambient levels. Preconstruction surveys would be completed to ensure that no manatees are harmed or harassed during construction. Surveys would also be conducted during construction of the cofferdam to determine if manatees are present in the area of construction. Manatee protection grates with openings no greater than eight inches by eight inches would be installed on all replacement culverts to prevent manatees from accessing culvert structures. The installation of cofferdams would prevent manatees from entering the construction zone and should prevent any disturbance to the manatees. No manatee critical habitat is adjacent or near the dike.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect, the West Indian manatee.

Wood Stork

Wood storks are known to forage within the toe ditch and nest near the proposed project area. The last noted colony near culvert HP-3 was about 3,400 feet away from the culvert. The action may produce noise above ambient levels, however, mufflers and sound dampening equipment would be required during construction. Project activities near foraging wood storks could temporarily displace individuals to other foraging areas available within the southwest littoral zone of Lake Okeechobee while construction is occurring on the culverts. Construction activity should take place no closer than 500-1500 ft to active colonies. Possible temporary displacement is not expected to adversely affect wood stork foraging opportunities or efficiency.

Conclusion: The Preferred Alternative may affect, but is not likely to adversely affect the wood stork.

4.4 WETLANDS

4.4.1 No Action Alternative

A failure of the dike system would affect wetlands landward of the HHD. Surging waters would erode soils, uproot vegetation, and physically alter the physiography. On the lakeside of the HHD, wetland effects due to lower lake levels would be minimal.

4.4.2 Replace and Remove Culverts (Preferred Alternative)

Construction activities at each of the culverts would temporarily impact wetlands adjacent to the HHD due to the construction of the cofferdam and dewatering of the area. The current estimate of maximum acreage of construction impact to wetlands would be approximately 4 acres for all 32 culverts. Individual culvert location impacts should be much less than this acreage. The extension of the culverts to the full width of the dike cross-section will result in the backfill of less than one acre per culvert of open water area at the mouth and exit of the culverts. The USACE will work in coordination with FDEP, USFWS, and the FFWCC to minimize any potential permanent wetland impacts during the design phase of each culvert. As previously mentioned, upon completion of construction and removal of cofferdams, emergent wetland vegetation comparable with preconstruction conditions would be planted on the lake side of the HHD. Emergent wetland vegetation should reestablish within the toe ditch upon removal of the cofferdam structure.

4.5 ESSENTIAL FISH HABITAT ASSESSMENT

Essential fish habitat (EFH) would not be affected by any of the alternatives as there is no designated EFH within the project footprint.

4.6 WATER USE AND HYDROLOGY

4.6.1 No Action Alternative

Because Lake Okeechobee's outlet capacity is less than its inflow capacity, the capability to discharge floodwaters from the lake is limited. Downstream constraints also limit the discharge capacity. Thus, it is important that the HHD is capable of withstanding severe hydraulic loads for extended lengths of time so that lake stages can be reduced gradually. Due to problems related to piping and internal erosion, HHD does not possess that capability in its present state.

The No Action Alternative would not change the hydraulics of the HHD. However, as stated in the purpose for this project, the HHD is at high risk of failure and its integrity needs to be addressed. If a breach were to occur, agricultural lands could be flooded, potentially causing loss of homes and an economic downturn.

4.6.2 Replace and Remove Culverts (Preferred Alternative)

Lake Okeechobee receives water principally from rainfall and runoff from watersheds of the Kissimmee River, Taylor Creek/Nubbin Slough, Lake Istokopoga and Fisheating Creek, all of which enter the lake from the north.

The USACE recognizes that there are permittees for most of the culverts and these permittees will be contacted by engineering during the design phase of this process. Permitted discharge

and water use will be considered during construction. Bypass pumping, use of existing water control structures and systems, and/or other comparable alternatives of providing drainage and irrigation during construction will be investigated during the design phase of this process.

Replacement of culverts will require two barrel structures at a minimum where single barrel structures currently exist (Figure 8). The double barrel redundancy will allow for taking one of the culverts out of service for inspection and maintenance while the other remains in service for drainage and water supply operations. Preliminary plan views of two barrel designs and earthen cofferdams are represented in Figure 9. Design and plan view of typical earthen cofferdams are represented in Figure 10 and Figure 11. In some cases, a three-barrel, cast-in-place box culvert structure will be used to replace the originally authorized culvert structures (Figure 8). In general, the hydraulic design objective will be to match the originally authorized culvert capacity as close as possible while meeting the minimum size requirement and considering a standardized barrel size. To satisfy the minimum size requirement, each culvert barrel will have a minimum rise of seven feet and span of six feet to facilitate access for inspection and maintenance; however, a standardized barrel size of seven feet by seven feet was determined for design of most culverts. Consideration of replacing culverts with similar size and capacity will be given for the culverts that are currently much smaller than the standardized barrel size of seven feet by seven feet. The replacement culverts are intended to provide similar hydrologic and hydraulic flow characteristics when compared to the existing/authorized culverts; however, the installation of standard box culvert sizes means that at some locations, the replacement culverts will have an insignificant increase in flow capacity and at others the capacity will be insignificantly reduced. The culverts will function as authorized and as currently permitted. All appropriate hydraulic load conditions to include setup and wave height will be considered in the replacement design as well as all current design criteria and dam safety criteria. Hydraulic loads for structural design will be as required by EM 1110-2-2100, Stability Analysis for Concrete Structures.

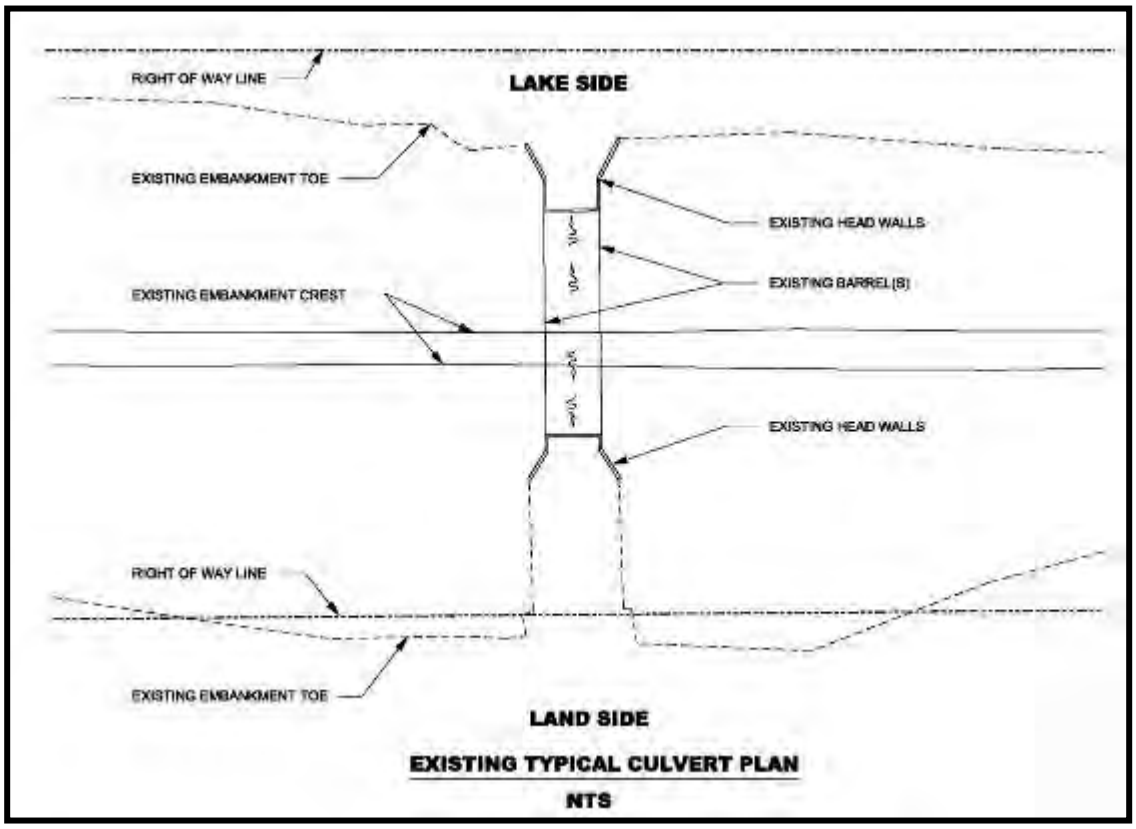

Figure 8. Typical Culvert Plan View

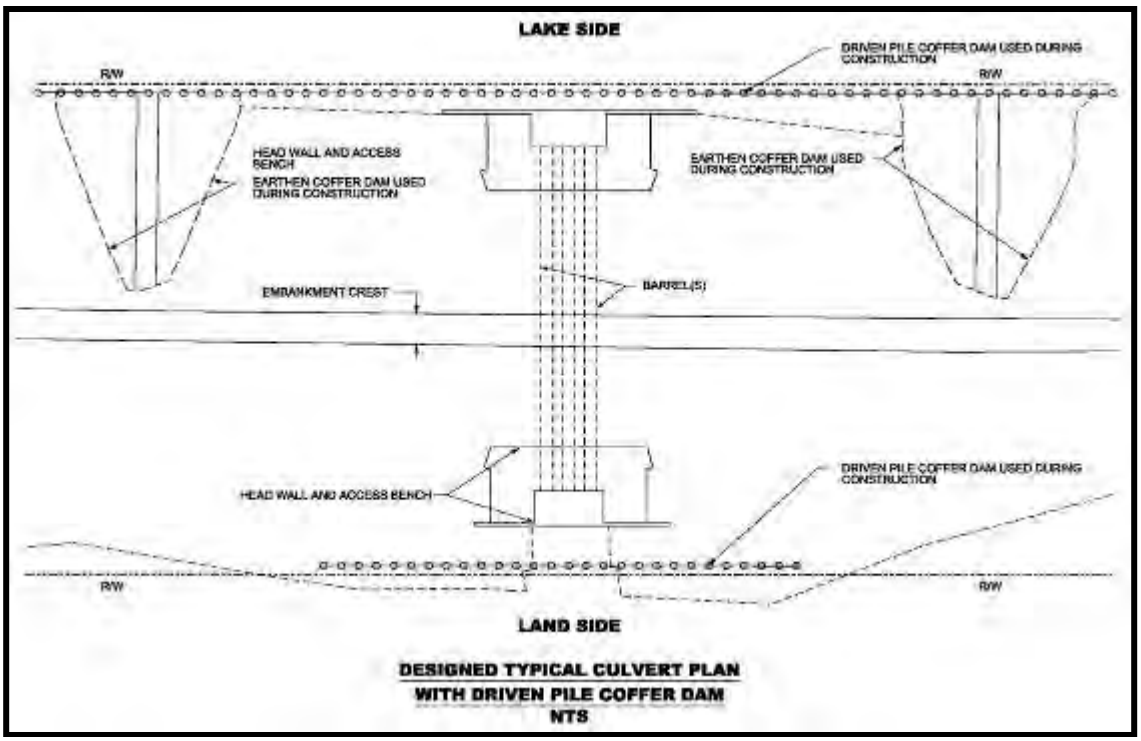

Figure 9. Typical Designed Culvert Plan View

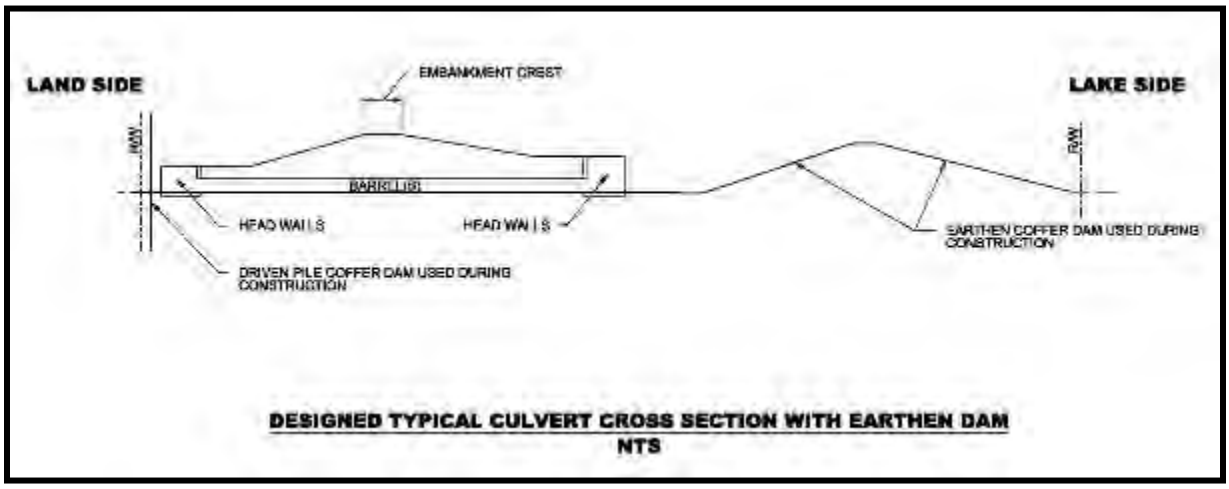

Figure 10. Typical Construction Footprint with Earthen Cofferdam

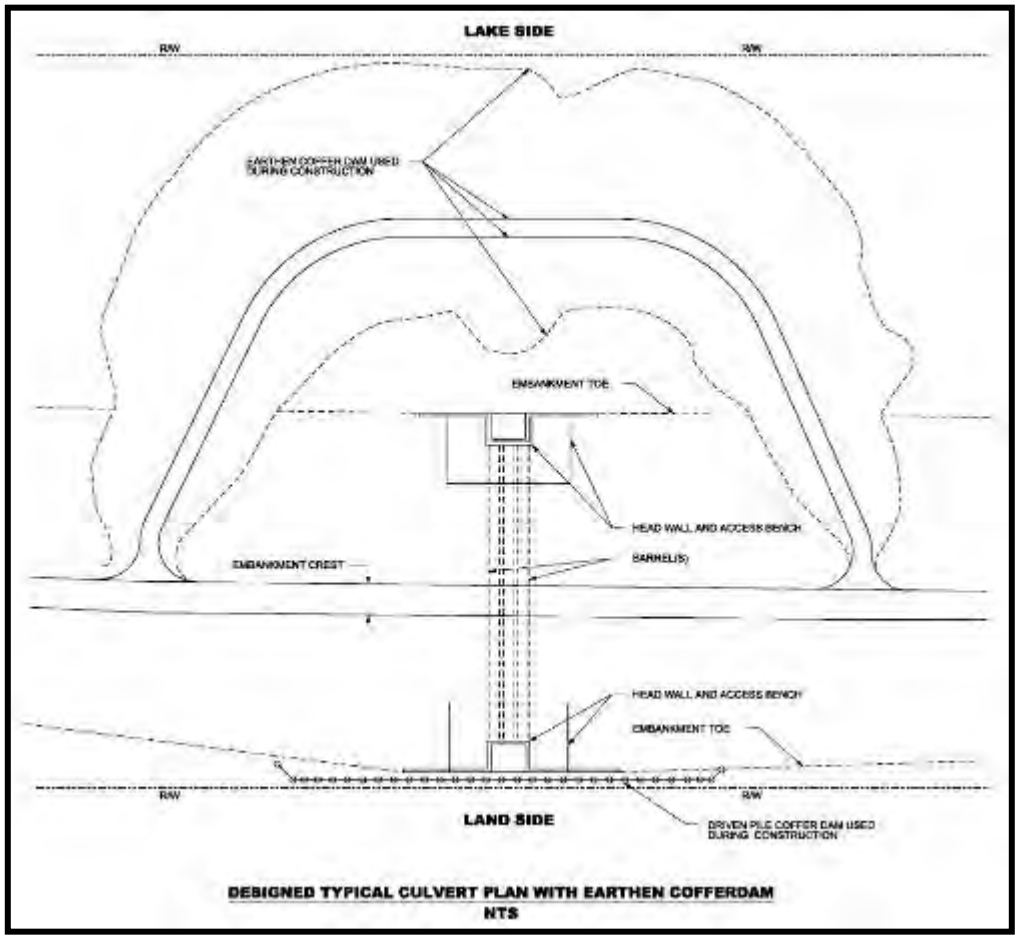

Figure 11. Typical Construction Footprint with Earthen Cofferdam – Plan View

4.7 WATER QUALITY

4.7.1 No Action Alternative

Regardless of the condition of the dike, the highly eutrophic condition of Lake Okeechobee is expected to persist for the foreseeable future due to past and future nutrient loading. If a

breach in the dike were to occur, mud sediments from Lake Okeechobee would be transported to nearby waterways, resulting in localized elevated total suspended solids and phosphorus concentrations. No significant effects outside the immediate area of the breach would be expected. Without dike rehabilitation and culvert replacement, the lake would be operated at lower stages, which may improve water quality conditions somewhat in the littoral zone of the lake. However, because of the dike's current lack of structural integrity, high-volume freshwater releases are required during flood events to avoid the possibility of a breach in the dike. These releases affect the lake's two primary outlets: the St. Lucie and Caloosahatchee rivers. Water released from the lake contains elevated nutrient concentrations that degrade the water quality of the St. Lucie and Caloosahatchee rivers and estuaries. No effects on groundwater quality would be expected. The operation of three of the 32 culverts is regulated by the LOPA. The No Action Alternative would not affect the LOPA permit for these three culverts (5, 5A, and 10A).

