



**PALM BEACH COUNTY
LOCAL MITIGATION STRATEGY
WORKING GROUP
AGENDA**



**September 27, 2023
9:00 a.m. to 10:30 a.m.**

**401 Clematis Street, Flagler Gallery
West Palm Beach, FL 33401**

- 1. Call to Order – Welcome and Introductions – Ralph Wall, Chairperson**
 - Introductions were made around the room.
 - Ralph thanked all in attendance.

- 2. LMS Attendance Requirement – Jerri L. Clairday, LMS/CRS Coordinator**
 - Jerri shared that the LMS requires a representative from each municipality to attend two (2) meetings per year in order for Letters of Support from the LMS Working Group to be issued when applying for funding for PPL projects.

- 3. LMS PPL Project Fall 2023 – Jerri L. Clairday, LMS/CRS Coordinator**
 - The PPL project submission period was September 1 – 16, 2023.
 - Twelve (12) projects were submitted and are currently being evaluated.
 - The evaluation period began on September 22 and will end on October 6, 2023.
 - Once the LMS Evaluation Panel finishes evaluating and ranks the projects, the Fall 2023 PPL will be submitted to the LMS Steering Committee for adoption on October 25, 2023.

- 4. Jurisdictional Implications of the New LMS – Ralph Wall, Chairperson**
 - PPL Requirement
 - Ralph shared that each jurisdiction must provide how they plan to mitigate identified hazards. Having projects on the PPL will demonstrate their mitigation plans and efforts.

- 5. LMS Revisions – Jerri L. Clairday, LMS/CRS Coordinator**
 - The current LMS expires on October 15, 2024.
 - The First Draft of the LMS revision was posted virtually on September 6, 2023.
 - The First Public Forum for input was held on September 13, 2023 at 6:00pm in the PBC EOC Operations Room.
 - The Final Draft will also be posted virtually and an additional Public Forum for input will be conducted prior to submission to FDEM on April 1, 2024.
 - The final draft must be submitted to FDEM on April 1, 2024.
 - Jerri shared that Palm Beach and Pasco counties are the first two (2) counties in Florida to be assigned the new LMS crosswalk. The new crosswalk requires addressing dam/dike mitigation.



PALM BEACH COUNTY LOCAL MITIGATION STRATEGY WORKING GROUP AGENDA



6. Herbert Hoover Dike Rehabilitation Project Update - USACE

- Tim Willadsen – Herbert Hoover Dike Rehabilitation Project Manager presented (see attached presentation).
 - Project goals were to safeguard human life while reducing the intolerable risk of social, economic, and environmental impacts to areas around Lake Okeechobee and impacts to the nationally and internationally significant Everglades ecosystem.
 - In 2006, The Dam Safety Action Classification assigned the Herbert Hoover Dike Level 1, the highest risk rating and required action.
 - Tim discussed key facts of the Congressional Authorization, construction techniques, and the current configuration of the Herbert Hoover Dike that have led to the current issues of the dike.
 - Rehabilitation solutions began in 2000, where a cutoff wall was instructed. In 2011, 32 culverts were replaced or removed. In 2016, a Dam Safety Modification Report (DSMR) was conducted to mitigate risk and prioritize project implementation.
 - All risk reduction measures have been implemented and completed as of 2023. This resulted in the risk reduction rising from Level 1 to Level 4.
 - An accreditation letter for the Herbert Hoover Dike was sent to FEMA in May of 2023 for the National Flood Insurance Program.
 - Key takeaway points were the completed risk reduction work, Dam Safety Action Classification Rating change, and the Herbert Hoover Dike Accreditation Recommendation.
 - Tim opened the floor opened for questions.
 - Nicole from the City of Wellington asked at what point the lake becomes a potential hazard for a breach and what would be the solution for the City of Wellington. Tim answered that the projects completed should prevent this from being an issue. Matt added that the culverts that were replaced and the cutoff walls would prevent that. For breach, he can't provide a number of when a breach could occur, but between the cutoff walls, culverts, and over washing, this shouldn't be an issue. However, nothing is 100%, and that is why we have Emergency Action Plans and Evacuation Plans in place.



PALM BEACH COUNTY LOCAL MITIGATION STRATEGY WORKING GROUP AGENDA



- Matt Taylor – Jacksonville District Dam Safety Program Manager (see attached presentation).
 - Palm Beach County is located within CIZ A and CIZ B. Matt also shared the link to the Palm Beach County Comprehensive Emergency Management Plan and the section that refers to the Herbert Hoover Dike.
 - The Herbert Hoover Dike Emergency Action Plan is in place to define responsibilities, identify unusual and unlikely conditions that may endanger the HHD, provides procedures to mitigate those dangers from the HHD, and notifies the appropriate emergency management officials.
 - Three (3) classes of emergencies for the HHD are evacuation conditions, alert conditions, and non-failure emergency conditions. Each emergency class has different associated corrective measures. Each emergency class also triggers certain groups to be notified. Examples of evacuation conditions were shared.
 - When hurricanes approach, pre-inspections are done before and after the storm.
 - The data for the dam is also automated. This allows for data to be accessed immediately.
 - Lastly, Matt explained the new 2023 definition of high water.
 - Matt opened the floor questions. There were no questions.

7. Questions/Comments – Ralph Wall, Chairperson

- Reminder from Ralph, please remember to sign in if you have not done so. Attendance is important.
- Virtual meetings will be held when possible, but please be cognizant that all meeting spaces are not equipped to provide a virtual component.

8. Adjournment – Ralph Wall, Chairperson

- Meeting adjourned at 10:28am



@PBCDEM



- PBCDEM

HERBERT HOOVER DIKE REHABILITATION PROJECT PROJECT OVERVIEW

Presenter:

Tim Willadsen

HHD Project Manager

Jacksonville District

September 27, 2023



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HERBERT HOOVER DIKE REHABILITATION PROJECT GOALS

Project Goals: Safeguarding human life while reducing the intolerable risk of social, economic and environmental impacts to areas around Lake Okeechobee and impacts to the nationally and internationally significant Everglades ecosystem.

- Dam Safety Action Classification (DSAC) Level 1 was assigned 2006 – High hazard dam; highest risk rating and required action in the Corps portfolio of dams
- \$1.80B Total Project Cost (TPC) – Estimate to complete all repairs for the approved plan in the 2016 Dam Safety Modification Report (DSMR)
- Lake Okeechobee System Operating Manual (LOSOM) – Implementation after substantial construction completion of all risk reduction measures
- Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) – HHD accreditation by Common Inundation Zone (CIZ)
- State and local interest in HHD – State of Florida contributed \$100M to accelerate the rehabilitation of Herbert Hoover Dike targeting completion in 2022 (\$50M in FY2018 and \$50M in FY2019)
- Supplemental Long-Term Disaster Recovery Investment Plan provided \$514,208,000 to fully fund Herbert Hoover Dike to completion (FY2019)

LAKE OKEECHOBEE OVERVIEW

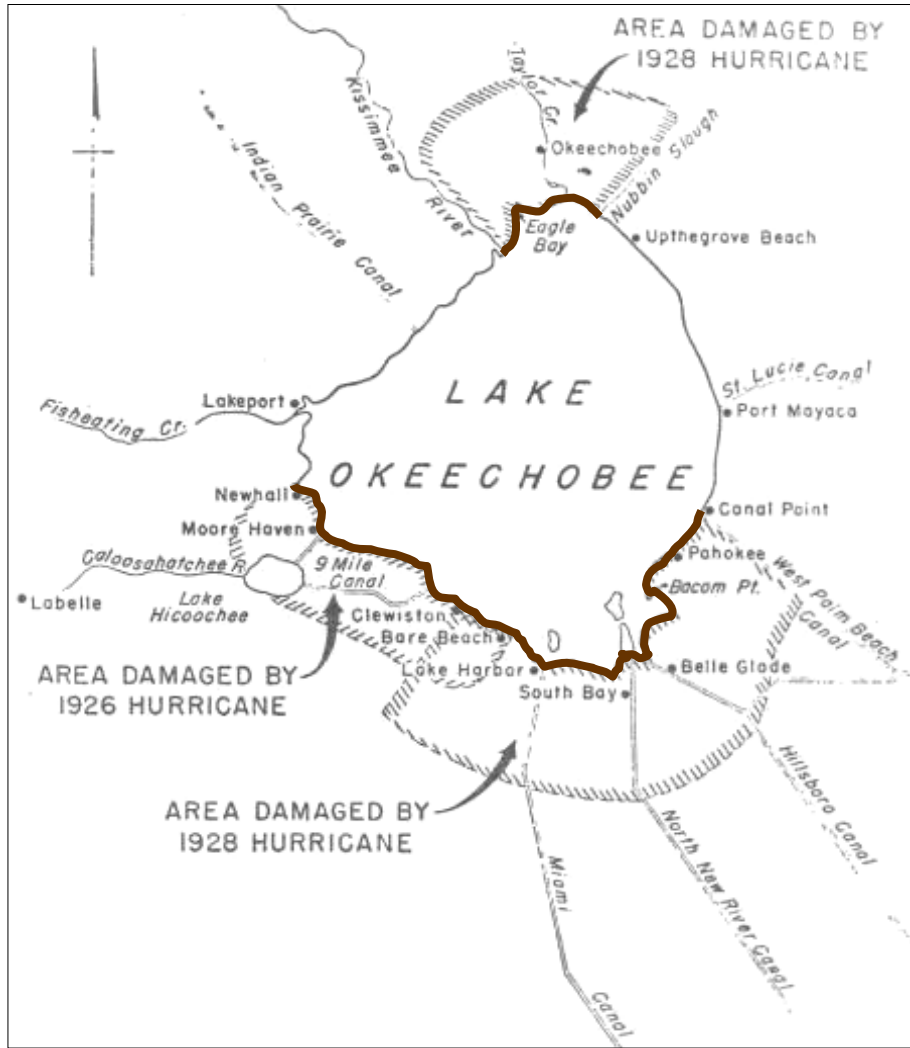


- Lake Okeechobee is approximately 730 square miles
- Basin is over 5,600 square miles
- Average water depth is 9 feet
- One foot of rainfall runoff from the basin can result in a three-to-four-foot rise of the lake
- During large flood events, water can flow into the lake six times faster than it can be released



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HERBERT HOOVER DIKE CONGRESSIONAL AUTHORIZATION



- Over 3,000 lives were lost by the 1926 and 1928 hurricanes
- Significant economic impacts
- HHD first authorized in Rivers and Harbors Act of 1930
- Subsequent authorization for HHD in Flood Control Act of 1948

