



Reviving
THE river OF grass

**Design Assumptions
Estuary Driven Everglades Restoration**

Matt Morrison, Lead Project Manager, Everglades
Restoration Planning

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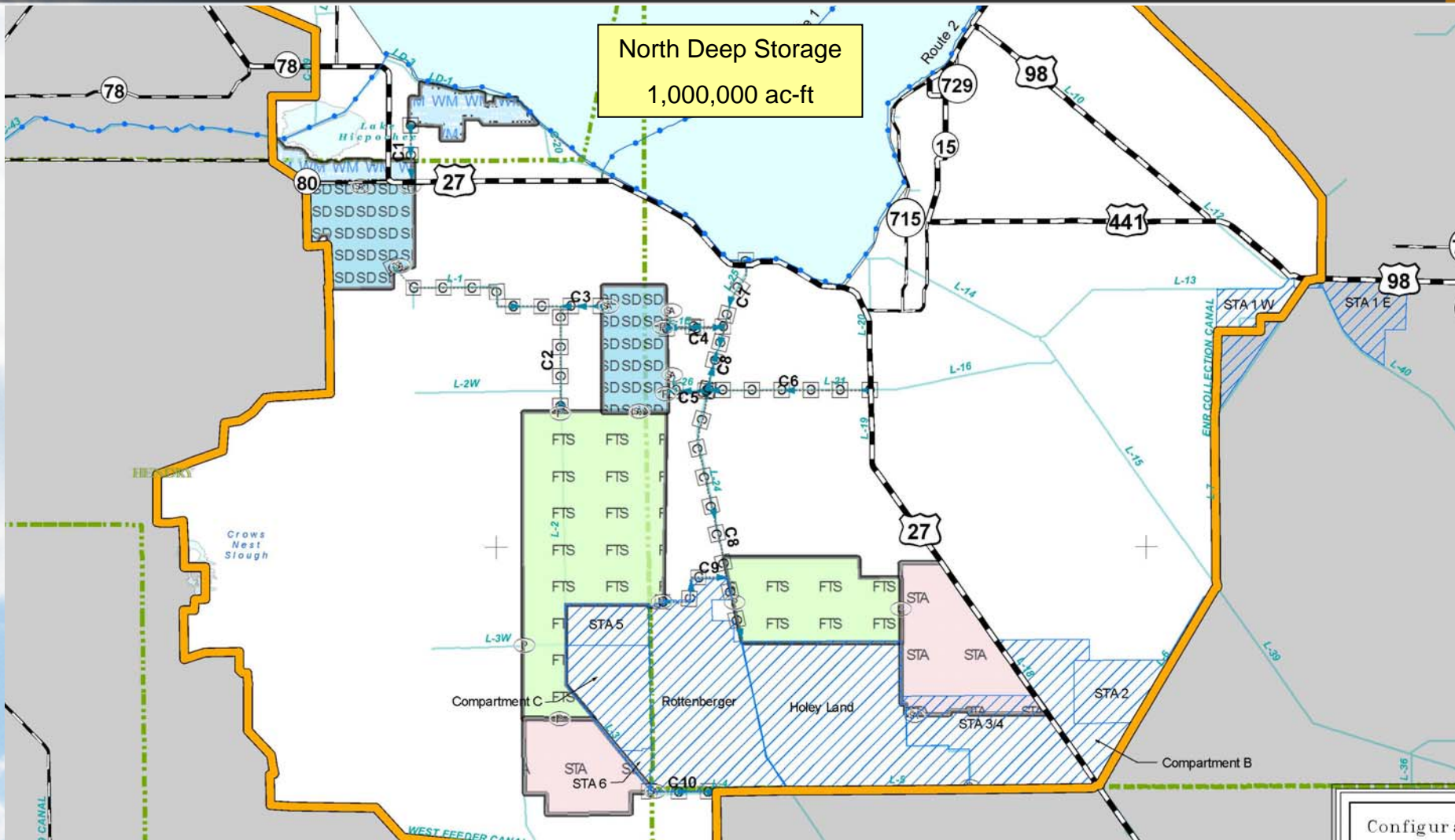
Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Authors of Configuration
 - Mark Perry – Florida Oceanographic Institute
 - Ted Guy – Rivers Coalition
 - Rae Ann Wessel - Sanibel Captiva Conservation Foundation
 - Pete Quasias - Collier County Audubon
 - George Jones - Indian River Keeper
- Facilitator – Matt Morrison
- Engineer - Matt Morrison

Estuary Driven Everglades Restoration

RESTORATION PLANNING



Configura

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – 95%
 - High Lake O Stage Envelope Standard Score – 85%
 - Increase in Mean Annual Flows to the Everglades – 380,000 ac-ft/yr
 - Everglades Demand Target Delivered Standard Score – 93%
 - Dry Season Everglades Demand Target Met Standard Score – 95%

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – Yes
 - South Shallow Storage – Yes
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - Other – Yes (Water Management Area)
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits - yes
 - meet Caloosahatchee MFL prior to sending water to Everglades Protection Area
 - no LO regulatory releases to St. Lucie Estuary

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- North Storage Feature
 - 1,000,000 ac-ft of storage
 - 5 - 200,000 ac-ft compartments at 15 feet deep
 - 75,000 acres of land
 - 90 miles of embankment
 - 25 miles of conveyance improvements
 - 5 pump stations and 5 gravity outflow structures
 - 8,375 cfs total inflow for pump stations
 - 8,375 cfs total outflow through gravity structures

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- South Deep Storage Feature
 - 352,096 ac-ft of storage
 - 24,207 acres of land
 - 2 compartments
 - 37.1 miles of embankment
 - Inflow Structures – 3 pump stations
 - two 2,000 cfs pumps, one 2,500 cfs
 - Outflow Structures – 6 gravity structures
 - 1,000 cfs each
 - Potential Impacts
 - 3.6 miles of two lane highway (CR833)
 - 19.4 miles of power transmission lines
 - Southern Gardens Citrus Plant
 - 298 District
 - 1.1 miles of railroad, 1 rail yard
 - Airport
 - Endangered species habitat (Kite, Panther, Indigo Snake)
 - Wetlands

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- South Shallow Storage
 - 241,212 ac-ft of storage
 - 66,334 acres of land
 - 2 compartments
 - 68 miles of embankment
 - Inflow Structures – 3 pump stations
 - 3,900 cfs pump, 2,500 cfs pump, 200 cfs pump
 - Outflow Structures – 1 pump station
 - 2,600 cfs pump
 - Potential Impacts
 - road removal and grading
 - 19.4 miles of power transmission lines
 - 298 District
 - 1.1 miles of railroad, 1 rail yard
 - Airport
 - Endangered species habitat (Panther, Indigo Snake)
 - Wetlands

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Stormwater Treatment Feature
 - 30,581 acres of land
 - 13 compartments (cells)
 - 112 internal structures
 - 40.5 miles of embankment
 - 7.6 miles of conveyance improvements
 - Inflow Structures – 2 pump stations
 - 3,900 cfs pump, 2,500 cfs pump
 - Outflow Structures – 1 pump station, 2 gravity structures
 - 3,900 cfs pump, 3,900 cfs gravity structure, 3,000 cfs gravity structure
 - Potential Impacts
 - 19.4 miles of power transmission lines
 - Airport

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Conveyance Features
 - 4.2 miles of new canals
 - 2 reaches 2,500 cfs each
 - 51.6 miles of improved canals
 - 5 reaches 2,000 cfs each
 - 2 reaches, 2,500 cfs each
 - 1 reach, 1,400 cfs
 - 55.8 acres
 - Potential Impacts
 - 298 Districts
 - 11 road bridges, 2 railroad bridges
 - Wetlands

Estuary Driven Everglades Restoration

RESTORATION PLANNING

- Water Management Area
 - 0 ac-ft of storage
 - 10,532 acres of land
 - 13.1 miles of embankment
 - Inflow Structures – none
 - Outflow Structures – none
 - Potential Impacts
 - 6.6 mile 2 lane highway (CR720)
 - Residential community
 - Farming out buildings and storage sheds

Estuary Driven Everglades Restoration Potential Configuration Refinements

RESTORATION PLANNING

- Water Management Areas (10,532 acres) changed to STAs, existing STA's downsized accordingly
- Navigation lock and control structure at west end of Lake Hicpochee
- Deep reservoir footprint modification to avoid Southern Gardens Citrus Plant and Airport, maintain storage volume
- Move upper reach of Canal 2 (1.4 miles canal) east to avoid wetland impacts
- Move shallow storage east off of ridge

A white egret is captured in mid-flight, its wings fully extended, flying over a body of water. The background is a lush green field of grass. The text 'Reviving THE river OF grass' is overlaid on the right side of the image.