4.7.2 Replace and Remove Culverts (Preferred Alternative)

Renovating the existing culverts is expected to result in little to no significant change to surface water quality conditions in Lake Okeechobee and adjacent canals. During the construction of the replacement culverts there will be a temporary increase in surface water turbidity levels within the lake and in the adjacent dike toe ditch. After construction, the replaced culverts will be operated in a manner consistent with the existing operations of these culverts. Based on the Total Max Daily Load (TMDL) study done for the lake (FDEP, 2001), which identifies the largest sources of phosphorus to the lake, the 32 culverts are estimated to provide approximately five percent of the existing total phosphorus load to the lake. The replacement culverts are intended to provide similar hydrologic and hydraulic flow characteristics when compared to the existing/authorized culverts; however, the installation of standard box culvert sizes means that at some locations, the replacement culverts will have a higher flow capacity and at others the capacity may be somewhat reduced. Increased capacity is most likely to occur at the smaller culvert locations where one culvert is replaced with two culverts. At the larger culverts, the increase in capacity is likely to be negligible. The net change to lake nutrient load is expected to be negligible based upon the relatively small nutrient contribution attributed to the project culverts and because the replacement culverts will be designed and operated such that future flows closely match historic flows. The replacement of Culverts 5, 5A, and 10A is likely to require coordination with the FDEP to modify the existing Lake Okeechobee Protection Act permit which regulates nutrient flows into and out of the lake; however, this is not expected to result in project constraints or delays.

The replacement of the culverts will have no significant impact on groundwater quality. The USACE or its construction contractor will develop an Environmental Protection Plan (EPP) which will include stormwater pollution prevention measures such as hay bales, silt screens, and turbidity curtains.

4.8 AIR QUALITY

4.8.1 No Action Alternative

Selection of the No Action Alternative would not affect air quality.

4.8.2 Replace and Remove Culverts (Preferred Alternative)

The project area is not located in a non-attainment airshed. Emissions associated with the Preferred Alternative would be generated from heavy machinery operating in the area where construction occurs. Construction activities would cause minor short-term air quality effects in the form of fugitive dust or airborne particulate matter from earthwork and unpaved roads accessed for the project. Short-term loadings of internal-combustion engine exhaust gases would be negligible. To help minimize construction emissions, reduced idling practices, cleaner fuels, and emission retrofits for construction equipment would be used by USACE contractors whenever feasible. Any restrictions due to volatile organic compounds would be covered in Material Safety Data Sheets included in designs, plans, and specifications and the environmental protection plan for construction. Every federally funded project must be consistent with state plans for implementing the provisions of the Clean Air Act Amendments (State Implementation Plans). This project is in conformance with the State Implementation Plan because it would not cause violations of the National Ambient Air Quality Standards.

4.9 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

4.9.1 No Action Alternative

If there is a breach in the dike, some lands east of the dike may potentially be subjected to widespread HTRW contamination as a result of the dispersion of otherwise contained pollutants on private lands.

4.9.2 Replace and Remove Culverts (Preferred Alternative)

The removal and replacement of the culverts is not expected to result in the discovery or generation of HTRW materials. The culverts are not located adjacent to typical sources of HTRW materials such as fuel storage tanks and there have been no land use activities in the immediate vicinity of the culverts that would have potentially resulted in the deposition of HTRW substances. Construction debris from the removal and replacement activities will be disposed of locally in a licensed/authorized landfill or otherwise processed at a recycling facility. In the unlikely event that HTRW materials are discovered during the construction process, the contractor will be instructed to rectify the situation in accordance with applicable state/Federal laws.

4.10 NOISE

4.10.1 No Action Alternative

The No Action Alternative would not increase ambient noise levels near the HHD. Without reconstruction, emergency construction repairs would continue and some level of construction type noise would be present similar to current conditions. Therefore, no additional effects to noise are expected to result due to selection of this alternative.

4.10.2 Replace and Remove Culverts (Preferred Alternative)

Heavy machinery associated with construction of the Preferred Plan could result in increased noise. Although sound levels could exceed 70 dB in proximity to construction activities, attenuation with distance from the construction site would reduce the noise. Noise could disturb the residences located near the project area. Noise could also disturb people engaged in outdoor activities at such locations as the Port Mayaca Public Use Area. Construction

staging areas away from the dike also have a potential for increasing noise levels. All noise impacts would be temporary in nature and limited to each culvert construction area.

4.11 AESTHETICS

4.11.1 No Action Alternative

Short-term impacts to aesthetics are anticipated, as patches and temporary emergency construction are necessary to repair ongoing piping and boils. Without reconstruction, dust and noise from emergency construction would continue, portions of the dike would remain closed, and aesthetics and safety would be compromised.

4.11.2 Replace and Remove Culverts (Preferred Alternative)

Temporary, short term impacts to localized areas would result from construction activities and the movement of construction equipment through lands designated for staging and construction. The LOST trail for viewing Lake Okeechobee from the top of the dike would be closed adjacent to the culverts during construction activities. Grassy side slopes of the dike would be affected, but would be revegetated following construction.

4.12 SOCIO-ECONOMIC

4.12.1 No action alternative

The No Action Alternative could have adverse effects on the surrounding agriculture and urban areas if a breach were to occur in the HHD system. Flooding could result in loss of property, life, and potentially cause businesses to close and displacement of people from their homes. Damages resulting from a dike failure would occur to residential structures, non-residential structures, agricultural resources, roadways, the Florida East Coast railroad, and public utilities.

4.12.2 Replace and Remove Culverts (Preferred Alternative)

Long-term adverse socioeconomic effects are not expected as a result of implementing the Preferred Plan. Temporary adverse effects that might be experienced include increased traffic congestion and possibly reduced tourism during project construction within the project footprint for each culvert. Construction jobs may be created during construction of the Preferred Plan. This would be a potential benefit to workers and contractors in the project area seeking work.

4.13 RECREATION RESOURCES

4.13.1 No action alternative

Moderate adverse impacts to recreational resources are anticipated without repairs to the dike. Piping and boils would continue, requiring emergency repairs for frequent breaches in the dike. Affected areas would be closed during emergency construction for safety reasons. Recreational resources would be adversely impacted by significant flooding if a breach in the dike would occur, including loss of the LOST in the area of the breach. Emergency repairs would cause temporary inaccessibility to the LOST and/or boat ramps.

4.13.2 Replace and Remove Culverts (Preferred Alternative)

There would be temporary impacts to the LOST during construction activities. However, there are multiple access points to enter and exit the trail and closings would be coordinated with FDEP and the Office of Greenways and Trails. There would be temporary impacts to Lake Okeechobee Jaycee Recreation Area, operated by the Okeechobee County, during removal of Culvert 7 and TCC.

4.14 PUBLIC SAFETY

4.14.1 No Action Alternative

A breach in the dike would result in widespread flooding as waters from Lake Okeechobee pass through the breach and onto adjacent lands. The risk to residents located within the vicinity of the dike is substantial. Inundation mapping and flood stage hydrographs indicate that flooding to the population would be severe. The culverts, in their current condition, are a recognized weak point in the structural integrity of the HHD.

4.14.2 Replace and Remove Culverts (Preferred Alternative)

Replacing and removing culverts would significantly improve safety in the areas surrounding the HHD at and around the culverts. The culverts pose an immediate and significant risk of failure due to the loss of embankment material into and along the culverts which could lead to a breach of the embankment. Replacing and removing the culverts are considered maintenance actions that are required to reduce this unacceptable risk due to the high probability of failure and associated potential loss of life. The recommendation provided in this document is designed to provide reliable flood protection for the communities surrounding the HHD.

4.15 HISTORIC PROPERTIES

4.15.1 No Action Alternative

Failure of the HHD would result in damage to the HHD itself, a site determined to be eligible for inclusion on the National Register of Historic Places. Depending on the location and severity of a failure in the dike, other recorded properties eligible for listing or listed on the National Register, as well as unrecorded properties adjacent to the dike may also be adversely affected.

4.15.2 Replace and Remove Culverts (Preferred Alternative)

While recommended as contributing elements to the HHD's National Register of Historic Places eligibility, USACE has determined that the removal and replacement of the culverts has been adequately mitigated by documentation in a cultural resources assessment report of the HHD (HHD, 2010) and that removal and replacement of the culverts will not adversely affect the National Register eligibility of the HHD. In a letter dated 17 March 2011, the Florida SHPO concurred with the USACE determination.

4.16 CUMULATIVE IMPACTS

Cumulative effects are defined in 40 CFR 1508.7 as those effects that result from:

> *...the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ).

Table 5 summarizes the impact of such cumulative actions by identifying the past, present, and reasonably foreseeable future condition of the various resources which are directly or indirectly impacted by the proposed action and its alternatives. Also illustrated is the future condition with any reasonable alternatives (or range of alternatives).

Table 5. Summary of Cumulative Impacts

Resources/Issues	Past Actions & Their Effects	Preferred Alternative Effects	Other Present and Reasonably Foreseeable Future Actions & Their Effects	Cumulative Effects of All Actions
Water Quality	The C&SF Project has greatly altered the natural hydrology of the project area. Construction methods implemented in the 1930s and 1940s created a dike unable to withstand lake stages higher than 18 feet (NGVD). As a result, rapid, high-volume releases of lake water are required during storm events that stress downstream estuaries.	There are no anticipated changes to water quality. Functions will be replaced in-kind. Public safety would be increased due to the rehabilitation of the HHD to the current dam safety regulations.	To avoid stressing the structural integrity of the HHD, the current operating schedule for the lake (LORS) operates a lower lake regulation schedule, which helps to avoid adverse impacts to water quality in downstream estuaries. The LORS operating plan will be re-evaluated once the HHD has been rehabilitated. Modifications may include increased water storage in the lake, which would benefit estuaries by reducing high volume freshwater releases. CERP projects and other initiatives would improve the water quality in Lake Okeechobee, reduce undesirable freshwater releases from the lake, and reduce watershed runoff to the estuaries.	Rehabilitation of the HHD, along with other current and reasonably foreseeable actions, would improve water quality in Lake Okeechobee and provide improvements in water deliveries to the coastal estuaries.

Resources/Issues	Past Actions & Their Effects	Preferred Alternative Effects	Other Present and Reasonably Foreseeable Future Actions & Their Effects	Cumulative Effects of All Actions
Protected Species	Fish and wildlife habitat has been greatly altered as a result of the C&SF Project. Most land has been converted to agricultural, commercial, or residential use.	Minor temporary impacts to foraging and loafing habitat are expected from the maintenance operations for construction of the Preferred Alternative. Since each culvert will not be concurrently constructed, an abundance of alternative foraging and loafing habitats are available in areas of no construction.	An abundance of alternative foraging and loafing habitats are available around the lake and on Kreamer and Torry islands.	HHD rehabilitation as a whole is not expected to significantly affect protected species. Coordination with USFWS is ongoing.
Wetlands	The C&SF Project has greatly altered the natural hydrology of the project area. Most land has been converted to agricultural, commercial, or residential use. Compensatory mitigation for implementing rehabilitation features in L-D9 has already been completed. The USACE removed 57 acres of the invasive species melaleuca adjacent to L-D1.	The Preferred Alternative would have temporary impacts to wetlands during construction. Upon completion of construction and removal of cofferdams, vegetation will be restored comparable to preconstruction conditions.	Rehabilitation of the remainder of L-D1, L-D2, and L-D9 is expected. The construction of rehabilitation features would likely include filling in the HHD toe ditch in these levee designations. New drainage swales in other reaches may be constructed, creating wetland habitat	Overall, there will probably be a net increase in wetland functionality in the area as a result of new drainage swale wetland habitat and functional gains in surrounding wetlands as a result of mitigation efforts of future rehabilitation efforts.

Resources/Issues	Past Actions & Their Effects	Preferred Alternative Effects	Other Present and Reasonably Foreseeable Future Actions & Their Effects	Cumulative Effects of All Actions
Public Safety	Construction methods implemented in the 1930s and 1940s created a dike unable to withstand lake stages higher than 18 feet (NGVD). As a result, communities near the HHD are at risk during storm events.	The Preferred Alternative would aid in improving public safety for the communities that exist near the dike. The plan is designed to prevent piping around the culverts within in the HHD.	To avoid stressing the structural integrity of the HHD, the current operating schedule for the lake (LORS) operates a lower lake regulation schedule than the previous operating schedule (WSE). CERP projects designed to store excess water would help managers to operate the lake at lower stages during flood events. Glades, Hendry and Palm Beach counties are finalizing Emergency Operations Plans for an HHD failure scenario. These plans will help avoid significant adverse effects on residents near the dike if a breach occurs.	Rehabilitation of the HHD, along with other current and reasonably foreseeable actions, would significantly improve the safety of the communities adjacent to the dike.

4.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The Preferred Alternative would require irreversible and irretrievable commitments including the expenditure of funding, energy, labor, and materials. The project would not cause the permanent removal or consumption of any renewable resources. However, implementation would commit lands and resources for reconstruction of the HHD, fill material, and other project features.

4.18 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Both the Preferred Alternative and the No Action Alternative have unavoidable adverse direct and indirect environmental effects that are discussed in this document. The No Action Alternative would have significant adverse effects on public health and safety. Due to signs of dike instability during high water stages in the lake after the 2004 and 2005 hurricanes in South Florida, the SFWMD contracted for an expert review panel of the stability and safety of the HHD. Particular emphasis was placed on the structural stability of the dike with regard to seepage and water pressures within the embankment and erosion and potential overtopping concerns during large storm events. The technical review concluded that the current condition of the HHD poses a grave and imminent danger to the people and the environment of South Florida.

Inundation maps and flood stage hydrographs generated by the USACE indicate that flooding in the communities near the HHD would be severe and warning times would be limited if a breach in the dike were to occur. The location of the breach and the size of the storm event would determine the geographic extent of the flooding. Based on USACE analysis, the most significant flooding would occur if the dike were to breach along levee designations L-D9, L-D2, and L-D1 due to the topography and communities located in close proximity to the dike. A breach in the dike could cause significant adverse effects on not only public safety, but also on agriculture, recreational resources, transportation and communication infrastructure, real estate, and environmental and cultural resources.

As discussed under each resource subsection in Section 4, adverse effects associated with implementing the Preferred Alternative are expected to be minimal to moderate. Moderate impacts would be temporary and would mostly be on recreational resources due to temporary closings of the LOST.

Unavoidable adverse effects that would result from implementation of the Preferred Alternative would include the following:

Vegetation

No significant adverse effects to vegetation and cover types described are likely to occur during culvert removal and replacement. Minimal short-term impacts to vegetation as a result of construction and minor excavation for this alternative are expected. Grassy vegetation will be replaced on the slope of the HHD and emergent wetland vegetation will be planted lake side post construction and also reestablish through natural recruitment.

Threatened and Endangered Species
Adverse impacts to threatened and endangered species are not likely to occur due to culvert removal and replacement. Preconstruction surveys will be conducted prior to initiation of construction activities and monitoring will occur throughout construction.

No significant impacts to the foraging habitat for wading birds, reptiles and amphibians are likely to occur. Foraging habitat within toe ditches would be temporarily impacted as a result of construction and minor excavation for this alternative. However, the culverts will not all be replaced concurrently, thereby leaving foraging habitat available to species.

Wetlands
There will be temporary impacts to wetlands within the project footprint due to the installation of cofferdams and subsequent dewatering of the construction area. The USACE will work in coordination with FDEP, USFWS, and the FFWCC to minimize any potential permanent wetland impacts during the design phase of each culvert. Upon completion of construction activities and removal of cofferdams, vegetation similar to preconstruction conditions will be planted to aid in the restoration of the vegetation within the project footprint.

Water Use and Hydrology
The removal of abandoned culverts poses a temporary risk during construction when the lake is contained by an upstream cofferdam. In the event of a storm, the cofferdam could be considered a weak point in the dike and could have a higher probability of failure.

Water Quality
Water quality is not expected to be adversely affected by the Preferred Alternative.

Air Quality
Air quality is not expected to be impacted due to culvert removal and replacement.

HTRW
Hazardous, toxic and radioactive wastes are not expected to be a problem within the project footprint.

Noise
Minor localized noise related impacts during construction operations are expected to occur due to implementation of the culvert removal and replacement.

Aesthetic Resources
Limited, short-term adverse impacts associated with construction activities would be imposed on aesthetic resources within the project area.

Socioeconomics
Socioeconomics are not expected to be adversely impacted by the implementation of culvert removal and replacement, though tourism in areas immediately adjacent to culvert

construction may be reduced during construction. The construction activities resulting from culvert replacements and removals may provide jobs opportunities to local residents.

Recreational Resources

Temporary impacts to the LOST trail and possibly to some lakeside boat ramp areas as a result of construction activities and/or access of construction site, equipment, and staging areas are anticipated. Construction and staging would temporarily limit certain segments of the trail. Closings of the LOST would be coordinated FDEP and the Office of Greenways and Trails. There will be temporary impacts to Lake Okeechobee Jaycee Recreation Area, operated by the Okeechobee County, during removal of Culvert 7 and TCC.

Public Safety

Public safety levels at and around culverts are expected to significantly increase once construction is complete.

Historic Properties

The USACE and the Florida SHPO have determined that the replacement and removal of the culverts have been sufficiently mitigated by documentation in a cultural resources assessment report and will have no adverse effect on the National Register eligibility of the HHD. Consultation and coordination with the Florida SHPO, appropriate federally recognized tribes, and other interested parties is ongoing and will continue through project completion.

4.19 COMPATIBILITY WITH FEDERAL, STATE AND LOCAL OBJECTIVES

The objective of this project is implementation of risk reduction measures in order to reduce the probability of a breach due to seepage and boils around the Federal culverts. State and local objectives concur with the Federal objective and current operations would be maintained throughout the duration of the HHD culvert construction work as justified on a temporary basis to prevent significant hardships.