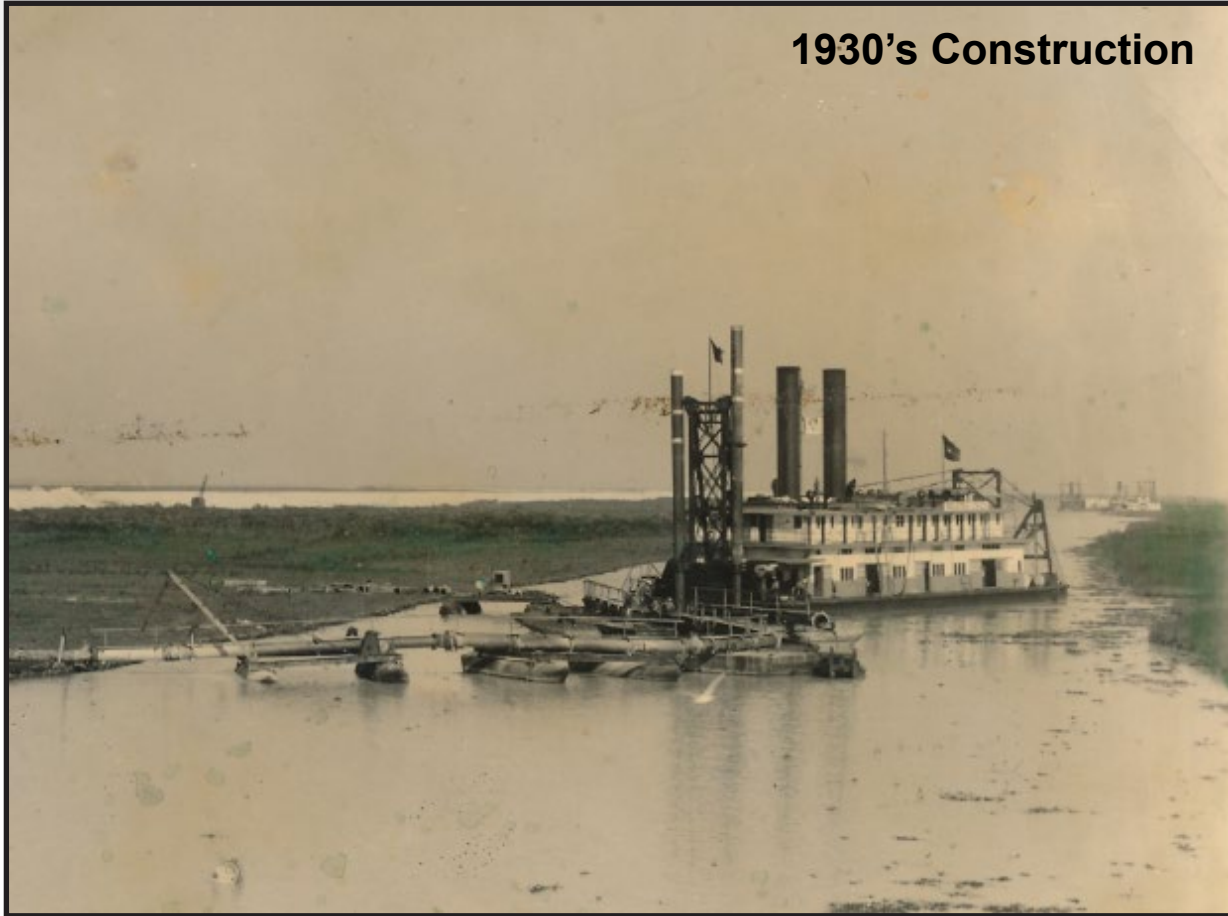


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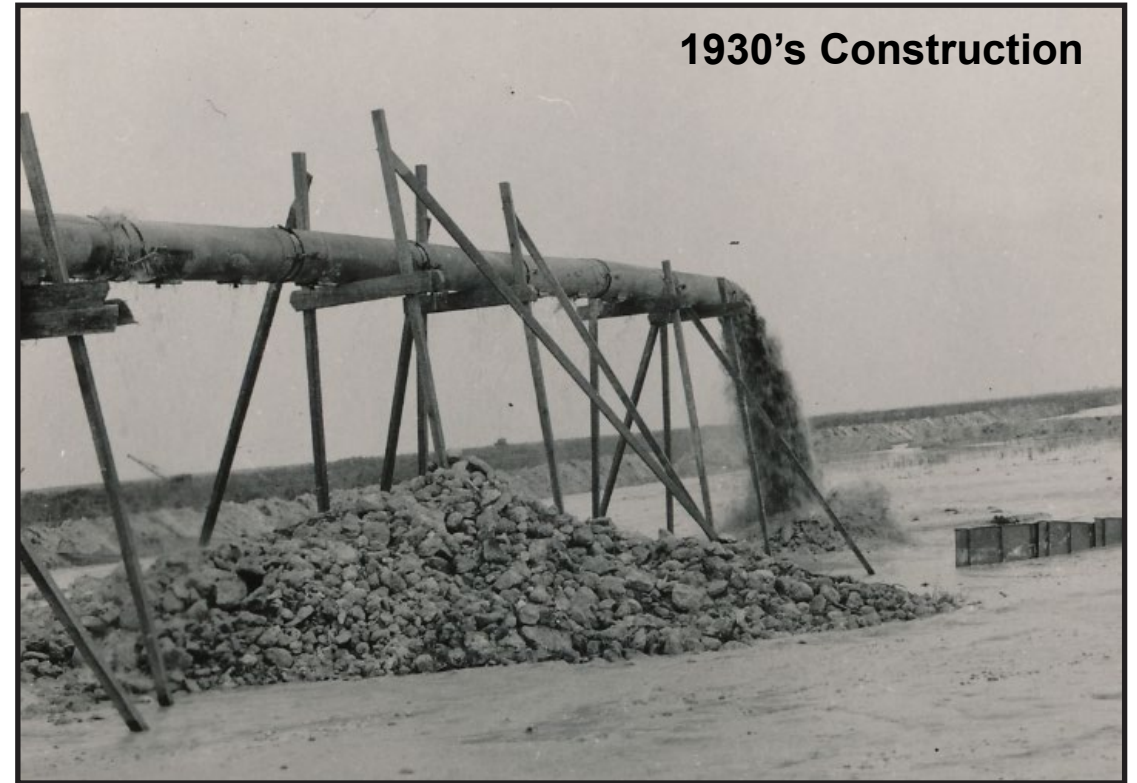
HERBERT HOOVER DIKE CONSTRUCTION TECHNIQUES



1930's Construction



1930's Construction



Hydraulic Dredge and Fill Method



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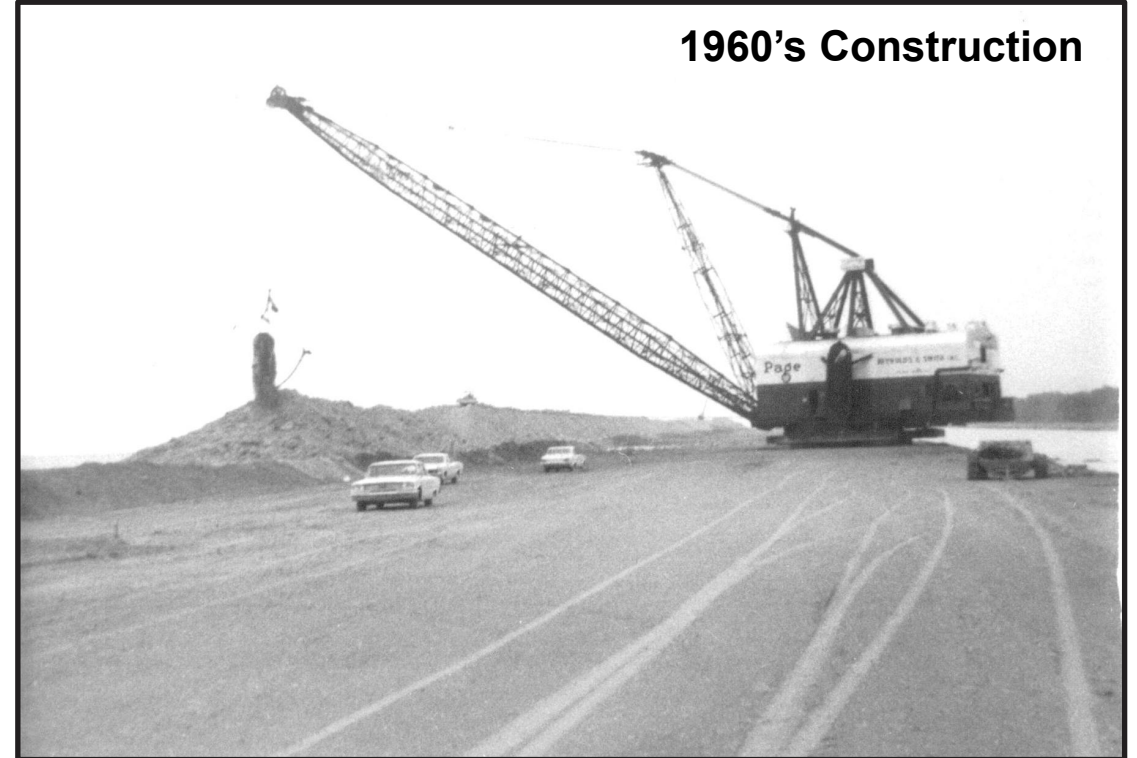
HERBERT HOOVER DIKE CONSTRUCTION TECHNIQUES



1930's Construction



1960's Construction



Dragline Method



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HERBERT HOOVER DIKE CURRENT CONFIGURATION



143 miles of embankment around Lake Okeechobee

- 32 federal culverts
- 5 spillway inlets
- 5 spillway outlets
- 9 navigation locks
- 9 pump stations

No overflow capability

Constructed by hydraulic dredge and fill, and dragline methods

- Not acceptable to today's construction standards





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HERBERT HOOVER DIKE

PROBLEMS (FAILURE MODES)



Internal erosion

- Seepage (water only)
- Piping (with material)