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Questions?

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RESTORATION PLANNING

A white egret is captured in mid-flight, its wings fully extended, against a background of lush green grass. The bird is positioned on the left side of the frame, facing right. The text 'Reviving THE river OF grass' is overlaid on the right side of the image.

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Design Assumptions Everglades Northern Expansion

Alan Shirkey, P.E., Lead Engineer, Infrastructure &
Operations Development Division

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Everglades Northern Expansion

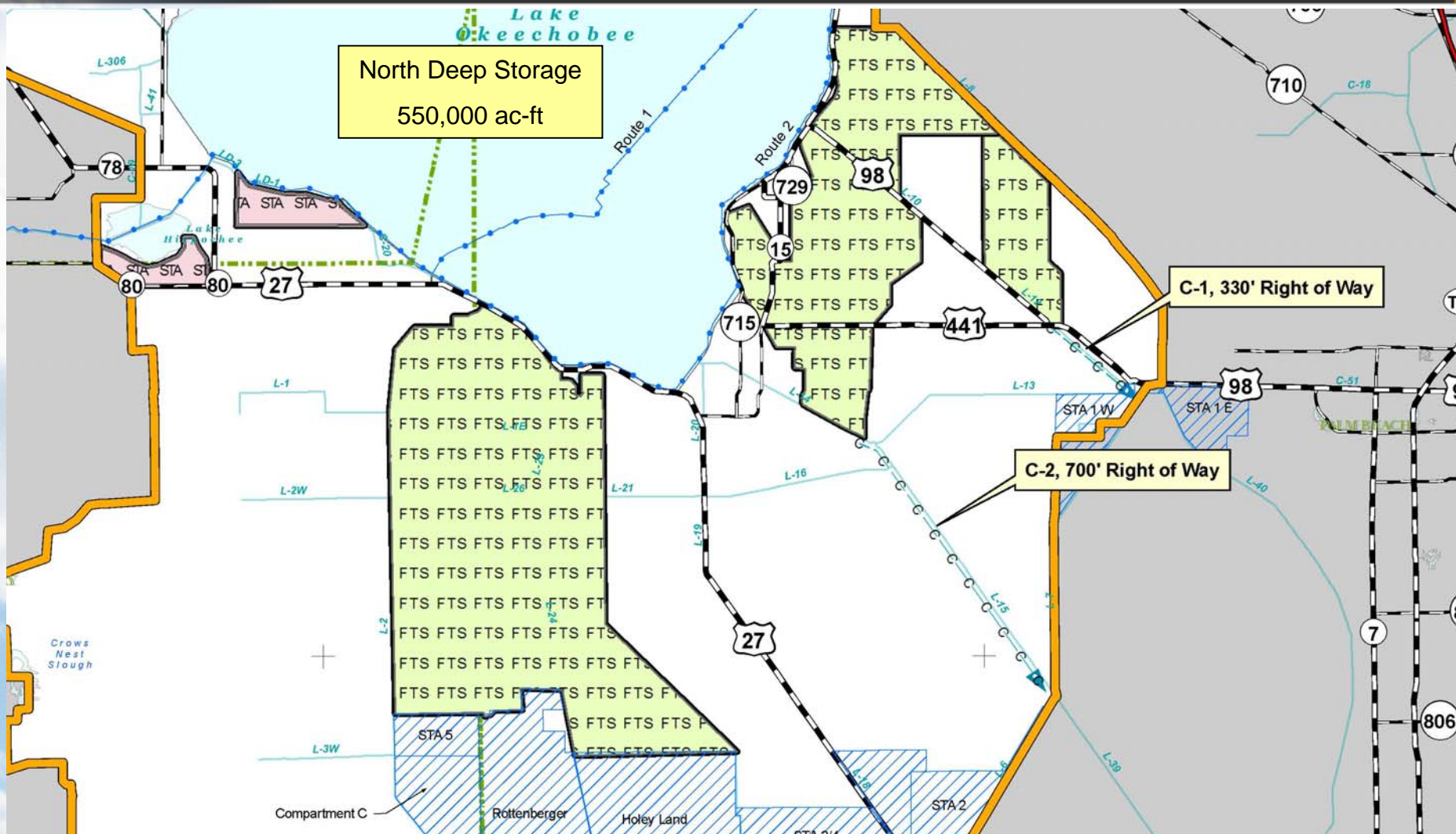


RESTORATION PLANNING

- Authors of Configuration
 - Drew Martin – Sierra Club
 - Bret Harquitz – Local Resident
- Facilitator – Dean Powell
- Engineer – Alan Shirkey

Everglades Northern Expansion

RESTORATION PLANNING



Everglades Northern Expansion

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – No specific target given. Requested RESOPS to optimize.
 - High Lake O Stage Envelope Standard Score – No specific target given. Requested RESOPS to optimize.
 - Increase in Mean Annual Flows to the Everglades – No specific target given. Requested RESOPS to optimize.
 - Everglades Demand Target Delivered Standard Score – No specific target given. Requested RESOPS to optimize.
 - Dry Season Everglades Demand Target Met Standard Score – No specific target given. Requested RESOPS to optimize.

Everglades Northern Expansion

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – No
 - South Shallow Storage – Yes
 - Stormwater Treatment Area – No, but water quality treatment is expected from shallow storage features (flow ways).
 - Canal Conveyance Improvements – Yes
 - Other – No
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – Yes. No specific targets were provided.

Everglades Northern Expansion



RESTORATION PLANNING

- North Storage Feature
 - 550,000 ac-ft of storage
 - 2.75 - 200,000 ac-ft compartments at 15 feet deep
 - 41,250 acres of land
 - 49.5 miles of embankment
 - 13.8 miles of conveyance improvements
 - 3 pump stations and 3 gravity outflow structures
 - 4,600 cfs total inflow for pump stations
 - 4,600 cfs total outflow through gravity structures

Everglades Northern Expansion

RESTORATION PLANNING

- South Shallow Storage
 - 551,205 total ac-ft of storage in three flow ways
 - 204,150 total acres of land
 - No compartments – natural flow way specified
 - 152.7 miles of embankment
 - Inflow Structures – 3 pump stations
 - 1 – 1,000 cfs
 - 1 – 3,000 cfs
 - 1 – 4,500 cfs
 - Outflow Structures – 3 gravity structures
 - 1 – 1,000 cfs
 - 1 – 3,000 cfs
 - 1 – 4,500 cfs
 - Potential Impacts
 - 21.5 miles of existing roads, 65.5 miles of railroads, 17.7 miles of transmission line, 2 housing developments, 3,190 miles of roads and canals to be removed/degraded, 3 new bridges needed, plus impacts to existing 298 districts.
 - Indigo Snake habitat

Everglades Northern Expansion

RESTORATION PLANNING

- Stormwater Treatment Feature
 - Shallow Storage Features (three flow ways) on previous slide double as a stormwater treatment features.

Everglades Northern Expansion



RESTORATION PLANNING

- Conveyance Features
 - 20.7 miles of new canals
 - 1 at 1,000 cfs and 1 at 3,000 cfs
 - 7.6 miles of improved canals
 - 4,500 cfs for canal leading to WCA-3
 - 1969.5 total acres
 - Potential Impacts
 - 9 major canal crossings and the need for 6 new roadway bridges.
 - Impacts to existing drainage features of surrounding land will necessitate small pump stations or bypass canals.

Everglades Northern Expansion Potential Configuration Refinements

RESTORATION PLANNING

- Reduce minimum flowway level to 0.5'.
- Use a 10' max. depth on north deep storage reservoir(s).
- Change high end lake schedule from 17.25 to 17.50.
- Use spreader berm to distribute water into Holey Land & Rotenberger.
- Add footnote that Diston/Hicpochee STA's are to be built in the future.