4.20 CONFLICTS AND CONTROVERSY

The Sugar Cane Growers Cooperative of Florida had concerns on previous HHD environmental documents regarding unique farmland, benefits of the dike system, and project segmentation. As previously stated, current operations will be maintained during replacement as justified on a temporary basis to prevent significant economic hardships. Current operation procedures would continue post construction. Impacts discussed within this document would all occur on lands currently owned by the Federal government.

5 ENVIRONMENTAL COMPLIANCE AND COMMITTMENTS

The Preferred Alternative of the HHD Project was considered in relation to compliance with Federal environmental review and consultation requirements. The following paragraphs document compliance with all applicable Federal statutes, executive orders, and policies.

Table 6 at the end of this section summarizes the level of compliance with those statutes, orders, and policies.

5.1 ENVIRONMENTAL COMMITMENTS

The USACE commits to mitigating effects of the Preferred Plan to the greatest extent possible in both the planning and construction phases of the project. According to the Council on Environmental Quality (40 CFR 1508.2), mitigation as it relates to the National Environmental Policy Act includes the following:

- Avoiding the effect altogether by not taking a certain action or parts of an action.
- Minimizing effects by limiting the degree or magnitude of the action and its implementation.
- Rectifying the effect by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action.
- Compensating for the effect by replacing or providing substitute resources or environments.

5.2 AVOIDANCE

The Preferred Alternative was formulated to not only meet planning objectives and engineering criteria, but also to avoid significant effects on the natural and human environment wherever possible.

5.3 MINIMIZATION

Minimization of impacts will occur in areas of snail kite critical habitat by using driven pile cofferdams which generally have an approximately 50 percent smaller footprint than earthen cofferdams. Driven pile cofferdams, not earthen, would be constructed as close as possible to the construction area to avoid impacts to snail kite critical habitat in Culverts 1, 1A, 2, 5, and 5A.

Once the first set of culverts is completed, there would be discussion as how to best minimize impacts and better assess remaining culvert construction and replacement. This allows for adaptive management to produce better results once the first six have been replaced.

5.4 MITIGATION

The USACE and its contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

1) Standard protection measures regarding the eastern indigo snake shall be included in the environmental protection plan when the USACE proceeds to the plans and specifications phase of this project.

2) The USACE/contractor shall conduct a pre-construction survey to determine locations of bald eagle nests within the immediate vicinity of construction prior to issuance of any construction contracts. Results shall be coordinated with the USFWS, Vero Beach office. The USACE will conduct surveys to locate the nest trees ahead of construction and will avoid construction close to the nests during the nesting season. If the hatchlings fledge prior to May 15, activity within the 660-foot buffer would be allowed. In the event that construction within the interior of the buffer is unavoidable within nesting season, the Bald Eagle Monitor Guidelines will be implemented accordingly. The guidelines can be reviewed at the following web address: www.fws.gov/northflorida/BaldEagles/bald-eagles.htm.

3) The USACE shall conduct a survey for burrowing owls commensurate with that for bald eagle nests prior to issuance of any construction permits. The USACE shall consult with the FFWCC regarding adopting standardized protection measures should any owls be identified within the project construction footprint. Results shall be coordinated with the USFWS and FFWCC. If burrowing owls or active bald eagle nests are found to be present in the project area, effects shall be minimized by altering construction schedules to avoid the nesting season and/or burrows shall be cordoned off to avoid their direct destruction.

4) The USACE shall consult with the FFWCC regarding adopting standardized protection measures should any protected species nests be identified within the project construction zone. Results shall be coordinated with the USFWS and FFWCC.

5) Some culverts will require a Water Quality Certification under Section 401 of the Clean Water Act and some will be exempt. The USACE will work in correspondence with FDEP during the time of permit application**.**

6) Turbidity screening and diversion will be used to control effects to the drainage ditches and connected canals. Runoff from the construction site or storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, and any measures required by area wide plans approved under paragraph 208 of the Clean Water Act. Temporary and permanent erosion and sedimentation control features or screening will be installed. Temporary velocity dissipation devices shall be placed along drainage courses to provide for non-erosive flows. Temporary erosion and

sediment control measures such as berms, dikes, drains, sediment traps, sedimentation basins, grassing, mulching, straw, and silt fences shall be maintained until permanent drainage and erosion control facilities are completed and operative. For silt fences, the filter fabric is to be of nylon, polyester, propylene, or ethylene yarn of at least 50 lb/in strength and able to withstand a flow rate of at least 0.3 gal/ft sq/minute. It also would contain ultraviolet ray inhibitors and stabilizers and be a minimum of 36 inches in width.

7) In addition, during construction, the contractor will be responsible for keeping construction activities, including refueling and maintenance sites, under surveillance, management, and control to avoid pollution of surface, ground waters, and wetlands. The contractor is responsible for conducting all operations in a manner to minimize turbidity and shall conform to all water quality standards as prescribed by Chapter 62-302, State of Florida, FDEP.

8) Project construction shall not destroy migratory birds, their active nests, their eggs, or their hatchlings. Monitoring for such would be required by the construction contractor. A buffer zone around active nests or nestling activity would be required during the nesting season.

5.5 CLEAN AIR ACT OF 1972, AS AMENDED

This project is being coordinated with the FDEP, Air Quality Division, and the Agency. No air quality permits are required, and no permanent sources of air emissions are part of the Preferred Plan. This project is in compliance with Sections 176 and 309 of the Clean Air Act.

5.6 CLEAN WATER ACT OF 1972, AS AMENDED

Full compliance will be achieved with issuance of Water Quality Certification under Section 401 from the State of Florida. All State water quality standards would be met. A Section 404(b)(1) Evaluation is included in this report in Appendix C.

Section 402(b)(2) requires that a NPDES construction activities permit be acquired for construction activities that disturb more than five acres of land. The FDEP issues these permits within 48 hours of application. This permit will be acquired prior to initiation of construction.

5.7 COASTAL BARRIER RESOURCES ACT AND COASTAL BARRIER IMPROVEMENT ACT OF 1990

There are no designated coastal barrier resources in the project area that would be affected by this project. These Acts are not applicable.

5.8 COASTAL ZONE MANAGEMENT ACT OF 1972, AS AMENDED

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix D. State consistency review was performed during the public review period of this EA and the state has concurred with this determination.

5.9 ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Consultation was initiated with the USFWS on 10 December 2010. A Complete Initiation Package (CIP) was sent to the USFWS for their concurrence on USACE effect determinations and their concurrence letter is in Appendix E. The EA was also sent to NMFS for their review and concurrence. This project has been coordinated under the Endangered Species Act and will therefore be in compliance. The USACE has and will continue to maintain continuous coordination with the USFWS through the replacement and removal of the federal culverts evaluated in this EA.

5.10 ESTUARY PROTECTION ACT OF 1968

No estuaries designated under the Act are in the project area. However, failure of the dike, a possibility under the No Action Alternative, could severely negatively impact estuaries downstream of Lake Okeechobee as large deliveries of fresh water dramatically change the estuarine water chemistry. This act is not applicable.

5.11 FARMLAND PROTECTION POLICY ACT OF 1981

The USDA-NRCS has determined that zero acres of Unique Farmland would be affected by the project, and a Form AD-1006 was provided. Their concurrence letter is in Appendix E. The project is in compliance.

5.12 FEDERAL WATER PROJECT RECREATION ACT OF 1965, AS AMENDED

The effects of the proposed action on outdoor recreation have been considered and are presented in this EA. Impacts to the Lake Okeechobee Scenic Trail located on top of the dike will require close coordination with FDOT and FDEP in order to return the trail to as-built conditions and limit trail closure time. The project is in compliance with the Act.

5.13 FISH AND WILDLIFE COORDINATION ACT OF 1958, AS AMENDED

This project has been coordinated with the USFWS. In response to the requirements of this Act, the USACE has and will continue to maintain continuous coordination with the USFWS and the FFWCC during all stages of planning and implementation of this project.

5.14 MAGNUSION-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

This Act is not applicable. Lake Okeechobee is a freshwater lake.

5.15 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT OF 1972, AS AMENDED

This Act is not applicable. Ocean disposal of dredged material is not proposed as a part of the culvert replacement and removal plan.

5.16 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

Under the Migratory Bird Treaty Act, project construction shall not destroy migratory birds, their active nests, their eggs, or their hatchlings. Monitoring for such would be required by the construction contractor. A buffer zone around active nests or nestling activity would be required during the nesting season. No migratory birds would be affected by project activities; however, several bald eagle nests have been identified adjacent to the HHD. The toe ditch provides very little quality habitat for migratory birds. Alternative and higher quality habitats are available along the Lake Okeechobee shoreline and in adjacent canals. This project is in compliance with these Acts.

5.17 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969, AS AMENDED

Environmental information on the project has been compiled and this EA has been prepared in compliance with NEPA. A notice of availability of this EA was mailed describing the 30 day comment period. A public meeting was held 8 March 2011 in Okeechobee, Florida and on 10 March 2011 in Clewiston, Florida. This EA complies with all NEPA requirements through the public review process.

5.18 NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED

Coordination and consultation with the Florida SHPO, appropriate federally recognized tribes, and other interested parties has been initiated as of January, 2011, in accordance with the National Historic Preservation Act, as amended (PL89-665) the Archaeological and Historic Preservation Act, as amended (PL93-29); Executive Order 11593, and appropriate Florida Statutes. Their concurrence letter is in Appendix E.

5.19 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), AS AMENDED BY THE HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA) OF 1984, COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA) AS AMENDED BY THE 5.26.21 SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1996, TOXIC SUBSTANCES CONTROL ACT (TSCA) OF 1976

Hazardous, toxic, and radioactive waste (HTRW) surveys have been conducted as part of environmental assessment and environmental impact statements prepared as part of the prior HHD rehabilitation efforts. In December 2007, a HTRW survey of the HHD was conducted using aerial imagery and a contaminated site and petroleum storage site database compiled by the FDEP. A windshield survey was conducted to verify the findings of the desktop survey. The survey was updated in August 2009 for the Reach 1A SEIS (USACE 2010) and in February of 2010 for L-D1 and L-D2. The purpose of the last two surveys was to preliminarily identify potential contamination sites within 500 feet of the HHD in L-D1, L-D2, and L-D9. The results of these surveys show that agricultural and rural residential development has resulted in HTRW contamination in areas adjacent to the HHD; however, no contaminated areas or materials were found within the Federal right-of-way. The project is in compliance with these Acts.

5.20 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The project is in compliance.

5.21 SAFE DRINKING WATER ACT (SDWA) OF 1974, AS AMENDED

Lake Okeechobee, as well as ground and surface waters, supply drinking water for several communities around the lake. Implementation of the project would not impact water quality of Lake Okeechobee, ground waters, or surface water used to supply drinking water. This project complies with the Act.

5.22 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970 (PUBLIC LAW 91-646)

Acquisition of real estate is not required for the proposed project. All work will be completed within the current Federal right-of-way. This project is in compliance with this Act.

5.23 WILD AND SCENIC RIVER ACT OF 1968, AS AMENDED

No rivers designated under the Act are in the project area. The project is in compliance.

5.24 WATER RESOURCES DEVELOPMENT ACT (WRDA) OF 1986, SECTION 904

Section 904 of the 1986 WRDA requires that the plan formulation and evaluation process consider both quantifiable and unquantifiable benefits and costs of the quality of the total environment, and preservation of cultural and historical values. The engineering study and EA are in compliance.

5.25 WRDA OF 1990, SECTION 307

Section 307 of the 1990 WRDA establishes, as part of the water resources development program, an interim goal of no overall net loss of the Nation's remaining wetlands, and a long-term goal of increasing the quality and quantity of the Nation's wetlands. Construction of the Preferred Plan will result in temporary impacts to wetlands, and wetland conditions will be restored to pre-construction conditions. The Preferred Plan is in compliance.

5.26 EXECUTIVE ORDER (E.O.) 11990, PROTECTION OF WETLANDS

The Preferred Plan would result in temporary impacts to wetlands as a result of construction of the cofferdam during replacement or removal of culverts. Impacted areas would be restored to preconstruction conditions upon completion of the culvert removal or replacement action. The study is in compliance.

5.27 E.O. 11988, FLOODPLAIN MANAGEMENT

The Preferred Plan would directly support a reduction in hazards and risks associated with floods and would minimize the impact of floods on human safety, health and welfare. The Preferred Plan would have no impact on the restoration and preservation of the natural and beneficial values of the base floodplain. The project is in compliance.

5.28 E.O. 12898, ENVIRONMENTAL JUSTICE

Executive Order 12898 requires the Federal government to review the effects of their programs and actions on minorities and low-income communities. The Preferred Plan that was formulated for the HHD Federal culvert replacement would help to ensure the safety of those communities within the study area as well as residents living within the area anticipated to be impacted in the event of a dike failure. In addition to ensuring the safety and well-being of residents and their property, implementation of the Preferred Plan may have a significant beneficial effect on local communities through job creation, increased sale of construction material and other goods necessary to sustain a large construction force for the duration of the project. The study area is known to contain a significant percentage of low income and minority individuals. This project is not expected to have disproportionately high and adverse human health or environmental impacts on minority or low-income populations.

5.29 E.O. 13045, PROTECTION OF CHILDREN

Executive Order 13045, requires each Federal agency to "identify and assess environmental risks and safety risks [that] may disproportionately affect children" and ensure that its "policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This project has no environmental or safety risks that may disproportionately affect children. The project is in compliance.

5.30 E.O. 13112, INVASIVE SPECIES

Exotic and invasive plant species are within drainage swales, connecting canals, wetlands, and some uplands within the project area. However, the project will not contribute to nutrient loading that could favor invasive species. Further, some removal of invasives will be necessary within the project footprint. Ballast water organisms or terrestrial exotic wildlife species would not be affected. This project is in compliance.

5.31 E.O. 13186, MIGRATORY BIRDS

The HHD itself is not considered migratory bird habitat though it is adjacent to Lake Okeechobee, known for its abundance of migratory birds. A bird monitor will be required to be on site during construction to provide preconstruction surveys and monitor for migratory birds. The project is in compliance with this Executive Order.

Table 6. Compliance with Environmental Laws, Regulations and Executive Orders: Preferred Plan

Law, Regulation or Policy	Status	Comments
Clean Air Act	Complies	**Sec. 309:** EA has not yet been coordinated with the public and agencies. **Sec. 176:** No permanent sources of air emissions are part of the Preferred Plan.
Clean Water Act	Complies	Full compliance upon USACE approval of 404(b)(1), which is included in EA, issuance of water quality certification, and NPDES permits from the state.
Coastal Barrier Resources Act	Not applicable	The study area is not a designated Coastal Barrier Resources Act unit.
Coastal Zone Management Act	Complies	A Coastal Zone Management Consistency Evaluation is included in this EA. The project will be in full compliance when the evaluation is approved by the state.
Endangered Species Act	Complies	Consultation was initiated with the USFWS on 10 December 2010 and is ongoing. The EA will be sent to NMFS for their review and concurrence.
Estuary Protection Act	Not applicable	No estuaries designated under the act are in the project area.
Farmland Protection Policy Act	Not applicable	No prime and unique farmlands are present at the project site.
Federal Water Project Recreation Act	Complies	Impacts to the Lake Okeechobee Scenic Trail located on top of the dike will require close coordination with FDOT and FDEP in order to return the trail to as-built conditions and limit trail closure time.

Law, Regulation or Policy	Status	Comments
Fish and Wildlife Coordination Act	Complies	This project is being coordinated with the USFWS. In response to the requirements of this Act, the USACE has and will continue to maintain continuous coordination with the USFWS and the FFWC during all stages of planning and implementation of this project.
Magnuson-Stevens Fishery Conservation and Management Act	Not Applicable	Essential Fish Habitat (EFH) is not present within the project footprint.
Marine Protection, Research and Sanctuaries Act	Not applicable	Ocean disposal of dredged material is not part of the project.
Migratory Bird Treaty Act and Migratory Bird Conservation Act	Complies	No migratory birds would be affected by project activities. Monitoring would be required of the construction contractor.
National Environ-mental Policy Act	Complies	Environmental information on the project has been complied and this Environmental Assessment has been prepared.
National Historic Preservation Act	Complies	The HHD is historically significant for its engineering design and is eligible for listing on the National Register of Historic Places.
RCRA, CERCLA, Toxic Substances Control Act	Complies	An HTRW assessment has been performed to identify sites of concern in the project area and vicinity. The results of these surveys show that agricultural and rural residential development has resulted in HTRW contamination in areas adjacent to the HHD; however, no contaminated areas or materials were found within the Federal right-of-way.
Rivers and Harbors Act	Complies	The proposed work would not obstruct navigable waters of the United States.
Safe Drinking Water Act	Complies	The project would not impact water quality of Lake Okeechobee, groundwater, or surface water used to supply drinking water.
Uniform Relocation Assistance and Real Property Acquisition Policies Act	Complies	Acquisition of real estate is not required for the proposed project. All work will be completed within the current Federal right-of-way.
Wild and Scenic River Act	Not applicable	No designated Wild and Scenic Rivers would be affected by project related activities.
WRDA of 1986, Section 904	Complies	The plan formulation and evaluation process of the Preferred Plan considered quantifiable and unquantifiable benefits and costs of the quality of the total environment and preservation of cultural and historical values.
WRDA of 1990, Section 307	Complies	Construction of the Preferred Plan will result in only temporary impacts to wetlands, and wetland conditions will be restored to pre-construction conditions.
E.O. 11990 Protection of Wetlands	Complies	The project would result in temporary impacts to wetlands as a result of construction of the cofferdam during replacement or removal of culverts. Upon completion of the culvert removal or replacement action and removal of cofferdams, impacted areas would be restored to preconstruction conditions.
E.O. 11988 Floodplain Management	Complies	The project would directly support a reduction in hazards and risks associated with floods and would minimize the impact of floods on human safety, health and welfare.