Culvert structures

- Soil erosion into conduit
- Erosion/Piping around conduit

Overwash/Overtopping

- Erosion of downstream slope

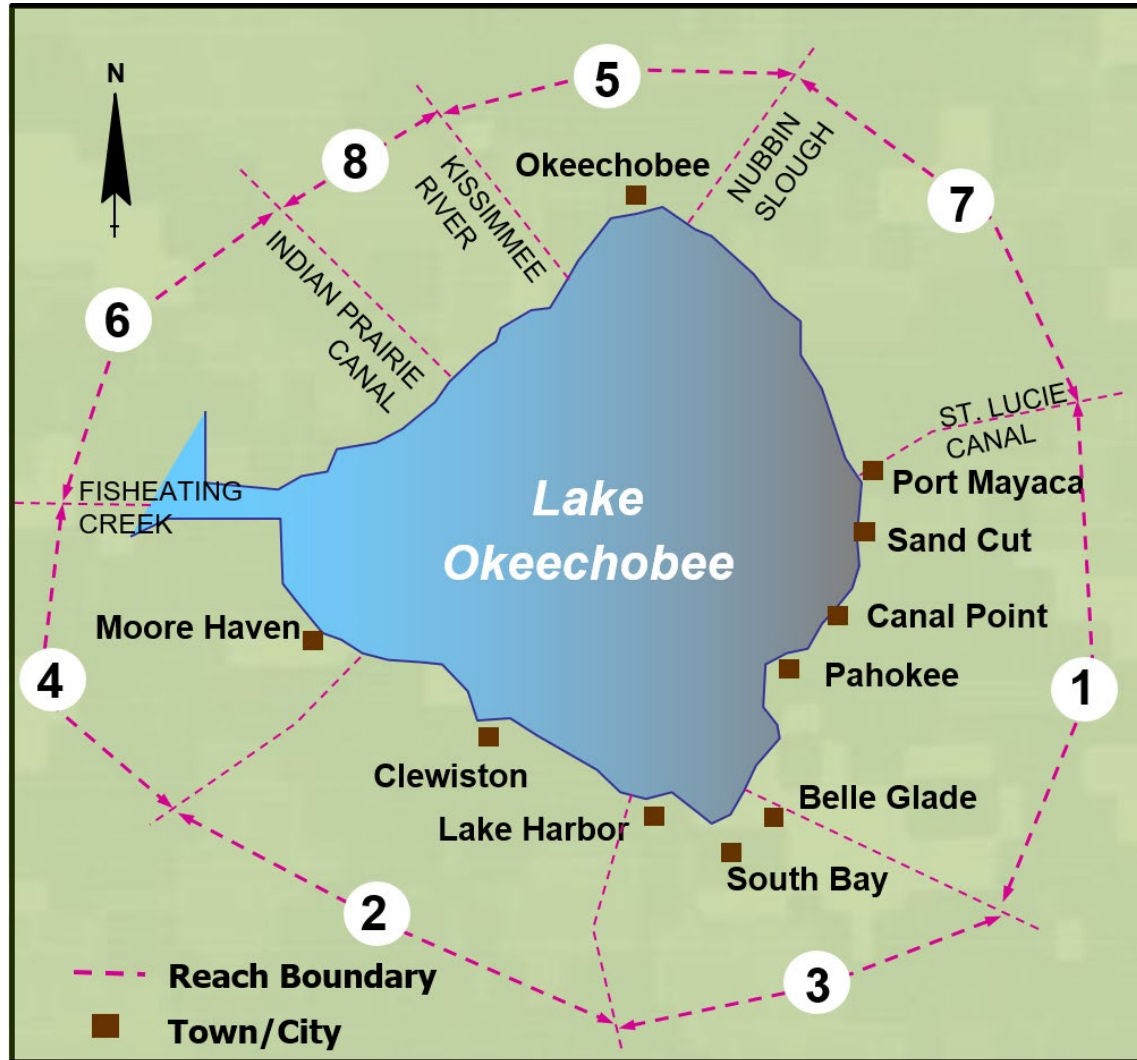
**Dam Safety Action Classification (DSAC)
Level 1- Assigned 2006**





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HERBERT HOOVER DIKE REHABILITATION SOLUTIONS



Major Rehabilitation Report (MRR) 2000

- Reach 1 initial phase
- Cutoff wall constructed

Federal Water Control Structure Culverts 2011

- 32 Federal culverts within the entire HHD system
- Replacement or removal

Dam Safety Modification Report (DSMR) 2016

- System-wide approach
- Risk reduction measures below tolerable guidelines
- Prioritize implementation



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HERBERT HOOVER DIKE DAM SAFETY MODIFICATION STUDY



Existing Condition Risk Assessment

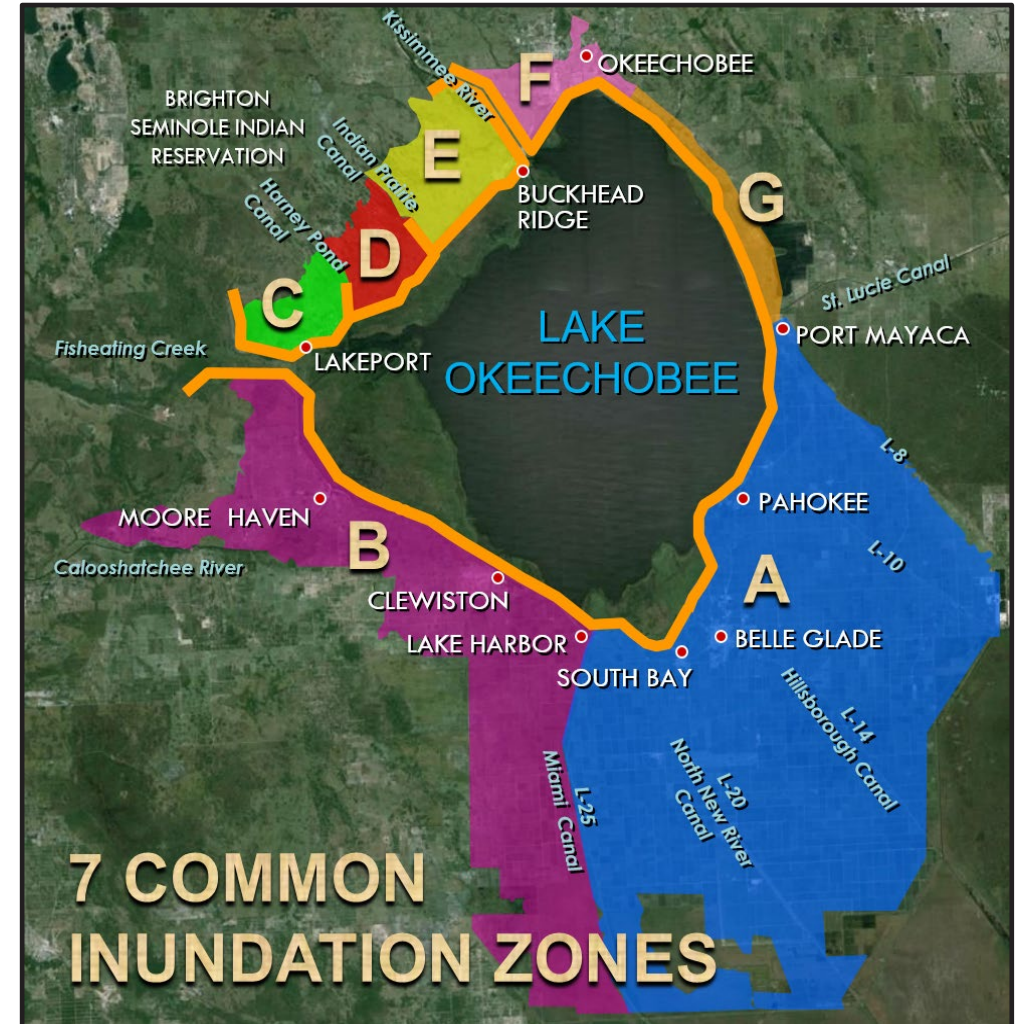
- Established 7 common inundation zones (SPF breach containment)
- Analysis performed on 32 dam segments within inundation zones to identify and prioritize remediation

Dam Safety Modification Report

- Recommends final HHD system repairs to reduce risks to within tolerable levels
- DSMR was approved by Corps Headquarters 30 Aug 2016

Path Forward

- Construction project implementation planned from 2019 through 2022 (original planned completion in 2025)
- Risk reductions to support the ongoing Lake Okeechobee System Operating Manual (LOSOM)
- Accreditation recommendation by inundation zone for Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP)



An aerial photograph showing a large-scale construction project for a dike. The dike is a long, narrow earthen structure extending from the left side of the frame towards the right, separating a body of water from a flat, green landscape. Various pieces of heavy machinery, including excavators, trucks, and cranes, are visible along the construction site. The water is a dark blue-grey color, and the sky is a pale, hazy blue.

HERBERT HOOVER DIKE IMPLEMENTATION



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HERBERT HOOVER DIKE IMPLEMENTATION



PALM BEACH COUNTY – CUTOFF WALL CONSTRUCTION:

- Reach 1 Cutoff Wall – 21.4 miles completed in 2013
- Reach 1 Cutoff Wall Gap Closures – Pump Station S-2, S-351, and S-352 completed in 2020
- Reach 1 Cutoff Wall Extension – 6.4 miles completed in 2021
- Dam Modification Cutoff Wall MATOC Task Order #1 – 8.3 miles completed in 2022

PALM BEACH COUNTY – WATER CONTROL STRUCTURE (CULVERT) CONSTRUCTION:

- Structure S-270 (C-16) Replacement – completed in 2016
- Culvert C-14 Removal – completed in 2012
- Structure S-271 (C-10A) Replacement – completed in 2020
- Structure S-272 (C-13) Replacement – completed in 2019
- Structure S-273 (C-10) Replacement – completed in 2021
- Structure S-274 (C-12A) Replacement – completed in 2020
- Structure S-275 (C-12) Replacement – completed in 2021
- Structure S-276 (C-4A) Replacement – completed in 2018
- Structure S-277 (C-3) Replacement – completed in 2018



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HERBERT HOOVER DIKE IMPLEMENTATION PROGRESS

SEPTEMBER 2023



Reach 1 Cutoff Wall Extension

- Contract for 6.4 miles (34,000-LF) of Cutoff Wall Construction
- Contract Awarded February 2018 for \$55.1M
- State of Florida Contributed \$50M
- Treviicos South, Inc.

Construction Progress

- Substantial Completion on 22 Dec 2021
- Final Acceptance on 14 Jan 2022
- Transfer to SFOO on 20 Jan 2022

Contract Closeout

- Final Payment disbursed on 04 Apr 2023
- Contract File closed on 28 Jul 2023





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HERBERT HOOVER DIKE REACH 1 CUTOFF WALL EXTENSION

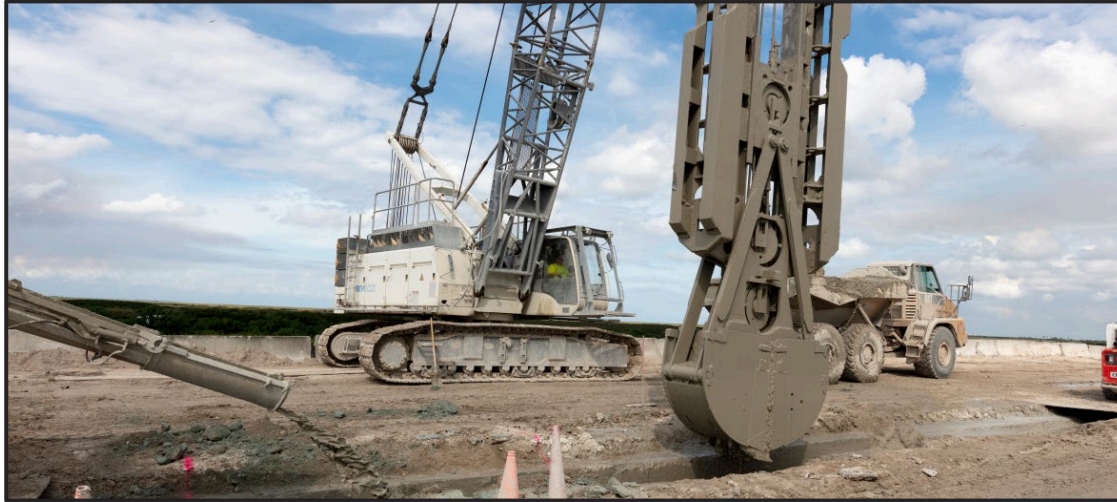


Photo Taken 04 Nov 2019



Photo Taken 03 Mar 2020

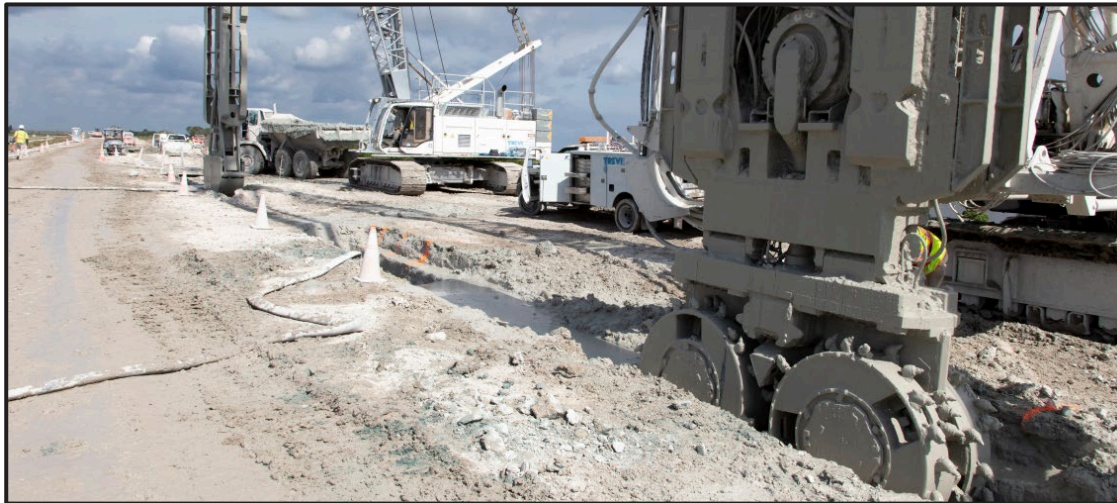


Photo Taken 31 Mar 2020



Photo Taken 03 Aug 2020



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HERBERT HOOVER DIKE IMPLEMENTATION PROGRESS

SEPTEMBER 2023



Cutoff Wall MATOC Task Order #1

- Contract for 8.3 miles (43,900-LF) of Cutoff Wall Construction
- Contract Awarded April 2019 for \$67.1M
- State of Florida Contributed \$50M
- Bauer Foundations Corporation