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Design Assumptions Chain of Lakes

Alan Shirkey, P.E., Lead Engineer, Infrastructure &
Operations Development Division

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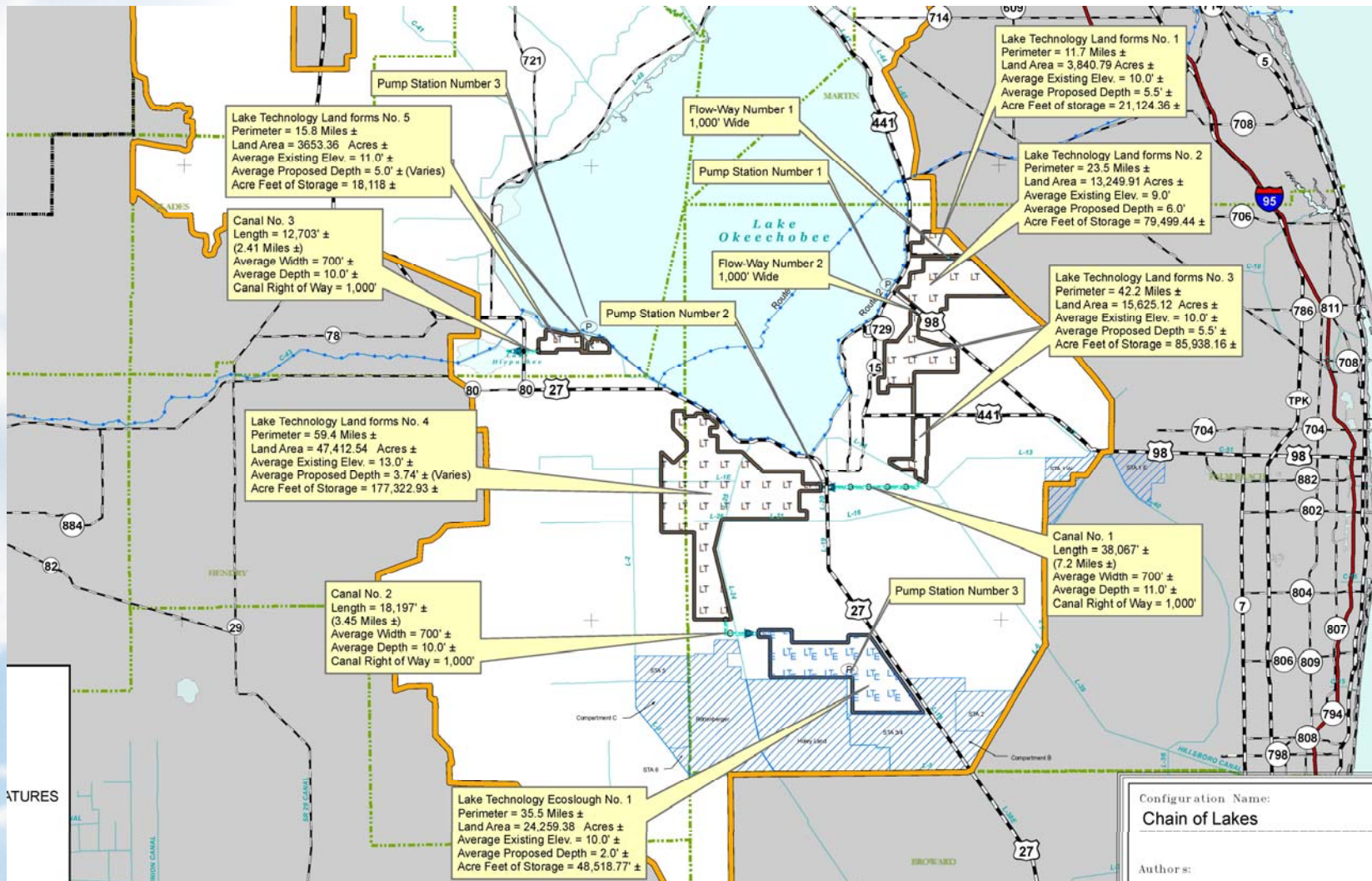
Chain of Lakes

RESTORATION PLANNING

- Authors of Configuration
 - Forest Michael – Michael Planning Team
- Facilitator – Alan Shirkey
- Engineer – Alan Shirkey

Chain of Lakes

RESTORATION PLANNING



FEATURES

Configuration Name:
Chain of Lakes

Authors:

Chain of Lakes

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – No specific target given. Requested RESOPS to optimize.
 - High Lake O Stage Envelope Standard Score – No specific target given. Requested RESOPS to optimize.
 - Increase in Mean Annual Flows to the Everglades – No specific target given. Requested RESOPS to optimize.
 - Everglades Demand Target Delivered Standard Score – No specific target given. Requested RESOPS to optimize.
 - Dry Season Everglades Demand Target Met Standard Score – No specific target given. Requested RESOPS to optimize.

Chain of Lakes

RESTORATION PLANNING

- Configuration Components
 - North Storage – No
 - South Deep Storage – Yes, via Lake Technology Landforms
 - South Shallow Storage – Yes, via Lake Technology Ecoslough
 - Stormwater Treatment Area – No, but water quality treatment is expected from Ecoslough
 - Canal Conveyance Improvements – Yes
 - Other – No
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – Yes: no specific targets were provided.

Chain of Lakes

RESTORATION PLANNING

- South Deep Storage Feature
 - 364,100 ac-ft of storage
 - 94,795 acres of land
 - 5 interconnected lakes
 - 140 miles of embankment
 - Inflow Structures – 2 pump stations at 3000 cfs each
 - Outflow Structures – One gravity outfall to Ecoslough at 6000 cfs.
 - Potential Impacts
 - 8.9 miles of roads, 31.8 miles of railroads, 17.2 miles of transmission line, 4 major canal crossings, existing 298 Districts.

Chain of Lakes

RESTORATION PLANNING

- South Shallow Storage
 - 48,520 ac-ft of storage
 - 26,685 acres of land
 - No compartments – Ecoslough concept
 - 35.5 miles of embankment
 - Inflow Structures – Receives water via gravity discharge from Deep Storage at 6000 cfs.
 - Outflow Structures – One pump station at 6000 cfs.
 - Potential Impacts
 - 400 miles of both canal and road removal/de-grading plus impacts to drainage of surrounding lands.

Chain of Lakes

RESTORATION PLANNING

- Stormwater Treatment Feature
 - Shallow Storage Feature (Ecoslough) on previous slide doubles as a stormwater treatment feature. There are also vegetated areas within the Deep Storage Feature that may provide a small amount of additional treatment.

Chain of Lakes

RESTORATION PLANNING

■ Conveyance Features

- 10.7 miles of new canals
 - One 7.2 mile canal at 3000 cfs and one 3.5 mile canal at 6000 cfs.
- Total Acreage for both new canals is 1290.
- Potential Impacts
 - 4 major canal crossings and the need for 9 new roadway bridges.
 - Impacts to existing drainage features of surrounding land will necessitate small pump stations or bypass canals.