Law, Regulation or Policy	Status	Comments
E.O. 12898 Environmental Justice	Complies	The study area is known to contain a significant percentage of low income and minority individuals. This project is not expected to have disproportionately high and adverse human health or environmental impacts on minority or low-income populations.
E.O. 13045, Protection of Children	Complies	Executive Order 13045, requires each Federal agency to "identify and assess environmental risks and safety risks [that] may disproportionately affect children" and ensure that its "policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This project has no environmental or safety risks that may disproportionately affect children.
E.O. 13112 Invasive Species	Complies	Exotic and invasive plant species are within drainage swales, connecting canals, wetlands, and some uplands within the project area. However, the project will not contribute to nutrient loading that could favor invasive species. Some exotic species may be removed.
E.O. 13186, Migratory Birds	Complies	The HHD itself is not considered migratory bird habitat though it is adjacent to Lake Okeechobee, known for its abundance of migratory birds. A bird monitor will be required to be on site during construction to provide preconstruction surveys and monitor for migratory birds.

6 MONITORING DURING CONSTRUCTION PHASE

Monitoring of listed species identified to occur within the HHD will be addressed with ongoing communication with the USFWS. Construction of culverts will span over multiple years (see Table 2 for estimated construction durations) and design plans have not currently been established for each culvert, therefore informal consultation with the USFWS will continue with replacement of each culvert.

The following link provides conservation guidelines for all threatened and endangered species in Florida:
http://www.fws.gov/verobeach/index.cfm?Method=programs&NavProgramCategoryID=3&programID=73&ProgramCategoryID=3

Before, during and post construction guidelines should be followed according to the accompanying documents for each respective specie (also refer to section 5.4 Mitigation During Construction):

Audubon's Crested Caracara

Conservation Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/Caracara_Conservation_Guidelines.pdf

Nesting Protocol Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/Caracara_Survey_Protocol.pdf

Eastern Indigo Snake

Species Conservation Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/Eastern_Indigo_Snake_Conservation_Guidelines.pdf

Everglade Snail Kite

Management Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/20060221%20Snail%20Kite%20Management%20Guidelines2.pdf

Okeechobee Gourd

Species Information:
http://www.fws.gov/verobeach/images/pdflibrary/cuok.PDF

West Indian Manatee

Species Conservation Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/Manatee%20_Conservation_Guidelines.pdf

Wood Stork

Habitat Management Guidelines:
http://www.fws.gov/verobeach/images/pdflibrary/Management_Guidelines_Wood%20Stork.pdf

7 LIST OF PREPARERS

The people who were responsible for contributing to this Environmental Assessment for the Herbert Hoover Dike Culvert Replacement and Removal are listed in Table 7.

Table 7. List of Preparers and Reviewers

Name	Discipline/ Expertise	Organization	Role in Document Preparation
Stacie Auvenshine	Biologist	USACE	NEPA/Report Preparation
Angela Dunn	Biologist	USACE	NEPA & Environmental Technical Lead/Reviewer
Jason Spinning	Biologist	USACE	NEPA Compliance Reviewer
Timothy Willadsen	Civil Engineer	USACE	Project Management
Mike Christofidis	Civil Engineer	USACE	Engineering Technical Lead/Reviewer
John Kendal	Geotechnical Engineer	USACE	Geotechnical Lead/Reviewer
Crystal Markley	Civil Engineer	USACE	Reviewer
Thomas Crafton	Water Resources Engineer	USACE	Water Resources Engineering Lead/Reviewer
Matt Fischer	Hydraulic Engineer	USACE	Hydraulics & Hydrology/Reviewer
Mark Shafer	Environmental Engineer	USACE	Water Quality and HTRW Appendices/Reviewer
Wendy Weaver	Archeologist	USACE	Cultural & Historic Resources/Reviewer
Hansler Bealyer	Real Estate	USACE	Reviewer
Dan Peck	Socioeconomics	USACE	Economics Lead/Reviewer
Al Walker	Planning	USACE	Planning Technical Lead/Reviewer
Brent Trauger	Dam Safety	USACE	Reviewer
John Bretz	Civil Engineer	EPJV	Reviewer
Jennifer Bockman	Civil Engineer	EPJV	Reviewer

8 PUBLIC INVOLVEMENT

8.1 SCOPING AND EA

The EA and Proposed Finding of No Significant Impact (FONSI) were made available to the public, tribes, Federal and state agencies by Notice of Availability dated 16 February 2011 (see Appendix E).

Public meetings were held in Okeechobee (8 March 2011) and Clewiston (10 March 2011) during the public comment period. The meetings served as an update on the HHD rehabilitation project as well as to describe the path forward for replacing and removing the Federal culverts. Overall, the attendees supported the ongoing HHD rehabilitation efforts and comments at the Okeechobee meeting included the following: the need for real estate acquisition, future including timeframe, of seepage berm presented in the June 2010 draft SEIS, and clarifying the original purpose of culverts. In Clewiston, comments included: what are impacts to the rim canal (Okeechobee Waterway) and boating, request for coordination of Culvert 2 with SFWMD and S169, request for repaving of the LOST upon completion of the culvert replacement as well as upon completion of future rehabilitation work, request for clarification of culvert replacement and its affect to public safety, question to culvert usage and the need to replace all 28 in kind (why not remove more), and results of a cost analysis (if needed). HHD team members also attended the meetings and answered questions as they pertained to culvert replacement and removal.

8.2 AGENCY COORDINATION

Agency coordination letters are included in the final document in Appendix E.

8.3 LIST OF RECIPIENTS

Copies of the notice of availability and /or EA were mailed to the Federal and state agencies, and tribal representatives, as listed in Table 8. A complete mailing list, including the general public, is available upon request. The final EA is posted on the internet at the following address under Martin, Palm Beach, Okeechobee, Hendry, and Glades Counties: http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DocsNotices_OnLine.html

Table 8. List of Recipients

AGENCY	COMPANY / DIVISION
Federal	Advisory Council on Historic Preservation
Federal	Bureau of Indian Affairs
Federal	Council on Environmental Quality
Federal	Department of Energy, Office of Environmental Compliance
Federal	Department of the Interior, Office of Environmental Affairs
Federal	Everglades National Park
Federal	Federal Emergency Management Administration, Office of Federal Coordination
Federal	Federal Highway Administration
Federal	Federal Maritime Commission

AGENCY	COMPANY / DIVISION
Federal	FEMA Region IV
Federal	National Oceanic and Atmospheric Administration (NOAA), NEPA Coordinator, Strategic Planning
Federal	National Park Service, Regional Director
Federal	NOAA National Marine Fisheries Service, Habitat Conservation Division
Federal	NOAA National Marine Fisheries Service, Protected Resources Division
Federal	U.S. Department of Agriculture, Agricultural Research Service
Federal	U.S. Department of Agriculture, Forest Service, Southern Regional Forester
Federal	U.S. Department of Agriculture, Natural Resources Conservation Service
Federal	U.S. Department of HUD, Regional Environmental Clearance Officer
Federal	U.S. Department of Justice, Environmental & Natural Resources
Federal	U.S. Department of the Interior, Office of Environmental Policy and Compliance
Federal	U.S. Environmental Protection Agency
Federal	U.S. Environmental Protection Agency, Region 4
Federal	U.S. Fish and Wildlife Service, Regional Director
Federal	U.S. Fish and Wildlife Service, Vero Beach
Federal	U.S. Geological Survey
Federal	U.S. Geological Survey, Water Resources Division
Federal	U.S. House of Representatives, Alcee Hastings
Federal	U.S. House of Representatives, Allen West
Federal	U.S. House of Representatives, Thomas Rooney
Federal	U.S. Senate, Bill Nelson
Federal	U.S. Senate, Marco Rubio
Federal	U.S. Coast Guard District, 7th District
State	Central Florida Regional Planning Council
State	Division of Historic Resources, State Historic Preservation Officer
State	East Beach Water Control
State	FL Department of Environmental Protection
State	FL Department of Environmental Protection, Bureau of Invasive Plant Management
State	FL Department of Environmental Protection, Ecosystem Planning
State	FL Department of Environmental Protection, Florida State Clearinghouse
State	FL Department of Environmental Protection, Office of Intergovernmental Programs
State	FL Department of Environmental Protection, Watershed Management & Planning
State	FL Department of Transportation, District 4
State	FL Department of Transportation, Environmental Office
State	FL Dept of Agriculture & Consumer Services
State	FL Fish & Wildife Conservation Commission
State	FL Fish & Wildlife Conservation Commission, Everglades Protection & Restoration Program
State	FL Fish & Wildlife Conservation Commission, Office of Environmental Service
State	Florida Governor's Office
State	Florida Integrated Science Center
State	Florida Legislative Library
State	Florida Power and Light
State	Highlands Glades Drainage District

AGENCY	COMPANY / DIVISION
State	Pahokee Water Control District
State	South Florida Conservancy District
State	South Florida Water Management District
State	South Florida Water Management District, Okeechobee Field Station
State	University of Florida, Institute of Food & Agricultural Sciences Research Center
State	University of Florida, Institute of Food & Agricultural Sciences, Center for Aquatic Plants
Tribe	Miccosukee Tribe of Indians of Florida, Chairman
Tribe	Mucogee (Creek) Nation of Oklahoma
Tribe	Poarch Band of Creek Indians, Tribal Historic Preservation Officer
Tribe	Seminole Nation of Oklahoma
Tribe	Seminole Tribe of Florida, Executive Director
Tribe	Seminole Tribe of Florida, Tribal Historic Preservation Officer
Tribe	South Florida Restoration Task Force, Executive Director
County	Canal Point Community Development, Inc.
County	City of Belle Glade
County	City of Pahokee
County	City of Pahokee
County	City of South Bay
County	Economic Council of Okeechobee County, Inc.
County	Economic Council of Palm Beach County
County	Glades City Board of County Commissioners
County	Glades County Administration, County Coordinator
County	Hendry County Administration, County Administrator
County	Hendry County Board of County Commissioners
County	Hendry County Board of County Commissioners
County	Hendry County Building Department, Flood Plain Manager
County	Lee County Administration, Country Manager
County	Martin County Administration, County Administrator
County	Martin County Board of County Commissioners
County	Miami-Dade County, County Manager
County	Okeechobee Chamber of Commerce
County	Okeechobee County Administration, County Administrator
County	Okeechobee County Board of County Commissioners
County	Osceola County Administration, County Manager
County	Palm Beach Board of County Commissioners
County	Palm Beach County
County	Palm Beach County Administration, County Administrator
County	Palm Beach County Water Utilities
County	Palm Beach County, County Archaeologist
County	Palm Beach County, Economic Development Office
County	Palm Beach County, Water Utilities Department
County	Polk County Administration, County Manager
County	Polk County Board of County Commissioners
County	St. Lucie County Administration, County Administrator
County	St. Lucie River Initiative
County	Town of Palm Beach
Library	Barron Library
Library	Clewiston Public Library
Library	Loula V. York Branch Library
Library	Martin County Blake Library

AGENCY	COMPANY / DIVISION
Library	Okeechobee County Public Library
Library	Palm Beach County Library
Marina & Fish Camp	Angler's Guide Service
Marina & Fish Camp	Fast Break
Marina & Fish Camp	Garrard's Bait & Tackle
Marina & Fish Camp	Gulf Citrus Growers Association
Marina & Fish Camp	J & S Fish Camp
Marina & Fish Camp	Little Big Man's
Marina & Fish Camp	Martin's Marina & Resort
Marina & Fish Camp	Okee Tantie Bait & Tackle
Marina & Fish Camp	Taylor Creek Lodge
Marina & Fish Camp	Twin Palm Resort
Agricultural	Atlanta Sugar Association, Inc.
Agricultural	Berry Grove Corporation
Agricultural	Conservation Alliance of St. Lucie County
Agricultural	Dairy Farmers Inc.
Agricultural	Everglades Coordinating Council
Agricultural	Florida Citrus Mutual
Agricultural	Florida Sugar Cane League, Inc.
Agricultural	Frierson Farm
Agricultural	Gutwein Groves, Inc.
Agricultural	Larson Dairy, Inc.
Agricultural	Lykes Bros. Inc.
Agricultural	McArthur Farms Inc.
Agricultural	Okeelanta Corporation
Agricultural	South Central Florida Express, Inc.
Agricultural	South Florida Agricultural Council
Agricultural	Sugar Cane Growers Cooperative
Agricultural	U.S. Sugar Corporation
Association	Audubon Society of the Everglades
Association	Caloosahatchee River Citizens Association
Association	Florida Wildlife Federation
Association	Friends of Lake Okeechobee
Association	Friends of the Everglades
Association	Lake Region Audubon Society
Association	League of Women Voters, Broward County
Association	National Audubon Society
Association	National Resources Defense Council
Association	The Florida Biodiversity Project
Association	The Nature Conservancy
Association	Tropical Audubon Society
Association	Trust for Public Lands
Other	Bauer Foundation Corp.
Other	BC Property Investments
Other	BCI Engineers & Scientists Inc.
Other	Camp Dreser & McKee, Inc.
Other	Curtoom Companies
Other	Environmental Policy and Culture Program, Northwestern University
Other	Everglades Coordinating Council
Other	Five Smooth Stone Incorporated
Other	Florida Rural Area Construction Coop.
Other	Friends of Lake Okeechobee

AGENCY	COMPANY / DIVISION
Other	Ladies of the Lake, U.S.A.
Other	Lake Point Restoration
Other	Landers & Parsons
Other	Macvicar, Frederico & Lamb, Inc.
Other	Okeechobee Waterway Association
Other	South Florida Regional Planning Council
Other	South Florida Watershed Council Inc.
Other	Southwest Florida Regional Planning Council
Other	Southwest Florida Watershed Council
Other	St. Lucie River Initiative
Other	Treasure Coast Regional Planning Council
Other	Trucane Sugar Corporation
Media	National Public Radio
Media	Palm Beach County Public Affairs
Media	Palm Beach Post
Media	Orlando Sun Sentinel

8.4 COMMENTS RECEIVED AND RESPONSE

A table summarizing comments received and responses prepared is below. If changes were made as a result of a comment received, it is noted in the Corps response in the Table 9.

Table 9. Public Comment Matrix

Agency/Public	Comment	USACE Response
Florida Department of Transportation (FDOT) March 18, 2011	Numerous state roads occur within the proposed project vicinity. The USACE will be responsible for coordinating with the appropriate FDOT District personnel to obtain the necessary FDOT permits prior to conducting any project activities within or connecting to FDOT right of ways. Environmental permit applications associated with proposed activities on state rights-of-way will also require close coordination with FDOT staff.	The USACE will coordinate with FDOT as necessary throughout the culvert replacement/removal process.
FDOT - 2	If any impacts will occur to environmental resources located within the FDOT rights-of-way, please coordinate with the appropriate FDOT District Planning and Environmental Management Office.	The USACE will coordinate with FDOT as necessary throughout the culvert replacement/removal process.
FDOT – 3	If any FDOT rights-of-way or property will be used for the installation of facilities or the storage/staging of equipment, materials or vehicles, please notify the FDOT District Planning and Environmental Management Office with appropriate project-specific plan/details so the information can be distributed to the appropriate divisions for review.	The USACE will coordinate with FDOT as necessary throughout the culvert replacement/removal process.
FDOT – 4	Should the need for lane closures or traffic channeling on the state roadway system arise, Maintenance of Traffic Plans may be necessary and coordination with the FDOT Traffic Operations Office will be required.	All construction activities will take place in the Federal right-of-way and will not affect the state roadway system. If required, FDOT permits will be acquired by the construction contractor.
FDOT – 5	If any hazardous materials will need to be transported on FDOT roads, a hazardous spills response plan will need to be prepared and coordinated with the FDOT District Maintenance-Permits Office.	The Contractor shall ensure that hazardous wastes are packed, labeled, and transported in accordance with 49 CFR 173 and State and local regulations. Contractors Spill contingency planning shall be strictly in accordance with the criteria of 40 CFR, Part 109. All hazardous waste shall be transported by a licensed transporter in accordance with 40 CFR 263 and 49 CFR 171, Subchapter C.
FDOT – 6	It is imperative that any facilities owned, managed or maintained by the state that are damaged by construction activity on the Herbert Hoover Dike or Federal culverts associated with the HHD be restored to the condition that existed prior to construction.	The contractor will be responsible for repairing or replacing any damage associated with their construction activities.
Florida Department of Environmental Protection (FDEP) March 18, 2011	DEP notes that even though the EA indicates USACE commitment to ensuring continued drainage and irrigation capabilities for those permitted to use the subject culverts, it does not provide details clearly demonstrating how this will be accomplished.	The USACE will research the permitted users and permitted capacity for each culvert to be replaced prior to construction. Drainage and irrigation will be compensated at each culvert separately depending on the type and amount of water supply currently used and