Construction Progress

- Substantial Completion on 13 Dec 2022
- Final Acceptance on 08 Mar 2023
- Transfer to SFOO was completed on 08 Mar 2023

Contract Closeout

- Closeout submittals are being processed
- Final Payment is pending
- Contract Closeout in pending





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HERBERT HOOVER DIKE

DAM MODIFICATION CUTOFF WALL MATOC TASK ORDER #1



Photo Taken 07 Jul 2020



Photo Taken 05 Jan 2021



Photo Taken 08 Jul 2021



Photo Taken 07 Feb 2022



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HERBERT HOOVER DIKE STRUCTURE S-271 (C-10A)



Photo Taken 10 JUL 2018



Photo Taken 02 SEP 2020

Located near Canal Point



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HERBERT HOOVER DIKE STRUCTURE S-273 (C-10)



Photo Taken 08 JUL 2020



Photo Taken 05 MAY 2021

Located south of Pahokee



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HERBERT HOOVER DIKE STRUCTURE S-275 (C-12)



Photo Taken 14 SEP 2016



Photo Taken 08 JUL 2020

Located near Paul Rardin Park



HERBERT HOOVER DIKE

KEY TAKEAWAY POINTS



Completed Risk Reduction Work:

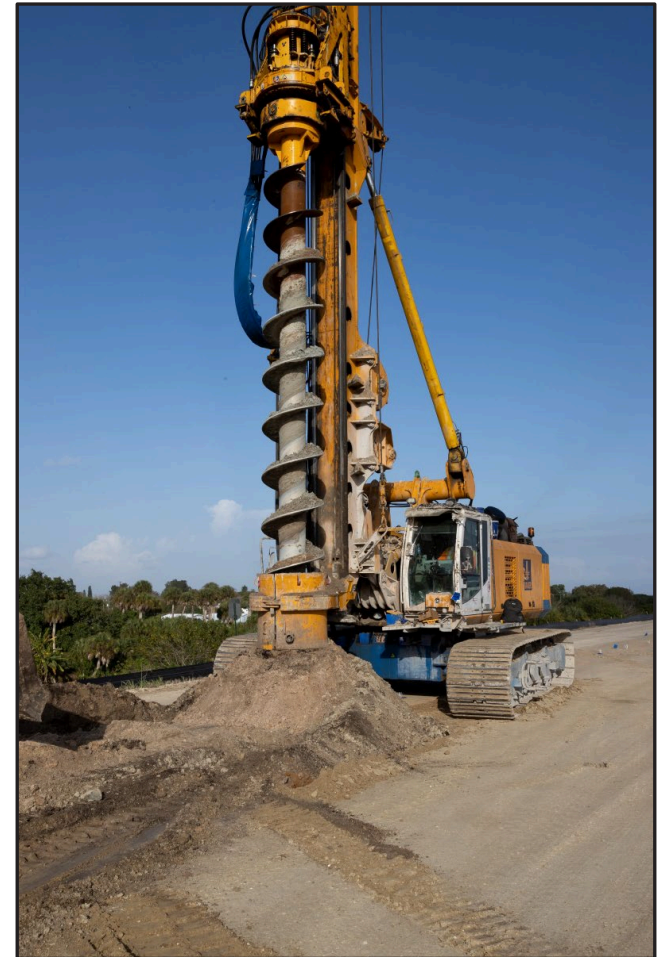
- Strategic planning and construction sequencing completed risk reduction work in early 2023

Dam Safety Action Classification (DSAC) Rating Change:

- Dam Senior Oversight Group (DSOG) changed DSAC rating from Level 1 to Level 4 on 12 Apr 23
- Final DSAC memorandums were signed on 12 Jun 23

HHD Accreditation Recommendation:

- Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP)
- Accreditation recommendation letter for HHD was sent to FEMA on 26 May 23



HHD EMERGENCY ACTION PLAN (EAP)

Matt Taylor, P.E.

District Dam Safety Program Manager

HHD Introduction to Palm Beach County EM partners

Presented September 27, 2023

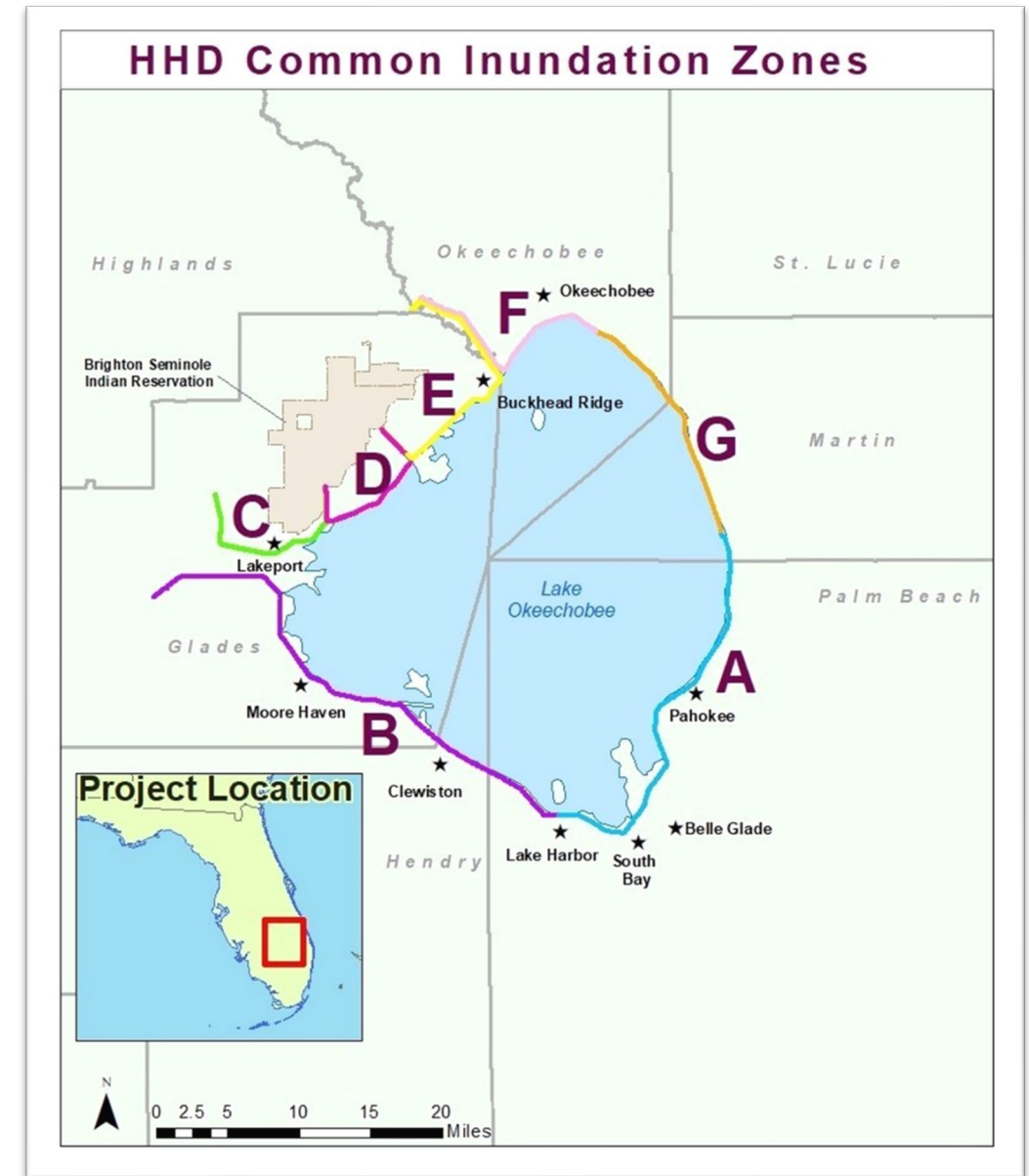


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PALM BEACH COUNTY

- Located within CIZ A and CIZ B
- Palm Beach County Comprehensive Emergency Management Plan (CEMP)
 - <https://discover.pbcgov.org/publicsafety/dem/Sections/Planning-CEMP.aspx>
 - <https://discover.pbcgov.org/publicsafety/dem/Sections/Planning-Herbert-Hoover-Dike.aspx>



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HHD EAP



**US Army Corps
of Engineers
Jacksonville District**

EMERGENCY ACTION PLAN For Herbert Hoover Dike NID Identifier FL36001

**Owner/Operator: U.S. Army Corps of Engineers
Jacksonville District
Address: 701 San Marco Blvd,
Jacksonville, FL 32207**

**6 April 2009
Revised June 2022**



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EAP PURPOSE

- Defines responsibilities
- Identifies unusual and unlikely conditions that may endanger HHD
- Provides procedures to mitigate those dangers to HHD
- Notifies the appropriate emergency management officials



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SECTIONS OF THE EAP

- Notification Flowcharts
- Statement of Purpose
- Project Description
- Emergency Detection, Evaluation, and Classification
- General Responsibilities under the EAP
- Preparedness
- Inundation Maps

Section 1	NOTIFICATION FLOWCHARTS
Section 2	STATEMENT OF PURPOSE
Section 3	PROJECT DESCRIPTION
Section 4	EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION
Section 5	GENERAL RESPONSIBILITIES UNDER THE EAP
Section 6	PREPAREDNESS
Section 7	INUNDATION MAPS
Section 8	APPENDIX A – INVESTIGATION & ANALYSIS OF DAM BREAK ANALYSIS-FLOODS
Section 9	APPENDIX B – PLANS FOR TRAINING, EXERCISING, UPDATING, AND POSTING
Section 10	APPENDIX C – SITE-SPECIFIC CONCERNS
Section 11	APPENDIX D – DOCUMENTATION