Chain of Lakes Potential Configuration Refinements

RESTORATION PLANNING

- 500,000 ac-ft north storage
- Add additional LT area east of Miami Canal
- Add additional LT area north of 441
- Add large capacity gravity structures next to pump stations and reduce pump station sizes

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Design Assumptions Florida Crystals

Mark Long, Project Manager, Engineering Department

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Florida Crystals

RESTORATION PLANNING

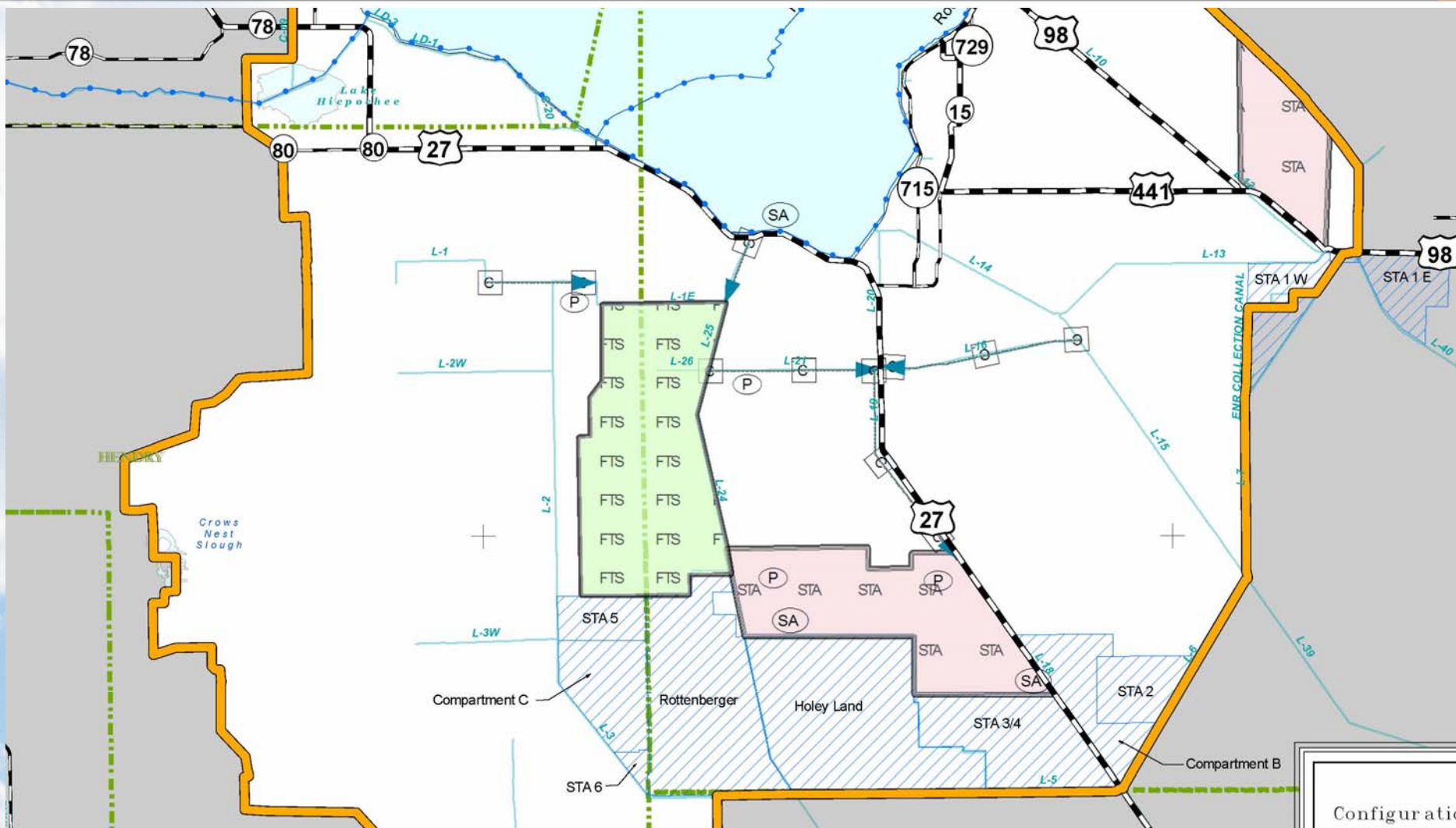
- Authors of Configuration
 - Sam Poole – Florida Crystals
 - Galen Miller – Burns & McDonnell

- Facilitator – Mark Long

- Engineer – Mark Long

Florida Crystals

RESTORATION PLANNING



Configurat

Florida Crystals

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – not specified
 - High Lake O Stage Envelope Standard Score – not specified
 - Increase in Mean Annual Flows to the Everglades – not specified
 - Everglades Demand Target Delivered Standard Score – not specified
 - Dry Season Everglades Demand Target Met Standard Score – not specified

Florida Crystals

RESTORATION PLANNING

- Configuration Components
 - North Storage – No
 - South Deep Storage – No
 - South Shallow Storage – Yes
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - Other – No
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – yes

Florida Crystals

RESTORATION PLANNING

- North Storage Feature
(not included)
- South Deep Storage Feature
(not included)

Florida Crystals

RESTORATION PLANNING

- South Shallow Storage
 - 45,000 ac-ft of storage
 - 47,000 acres of land
 - 1 compartment
 - 40 miles of embankment
 - Inflow Structures – 1 gravity structure
 - 7,000 cfs
 - Inflow Structures – 1 pump station from S-4 basin
 - 1,600 cfs
 - Outflow Structures – pump station included in STA
 - Potential Impacts
 - road removal and grading

Florida Crystals

RESTORATION PLANNING

- Stormwater Treatment Feature – Talisman
 - 36,500 acres of land
 - 16 compartments (cells)
 - 120 internal structures
 - 81 miles of embankment
 - 7.6 miles of conveyance improvements
 - Inflow Structures – 2 pump stations
 - 3,600 cfs each
 - Outflow Structures – 1 pump station
 - 7,200 cfs

Florida Crystals

RESTORATION PLANNING

- Stormwater Treatment Feature – S-5A
 - 15,500 acres of land
 - 8 compartments (cells)
 - 60 internal structures
 - 40 miles of embankment
 - Inflow Structures – 1 pump station
 - 3,600 cfs each
 - Outflow Structures – 1 pump station
 - 3,600 cfs
 - Potential Impacts
 - 2 miles FPL transmission lines

Florida Crystals

RESTORATION PLANNING

■ Conveyance Features

- 40 miles of improved canals
- 950 acres
- Potential Impacts
 - Railroad – 9 miles and one bridge
 - Road bridges – 3 two lane and 1 six lane

Florida Crystals Potential Configuration Refinements

RESTORATION PLANNING

- Add dispersed storage north of Lake Okeechobee
 - 200,000 acres highly managed type
 - 300,000 acres wetland restoration type



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RESTORATION PLANNING



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Design Assumptions Restoration Plus Employment

Mark Long, Project Manager, Engineering Department

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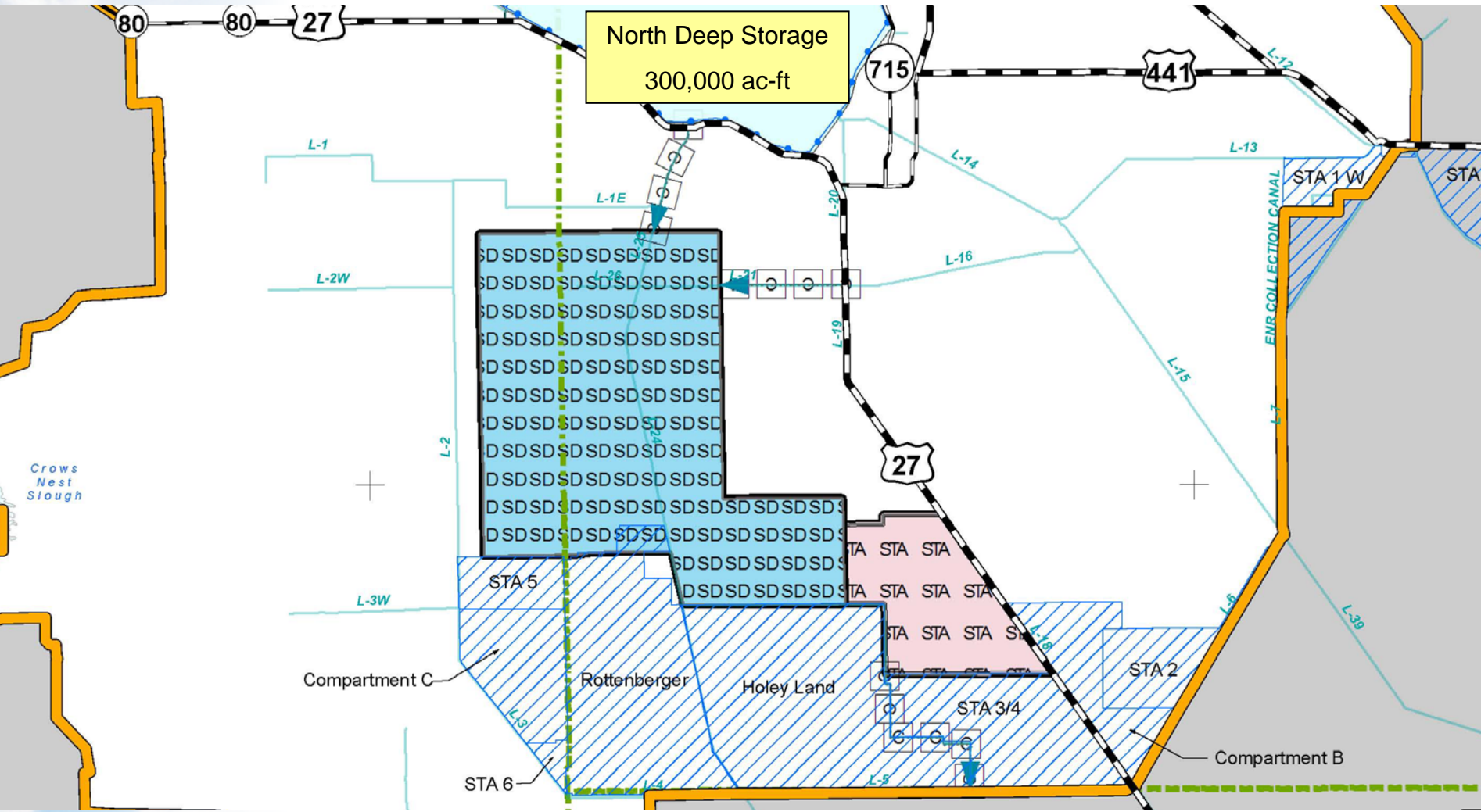
Restoration Plus Employment