		needed.
FDEP – 2	Ongoing coordination with the permitted users is critical, especially during construction, to minimize economic hardship and impacts on their operations.	The USACE is meeting with the permitted users for each culvert to be replaced and will continue coordination upon each culvert package.
FDEP - 3	Minor short-term impacts to vegetation, noise level, air quality and recreational resources are also expected during construction	Most impacts to vegetation, noise, air quality, and recreation will be temporary in nature. The slope of the dike will be reseeded upon completion of construction as discussed in Section 4.
FDEP – 4	Of particular concern are portions of the LOST that may be temporarily closed or removed. USACE has not committed to repaving impacted portions of the LOST that are currently paved. DEP staff requests that closures of the trail be limited to those required for safety reasons and that the time period of trail closures be reduced to the extent feasible while ensuring safety.	The LOST will be temporarily closed for the duration of culvert construction (approximately one year) directly around the culvert. Signs will be posted at the trailheads indicating where closures will occur.
FDEP - 5	Signs should be placed at the nearest trail entry points, from both directions of the closure, stating the trail is closed X number of miles (or feet) ahead. Signage should also identify whether the access point is the only one to or from the trail Greenways and Trails, as those impacts would not be addressed during the permitting process. Please contact Rick Halvorsen (850) 245-2052 to discuss this aspect of the project.	The USACE will coordinate with Rick Halvorsen as requested prior to and during construction.
FDEP -6	Please clarify whether the acreage for wetland impacts includes the temporary earthen cofferdams shown on Figure 11 and how the number of earthen dam vs sheet pile dewatering sites was determined. Impacts for the earthen dam sites appear to be greater.	Temporary wetland impacts estimated were based on the footprint for an earthen cofferdam typical construction methods. The temporary earthen dam impacts are greater than the sheet pile, which is why sheet pile cofferdams are required for culverts adjacent to the snail kite critical habitat areas and the navigation channel (Route 1).
FDEP – 7	Figure 2 shows all the subject culverts, but does not differentiate the ones that will be removed. Please consider revising this figure for clarity.	The distinguishment between removal and replacement are indicated in the text in Table 2 and is found on page 12 immediately following Figure 2.
FDEP – 8	Section 5.4 (6) mentions the use of "baled hay or straw" for erosion control. Note that these materials are no longer an acceptable BMP, and have been removed from the Florida Stormwater Erosion and Sedimentation Control Inspector's Manual, as there are newer products available that are more effective than straw or hay bale barriers. Please refer to the Inspector's Manual for additional products that offer better protection: http://www.dep.state.fl.us/water/nonpoint/docs/erosions/erosion-enspectors-manual.pdf	Hay bales will be not be a solely acceptable BMP within a contractor submitted Storm Water Pollution Prevention Plan (SWPPP). The contractors Environmental Protection Plan (EPP) and subsequent USACE approval will also provide assurance as to proper erosion control and protection of natural resources. Language was updated in Section 5.4(6) accordingly.
FDEP – 9	Appendix C mentions that the disposal of material removed at the culvert locations may be reused or spread over the levee. Has the sediment been tested	Soil borings have been taken at each culvert location. It will be the contractor's responsibility to dispose of

	at each of the sites or will this occur just prior to construction? This may impact the appropriate disposal for this material.	materials in a legal manner.
FDEP – 10	We strongly recommend that the Corps contact the Southeast District Office to schedule a pre-application meeting to ensure that permit requirements and milestones are reflected appropriately in the project management schedule. The Department has recently been asked to expedite permit reviews, as it appears that adequate time for permit processing was not provided to the Corps scheduling process.	The USACE has begun coordination with DEP and SFWMD for the first six culverts. Continued coordination will occur throughout the culvert replacement/removal process and schedules will reflect typical review periods.
FDEP – 11	On Feb 21, 2011, the Corps submitted an environmental resource permit application for the replacement of Culverts C4a, C11 and C16, which is currently being processed by DEP's Southeast District Office as DEP File NO. 0234604-011 and for C1, C1a, and C3 as DEP File No. 0234604-012.	Noted.
FDEP – 12	Coordination should be undertaken far enough in advance so as to avoid project constraints or delays. Please note that operation of these structures is currently regulated under the existing Lake Okeechobee Water Control Structure Operations Permit (LOPA Permit No. 0174552-007) issued to the SFWMD. The replacement of these structures should be discussed with both SFWMD and the Department's Restoration Planning and Permitting Section in Tallahassee.	Coordination with SFWMD and DEP has begun. A site visit to the first six culverts in the application package to be constructed has been completed. Communication with both agencies will continue as designs are developed for each culvert package.
South Florida Water Management District (SFWMD) April 1, 2011	It is unclear whether the Corps will agree to provide landowners with equivalent water supply and drainage capacity as the specific culvert replacement designs are developed…The Corps needs to ensure the designs and construction bypass structures provide equivalent capacity for drainage and irrigation both during and after construction and that the structures are sized to address future changes to the Lake Okeechobee regulation schedule.	The culvert replacements (size/capacity/inverts/etc.) will be based on the original authorization. The post-construction hydraulic design objective is to match the originally authorized culvert capacity as close as possible while meeting the minimum size for maintenance and inspection requirements and considering a standardized barrel size. The objective is to maintain the current operational function of the culverts which is drainage to Lake Okeechobee and water supply from Lake Okeechobee. Drainage and water supply bypass during construction will be addressed during the design phase for each culvert package to include coordination with SFWMD and the permitted users.
SFWMD – 2	The Corps needs to consider the effects of future planned and potential changes to the Central and Southern Florida Flood Control system that may impact culvert design such as new Stormwater Treatment Area capacity, the automation of north shore pumping stations, the lake forward pumps, and remote gate control capability.	The culvert replacements will be based on the original authorization. USACE will not be considering future uses and changes, however, remote gate control capabilities are being considered.
SFWMD – 3	The Corps should consider secondary and cumulative impacts to the ecological health of the Lake Okeechobee including water quality, submerged and emergent vegetation, wading birds, sport fish, and native apple snails that are	Cumulative impacts were discussed in Table 5. Native apple snails are not anticipated to be affected by the culvert replacement as all work is occurring adjacent to

	anticipated to occur as a result of the culvert replacement.	critical habitat. Habitat is outside of designated culvert areas does not support apple snails and consists of mainly riprap and cattail.
SFWMD – 4	…restocking of native apple snails should be required in addition to the proposed replanting of wetland vegetation.	Cumulative impacts were discussed in Table 5. Native apple snails are not anticipated to be affected by the culvert replacement as all work is occurring adjacent to critical habitat. Habitat is outside of designated culvert areas does not support apple snails and consists of mainly riprap and cattail.
SFWMD – 5	p. 36, section 4.3, under wood stork: include any information for the presence of active wood stork rookeries/colony since it is observed to be foraging in the area.	Appendix A, page A-10 has a map of observed wood stork colonies from 1970-2009. Text in Section 4.3 has been updated accordingly.
SFWMD – 6	p. 36, section 4.4.2, sentence 3: include a map showing where the 4 acre wetland impacts are proposed and briefly describe the quality and function of those wetlands. In addition, include details of wetland mitigation that is proposed for the 4 acre wetland impacts.	Wetland impacts will be assessed with interagency coordination prior to construction of each culvert. It will then be determined what the quality and function is and be decided at that point what types of native seed or planting needs to occur. The area of impact for all culverts is 4 acres and text in Section 4.2.2 has been updated accordingly.
SFWMD – 7	p. 48, section 4.18, under vegetation: please describe what the minimal short term impacts to wetland vegetation are and also elaborate on what vegetation will be planted to offset those impacts.	Minimal short term impacts include impact from the cofferdams. The cofferdams will be taken out post construction and most emergent wetland vegetation will grow back. If it is determined to replant any vegetation upon completion of construction, it will be replaced with in-kind native vegetation which will be dependent upon each culvert site.
SFWMD – 8	p. 51, section 5.3, minimization: only minimization of impacts to the snail kite was included in this paragraph. Include information on minimization of impacts to other T&E species such as Caracara, wood storks, gopher tortoise and Easter Indigo snake.	Snail kite critical habitat was the only impact noted in minimization because other species are not expected to be impacted. Preconstruction surveys will be completed to ensure no nesting activity is taking place as well as an onsite monitor for active bird activity during construction. Contractors will be required to have an EPP to protect all listed species.
SFWMD – 9	p. 52, section 5.4, mitigation: Include details of any preconstruction surveys that will be conducted for Caracara, wood storks, gopher tortoise, and Eastern Indigo snake.	Preconstruction surveys will be conducted for Caracara, wood storks, and Eastern Indigo snake. These are stated in Section 4.18 under Threatened and Endangered Species. The contractor will be required to do preconstruction surveys and each listed species will be described in the EPP.

SFWMD – 10	p. 52, section 5.4, mitigation: include details of wetland mitigation that is proposed for the 4 acre wetland impacts.	Minimal impacts to wetlands are expected to occur. Wetlands will be assessed through interagency coordination with DEP and FWS prior to construction of each culvert. Replanting of native wetland plants will be coordinated for each culvert during the permit application process because they will all have different compositions.
SFWMD -11	During low water levels, the L-8 canal stage cannot be raised above the lake even when there is water available from other sources such as WCA1 or L-8 reservoir. It will solve the problem if a slide gate can be installed on the canal side of the culverts. Since, this applies to other culverts around the lake, every culvert should be reviewed for the need for slide gates.	The culvert replacements (size/capacity/inverts/etc.) will be based on the original authorization. USACE will not be considering future uses and changes. Specific issues related to each culvert will be addressed during the design.
SFWMD – 12	Culvert 10A is unable to meet water supply needs during low lake stages. Unlike structures S-351, S-352, and S-354 where SFWMD has been able to install temporary horizontal pumps to continue water supply withdrawals from Lake Okeechobee down to lake stages of approximately 8 feet NGVD, Culvert 10A does not have features necessary for installation of pumps. These features should be a consideration at Culvert 10A.	The culvert replacements will be based on the original authorization. USACE will not be considering future uses and changes. Specific issues related to each culvert will be addressed during the design. Currently, Culvert 10A invert elevations and the ability to chain the lakeside flap gates open for water supply during low lake levels should allow for water supply down to lake stages of approximately 5.7 to 6.3 feet NGVD29.
SFWMD – 13	Culvert 8: slide gates instead of flap gates would be a better design to solve the water supply concerns at this structure when the Lake Okeechobee levels are low and canal levels cannot be maintained. If gate openings create erosive discharge from either direction, armoring of the canal banks to transition from culvert channel through 90 degree bends and additional canal bank protection is needed on canal banks running east and west.	The culvert replacements will be based on the original authorization. USACE will not be considering future uses and changes. Specific issues related to each culvert will be addressed during the design.
SFWMD – 14	SFWMD has no objection to the removal of Culverts 7, 9, 14 and TCC.	Noted. Thank you.
Closter Farms March 14, 2011	Pursuant to provisions of a long-terms lease with the State of Florida, Closter farms that lands adjacent to Culvert 12A of the HHD in accordance with existing state and water management district permits. Closter and other entities connected hydrologically to Culvert 12A, farm over 3,000 acreas in the basin. Closter supports the replacement of Culvert 12A by the USACOE.	Noted. Thank you.
Robert Notron March 5, 2011	…We also must remove all culverts from the dike that allow back pumping into lake Okeechobee…	The USACE has committed to replacing culverts currently in use and removing culverts that are abandoned.

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US Army Corps
of Engineers®

Jacksonville District

SEMINOLE TRIBE OF FLORIDA

6300 Stirling Road
Hollywood, FL 33024
PHONE (954) 965-4380
FAX: (954) 962-8727
WEBSITE: http://www.semtribe.com

SEMINOLE WATER COMMISSION
STORMWATER MANAGEMENT PERMIT

Permit Number:	**ERMD- 14-258**	Date**:**	**07-24-2014**
Project Name:	**HP2 and HP3 Culvert Upgrades**	Reservation:	**Brighton Seminole Indian Reservation**

APPLICANT INFORMATION

Name/Company:	**Seminole Tribe of Florida**						
Address:	**6300 Stirling Road**	City:	**Hollywood**	State:	**FL**	ZIP:	**33024**

PROJECT INFORMATION

Section/Township/Range:	**Section 1&12, Township 40 East, Range 32 East**				
Project Location:	**Southern portion of the reservation along the C41 Canal**				
Acres (if applicable):	**N/A**	Estimated Gallons per Day (if specified):			**N/A**
Water Use Limitations (if specified):		Gallons:	**N/A**	Frequency:	**N/A**
Seminole Water Commission Approval Date:	**03/25/2014**	Tribal Council Approval Resolution No. :			**C-272-14**
South Florida Water Management District Governing Board Approval Date:	**July 10, 2014**	Tribal Council Approval Date:			**05/16/2014**
South Florida Water Management District Governing Board Work Plan (& Amendment, if applicable):	**9th Amendment to the 27th Annual Work Plan**	*NOTE: South Florida Water Management District Water Shortage Declarations are Applicable*			

If you have any questions, please do not hesitate to contact the Environmental Resource Management Department at 954-965-4380

Permits issued by the Seminole Water Commission are subject to the following requirements and impose the following conditions as fully identified in the Tribal Water Code of the Seminole Tribe of Florida, Subtitle A, Beneficial Use and Conservation of Water Resources :

1. Each permit issued by the Commission shall identify:
    a. the name and address of the applicant,
    b. the activity and the location of the activity described in the application,
    c. and any conditions required by the Commission.
2. The Commission, in granting any permit for a proposed activity, shall impose such conditions as assure that the proposed activity:
    a. Makes provision for adequate flood protection and drainage;
    b. Will not adversely impact water quality or quantity on receiving waters and adjacent lands;
    c. Will not adversely impact surface and groundwater levels and flows;
    d. Will not adversely impact the environment;
    e. Can be effectively operated and maintained;
    f. Will not adversely affect public health;
    g. Will not be harmful to water or water resources of the reservation or Tribal Trust Lands; and
    h. Is, in the opinion of the Director, the most acceptable alternative available.
3. The Commission may impose conditions on any permit, to assure that the proposed activity is consistent with the overall objectives of this Code and will not harm the water or water resources of the reservation or Tribal Trust Lands.
4. Employees of the Department are authorized to enter the site of any permitted activity to inspect, monitor or enforce permit conditions.
5. A permit issued under this Code constitutes a tribal license to use, drain or divert water, subject to all conditions of the permit and the provisions of this Code. Such permit does not convey any ownership interest in the water or water resources of the Tribe.
6. Any permit issued under the provisions of this Code may be revoked by the Commission, on the recommendation of the Director, on the following conditions:
    a. The commission finds that the permittee has violated the provisions of this Code, the Compact or the Manual; or
    b. The Commission finds that the permittee has violated or failed to comply with the conditions of his permit; or
    c. The permit is in force, but the Commission finds that the permittee has not proceeded in a timely fashion to construct facilities authorized under the terms of the permit, if required, and more than one year has elapsed since the permit was issued.
7. Where an application for a proposed activity is submitted to the Director, which, in the judgment of the Commission, upon recommendation by the Director, does not significantly affect any interest protected by this Code, the Compact or the Manual, the Commission may suspend further proceedings and grant a Special Permit exempting the proposed activity from any further procedures ordinarily required under this Code.
8. Applications to modify any activity licensed under this Code may be made by letter to the Department, providing sufficient information so that the Director may determine that the modification does not:
    a. Substantially alter the permitted activity;
    b. Increase the authorized off site discharge;
    c. Alter the environmental features of the project;
    d. Decrease the required flood control elevations for roads or buildings;
    e. Decrease the required retention/detention; or
    f. Decrease the pollution removal efficiency.
9. The Commission may grant, grant with conditions, or deny an application for permit at its next regularly scheduled meeting following receipt of the Director's Report and any additional information it has requested.

For more information please visit http://www.semtribe.com/services/water.html

Please see the attached report from the South Florida Water Management District covering the permit application.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

RECEIVED

JUN 3 0 2014

ENVIRONMENTAL RESOURCE MANAGEMENT DEPARTMENT
Received by:

June 27, 2014

Ms. Cherise Maples
Seminole Tribe of Florida
Water Resource Management
6300 Stirling Road
Hollywood, FL 33024

Dear Ms. Maples:

Subject: Ninth Amendment to the Twenty Seventh Annual Work Plan

Enclosed is a copy of the South Florida Water Management District's staff report covering the permit application referenced therein. It is requested that you read this staff report thoroughly and understand its contents. The recommendation as stated in the staff report will be presented to our Governing Board for consideration on **Thursday, July 10, 2014.**

Should you wish to object to the staff recommendations or file a petition, please provide written objections, petitions and/or waivers (refer to the attached "Notice of Rights") to:

Office of the District Clerk
South Florida Water Management District
Post Office Box 246820
West Palm Beach, FL 33416-4680

The "Notice of Rights" addressed the procedures to be followed if you desire a public hearing or other review of the proposed agency action. You are advised, however, to be prepared to defend your position regarding the permit application when it is considered by the Governing Board for final agency action, even if you agree with the staff recommendation, as the Governing Board may take final agency action which differs materially from the proposed agency action.

Please contact the District if you have any questions concerning this matter.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a "Notice of Rights" has been mailed to the addressee this 27th day of June, 2014 in accordance with Section 120.06 (3), Florida Statutes.

Sincerely,

Armando Ramirez
Tribal and Federal Affairs Liaison
Office of Everglades Policy & Coordination

AR/ja
Enclosures

BRIGHTON RESERVATION

INTRODUCTION

The Harney Pond (C-41) and Indian Prairie Canals (C-40) traverse the reservation from the northwest to the southeast. The southern boundaries of the reservation are formed by District Canals L-59, L-60, and L-61 (Exhibit 1). The Tribe holds Right-Of-Way Occupancy Permits from the District allowing the construction of irrigation and drainage facilities along District rights-of-way on the project canals.