EAP APPENDICES

- Modeling and Mapping Documentation
- List of Trained Project Personnel
- Surveillance Plans and Inspection Checklist
- History of Structures Maintained by Corps
- Right-of-Entry for Emergency Repairs

Plans for Training, Exercising, Updating, and Posting the EAP Trained Project Personnel (within the past five years)

Dam Safety Training for SFWMD and SAJ Project Personnel (including other non-USACE partners) was provided on 31 August 2021 or within the past 5 years to the following:

USACE:

Alan Adams	David Hart	Robert Poff
Lionela Agastra	Mike Hodge	DeeDee Pope
Terry Ashcraft	John Howard	Steve Reinert
James (Mike) Carlson	James Huff	Sarah Rowell
Kavin Carter	James Killion	Art Ruebenson
Christopher Chocholek	Devin Kirkpatrick	Thomas Sacre
Tommy Cleveland	Doug Lenders	Muron Skalte

Non-USACE Partners:

Paul Adams	Mirko Ivanovic	Robbie Rimes
Ashie Akpoji	Junior Jean Pierre	Rafael Rodriguez
Joe Albers	Dieter Josef	Larry L. Rogers
Matthew Alexander	SGT Michael Kirschner	Charlie Roup
Baird Baird	Matthew Korbly	Alexis San Miguel
Robin Barber	Ed Luty	Pablo Santos
James Barnes	Thomas McKenzie	Darla Sauers
Tanya Barnes	Amber McPherson	Justin Scott
Timothy Bass	Craig Means	Kyle Sheppard
Eddy Bouza	Joseph Mercurio	Chad Siefker
Joseph Bradley	Vijay Mishra	Rudy Smith
Albert Cantelo	Eric Monath	Sandra Smith
Timothy Carter	John Moody	Edward Sperbeck
George Clark	Kristabel Moore	Jonathan Spooner
Srijana Dawadi	John Nolan	Barry Staats
Rosalyn Ellington	Donald Nuelle	James Strickland
Daniel Fellows	Ben Palmer	Teri Swatrx
Martha Fox	Neha Pandya	Albert Theriault
Brian Grove	Emory Payne	Ronald Thomas
Thomas Guerry	Dan Pecceolo	Shawn Waldeck
Suzanne Halverson	Patrick Pendrey	Lynn R. Wilhoit
Erik Hartl	Jose Perez	Rocky Wise
Ronnie Heen	Andrew Porath	Tracy Woods
John Hicks	Denys Purdy	
Greg Hoyle	Aaron Ray	

RESPONSIBILITIES

- 5.1.1 – South Florida Operations Office (SFOO) Personnel
- 5.1.2 – South Florida Water Management District (SFWMD) Personnel
- 5.1.3 – Chief South Florida Operations Office (SFOO)
- 5.1.4 – Jacksonville District Operations Division (SAJ-CD)
 - HHD Resident Office (RO) Personnel
- 5.1.5 – Jacksonville District Operations Division (SAJ-OD)
- 5.1.6 – Jacksonville District Engineering Division (SAJ-EN)
- 5.1.7 – Jacksonville District Corporate Communications Office (SAJ-CCO)
- 5.1.8 – Jacksonville District Emergency Operations Center (SAJ-EOC)
- 5.1.9 – Jacksonville District Dam Safety Committee



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3 CLASSES OF EMERGENCIES

- **Evacuation Condition**

- Failure either has occurred, is occurring, or obviously is just about to occur
- There is no longer time available to attempt corrective measures to prevent failure.

- **Alert Condition**

- Potential failure situation is developing
- Time is still available for further analyses and decisions to be made before failure is considered a foregone conclusion.

- **Non-failure Emergency Condition**

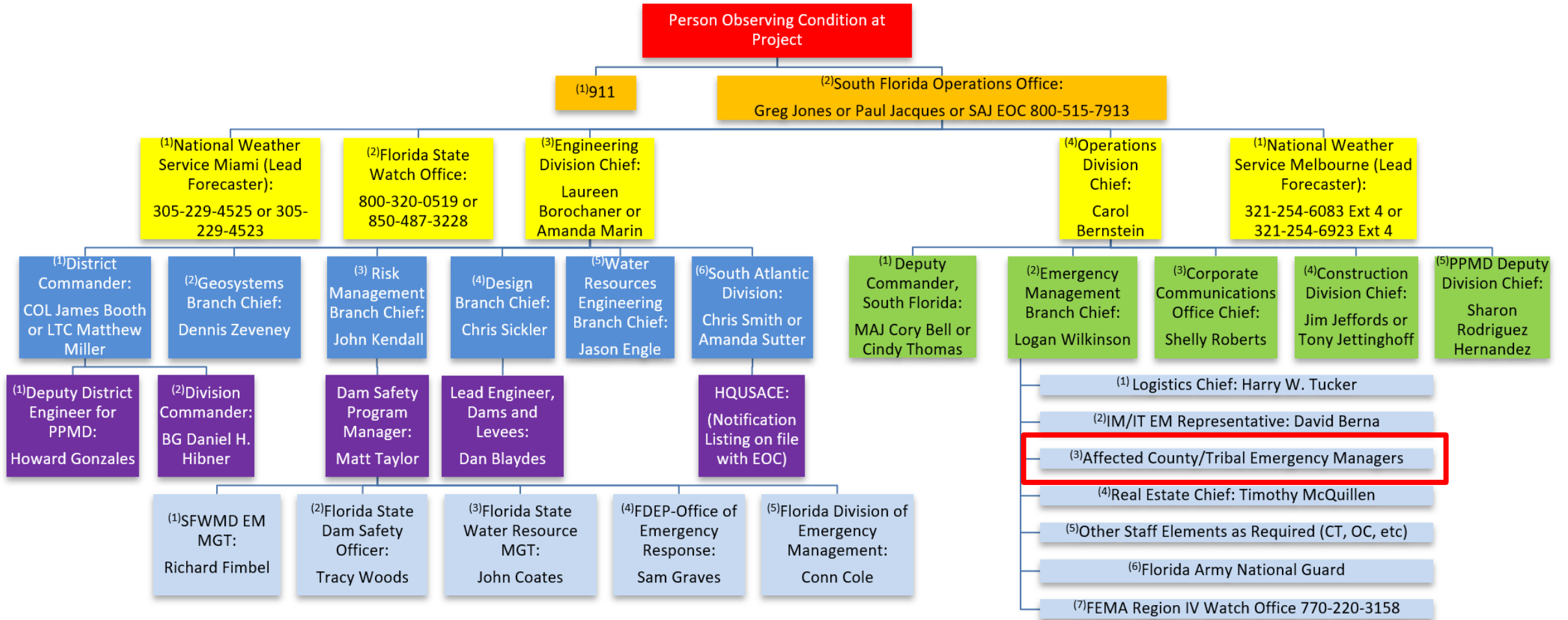
- There is no danger of failure, but flow conditions are such that flooding is expected to occur downstream of the outlet structure



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1.1 NOTIFICATION FLOWCHART FOR FAILURE IMMINENT OR HAS OCCURRED (EVACUATION CONDITION) Herbert Hoover Dike (HHD)



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EXAMPLES OF EVACUATION CONDITION

Slide (slope failure) passing through the crest with less than 10 feet (measured vertically) between the top of the lowered crest and the water surface.



Source: The Dallas Morning News



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EXAMPLES OF EVACUATION CONDITION

Sinkhole (settlement) above a seepage area is very large or rapidly enlarging and is accompanied by turbid discharge



EXAMPLES OF EVACUATION CONDITION

An upstream swirl (**vortex**) that is caused by seepage water through the embankment or flowing under the discharge structure



PREPAREDNESS

- Instrumentation monitoring and visual inspections
- Response during periods of darkness (blackouts)
- Access to the site
- Response during weekends and holidays
- Response during periods of adverse weather
- Alternative systems of communication

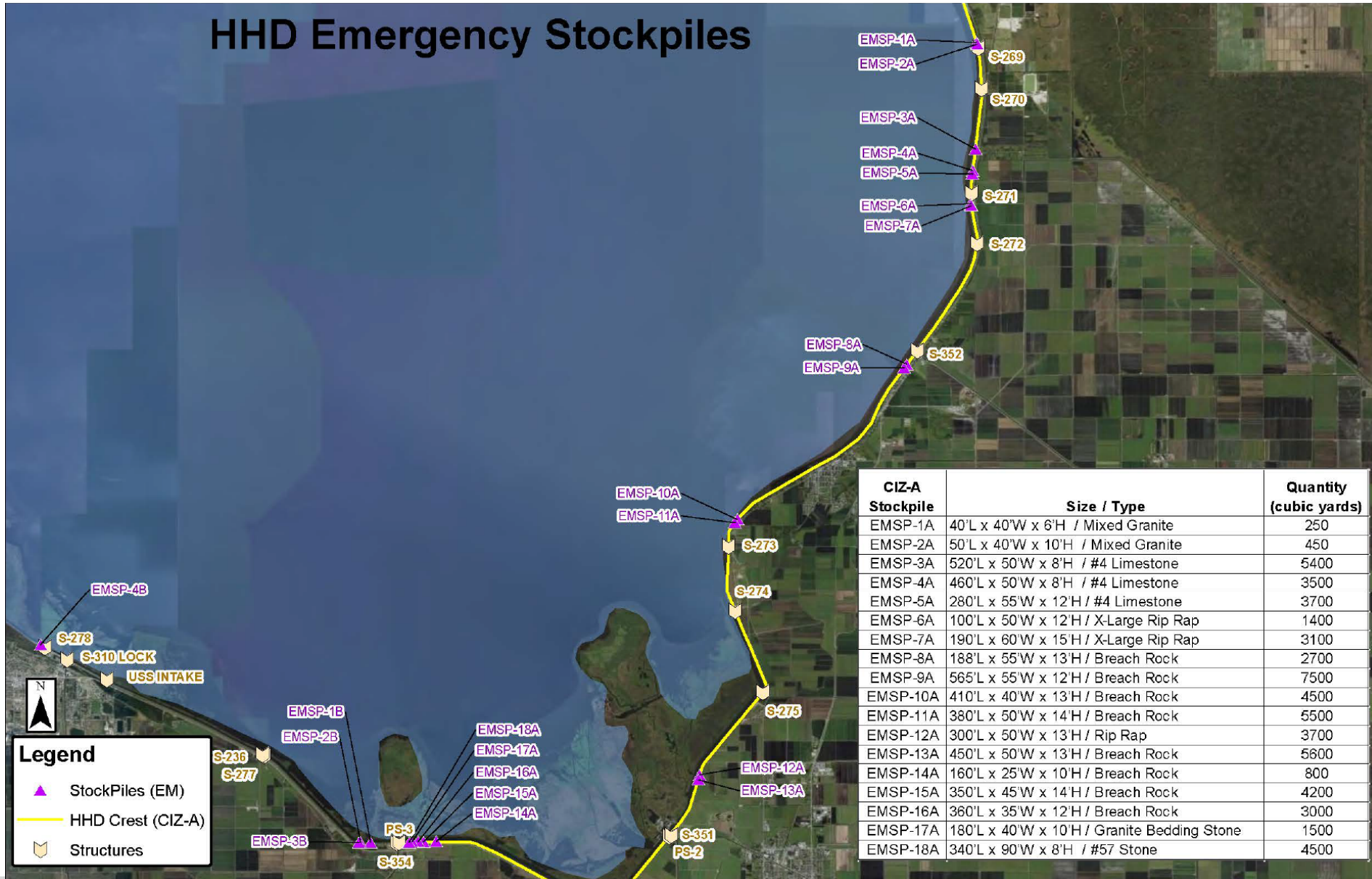


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ON-SITE EMERGENCY STOCKPILES