RESTORATION PLANNING

- Authors of Configuration
 - Joan Davis – League of Women Voters
 - Bevin Beaudet – Palm Beach County
- Facilitator – Agnes Ramsey
- Engineer – Mark Long

Restoration Plus Employment

RESTORATION PLANNING



Restoration Plus Employment

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries –95%
 - High Lake O Stage Envelope Standard Score –84%
 - Increase in Mean Annual Flows to the Everglades – 370,000 ac-ft/yr
 - Everglades Demand Target Delivered Standard Score –93%
 - Dry Season Everglades Demand Target Met Standard Score –91%

Restoration Plus Employment

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – Yes
 - South Shallow Storage – No
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - Other – No
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – yes

Restoration Plus Employment

RESTORATION PLANNING

- North Storage Feature
 - 300,000 ac-ft of storage
 - One and a half 200,000 ac-ft compartments at 15 feet deep
 - 22,500 acres of land
 - 27 miles of embankment
 - 7.5 miles of conveyance improvements
 - 1 pump station and gravity outflow structure
 - 2,500 cfs total inflow for pump stations
 - 2,500 cfs total outflow through gravity structures

Restoration Plus Employment

RESTORATION PLANNING

- South Deep Storage Feature
 - 900,000 ac-ft of storage
 - 83,000 acres of land
 - 5 compartments
 - 79 miles of embankment
 - Inflow Structures – 2 pump stations
 - 3,500 cfs each
 - Outflow Structures – 5 gravity structures
 - 7,000 cfs each
 - Potential Impacts
 - 10 miles railroad plus 1 bridge

Restoration Plus Employment

RESTORATION PLANNING

- South Shallow Storage
 - (not included)

Restoration Plus Employment

RESTORATION PLANNING

- Stormwater Treatment Feature
 - 20,000 acres of land
 - 9 compartments (cells)
 - 68 internal structures
 - 25 miles of embankment
 - 7.6 miles of conveyance improvements
 - Inflow Structures – 1 pump station
 - 7,000 cfs
 - Outflow Structures – 1 pump station
 - 7,000 cfs

Restoration Plus Employment

RESTORATION PLANNING

- Conveyance Features
 - 9 miles of improved canals
 - 180 acres
 - Potential Impacts
 - 3 – two lane bridges
 - 1 – six lane bridge



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RESTORATION PLANNING

A white egret is captured in mid-flight, its wings fully extended, against a background of lush green grass. The bird is positioned on the left side of the frame, facing right. The overall scene is bright and natural.

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Design Assumptions Marshall Plan Element 6

Jeffrey R. Kivett, P.E., Director,
Everglades Engineering Department

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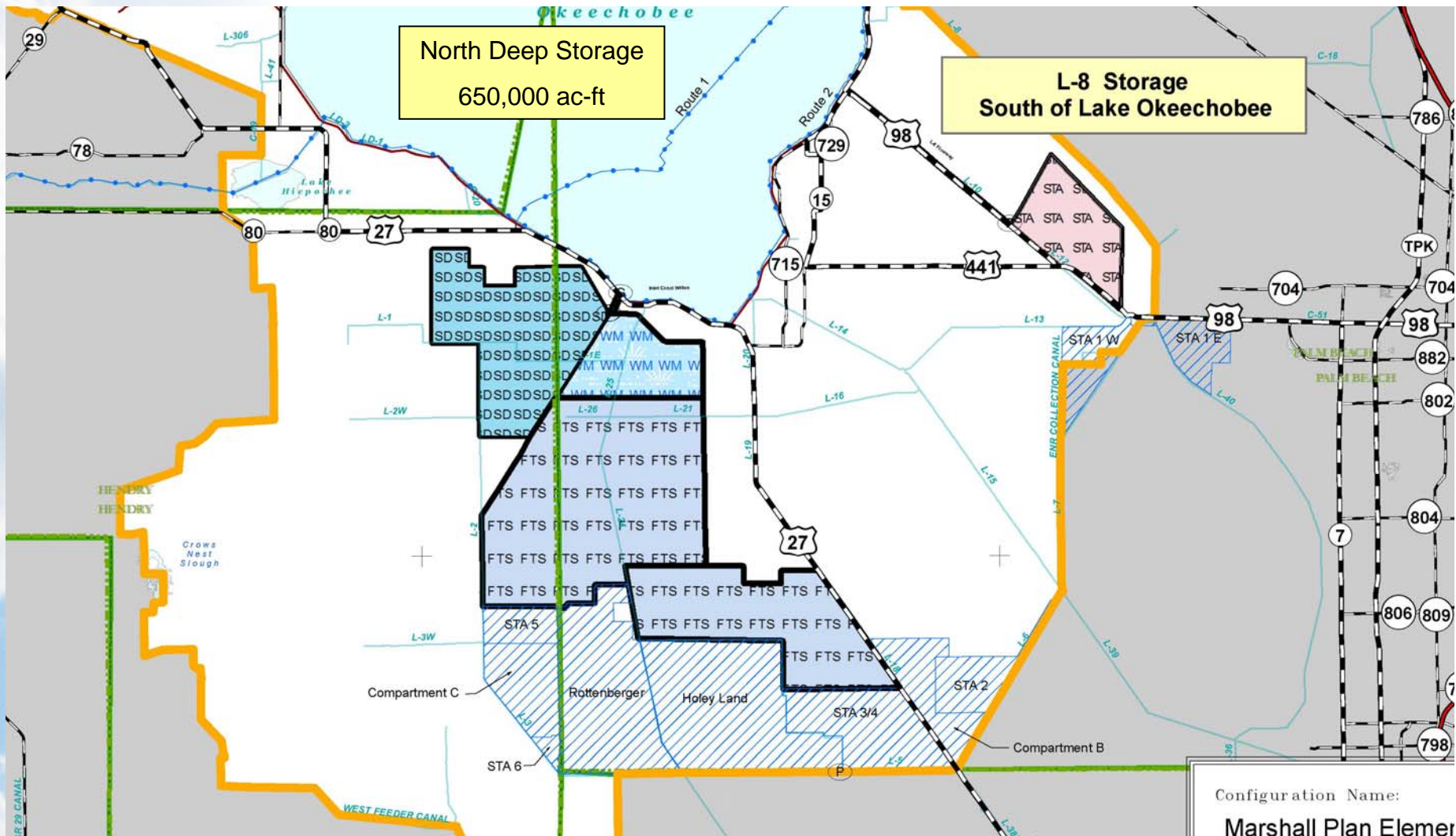
Marshall Plan Element 6

RESTORATION PLANNING

- Authors of Configuration
 - John Marshall – Arthur R. Marshall Foundation
 - Martha Musgrove – Arthur R. Marshall Foundation
 - Joel VanArman – Arthur R. Marshall Foundation
 - Tom Poulson – Arthur R. Marshall Foundation
 - Deborah Nichols – Arthur R. Marshall Foundation
- Facilitator – Jeffrey R. Kivett
- Engineer – Jeffrey R. Kivett