WORK PROPOSED BY THE WORK PLAN

1. HP2 and HP3 Culvert Upgrades - Brighton

The Tribe is proposing the replacement of Culvert HP2 and HP3 with upgraded structures to be renamed S-287 and S-286, respectively, at the existing locations of the two culverts. The replacement structures will consist of installing on 7-foot by 7-foot gated culvert, approximately 98 feet long. The embankment levee will be reconstructed to a reduced elevation of 32 feet (from 36 feet). Rip rap will be installed along the lakeside embankment face and a control building will be installed at the landside work platform. The work includes demolition and removal of the existing culvert and construction of a new, in-kind water control structure S-287 and S-286. The demolition and construction requires the installation of a cofferdam, either sheet pile or earthen, or a combination thereof, at the entrance channels of the culvert in order to dewater the construction site. The structure will include cast-in place reinforced concrete foundations, a culvert barrel (with stainless steel liner), and headwalls. A combination flap/slide gate will be installed at the lakeside headwall of the structure. Replacing degrading culvert structures is one part of the overall program to increase the safety of the Herbert Hoover Dike System. The replacement is needed to enhance public safety in the vicinity of Lake Okeechobee, as the culverts have been identified as the highest potential points for failure in the Herbert Hoover Dike System. As dewatering will be required for the construction, the U.S. Army Corps of Engineers has provided a draft dewatering plan for approval. The final document will not be completed until the contractor is selected and final project documentation is completed. The final plan will be included with the permit documents as an update to the dewatering plan.

Proposed Surface Water Management Activities and Staff Evaluation

Proposed is the replacement of two existing culverts (HP2 & HP3) with two in-kind water control structures to be renamed S-286 & S-287. There are no stormwater management related issues associated with this project. No adverse water quality or quantity impacts are anticipated.

Proposed Water Use Activities and Staff Evaluation

Dewatering is required for the replacement of two existing culverts. Dewatering of the site will be accomplished using a series of well points, 10 to 12 inches in diameter, installed to a depth of 35 feet below land surface. The wells will be fitted with 3-inch, 5 HP submersible electric pumps, each capable of generating a flow of approximately 250 gallons per minute (gpm) per well, for a total dewatering capacity of 3,000 gpm. Dewatering discharge will be routed back into the Harney Pond Canal with appropriate turbidity monitoring ensuring that turbidity levels in the dewatering effluent will not exceed 29 NTU above the background level. Dewatering location map and plans are included in Exhibit 2.

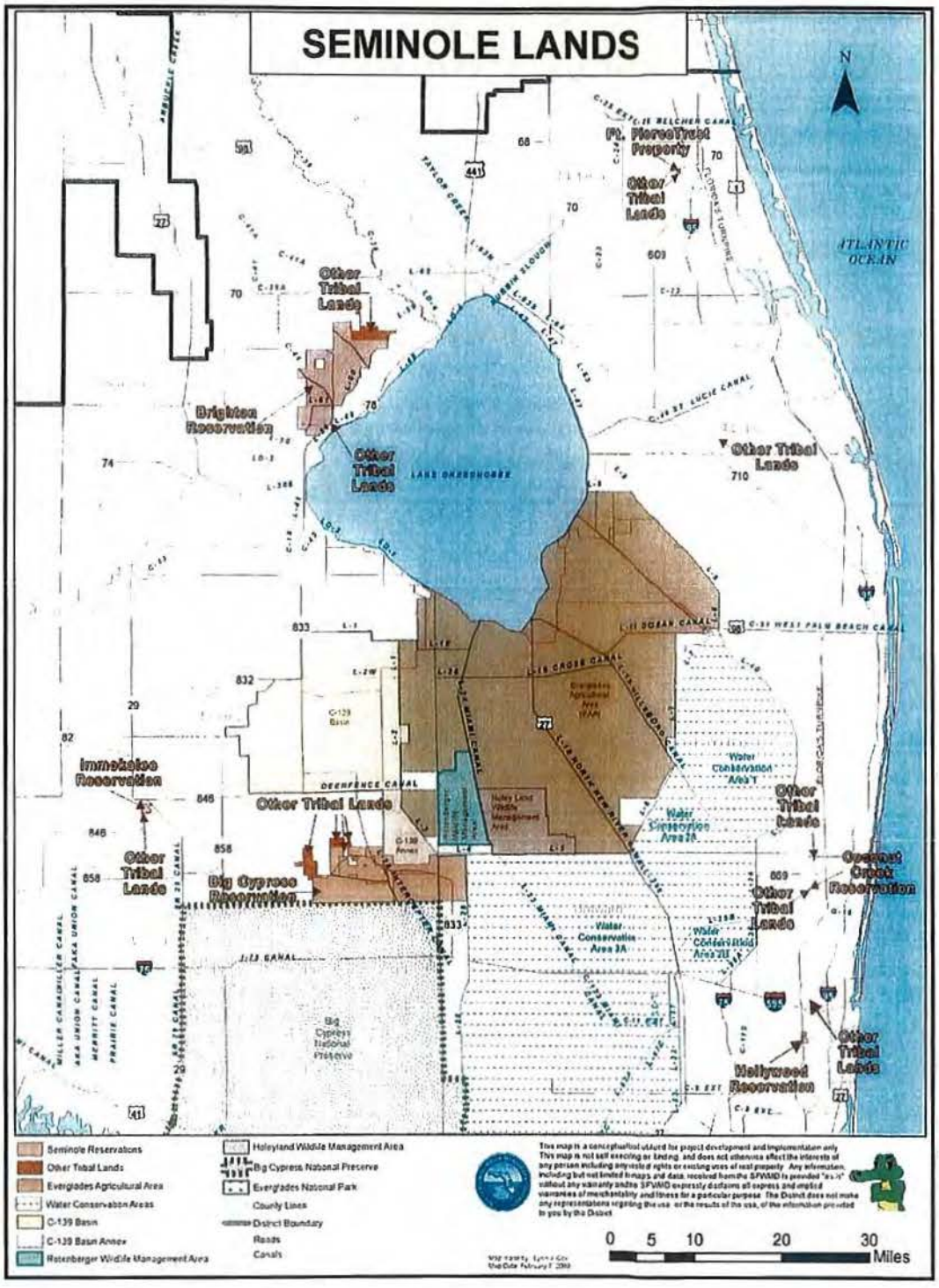
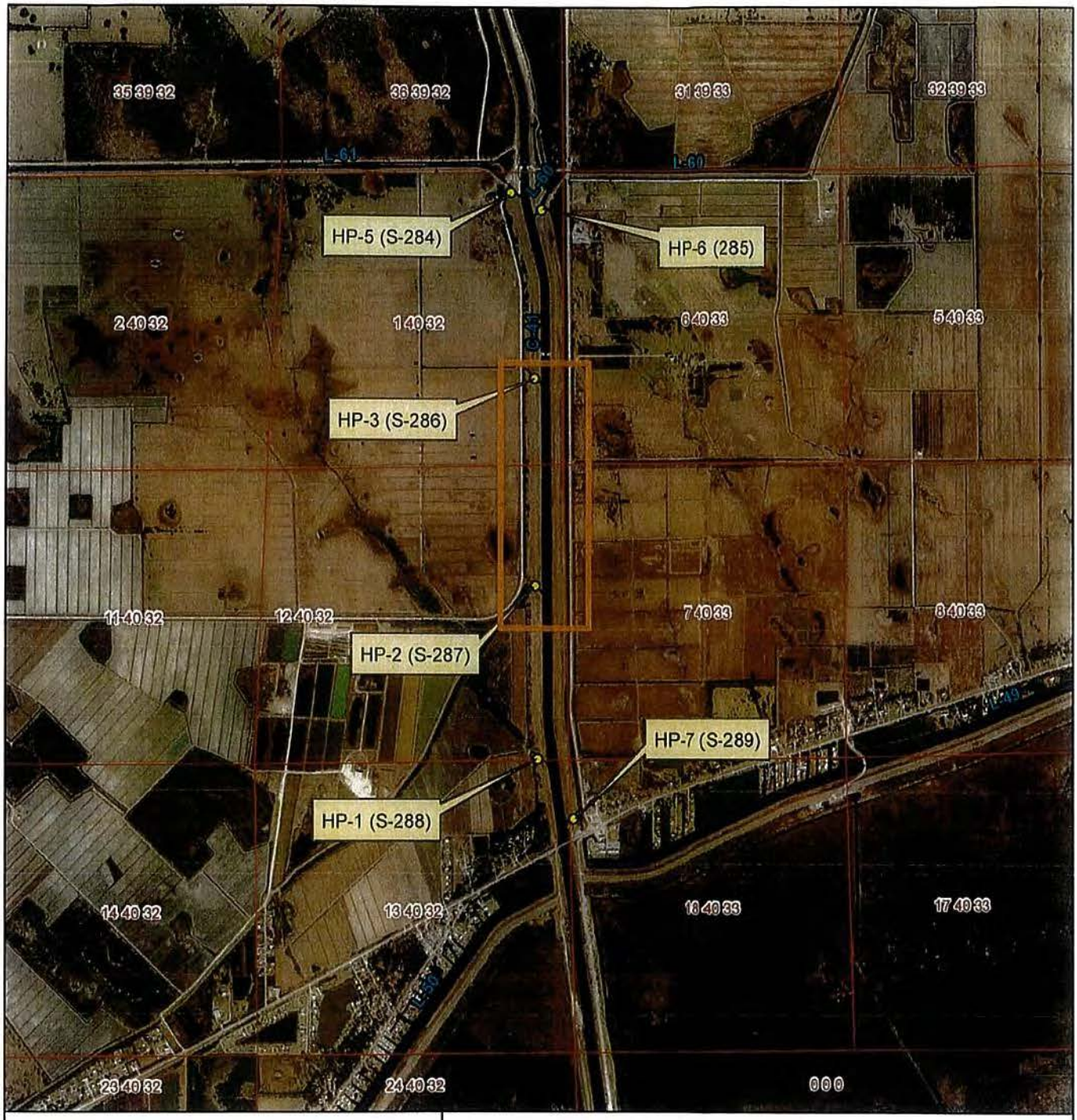
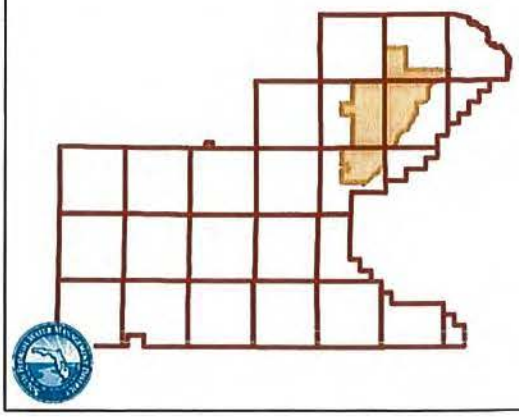

SEMINOLE LANDS
N
Ft. Pierce Trust Property
Other Tribal Lands
ATLANTIC OCEAN
Brighton Reservation
LAKE OKEECHOBEE
Immokalee Reservation
Big Cypress Reservation
Hollywood Reservation
Coconut Creek Reservation
Water Conservation Area 3A
Big Cypress National Preserve
Seminole Reservations
Other Tribal Lands
Everglades Agricultural Area
Water Conservation Areas
C-139 Basin
C-139 Basin Annex
Rotenberger Wildlife Management Area
Holeyland Wildlife Management Area
Big Cypress National Preserve
Everglades National Park
County Lines
District Boundary
Roads
Canals
0 5 10 20 30
Miles

EXHIBIT 1





GLADES COUNTY, FLORIDA

N

Project Area

Brighton Reservation

Map Date: 2014-06-24

Sec 1, 12 / Twp 40 / Rge 32

Project Name: HP2 and HP3 Culvert Upgrades
Brighton Reservation

0 2,800 5,600 Feet

B-287 RECONSTRUCTION (HP-2)
HP-2
LANDSIDE
R.O.W
EXIST FENCE
STORAGE AREA (SEE NOTE 2)
STORAGE AREA (SEE NOTE 2)

HP-3
S-286 RECONSTRUCTION (HP-3)
DETAIL
WORK LIMITS
REVIEW ONLY
DO NOT USE FOR CONSTRUCTION
GRAPHIC SCALE
LEGEND
WORK LIMITS
R O W
LANDSIDE
BIA HWY 1305
STORAGE AREA
FEDERAL R.O.W.
FENCE EXISTING
STORAGE AREA

Culvert HP-3 (S-286)

Culvert HP-3

- Planned replacement of HP-3 for flood risk reduction as part of the Herbert Hoover Dike Rehabilitation.
- 100% Federally funded project
- Seeking Water Quality Certification from the Seminole Tribe of Florida

Culvert HP-2 (S-287)

Culvert HP-2

- Planned replacement of HP-2 for flood risk reduction as part of the Herbert Hoover Dike Rehabilitation.
- 100% Federally funded project
- Dual jurisdiction: STOF and FDEP
- Seeking Water Quality Certification from the Seminole Tribe of Florida
- Seeking concurrence to the Care, Control and Diversion of Water During Construction Plan for SFWMD portion of land

Drainage Patterns for HP-2 and HP-3

HP-2 and HP-3 provide secondary drainage to the Harney Pond canal.

Primary drainage is to Pumping Station S-131.

Condition of HP-2 and HP-3

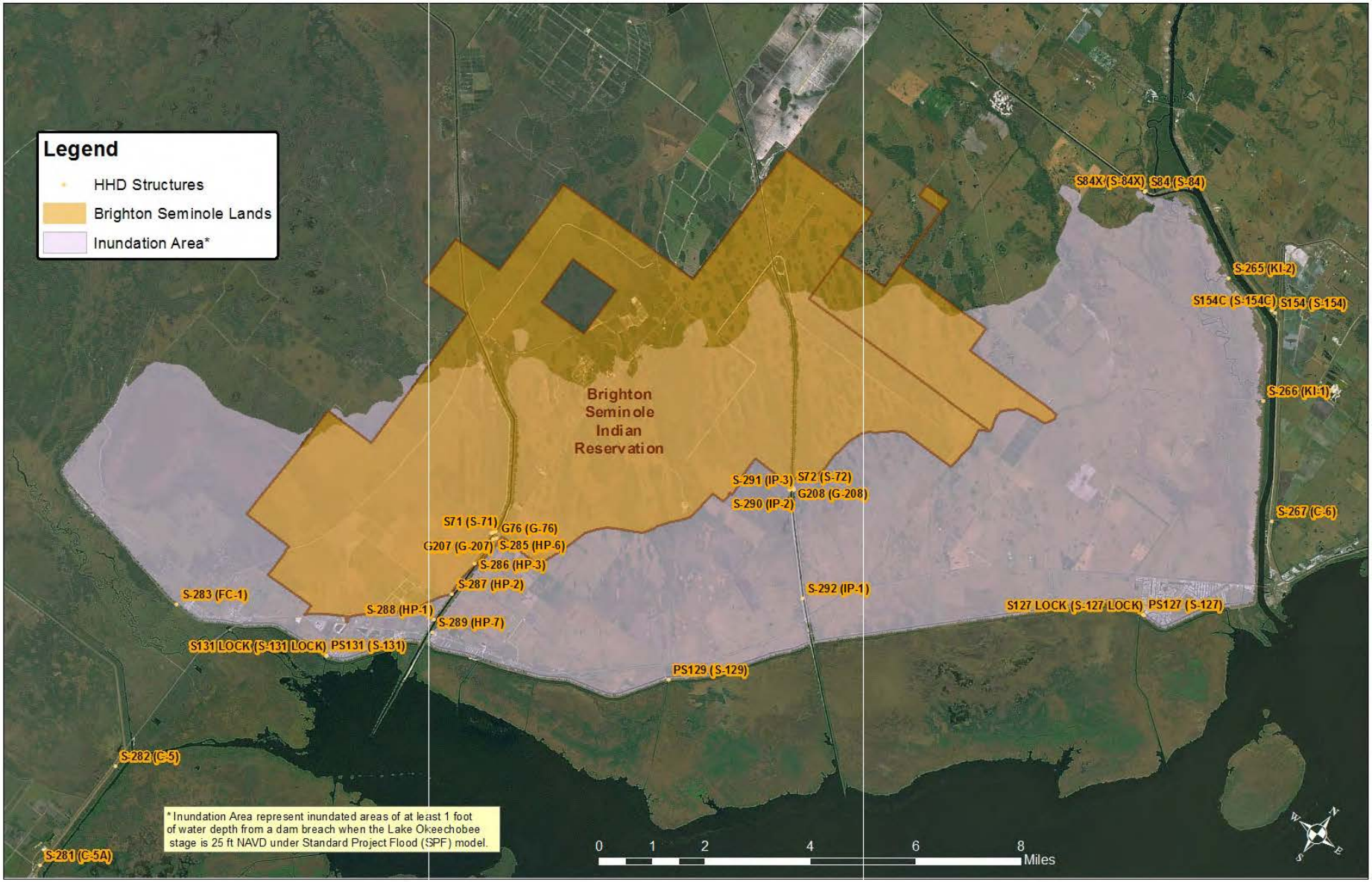
Culvert HP-2

Culvert HP-3

Continued degradation of these structures potentially leading to failure.

Failure of the structure would undermine the integrity of the HHD embankment, opening the potential for uncontrolled flooding of the adjacent lands.