HHD Emergency Stockpiles



SITE-SPECIFIC ACTIONS

- Seepage
- Embankment Slides (Slope Failure) or Sinkholes (Settlement)
- Erosion
- Failure of Gate or Operating Equipment
- Hurricane Planning Criteria
- Severe Storms



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SITE-SPECIFIC ACTIONS

- Fires
- Demonstrations, Sabotage, or Nuclear Attack
- Oil and Hazardous Substance Spills
- Large or Sudden Releases into the Downstream Channel
- Fish and Wildlife Losses
- Drowning



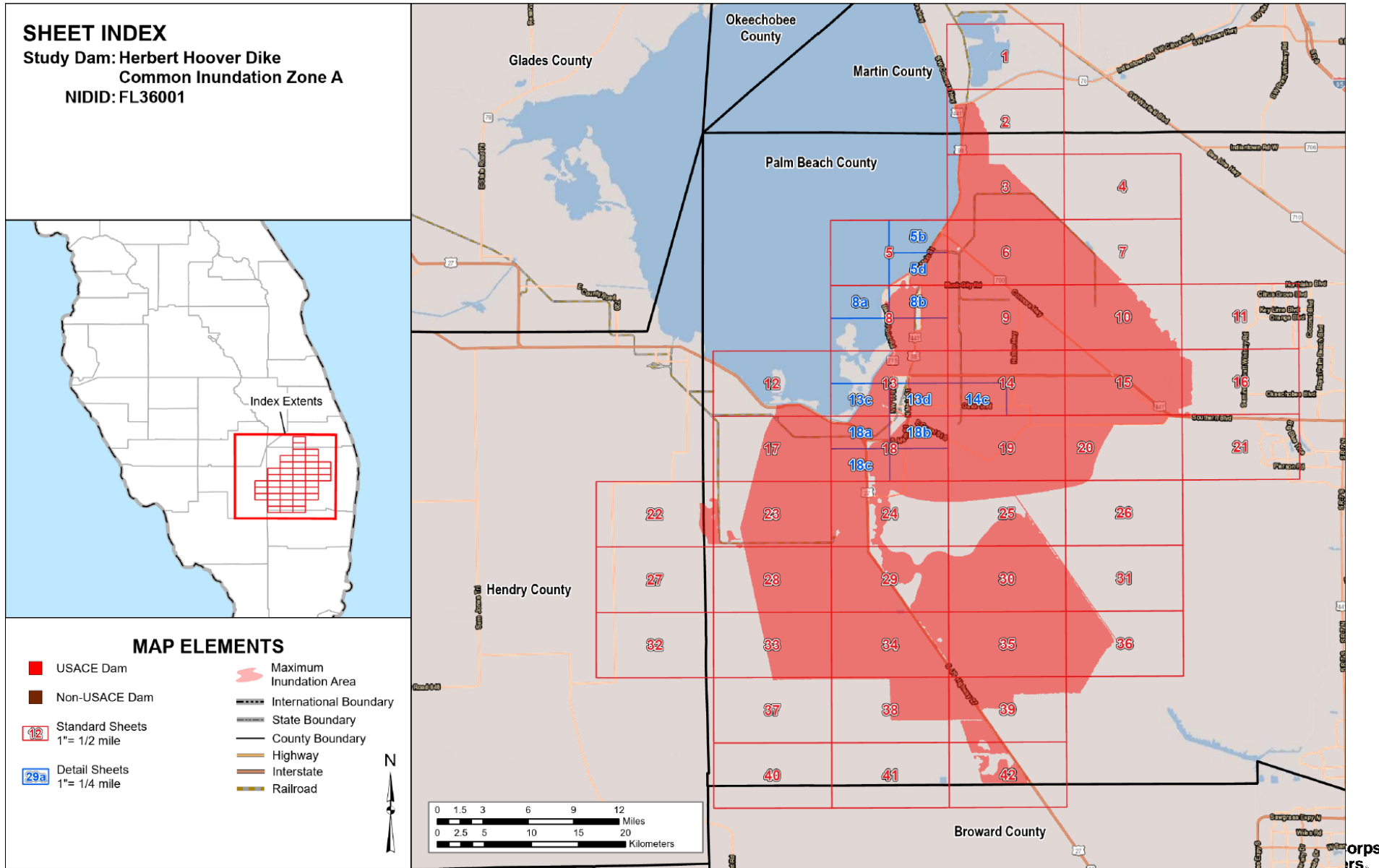
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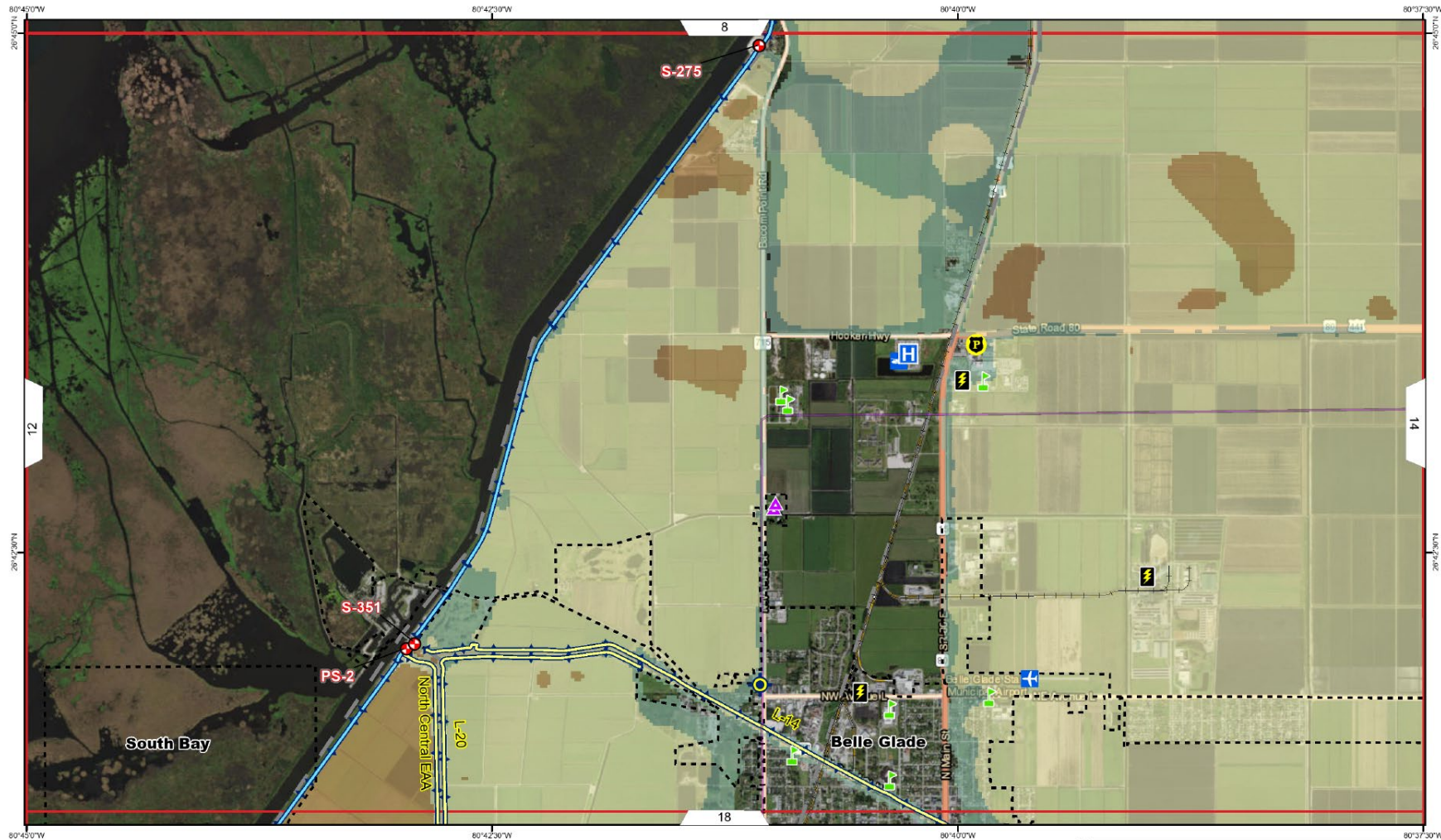
INUNDATION MAPS



INUNDATION MAPS



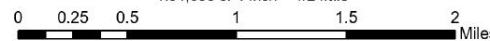
INUNDATION MAPS



Model Lake Level: 20 Feet NAVD88

Depths
 0.25ft - 2ft 2ft - 6ft 6ft - 12ft >12ft

USNG Grid Zone 17R
 100,000 Meter Grid ID NK
 1:31,680 or 1 inch = 1/2 Mile



Herbert Hoover Dike
Common Inundation Zone A SEPTEMBER 2020
 National Inventory of Dams (NID) ID: FL36001
 Dam Owner: U.S. Army Corps of Engineers
 Jacksonville District
 Section of USGS Quad : 26080-F6 Belle Glade

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DSAC RECLASSIFICATION – DSAC 1 -> DSAC 4

FEATURE : RISK REDUCTION

Herbert Hoover Dike: 22 Years of Rehabilitation

BY JOHN KENDALL, P.E., GEOTECHNICAL ENGINEER, RISK MANAGEMENT CHIEF; & MATT TAYLOR, P.E., GEOTECHNICAL ENGINEER, DAM SAFETY PROGRAM MANAGER; U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE, FLORIDA



ALL PHOTOS & CHARTS COURTESY USACE

The U.S. Army Corps of Engineers (USACE) completed the last of planned risk reduction measures at Herbert Hoover Dike (HHD). The 143-mile-long embankment dam in South Florida has received a tremendous amount of attention and over \$1.6 billion in federal funding since 2001 to address performance problems related to backward erosion piping, failing culverts from the original 1930s construction, and potential storm surge overwash. This article will discuss HHD's past poor performance and the causes of these issues, focusing on the construction methods and embankment soils that created ideal conditions for backward erosion piping at low gradient. Additionally, this article will describe the dam modifications that were completed to reduce risk of failure from internal erosion, specifically, the design and implementation of the 56.2 miles of cutoff wall constructed around the southern perimeter of Lake Okeechobee.

https://www.usddamsandleveesbulletin-digital.com/damq/0223_summer_2023/

CUTOFF WALL

Given the higher head across the embankment and the more favorable conditions for backward erosion piping on the southern side of the dam, USACE concluded in its dam safety modification study that risk reduction for backward erosion piping potential failure modes was warranted around the southern perimeter of HHD. Many different alternatives were developed as part of the dam safety modification study, including the addition of toe drains, purchasing land on which the toe ditch is located and backfilling the problematic areas, as well as a variety of nonstructural alternatives in populated areas where risk exceeded the societal risk limits. Comparison of the array of alternatives found that cutoff wall construction was the most efficient risk reduction measure.