Marshall Plan Element 6

RESTORATION PLANNING



Configuration Name:
Marshall Plan Elemer

Marshall Plan Element 6

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – 95%
 - High Lake O Stage Envelope Standard Score – 80-85%
 - Increase in Mean Annual Flows to the Everglades – 350,000 ac-ft/yr
 - Everglades Demand Target Delivered Standard Score – 90-95%
 - Dry Season Everglades Demand Target Met Standard Score – 90%

Marshall Plan Element 6

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – Yes
 - South Shallow Storage – Yes
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – No
 - Other – Flowway
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – no
 - Use only LORS-2008
 - No Diversion of Run-off from L-8 Basin
 - Do not allow flowway to go dry

Marshall Plan Element 6

RESTORATION PLANNING

- North Storage Feature
 - 650,000 ac-ft of storage
 - 3.25 - 200,000 ac-ft compartments at 15 feet deep
 - 48.75 acres of land
 - 58.5 miles of embankment
 - 16.25 miles of conveyance improvements
 - 4 pump stations and outflow stations
 - 5,445 cfs Inflow capacity
 - 5,445 cfs Outflow capacity

Marshall Plan Element 6

RESTORATION PLANNING

- South Deep Storage Feature
 - 589,000 ac-ft of storage
 - 36,400 acres of land
 - 3 compartment
 - 50 miles of embankment
 - Inflow Structures – 3,000 cfs pump station
 - Outflow Structures – 6,660 cfs gravity structures
 - Potential Impacts
 - Requires relocation of Railroads and Transmission lines

Marshall Plan Element 6

RESTORATION PLANNING

- South Flowway for Shallow Storage and Treatment
 - 121,150 acres of land
 - 436,000 ac-ft of storage
 - 1 compartment
 - 38.5 miles of embankment
 - Inflow Structures – 1 gravity structure
 - 6,660 cfs
 - Outflow Structures – 1 pump station, 2 gravity structures
 - 6,660 cfs Ps, 2,000 cfs Structure to STA 5/6, 6660 cfs structure to STA 2 and STA 3/4
 - Potential Impacts
 - 1,890 miles road removal and grading
 - 1,890 miles Canal filling

Marshall Plan Element 6

RESTORATION PLANNING

- Stormwater Treatment Feature (L-8 Basin)
 - 14,000 acres of land
 - 8 compartments (cells)
 - 4 internal structures
 - 21.5 miles external embankment
 - 18 miles internal embankment
 - Inflow Structures – 1 pump station
 - 2,000 cfs
 - Outflow Structures – 1 gated structure
 - 2,000 cfs

Marshall Plan Element 6

RESTORATION PLANNING

- Other Features (Inlet conveyance to Flowway/Reservoir)
 - 225 acres of land
 - 3 miles of embankment
 - Inflow Structures – 1 gravity structure
 - 6,660 cfs
 - Potential Impacts
 - ½ mile 4 lane bridge for Rt 80
 - ½ mile 2 lane bridge for County Rd
 - ½ mile bridge for railroads



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Design Assumptions Performance

Sue Ray, Chief Engineer, Everglades Engineering

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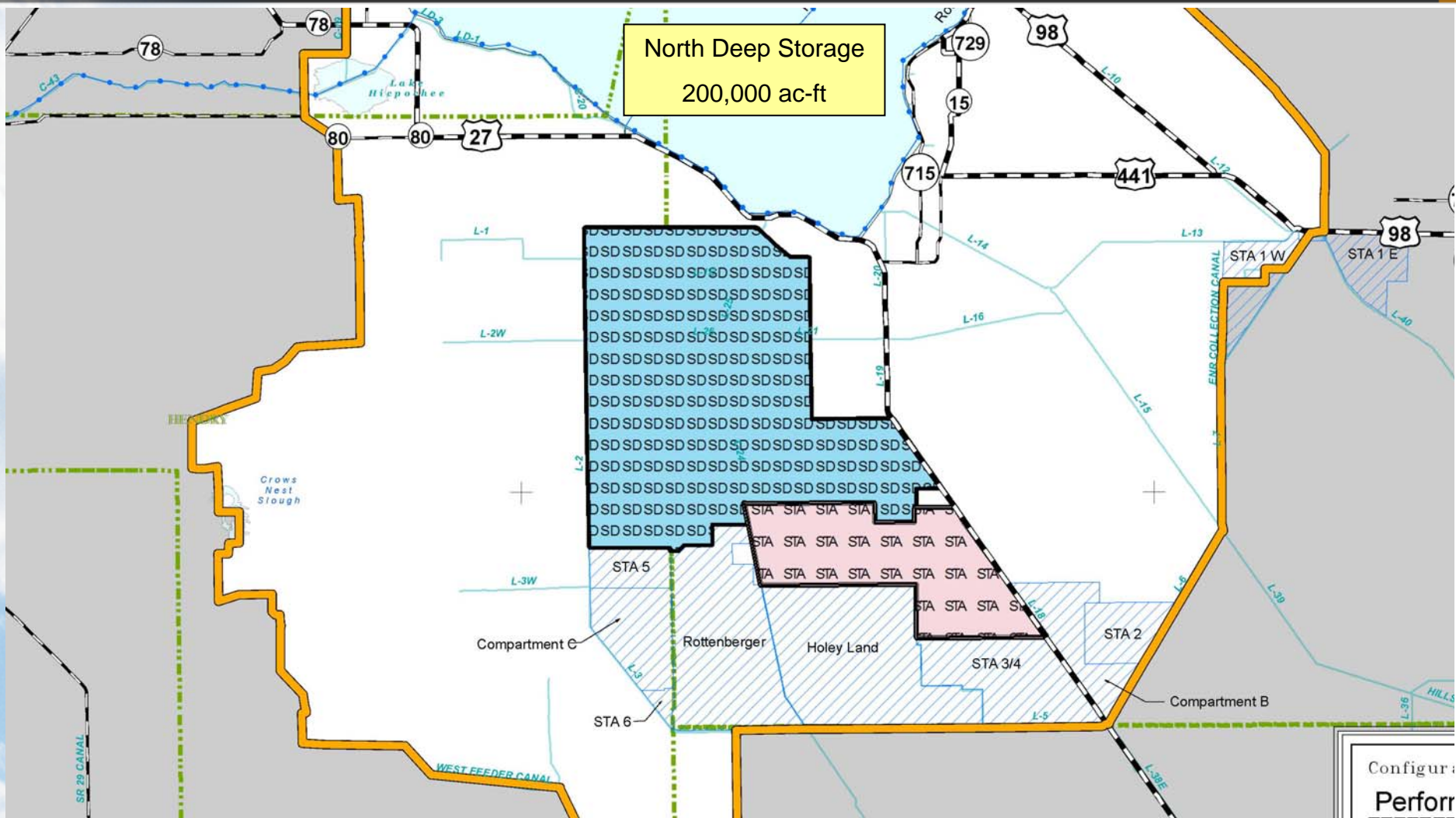
Performance

RESTORATION PLANNING

- Authors of Configuration
 - Karl Wickstrom - Rivers Coalition
 - Jennifer Nelson - DEP
 - Lisa Interlandi - Everglades Law Center
 - Joanne Davis - 1000 Friends of Florida
 - Maggy Hurchalla -
 - Cynthia Plockelman - Audubon Society of the Everglades
 - Mark Oncavage - Sierra Club Miami Group
 - Paul Gray - Audubon
 - Tom Van Lent - Everglades Foundation
- Facilitator – Susan Gray, Dave Unsell
- Engineer – Sue Ray

Performance Plan

RESTORATION PLANNING



Configur
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Performance

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – 95%
 - High Lake O Stage Envelope Standard Score – 85%
 - Increase in Mean Annual Flows to the Everglades – optimized
 - Everglades Demand Target Delivered Standard Score – optimized
 - Dry Season Everglades Demand Target Met Standard Score – 90%

Performance

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – Yes
 - South Shallow Storage – No
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - Other – No
 - RESOPS
 - use all parameters within RESOPS to achieve model optimum benefits – yes