Brighton Reservation Inundation Areas



July 2013

Central and Southern
Florida Project
Herbert Hoover Dike

HERBERT HOOVER DIKE REHABILITATION PROJECT

Final Water Resources Engineering
Care, Control, and Diversion of Water
During Construction Plan

S-287 (Culvert HP-2) – Culvert Replacement

Last Updated: 19-July-2013

US Army Corps
of Engineers
Jacksonville District

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1.1 S-287 (HP-2) – BYPASS DURING CONSTRUCTION

S-287 (HP-2) does not have a regulatory permit from SFWMD for surface water drainage from the adjacent agricultural (S-131) basin, nor does it have a regulatory permit to provide water supply to the adjacent agricultural (S-131) basin. However, S-287 (HP-2) is utilized by the Brighton Seminole Tribe of Florida as a "secondary" drainage outlet to the C-41 Canal of their lands adjacent to the culvert structure. Therefore, surface water drainage of this location should be preserved during construction.

1.2 S-287 (HP-2) ALTERNATIVES TO BYPASS PUMPING TO AND FROM C-41 CANAL DURING CONSTRUCTION

No alternative to bypass pumping during construction is available due to the location of this structure and the poor hydraulic connection available outside the Federal right-of-way. That is, during demolition of the existing structure, and construction of the replacement structure, bypass pumping for drainage will be required on site to ensure no additional flooding of adjacent lands occurs during runoff producing events that is not already inherent with the existing structure in place.

1.3 S-287 (HP-2) CARE, CONTROL, AND DIVERSION OF WATER DURING CONSTRUCTION PLAN

1.3.1 DRAINAGE (FLOOD RISK REDUCTION – SURFACE WATER MANAGEMENT)

Drainage: As per conversations with Brighton Seminole Tribe representative Craig Tepper, S-287 (HP-2) is utilized as a drainage structure for a portion of the adjacent SFWMD classified S-131 Basin (Lands belonging to the Brighton Seminole Tribe of Florida). Additionally, as per conversations with USACE South Florida Operations Office personnel, this structure infrequently conveys water from the adjacent lands to the C-41 Canal. The primary outlet for drainage (also confirmed by Mr. Tepper) of excess runoff of the S-131 Basin is via the S-131 Pumping Station located on the west shore of Lake Okeechobee in the alignment of Levee 50. S-131 is located just south of Florida State Road 78 and approximately 27 miles southwest of the town of Okeechobee.

1.3.1.1 S-287 (HP-2) CARE, CONTROL, AND DIVERSION DURING CONSTRUCTION PLAN SUMMARY

The care, control, and diversion of water during construction plan for S-287 (HP-2) is the following. Bypass to the C-41 Canal during construction is as shown in **Table 1.3.1.1-1.**

Drainage – Drainage bypass to the C-41 Canal during construction will be required as shown in **Table 1.3.1.1-1.** It is anticipated that during construction, bypass pumping facilities would only be utilized when water surface elevation within the landside catchment basin exceeds approximately 16.0 ft, NAVD 88. Since the primary flood control structure for the S-131 Basin is the S-131 pumping station, it is the recommendation of CESAJ-EN-WH to provide 35 cfs capacity to act as a secondary means of flood damage reduction of the adjacent lands during construction of the S-287 culvert. The 35 cfs capacity is recommended as it provides approximately 80% of the design discharge capacity of the S-287 (HP-2) structure and will lower the potential risk of additional flood damages to the adjacent basin during the construction period.

Water Supply – Water Supply bypass from the C-41 Canal during construction will not be required.

TABLE 1.3.1.1-1 S-287 (HP-2) BYPASS TO AND FROM C-41 CANAL DURING CONSTRUCTION

Culvert	Drainage (cfs)	Water Supply (cfs)
S-287 (HP-2)	35	0

July 2013

Central and Southern
Florida Project
Herbert Hoover Dike

HERBERT HOOVER DIKE REHABILITATION PROJECT

Final Water Resources Engineering
Care, Control, and Diversion of Water
During Construction Plan

S-286 (Culvert HP-3) – Culvert Replacement

Last Updated: 19-July-2013

US Army Corps
of Engineers
Jacksonville District

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1.1 S-286 (HP-3) – BYPASS DURING CONSTRUCTION

S-286 (HP-3) does not have a regulatory permit from SFWMD for surface water drainage from the adjacent agricultural (S-131) basin, nor does it have a regulatory permit to provide water supply to the adjacent agricultural (S-131) basin. However, S-286 (HP-3) is utilized by the Brighton Seminole Tribe of Florida as a "secondary" drainage outlet to the C-41 Canal of their lands adjacent to the culvert structure. Therefore, surface water drainage of this location should be preserved during construction.

1.2 S-286 (HP-3) ALTERNATIVES TO BYPASS PUMPING TO AND FROM C-41 CANAL DURING CONSTRUCTION

No alternative to bypass pumping during construction is available due to the location of this structure and the poor hydraulic connection available outside the Federal right-of-way. That is, during demolition of the existing structure, and construction of the replacement structure, bypass pumping for drainage will be required on site to ensure no additional flooding of adjacent lands occurs during runoff producing events that is not already inherent with the existing structure in place.

1.3 S-286 (HP-3) CARE, CONTROL, AND DIVERSION OF WATER DURING CONSTRUCTION PLAN

1.3.1 DRAINAGE (FLOOD RISK REDUCTION – SURFACE WATER MANAGEMENT)

Drainage: As per conversations with Brighton Seminole Tribe representative Craig Tepper, S-286 (HP-3) is utilized as a drainage structure for a portion of the adjacent SFWMD classified S-131 Basin (Lands belonging to the Brighton Seminole Tribe of Florida). Additionally, as per conversations with USACE South Florida Operations Office personnel, this structure infrequently conveys water from the adjacent lands to the C-41 Canal. The primary outlet for drainage (also confirmed by Mr. Tepper) of excess runoff of the S-131 Basin is via the S-131 Pumping Station located on the west shore of Lake Okeechobee in the alignment of Levee 50. S-131 is located just south of Florida State Road 78 and approximately 27 miles southwest of the town of Okeechobee.

1.3.1.1 S-286 (HP-3) CARE, CONTROL, AND DIVERSION DURING CONSTRUCTION PLAN SUMMARY

The care, control, and diversion of water during construction plan for S-286 (HP-3) is the following. Bypass to the C-41 Canal during construction is as shown in **Table 1.3.1.1-1.**

Drainage – Drainage bypass to the C-41 Canal during construction will be required as shown in **Table 1.3.1.1-1.** It is anticipated that during construction, bypass pumping facilities would only be utilized when water surface elevation within the landside catchment basin exceeds approximately 16.0 ft, NAVD 88. Since the primary flood control structure for the S-131 Basin is the S-131 pumping station, it is the recommendation of CESAJ-EN-WH to provide 25 cfs capacity to act as a secondary means of flood damage reduction of the adjacent lands during construction of the S-286 culvert. The 25 cfs capacity is recommended as it can remove approximately 0.11 ft of additional water from the basin which passes though a 48" Corrugated Aluminum Pipe beneath BIA Hwy 1305 into the S-286 (HP-3) landside catchment during the construction period.

Water Supply – Water Supply bypass from the C-41 Canal during construction will not be required.

TABLE 1.3.1.1-1 S-286 (HP-3) BYPASS TO AND FROM C-41 CANAL DURING CONSTRUCTION

Culvert	Drainage (cfs)	Water Supply (cfs)
S-286 (HP-3)	25	0

Herbert Hoover Dike

Culvert Rehabilitation Project

Culverts HP-2 and HP-3

Conceptual Dewatering Plan

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1.0 INTRODUCTION

1.1 Project Description

This Construction Dewatering Plan (Plan) was prepared for construction activities associated with the U.S. Army Corps of Engineers (USACE) Herbert Hoover Dike Rehabilitation Structure Culvert Replacement project (Contract #: TBD) located in Glades County, FL. This Plan was prepared in accordance with the requirements Section 35 41 00 of the project's Technical Specifications. HP-2 is located in Section 12, Township 40 South and Range 32 East. HP-3 is located in Section 01, Township 40 South and Range 32 East. The Site Location and Vicinity Maps are presented in Figure 1.

This Plan was assembled to specifically address the submittal requirements of Paragraph 1.4, Items A through G of Section 35 41 00. Detailed information for each item of Paragraph 1.4 (represented in ***bold italics***) is presented below.

1.2 Design Team Qualifications

a. Qualifications of the design professional(s) responsible for design and operation of the dewatering system and safety inspection procedures.

Contractors team of Florida registered professional engineers and geologists are highly experienced with the unique characteristics of the subsurface geology and hydrogeology in and around the Lake Okeechobee basin.

1.3 Site Plans

b. Site plan of the project component with a description of the Dewatering system and equipment, layout including the location of sumps, well points, backup pumps, temporary containment berms, cofferdams, or diversion ditches as necessary; installation methods; description and layout of the onsite water detention system; location of the proposed discharge point(s) in Harney Pond Canal, discharge rates, and the associated water quality monitoring locations; and re-watering procedures.

Dewatering of the Site may be accomplished using a series of wells, 10 to 12 inches in diameter, installed to a depth of 35 feet. The wells will be fitted with 3 inch, 5 HP submersible electric pumps, each capable of generating a flow of approximately 250 gpm per well, for a total dewatering capacity of 3,000 gpm. In addition, a conventional vacuum assisted single stage well point system constructed along the back side of the sheet pile wall to supplement the deep wells and to help minimize seepage through the interlocks and foundation of the cofferdam. The wellpoint system will be constructed with approximately 105 screened well points installed into the top of the existing limestone formation occurring at the Site. The well points will be connected in sequence to a header pipe which in turn will be connected to pumps of sufficient size and horsepower to extract the anticipated groundwater flow. Detailed Site plans will be developed to provide a layout of the dewatering system components (well points, header pipe, sumps, pumps, settling tanks, water quality monitoring and discharge locations, etc.) and their approximate locations on the Site. A detailed sequence of the dewatering system construction including installation methods and discharge rates are addressed in the following section of the Plan.

The Contractor shall supply electrical power for the primary operation of the submersible dewatering pumps in general accordance with the project specifications in Division 26 Electrical and Section 01 50 02 Temporary Construction Faculties. The Contractor shall conform to the requirements with IEEE C2 and NFPA 70 for temporary electrical lines. The Contractor will coordinate the electrical provider, Florida Power and Light (FPL), for the delivery of three phase power drop from the FDOT right-of-way to the Project Site. All electrical work shall be completed by a quality, state licensed electrical contractor. The Temporary Electrical system layout will be reviewed with the Government during the preparatory phase meeting for this definable feature of work (DFOW). Power to the dewatering system will consist of 120 V/ 240 V. Power supply lines will extend from the electrical service panel board through flexible conduit to control boxes at each of the submersible dewatering well locations.

2.0 DEWATERING SYSTEM

2.1 Sequence of Construction

c. A detailed description of the sequence of construction and dewatering, including a description of control elevations during cofferdam/stability berm construction, and control elevations during culvert construction.

The Culvert removal and replacement shall consist of construction activities that will include using driven sheet pile and earthen temporary cofferdams installed on the upstream and downstream sides of the culvert to allow the replacement of the culvert structure. The Site dewatering plan will be accomplished in two phases as described below.

Phase I of Plan focuses on the short term dewatering planned for the construction of the canal side Sheetpile. This dewatering is expected to occur following the installation of the driven sheet pile cofferdam and during the construction of any Stability Berm. Installation of the steel sheet pile driven cofferdam wall on the canal side of the Site will occur first. The sheet pile cofferdam will be flanked with earthen cofferdams on each side from the slope of the dike out to the sheeted cofferdam. Dewatering during this phase will be accomplished by the removal of surface water using hydraulic pump extraction from engineered collection sumps located at the canal side and landside of the existing culvert as needed. In addition, a conventional vacuum assisted single stage well point system constructed along the landside face of the driven sheet pile wall to dewater the stability berm location and to help minimize seepage through the interlocks and foundation of the cofferdam. The wellpoint system will be constructed with screened well points installed to the top of the existing limestone formation occurring at the Site. The well points will be connected in sequence to a header pipe which in turn will be connected to pumps of sufficient size and horsepower to extract the anticipated groundwater flow. Detailed Site plans will be developed which provide a layout of the dewatering system components (well points, header pipe, sumps, pumps, settling tanks, water quality monitoring and discharge locations, etc.) and their approximate locations on the Site. Specific details of the final system components will be reviewed with the USACE during the Preparatory Meeting for the corresponding Definable Feature(s) of Work that require dewatering.

Phase II of this plan deals with the longer term dewatering planned for the excavation required for the removal of the existing structure and the construction of the replacement culvert. For the purposes of developing and designing groundwater control dewatering systems for this project, the starting water level elevation design assumption was to the upper levels of the 2008 Lake Okeechobee Interim Regulation Schedule (2008 LORS).

Earthwork performed below elevation +15.0 ft NAVD88 is being considered to require long term groundwater control dewatering to an elevation of -5.0 ft NAVD88. Dewatering of the overall Site will be accomplished using a series of wells equipped with electrically powered submersible pumps installed to an approximate depth of 35 feet below land surface (approximate elevation of +20 ft NAVD88. The wells will be fitted with 3-inch, five horse power (HP) submersible electric pumps, each capable of generating a flow of approximately 250 gpm per well, for a total dewatering capacity of 3,000 gpm.

Elevation references used in the design are NAVD88. Measurements presented in this Plan will be in units of feet and inches and flow rates presented will be U.S. gallons per minute (GPM) or per day (GPD).

2.2 Turbidity Monitoring

d. The location and type of turbidity control devices and methods necessary to ensure State Water Quality will be met.

Turbidity monitoring will be performed by testing water samples with the use of a turbidity meter (meter) or equivalent. Prior to each testing of samples, the meter will be calibrated per the manufacturer's instructions (submitted separately as a submittal under Project Specification Section 01 57 25. Both background and compliance turbidity sampling for Culvert HP-2 and HP-3 shall be performed in accordance with Section 01 57 25, Paragraph 3.1 of the Technical Specifications. A global positioning system (GPS) device will be used to precisely record sampling locations.

The samples will be tested immediately (in no case longer than 30 minutes after collection) using the meter. As long as the difference in NTUs (Nephlometric Turbidity Units) between the background sample and compliance sample(s) is less than 29, compliance with F.A.C. Chapter 62-302.530 is met. If the monitoring reveals levels greater than the State Water Quality standards, AW will immediately notify Chief, Environmental Branch (904-232-1665) and the Contracting Officer's Representative, or on the morning of the following work day if it occurs after normal work hours. Also, all construction activities will cease until corrective measures have been taken and turbidity has returned to acceptable levels.

Turbidity testing will be performed at least twice daily at a minimum of four hours apart while dewatering discharge is occurring. One sampling event will occur between the hours of 12AM and 12PM and the other between 12PM and 12AM. Samples will be taken at the surface and mid-depth. When water is no longer being discharged off site, turbidity monitoring will be discontinued. As described in Section 01 57 25 of the project specifications the following data will be entered in to Form 01411 for each day sampling is performed:

- Time of day and date samples were taken.
- Depth of water body.
- Depth of sample.
- Antecedent weather conditions.
- Water stage and direction of flow.
- Salinity (provided for heavy metal and ammonia analysis only).
- pH (provided for heavy metal and ammonia analysis only).
- Water temperature, C degrees (heavy metal and ammonia analysis only).
- Site location (station location and map).
- Water sample location.
- Wind direction and velocity.

On a weekly basis, the data will be compiled and the USACE Turbidity Monitoring Weekly Report will be completed. AW will submit turbidity monitoring reports within 7 days after each test to the Contracting Officer, the Environmental Branch and FDEP in accordance with specification section 01 57 25. The report contents will include:

- Dates of sampling and analysis.

- A statement describing the methods used in collection, handling, storage, and quality control methods used in the analysis of the samples.

- A map indicating the sampling location and plume configuration, if any.

- A statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, and accuracy of the data.

- Results of the analyses.

- A description of any factors influencing the construction operation or the sampling program. Reports shall be furnished daily even when no sampling is conducted. When sampling is not conducted, a brief statement shall be given in the report explaining the reason for not conducting the sampling.

- State plane coordinates (x and y) shall be provided for all sampling stations for each sampling event to demonstrate compliance with the stated sampling distances.

2.3 Dewatering Modeling and Drawdown Calculations

e. Calculations estimating the area of influence of dewatering, depth of dewatering, pumpage rates, duration and volumes, and stability of system, consistent with planned construction activities.

FLOW CALCULATIONS

Some industry standard groundwater flow simulator will be utilized to simulate surficial aquifer conditions related to dewatering soils to enable construction of Herbert Hoover Dike culvert. References used to construct and parameterize the groundwater model include:

- Section 00 31 32 Geotechnical Data Report for Herbert Hoover Dike Rehabilitation Project Structure Replacements

- Herbert Hoover Dike Rehabilitation Structure Replacements Plans for Construction

The starting groundwater elevation will be specified as the solution of the steady-state, non- pumping scenario solution (pre-excavation) with an average initial groundwater table of +14.25 ft NAVD88. Effective porosity for all layers set at 25%.

The excavation dimensions used in this analysis are depicted on Drawing (tbd) of the Contract Documents. The north-south length of the excavation for which dewatering is required is approximately? The lowest elevation to be excavated is tbd. The required dewatering depth below the lowest excavation elevation is tbd (Technical Specification 35 41 00 Embankment Constructions), which sets the minimum dewatering elevation for the excavation area at tbd.

It is important to note that additional pumping capacity may be necessary to accommodate stormwater events and to decrease the groundwater table elevation upon dewatering system start-up in the desire amount of time. Additionally, aquifer heterogeneity, such as dissolved solution channels or unknown areas of increased hydraulic conductivity, may increase the amount of water to be removed from the excavation. In this case, the dewatering flow rate may need to be increased to an amount greater than the model-predicted tbd gpm.