Figure 7. Sink hole on landside slope that developed during 1995 high-water event.

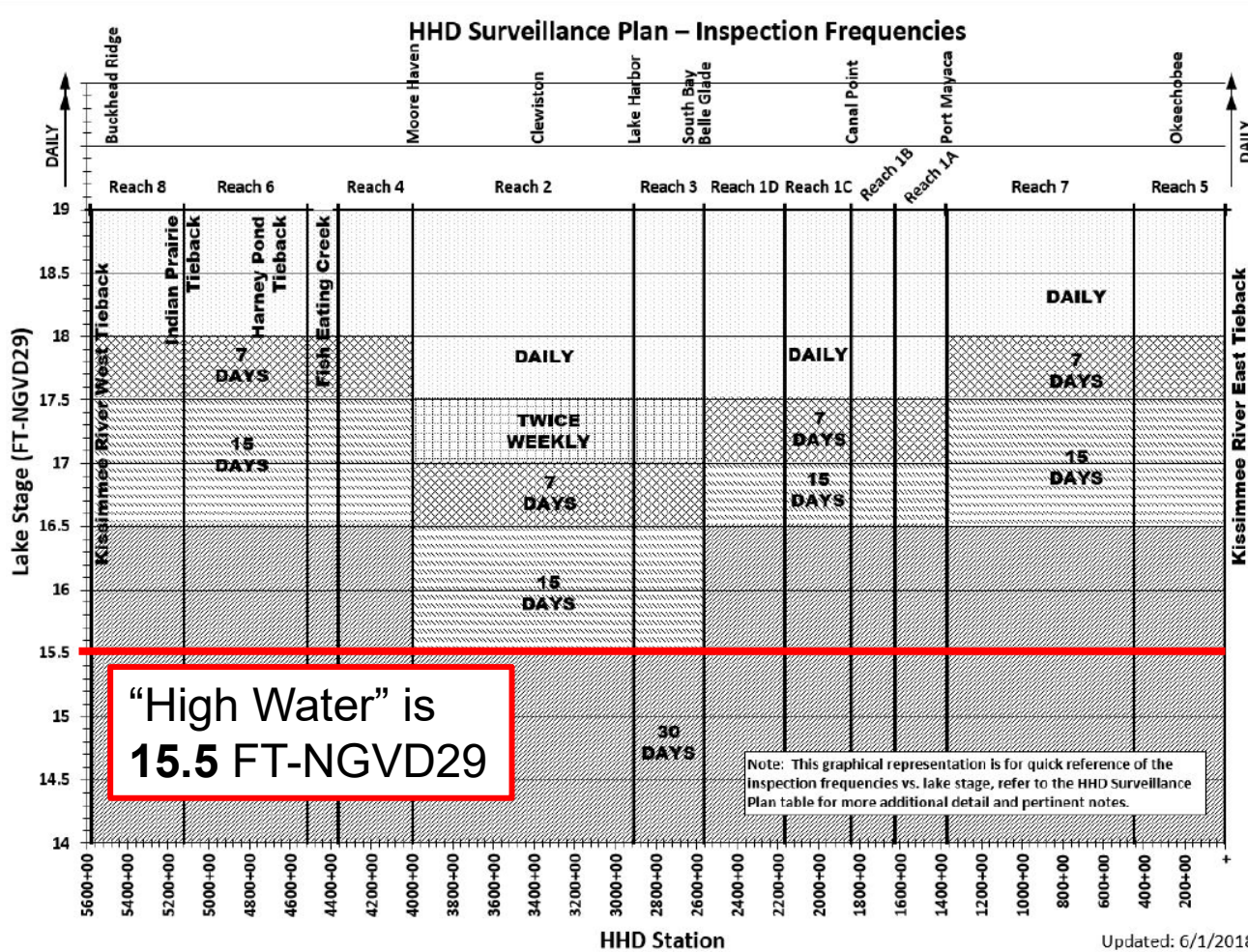
“The results are a substantial reduction in incremental risk and the Dam Safety Action Classification (DSAC) is under consideration to be reclassified from the highest risk (DSAC 1) to a low risk classification (DSAC 4)”



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2018 SURVEILLANCE AND MONITORING PLAN



HERBERT HOOVER DIKE SURVEILLANCE PLAN

VISUAL INSPECTION (INFORMAL/INTERMEDIATE INSPECTIONS) ^{(1), (2)}							
Location Description	St Lucie Canal (Port Mayaca) to L-8 Canal (C-10A)	L-8 Canal (C-10A) to WPB Canal (S-352)	WPB Canal (S-352) to C-10	C-10 to Hillsboro/N New River Canals (S-351)	Hillsboro/N. New River Canals (S-351) to Miami Canal (S-354)	Miami Canal (S-354) to Industrial Canal (S-310 Lock)	Industrial Canal (S-310 Lock) to Caloosahatchee River (Moore Haven)
DSMR CIZ Designation	CIZ A			CIZ B			
Major Rehabilitation Report Designation	Reach 1A	Reach 1B	Reach 1C	Reach 1D	Reach 3	Reach 2	
C&SF Project Levee Designation	L-D9		L-D2		L-D1		
SFOO Inspection Designation	1A	1B	1C	1D	3	2-1	L-D2
Inspection Team	Lake Elevation ⁽³⁾	Inspection Frequency					
SFOO Personnel (Informal)	to 15.5	30 days (performed as personnel are taking piezometer readings)					
	Above 15.5 to 16.5	30 days ⁽⁴⁾			15 days ⁽⁴⁾		
SFOO, OD, EN, & SFWMD Personnel (Intermediate)	Above 16.5 to 17.0	15 days ⁽⁴⁾			7 days ⁽⁴⁾		
	Above 17.0 to 17.5	7 days ^(4,5)			twice weekly ^(4,5)		
	Above 17.5	daily					
VISUAL INSPECTION (INFORMAL/INTERMEDIATE INSPECTIONS CONT.) ^{(1), (2)}							
Location Description	Caloosahatchee River (Moore Haven) to Fisheating Creek	Fisheating Creek (FC-1) to Harney Pond Canal (S-71)	Harney Pond Canal (S-71) to Indian Prairie Canal (S-72)	Indian Prairie Canal (S-72) to Kissimmee River (S-65E)	Kissimmee River (S-65E) to Kissimmee River (SR-78 Bridge)	Kissimmee River (SR-78 N) to Nubbin Slough (S-191)	Nubbin Slough (S-191) to St Lucie Canal (Port Mayaca)
DSMR CIZ Designation	CIZ B	CIZ C	CIZ D	CIZ E	CIZ F		CIZ G
Major Rehabilitation Report Designation	Reach 4	Reach 6		Reach 8	Reach 5		Reach 7
C&SF Project Levee Designation	L-D3	L-50	L-49	L-48	L-D4		L-47
SFOO Inspection Designation	4	6-1	6-2	8	5-1	5-2	7
Inspection Team	Lake Elevation ⁽³⁾	Inspection Frequency					
SFOO Personnel (Informal)	to 16.5	30 days (performed as personnel are taking piezometer readings)					
SFOO, OD, EN, & SFWMD Personnel (Intermediate)	Above 16.5 to 17.5	15 days (performed as personnel are taking piezometer readings)					
	Above 17.5 to 18.0	7 days					
	Above 18.0	daily					
PIEZOMETER READINGS ⁽⁶⁾							
Inspection Team	Lake Elevation ⁽³⁾	Piezometer Reading Frequency					
SFOO Personnel	to 15.5	30 days					
	Above 15.5 to 16.5	15 days					
	Above 16.5 to 17.0	7 days					
	Above 17.0	daily					
HURRICANE EMERGENCY PLAN ⁽⁷⁾							
Inspection Team	Lake Elevation ⁽³⁾	Pre/Post Hurricane Inspection					
SFOO/ SAJ-EN Personnel	Any Lake Elevation	Begin inspection 2 days prior to predicted landfall and reinspect within 2 days after occurrence					
VISUAL INSPECTION (FORMAL) ⁽⁷⁾							
Inspection Team	Lake Elevation ⁽³⁾	Inspection Frequency					
SAJ-EN Personnel	Any Lake Elevation	Annual Embankment Inspection					

Notes:

(1) Regardless of lake elevation, if a WATCH CONDITION is issued (Large Quantities of Clear Seepage or Seepage Flow Carrying Materials), daily inspections for the corresponding reach shall be implemented.

(2) Inspection frequencies are subject to change based on observed site conditions, piezometer readings and recommendations by the DSO. In addition, if the following conditions are met: 1) Lake is above 15.5, 2) Lake remains within a given "Lake Elevation" range for more than 30 days, and 3) No inspection points have been identified within a given location description/designation; the inspection team may recommend a reduced inspection frequency. Written approval from the DSO shall be received before reducing the inspection frequency.

(3) Lake elevations are reported in ft-NGVD29. The average daily lake elevation is used to initiate the frequencies listed in this table.

(4) Inspection shall give particular attention to Culverts/Structures where cutoff wall tie-in at Culverts/Structures is not yet completed.

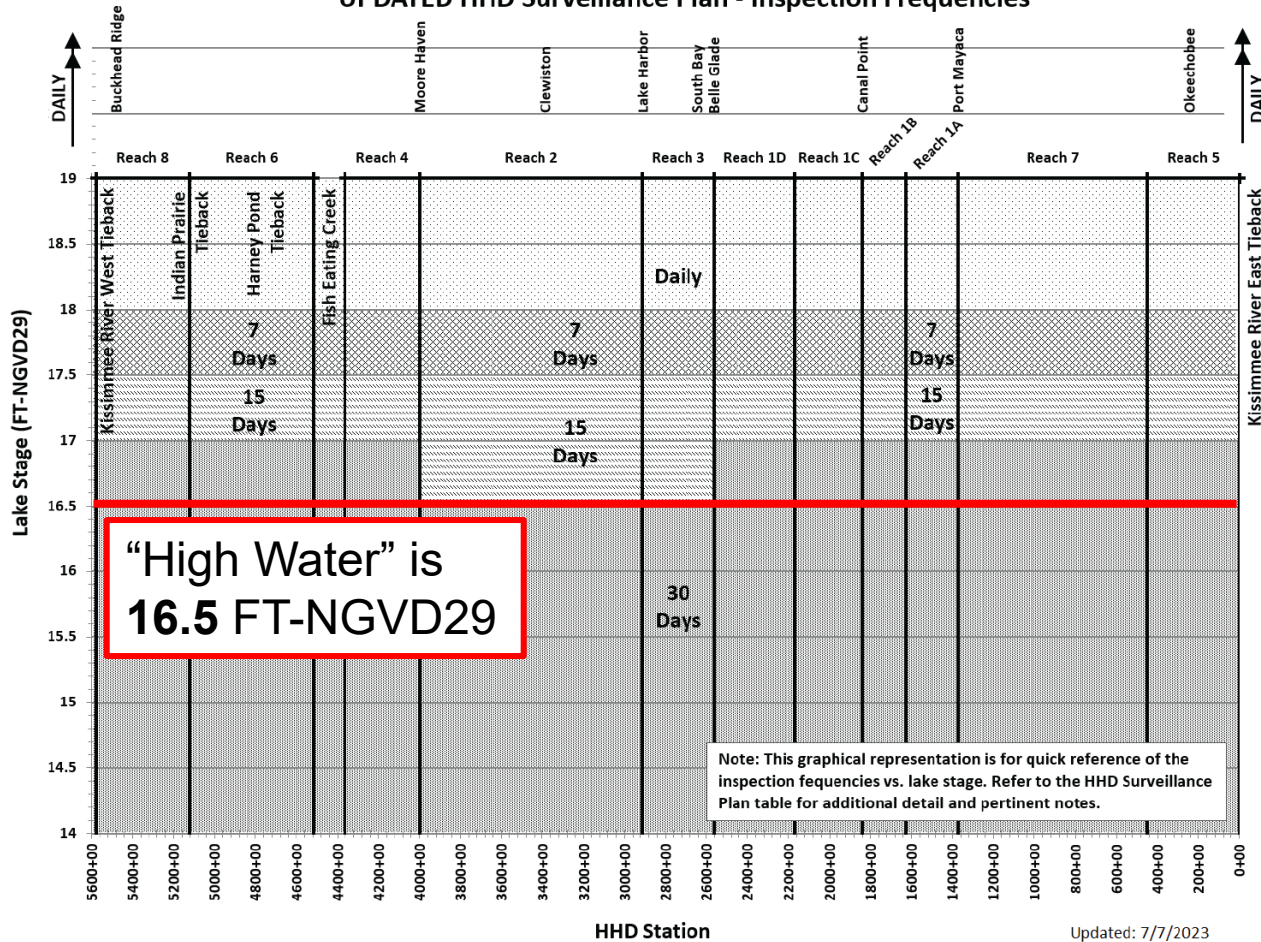
(5) Based on observations during past high water events, the inspection frequency may change to daily before the lake exceeds 17.5 feet. Reference (1) and (2)