Performance

RESTORATION PLANNING

- North Deep Storage Feature
 - 200,000 ac-ft of storage
 - 15,000 acres of land
 - 18 miles of embankment
 - 5 miles of conveyance improvements
 - 1 inflow pump stations and outflow stations
 - 1,675 cfs
 - 1 outflow gravity structure
 - 1,675 cfs

Performance

RESTORATION PLANNING

- South Deep Storage Feature
 - 1,200,000 ac-ft of storage
 - 116,500 acres of land
 - 6 compartments
 - 57 miles of embankment
 - Inflow Structures – 3 pump stations
 - 3,000 cfs, 3,000 cfs, 1,500 cfs
 - Outflow Structures – 2 gravity structures
 - 6,000 cfs, 4,500 cfs
 - Potential Impacts
 - 7.5 miles of new roads; 2 new bridges
 - 36.9 miles railroad
 - 21 miles of transmission lines

Performance

RESTORATION PLANNING

- Talisman A-1, A-2 Stormwater Treatment Area Feature
 - 36,500 acres
 - 16 compartments (cells)
 - 120 internal structures
 - 40 miles of embankment
 - Inflow Structures – None
 - Gravity flow from reservoir
 - Outflow Structures –
 - 1 gravity structure – 7,000 cfs
 - 1 pump station – 7,000 cfs

Performance

RESTORATION PLANNING

- Conveyance Features
 - New Canals
 - 7.6 miles at 7,000 cfs
 - 2 miles at 4,500 cfs
 - 1 mile at 6,000 cfs
 - Improved Canals
 - 4 miles for total flow of 3,000 cfs
 - 1,400 acres of land
 - Potential Impacts
 - Cities

Performance

RESTORATION PLANNING

- Lake Okeechobee Structures
 - Inflow Structures – 2 gravity structures
 - 1,500 cfs, 1,500 cfs

Performance Potential Configuration Refinements

RESTORATION PLANNING

- Add L-8 STA to insure treated water available for Loxahatchee National Wildlife Refuge in wet years
- Compare evaluated cost for deep northern storage to Lake Okeechobee Watershed Project cost curve
- Clearly identify FRESP as an integral part of this proposed configuration but recognize potential limited ability to model benefits and estimate costs at this phase – include in next planning phase
- Evaluate trade off of deeper south reservoir and higher embankments with less land required and construction costs
- Evaluate construction cost to be able to gravity from Lake Okeechobee to the reservoir with no pumping compared to the number of times this would be utilized given Lake Okeechobee water levels

Performance Potential Configuration Refinements

RESTORATION PLANNING

- Request additional information to be provided on specific impacts if dry season demands to Everglades are not met
- Evaluate benefits and costs of recycling water from STA to reservoir when STA needs water but Everglades does not
- Acknowledge potential to add Alum or similar treatment between reservoir discharge and STA inflow
- Acknowledge potential to utilize rock mine next to US 27 as potential part of configuration
- Consider ability to provide enhanced recreational components in future
- Most flow to Everglades out of all configurations
- Zip Lines



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RESTORATION PLANNING



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Design Assumptions Performance - Cost Plan

John Mitnik, P.E., Division Director

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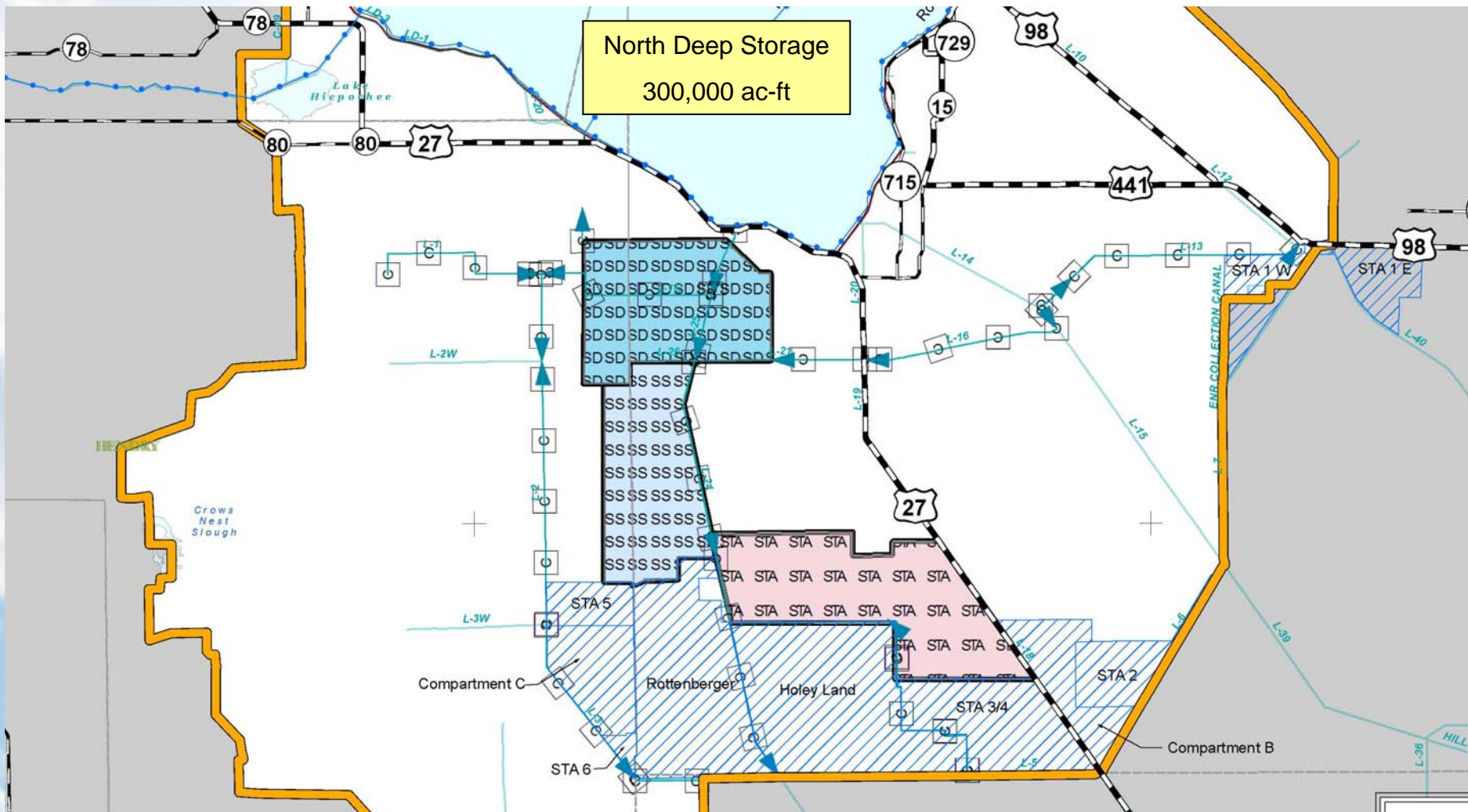
Performance – Cost Plan

RESTORATION PLANNING

- Authors of Configuration
 - Kevin Henderson – St. Lucie Rivers Initiative
- Facilitator – John Mitnik
- Engineer – John Mitnik

Performance Cost Plan

RESTORATION PLANNING



Performance – Cost Plan

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – 90%
 - High Lake O Stage Envelope Standard Score – 80% - 85%
 - Increase in Mean Annual Flows to the Everglades – not specified
 - Everglades Demand Target Delivered Standard Score – 90% - 95%
 - Dry Season Everglades Demand Target Met Standard Score – 85% - 90%

Performance – Cost Plan

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – Yes
 - South Shallow Storage – Yes
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – Yes, given the performance goals list previously

Performance – Cost Plan

RESTORATION PLANNING

- North Storage Feature
 - 300,000 ac-ft of storage
 - One and a half 200,000 ac-ft compartments at 15 feet deep
 - 22,500 acres of land
 - 27 miles of embankment
 - 7.5 miles of conveyance improvements
 - 1 pump station and gravity outflow structure
 - 2,500 cfs total inflow for pump stations
 - 2,500 cfs total outflow through gravity structures