2.4 Cofferdam Construction

f. A plan for construction of each temporary cofferdam system. The plan shall contain a description of the type of cofferdam, a list of materials to be used, and a detailed installation and removal sequence.

Cofferdam installation may be performed without the utilization of any barge mounted equipment. The imported fill material for each of the proposed work pads (canal side and landside) may be placed in 12-in thick compacted lifts using dozer and compaction equipment to the top of the cofferdam elevation, which is +15.0 ft NAVD88 for the landside cofferdams and +26.0 ft NAVD88 for the canal side cofferdams. The imported fill material will undergo quality control testing prior to and during installation by a USACE validated geotechnical laboratory in accordance with the project Technical Specification. Detailed information on the embankment fill material will be included under a separate submittal.

The cofferdams are intended to protect the integrity of the HHD during culvert construction and represent one of the most significant critical path items on the project schedule. At each structure site location the canal side cofferdam will be constructed before the landside, as it provides greater immediate work opportunities.

Prior to commencement of installation at either embankment fill work pad, surveyors will provide offset markers and benchmarks for work control. Floating turbidity curtains and manatee warning signs will be erected prior to undertaking any work on adjacent water bodies.

A pile driving template will be erected to ensure the sheet piles are properly located and aligned. The template will be supported and stabilized by temporary driven piles. The steel sheet piles will be driven to a specified tip elevation for the landside cofferdams and for the lake side cofferdams using a vibratory hammer suspended from a large land-based crawler crane. The steel piles will be extracted using the same equipment for condition inspection by the USACE. If required, an impact hammer will be used to attain tip elevation for sheets that due to subsurface conditions could not be achieved. The installation sequence will be continuous from end to end. Concurrent with the installation of the driven pile cofferdam wall will be placement of rip rap armoring at the lake bottom of the waterside face of sheets, and the steel and timber fender system. Existing rip rap on the shoreline in areas where the earthen cofferdam and stability berms will be constructed will be removed and stockpile on site for reuse.

After the driven cofferdam has progressed past the first earthen cofferdam area, the contractor will clear, grub, and strip the earthen cofferdam footprint in preparation for select fill placement. These operations will be in a watered-up condition and be performed from the crawler crane work pads. Select fill will then be placed and pushed outward in a leading edge to displace silt materials to the side and away from underneath the earthen cofferdam. Select material will be placed in this manner until it reaches a select height above the prevailing water line. Above this elevation, embankment fill will be placed to achieve the top of berm elevation. After all earthen cofferdam fill is in place; the exterior side of the berm will be covered with a geotextile fabric material, a one foot thick layer of bedding stone and topped with a layer of imported rip rap. This will provide washout protection in the event of severe weather or extreme high lake water level event.

In order to surface dewater the stability berm area for placement and compaction of backfill in the dry, as required by project specifications, the area will be subdivided into sections to allow each excavated area to be dewatered by open pumping from the basin created. Select fill will be placed in lifts and compacted to above the natural water elevation within each dewatered section prior to advancing to another section. After completion of the stability berm, the interior slopes of the earthen cofferdam and the stability berms will be covered with the drainage blanket consisting of geotextile, drainage gravel and a layer of rip rap.

After construction of the driven sheet pile/earthen cofferdam system, the existing dike will be excavated to the limits shown in the contract drawings. At this time, a series of deep wells may be installed in this area. Discharge piping will be installed and routed per the layout shown in the attached plan view (reference Figure tbd). These wells will be pumped and will begin lowering the water table around the existing culvert until 2 foot below the planned bottom of the culvert excavation (tbd ft. NAVD88) is reached.

This Plan provides measures to maintain the culvert work area free from ground and surface water during construction operations while controlling discharge turbidity. All discharge flows are intended to be detained on-site with the initial discharge being pumped to a settling (Baker) tank prior to the overflow being directed back to Lake Okeechobee as shown in Figure tbd.

Dewatering will be necessary for construction of the culvert which is the primary aspect of this project. The majority of the duration of construction activities will take place as the existing structure is demolished and removed and the new replacement structure is constructed in its place.

Groundwater control dewatering plans currently include the installation and operation of a conventional single stage well-point system to be installed around the excavation area at an elevation of tbd ft. NAVD88. Once primary excavation depths are achieved throughout the work area, an additional measure of rim ditches with dewatering sumps within the excavation may be utilized to further add to the overall dewatering capacity of the system and allow control of stormwater runoff.

After the excavation reaches its final depth (elevation -tbd ft. NAVD88) a shallow rim ditch may be created along the east and west toes of the excavation slopes. The intent of the rim ditches would be to further lower the water table at the culvert structure location. A dewatering sump will be excavated at the south end and north end of the excavation and a hydraulic pump will be staged at each these sumps. The rim ditches will connect to

the sumps so the hydraulic pumps can discharge this water. Both the south hydraulic pump and the north hydraulic pump will discharge the rim ditch water to the Baker Tanks, which will ultimately discharge to Harney Pond Canal. For location of the wells, sumps, and other equipment referenced, see Figure 2. Cut sheets and descriptions for the dewatering equipment proposed in this plan for the different aspects of the dewatering activities are included in Attachment tbd.

2.5 Maintaining Water Quality at Discharge

g. If it is not feasible to retain dewatering effluent onsite, then the plan shall also include all of the following:(1) Operational plan, which demonstrates that the discharge to the receiving water body meets all applicable Water Quality standards prior to discharge, and also contains the proposed sampling locations and daily turbidity measurements. (2) Contingency plan, which includes procedures for ceasing dewatering operations and corrective actions until water quality standards are met.

The dewatering system will be started up one at a time and will be discharged into a settling tank of adequate capacity, if necessary, until the system is developed and running clear. We do not anticipate turbid discharge once the wells are developed as the filter sand around the well screen prevents sand infiltration into the well. As long as a differential of 29 NTUs (between background and compliance samples) is not exceeded, we plan on discharging directly back into Harney Pond Canal. If the NTU differential exceeds tbd, discharge will be diverted back into the settling tank.

2.6 Permitting

Once the system is approved to be activated, all discharge flows will be tested to confirm comparable turbidity measurements with background levels as described, in Section 2.2 above. An inline flow meter will be used to measure volume of discharge and records will be maintained.

3.0 OPERATIONS AND MAINTAINENCE

As the system completes its initial multi day startup, the operations of the system will be turned over to Contractors on site designated personnel. Contractor's key personnel will be instructed in the normal operation of the system and corrective actions to repair and restore the system to normal condition in the case of incidental damage or non-critical equipment failure

At this point there are no actual actions to be taken to keep the system in operation, just a regiment of checking specific items, taking gauge readings and posting into the systems daily log. Examples of those items to be checked would include the items listed below.

3.1 Generator & Fuel Supply:

- Check oil pressure gauge and if diminished from the previous posting. Switch over to the backup generator and shut down the primary to physically check oil levels on the dipstick. If low, refill to appropriate levels.
- Confirm designated voltage is registering on meter, that alternator readout indicates a charging condition and that the water temperature gauge indicates unit is operating within normal range.
- Confirm fuel level in tank and check fuel filter back pressure gauge. Should it indicate a higher pressure that is designated, call for service.

3.2 Combined Discharge

- Confirm flow meter(s) are in operational order and record readout. Check that the piping to the final discharge point is secure and that flows are not causing any turbidity or erosion and if so, immediately correct.

3.3 Diesel Powered Generators and Pumps

Weekly a technician or designate will visit the job site and complete a full review of system operations. At that time an additive will be added to the fuel supply to prevent algae growth in the fuel systems. In addition, discharge header pressures will be correlated to flows and adjusted if necessary.

Every tbd hours or tbd days the service technician from the generator provider will provide a full service to the then primary unit and then make arrangements in the automatic switch where the previous backup unit is now the primary for this next service period. This rotation of units provides intervals for the proactive replacement of belts, address other consumables and decreases the chance of unscheduled shutdowns.

The primary supply issue would be fuel for the generators. A large capacity fuel tank will be located in the Temporary Facilities yard that will have refueling scheduled for every 5 days which will result in the tank always having no less than two days runtime in reserve for a delayed delivery. Portable tanks will then be used to directly refuel the generators at the excavation site. Should this calculated buffer not be sufficient during actual usage, additional fuel capacity will be made available on site. Should a period of

severe adverse weather conditions be forecasted, arrangements for additional capacity and/or more frequent refueling visits will be promptly made.

A supply of common repair parts and supplies, pipe fittings, fuel filters, coolant and engine oil will be maintained at all times to minimize any down time from routine maintenance or inadvertent damage.

4.0 REMOVAL OF SYSTEM

Once all work (e.g. dry fitting gates, structure backfill, pointing concrete etc.) within tbd ft above the native groundwater level or lake elevation (whichever is higher) is completed, dewatering will be discontinued. Once it is determined that the system is no longer needed, a gradual reduction of pumping capacity will be implemented to allow for a controlled "re-water" condition.

4.1 Restoration of Groundwater Levels

A systematic reduction of discharge flow by the means of reducing output or the shutdown of widely spaced pumps and monitoring of piezometer levels a program will be established to return groundwater to preconstruction levels at approximately the same rate they were drawn down.

4.2 System Shutdown

At complete shutdown, all power will be disconnected and system components including wiring, electrical controls and discharge header will be disassembled and removed from site before recovering the submersible pump assemblies.

The following are the abandonment procedures as required by specifications:

"The casings are to remain as situated and be abandoned after being backfilled by an appropriate amount of bentonite/grout to solidify the interior and prevent voids".

We will comply with specification 35 41 00, Paragraph 3.6.2 which states "All well points shall be tremie grouted from the bottom up after extraction."

5.0 DEWATERING SYSTEM TROUBLESHOOTING

- Check for vacuum leaks
- Check for disconnected or damaged equipment
- Check individual points- adjust valve as necessary to maximize vacuum
- Check discharge and settlement tank for leaks and excessive turbidity
- Check electrical wiring
- Check submersible pump(s) for discharge and pressure

5.1 Turbid Discharge

- Check each wellpoint swing joint to determine air leak and if turbidity is a singular issue or common to a group of wellpoints
- Restrict all discharge until adequate measures are in place to reduce/treat to enable clear discharge to acceptable standards
- Direct discharge to siltation tank for settlement and dissipation of energy
- Procure settlement bag and place in discharge flow for adequate settlement if necessary
- Should long term issue be apparent, setup adequate settlement and treatment options
- Investigate use of sock to encourage direct percolation discharge

5.2 Sudden Shutdown

- Call for service immediately then begin troubleshooting
- Confirm adequate fuel supply. Check Fuel filter log and if readings have been on the rise replace fuel filter with spare and restart
- Check battery voltage
- Check Control Panel
- Check oil and coolant levels
- Check generator or electrical supply for power to submersible pumps
- Determine if one or all pumps
- Swap with onsite spare if mechanical failure

5.3 Unusual Reduction in Discharge

- Compare to previous entries of flow measurement from the meter and compare discharge header pressure readings. If drop is dramatic (more than 20%), call for service before troubleshooting.

- Confirm all pumps are operational and check system for damage. Confirm gauges are functioning properly, if not replace.
- Check piezometer levels. If on the rise call for service. If dropping or stable, advise technician during weekly review.

6.0 DEWATERING CONTRACTOR'S QUALIFICATIONS AND EXPERIENCE

The selected dewatering contractor's qualifications and experience are to be provided.

3) Complete an endangered species determination for the project site

Usually the operator must assess the potential effects of stormwater runoff on federally listed threatened and endangered species and any designated critical habitat on or near the site. The STOF ERMD completes a threatened and endangered species review before any departmental permits are issued.

Visit www.epa.gov/npdes/stormwater/esa for more information.

4) File a Notice of Intent (NOI)

The Notice of Intent (NOI) form lets EPA know that you are filing for permit coverage. It is also your certification that you have read, understood, and implemented the requirements of EPA's permit. The fastest and easiest way to obtain permit coverage is through the EPA's new online permit application system (http://cfpub.epa.gov/npdes/stormwater/cgpenoi.cfm). EPA's permit requires a 14 day waiting period after an NOI is filed and posted on the EPA's web site (http://ofmpub.epa.gov/CGPSearch/faces/CGPPublicSearch.jspx?) Using EPA's eNOI system is the fastest way to begin this process. You are required to utilize the eNOI system to If you have a problem with the use of the eNOI system, contact the EPA Region 4 Office (http://cfpub.epa.gov/npdes/contacts.cfm?program_id=6&type=REGION). Approval must be granted by the corresponding EPA Regional Office to utilize the paper NOI.

EPA has designed a tutorial *Guide for Submitting your NOI for the 2012 CGP Using the eNOI System* . Please follow the link below: http://www.epa.gov/npdes/pubs/enoi_2012cgp_usermanual.pdf

For additional questions concerning the eNOI submission process please contact EPA's NOI processing center:

By Phone: 866-352-7755 8:00am-5:00pm (EST)

By E-mail: noi@avanticorporation.com

Permit coverage begins at the conclusion of the 14-day period unless you are notified otherwise. Your completed NOI should be posted at the construction site in a place accessible to the public.

5) Implement all BMPs outlined in your SWPPP

Remember to follow your SWPPP. All BMPs must be inspected and maintained regularly. Inspections are required either (1) at least once every 7 days or (2) at least once every 14 days within 24 hours of the end of a rain event of 1/2-inch or more. The plan must also be updated as the site conditions and BMPs change. Remember to keep records of your maintenance activities and any SWPPP modifications for review during inspection.

6) File an electronic Notice of Termination (NOT)

A NOT must be filed with the eNOI system (http://cfpub.epa.gov/npdes/stormwater/cgpenoi.cfm) in order to terminate permit coverage when either your project is completed (70% of the density of the original vegetation is reestablished on unpaved areas), another operator has assumed control and submitted an NOI under the CGP, or you have obtained coverage under an individual permit or another general NPDES permit.

For Additional information please Contact ERMD: (954)965-4380

Seminole Tribe Of Florida
Environmental Resource Management Department

How Do I Apply for A NPDES Permit ?

A Construction Site Operator's Guide to EPA's Stormwater Permit

If your construction project disturbs 1 or more acres of land through clearing, grading, excavating, or stockpiling of fill material, you may need permit coverage.

Why do I have to get Permit Coverage?

EPA's National Pollutant Discharge Elimination System (NPDES) program regulates stormwater runoff from construction sites. On February 16, 2012, EPA issued the Construction General Permit (CGP) which replaces the 2008 CGP. New non-numeric effluent limits for the Construction and Development Rule (C&D Rule) are applied to all permits under the 2012 CGP. A NPDES permit may be required if a construction project disturbs 1 or more acres, including smaller sites that are part of a larger plan of development.

Construction site operators need to submit an application called a Notice of Intent (NOI) to be covered under the EPA's CGP.

This Brochure describes how to meet the requirements of the EPA's NPDES permit which applies to construction sites in most **Indian Country Lands** an all Seminole Tribe of Florida Reservations. The 2012 GCP can be found at http://www.epa.gov/npdes/pubs/cgp2012_finalpermit.pdf

Why is stormwater runoff so bad?

Runoff from rainstorms and snowmelts pick up pollutants like sediment, oil and grease, nitrogen and phosphorous, and other chemicals and carries them into the storm drains and directly into waterbodies. Because most storm drain systems do not provide any treatment to the water they collect, preventing contamination to stormwater is critically important or polluted runoff will be discharged untreated into the waterbodies we use for swimming, fishing, and drinking water.

Why is sediment harmful to a waterbody?

Too much sediment in a waterbody can cloud the water and make it difficult or impossible for aquatic plants to receive the sunlight they need to grow. Excess sediment also smothers aquatic habitat, clogs fish gills, and impedes navigation in our waterways, which can lead to excessive dredging.

I need permit coverage. Where do I start?

1)Read EPA's Construction General Permit (CGP)

You can download a copy of EPA's permit at www.epa.gov/npdes/stormwater/cgp. Read EPA's permit carefully and remember that operators are legally responsible for complying with all its provisions.

- **Who Submits an NOI?**

The "operator" submits a Notice of Intent (NOI) form. The operator is the entity (generally company, corporation, etc.) that has operational control over the construction plans or day-to-day activities that are necessary to implement the Stormwater Pollution Prevention Plan (SWPPP). On some sites, several entities may meet the definition of operator and all must file NOIs. Operator may include owners, general contractor, and subcontractor.

It is the responsibility of the operator(s) to develop and implement a SWPPP and maintain all best management practices (BMPs) during each stage of the project. Best management practices are the techniques (buffers, silt fences, detention ponds,

2) Develop a stormwater pollution prevention plan (SWPPP)

The SWPPP is a plan for how you will control stormwater runoff from your construction site. The SWPPP must be completed before you file an NOI to apply for coverage under the EPA's permit. You don't have to submit the SWPPP with your NOI to obtain permit coverage, but the plan must be available on-site for review during inspection.

Because every site is unique, the SWPPP is unique. The SWPPP needs to be updated as your work progresses. Please visit http://cfpub.epa.gov/npdes/stormwater/swppp.cfm for more information on how to develop you SWPPP.

◊ **Basic SWPPP Principles**

- Install BMPs to control erosion and sediment and manage stormwater.
- Inspect the site regularly and properly maintain BMPs, especially after rainstorms.
- Revise the SWPPP as site conditions change during construction
- Minimize exposure of bare soils to precipitation to the extent practicable.
- Keep the construction site clean by putting trash cans, keeping storage bins covered, and sweeping up excess sediment on roads and other impervious surfaces.