(6) Unless otherwise specified, the listed reading frequency includes all active piezometers in all reaches.

(7) Inspection includes the entire damming surface encircling Lake Okeechobee.

2023 SURVEILLANCE AND MONITORING PLAN

UPDATED HHD Surveillance Plan - Inspection Frequencies



Updated: 7/7/2023

HERBERT HOOVER DIKE SURVEILLANCE PLAN

VISUAL INSPECTION (INFORMAL/INTERMEDIATE INSPECTIONS) (1), (2)

Location Description	St Lucie Canal (Port Mayaca) to L-8 Canal (C-10A)	L-8 Canal (C-10A) to WPB Canal (S-352)	WPB Canal (S-352) to C-10	C-10 to Hillsboro/ N. New River Canals (S-351)	Hillsboro/N. New River Canals (S-351) to Miami Canal (S-354)	Miami Canal (S-354) to Industrial Canal (S-310 Lock)	Industrial Canal (S-310 Lock) to Caloosahatchee River (Moore Haven)	
	CIZ A			Reach 1D	Reach 3	CIZ B		
DSMR CIZ Designation	Reach 1A	Reach 1B	Reach 1C	L-D2		Reach 2		
Major Rehabilitation Report Designation	L-D9						L-D1	
C&SF Project Levee Designation								
SFOO Inspection Designation	1A	1B	1C	1D	3	2-1	2-2	
Inspection Team	Lake Elevation (3)							Inspection Frequency
SFOO Personnel (Informal) (5)	to 16.5		30 days (4)		30 days (4)		30 days (4)	
	Above 16.5 to 17.0		30 days (4)		15 days (4)		15 days (4)(5)	
SFOO, OD, EN, & SFWMD Personnel (Intermediate)	Above 17.0 to 17.5		7 days (4)		7 days (4)		daily (4)	
	Above 17.5 to 18.0		7 days (4)		7 days (4)		daily (4)	
Above 18.0		7 days (4)		7 days (4)		daily (4)		

VISUAL INSPECTION (INFORMAL/INTERMEDIATE INSPECTIONS CONT.) (1), (2)

Location Description	Caloosahatchee River (Moore Haven) to Fisheating Creek	Fisheating Creek (FC-1) to Harney Pond Canal (S-71)	Harney Pond Canal (S-71) to Indian Prairie Canal (S-72)	Indian Prairie Canal (S-72) to Kissimmee River (S-65E)	Kissimmee River (S-65E) to Kissimmee River (SR 76 Bridge)	Kissimmee River (SR-76 N) to Nubbin Slough (S-191)	Nubbin Slough (S-191) to St Lucie Canal (Port Mayaca)
	CIZ B	CIZ C	CIZ D	CIZ E	CIZ F	CIZ G	
DSMR CIZ Designation	Reach 4		Reach 6		Reach 8		Reach 5
Major Rehabilitation Report Designation	L-D3		L-49		L-48		L-47
C&SF Project Levee Designation							
SFOO Inspection Designation	4		6-1		6-2		8
Inspection Team	Lake Elevation (3)		Inspection Frequency				
SFOO Personnel (Informal)	to 16.5		30 days		30 days		
	Above 16.5 to 17.0		30 days		15 days		
SFOO, OD, EN, & SFWMD Personnel (Intermediate)	Above 17.0 to 17.5		15 days		7 days		
	Above 17.5 to 18.0		7 days		7 days		
Above 18.0		7 days		7 days			

PIEZOMETER READINGS (6)

Inspection Team	Lake Elevation (3)	Piezometer Reading Frequency
SFOO Personnel	to 16.5	30 days
	Above 16.5 to 17.0	15 days
	Above 17.0 to 17.5	7 days
	Above 17.5	daily

HURRICANE EMERGENCY PLAN (7)

Inspection Team	Lake Elevation (3)	Pre/Post Hurricane Inspection
SFOO/ SAJ-EN Personnel	Any Lake Elevation	Begin inspection 2 days prior to predicted landfall and reinspect within 2 days after occurrence

VISUAL INSPECTION (FORMAL) (7)

Inspection Team	Lake Elevation (3)	Inspection Frequency
SAJ-EN Personnel	Any Lake Elevation	Annual Embankment Inspection

Notes:

- Regardless of lake elevation, if a WATCH CONDITION is issued (Large Quantities of Clear Seepage or Seepage Flow Carrying Materials), daily inspections for the corresponding reach shall be implemented.
- Inspection frequencies are subject to change based on observed site conditions, piezometer readings and recommendations by the DSO. In addition, if the following conditions are met: 1) Lake is above 16.5, 2) Lake remains within a given "Lake Elevation" range for more than 30 days, and 3) No inspection points have been identified within a given location description/designation; the inspection team may recommend a reduced inspection frequency. Written approval from the DSO shall be received before reducing the inspection frequency.
- Lake elevations are reported in ft-NGVD29. The average daily lake elevation is used to initiate the frequencies listed in this table.
- Inspection shall give particular attention to Culverts/Structures where cutoff wall tie-in at Culverts/Structures have recently been completed
- At 16.5 FT-NGVD29, EN will perform an initial intermediate inspection of Reaches 2 and 3; SFOO will perform informal inspections at the indicated frequency for all Reaches.
- Unless otherwise specified, the listed reading frequency includes all active piezometers in all reaches.
- Inspection includes the entire damming surface encircling Lake Okeechobee.

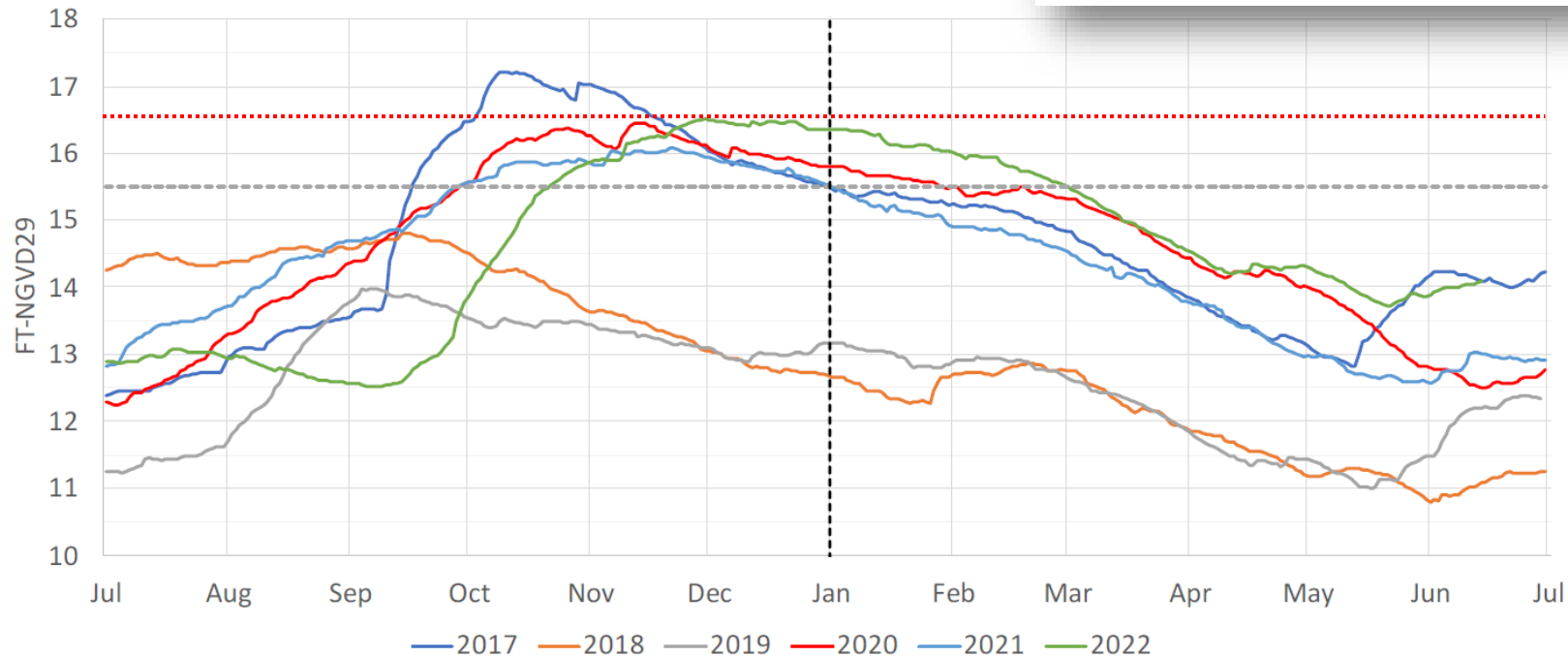
NEW “HIGH WATER” DEFINITION

Table 1: Days at or above specific High Water lake levels; by year. Lake Level is based on 8-gage average around Lake Okeechobee. Note that 2018 and 2019 wet seasons did not see High Water.

Lake Elevation (FT-NGVD29)	Days in High Water, by wet season <small>(2018 definition)</small>					
	2017	2018	2019	2020	2021	2022
At or above 15.5	110	-	-	122	96	96
At or above 16.0	72	-	-	67	22	84
At or above 16.5	48	-	-	-	-	5*
At or above 17.0	20	-	-	-	-	-

*45 days above 16.4 FT-NGVD29

Lake Okeechobee 8-Gauge Avg. by Wet Season



New 2023 definition of “High Water”

Old 2018 definition of “High Water”

Figure 2: Average Lake Level, by wet season. Note that a year’s wet season extends into the next year. For example, the 2022 season High Water (in green) started 20-Oct-2022 and ended 01-Mar-2023.



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