Performance – Cost Plan

RESTORATION PLANNING

- South Deep Storage Feature
 - 460,000 ac-ft of storage
 - 30,000 acres of land
 - 2 compartments
 - 29 miles of embankment
 - Inflow Structures – 3 pump stations
 - 3,000 cfs, 3,000 cfs, 1,500 cfs
 - Outflow Structures – 3 gravity structures
 - 3,000 cfs, 3,000 cfs, 1,500 cfs
 - Potential Impacts
 - Power Lines
 - Highways / Roads
 - Intermodal Port
 - Mining Sites

Performance – Cost Plan

RESTORATION PLANNING

- South Shallow Storage
 - 90,000 ac-ft of storage
 - 25,000 acres of land
 - 1 compartment
 - 24 miles of embankment
 - Inflow Structures – 3 gravity structures
 - 3,000 cfs, 3,000 cfs, 1500cfs
 - Outflow Structures – 3 gravity structures
 - 3,000 cfs, 3,000 cfs, 1500 cfs
 - Potential Impacts
 - Rail Roads
 - Indigo Snake

Performance – Cost Plan

RESTORATION PLANNING

- Stormwater Treatment Feature
 - 36,500 acres of land
 - 16 compartments (cells)
 - 120 internal structures
 - 40 miles of embankment
 - 7.6 miles of conveyance improvements
 - Inflow Structures – 1 pump station
 - 7,500 cfs
 - Outflow Structures – 1 pump station
 - 7,500 cfs
 - Potential Impacts
 - Grading

Performance – Cost Plan

RESTORATION PLANNING

- Conveyance Features
 - 7.6 miles of new canals
 - 7,500 cfs
 - 65 miles of improved canals
 - 7,500 cfs
 - ~1,000 acres of land
 - Potential Impacts
 - Highways



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RESTORATION PLANNING



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**Design Assumptions
Reservoir Within Lake Okeechobee**

John Mitnik, P.E., Division Director

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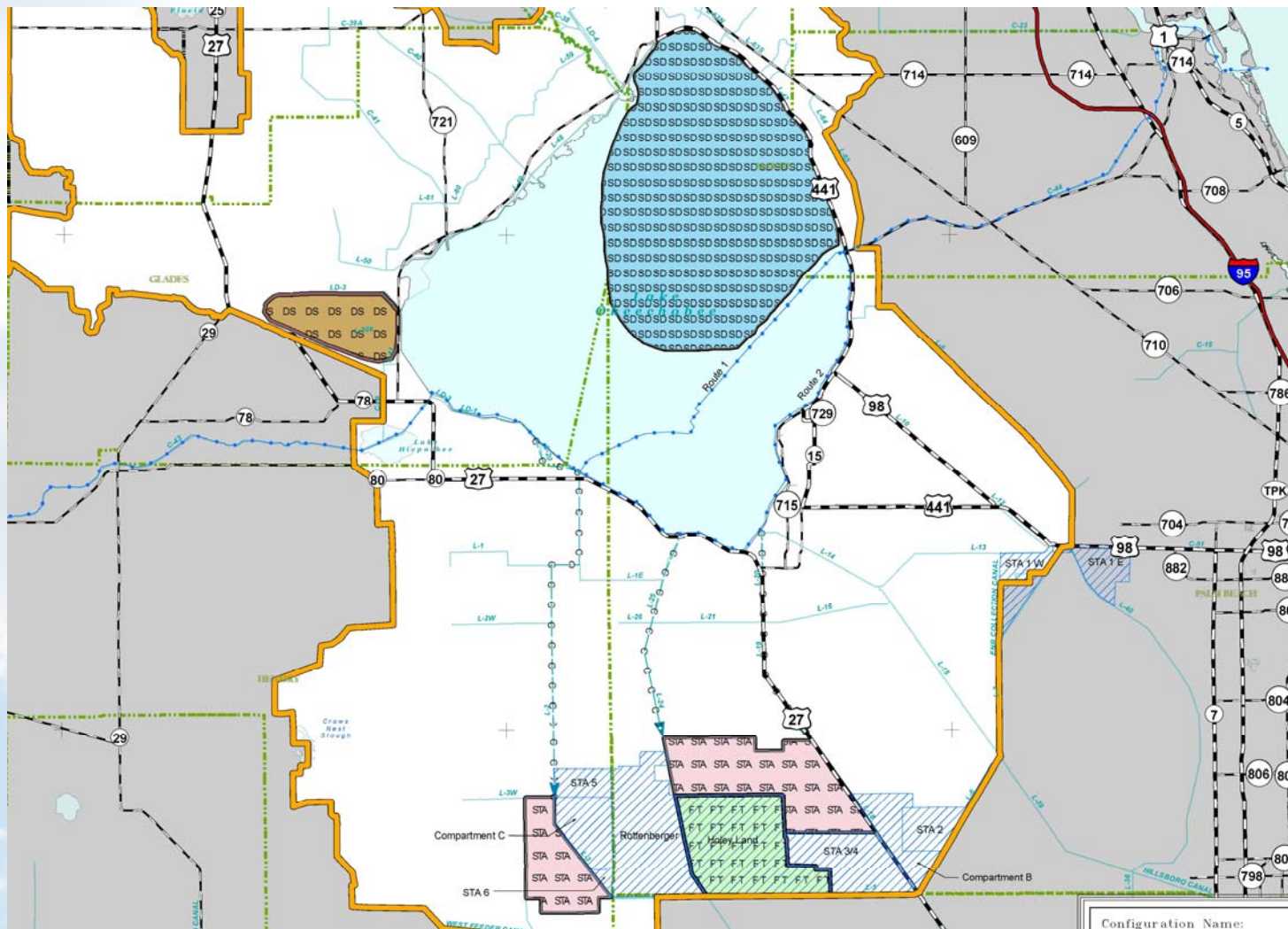
Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Authors of Configuration
 - Kevin McCarthy
 - Tom MacVicar
 - Rebecca Elliott
 - Linda McCarthy
 - Scott McCaleb
- Facilitator – Janet Starnes
- Engineer – John Mitnik

Reservoir Within Lake Okeechobee

RESTORATION PLANNING



Configuration Name:

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Team Specified Performance Level
 - Percent Reduction in Lake Triggered Discharges to Northern Estuaries – optimize
 - High Lake O Stage Envelope Standard Score – optimize
 - Increase in Mean Annual Flows to the Everglades – optimize
 - Everglades Demand Target Delivered Standard Score – optimize
 - Dry Season Everglades Demand Target Met Standard Score – optimize

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Configuration Components
 - North Storage – Yes
 - South Deep Storage – No
 - South Shallow Storage – No
 - Stormwater Treatment Area – Yes
 - Canal Conveyance Improvements – Yes
 - Other – Yes
 - RESOPs
 - use all parameters within RESOPs to achieve model optimum benefits – Yes

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- North Storage Feature
 - 1,200,00 ac-ft of storage
 - 158,000 acres within Lake Okeechobee
 - 63 miles of embankment
 - 0 miles of conveyance improvements
 - 1 pump stations
 - 5,000 cfs

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Stormwater Treatment Feature
 - 53,500 acres of land
 - 23 compartments (cells)
 - 160 internal structures
 - 64 miles of embankment
 - 7.6 miles of conveyance improvements
 - Inflow Structures – 3 pump stations
 - 4,000 cfs, 4,000 cfs, 3,000 cfs
 - Outflow Structures – 1 pump stations
 - 8,000 cfs
 - Potential Impacts
 - Bald Eagles
 - Indigo Snake
 - Panther Habitat
 - Power Lines

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Conveyance Features
 - 0 miles of new canals
 - 59 miles of improved canals
 - 4,000 cfs
 - 1,850 acres of land
 - Potential Impacts
 - Highways
 - Bridges
 - Cities

Reservoir Within Lake Okeechobee

RESTORATION PLANNING

- Other Features (treatment, storage, conveyance, other)
 - Dispersed Storage within Nicodemus Slough
 - Holey Land Flowway
 - Potential Impacts
 - Bald Eagles
 - Snail Kites
 - Indigo Snake
 - Panther Habitat

Reservoir Within Lake Okeechobee Potential Configuration Refinements

RESTORATION PLANNING

- Adjust working storage depths
- Refine Holey Land Flowway concept
- Canal enhancements needed
- Potential improvements to Herbert Hover Dike



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RESTORATION PLANNING