



Loxahatchee River Watershed Restoration Project Groundwater Model Results, Status and Discussion

South Florida Water Management District
May 31, 2017



Outline

- **Overview of Alternatives**
- **Difference Maps**
- **Observations Made to Date**
- **Resolution of Observations**
- **Sensitivity Model Runs**
- **Observations Requiring Team Discussion**

Overview of Alternative 2

Flowway 1	Flowway 2	Flowway 3
Unrestricted Flows into GWP from Regional System	C18W – Impoundment 7,200 acre-feet	Fill Drainage Ditches in Gulfstream East
20 cfs to G-161 from GWP	East Corbett Weir at 21 ft NGVD	Culpepper Control elevations at 19.5 - 20.1 ft NGVD
1.4:1 make up water	2 ASR Wells at C-18W Impoundment	Regrade Shiloh Farms
Northlake Weir at 19 ft NGVD	L-8 Shallow Reservoir 4,300 acre-feet	Weir at Hobe Grove Ditch at 7.5 ft NGVD
Projected Demands for WPB	Seepage Collection Canal with pump station @ 250 cfs	Weir in Kitching Creek at 12.5 ft NGVD
	MO Connector Canal pump station @ 120 cfs	Flow Through Marsh
		Remove Drains in Nine Gems
		Cypress Creek Weir at 13 ft NGVD

Alternative 2 Difference Map



Lake Okeechobee

LRWRP Boundary

Modeled Structures

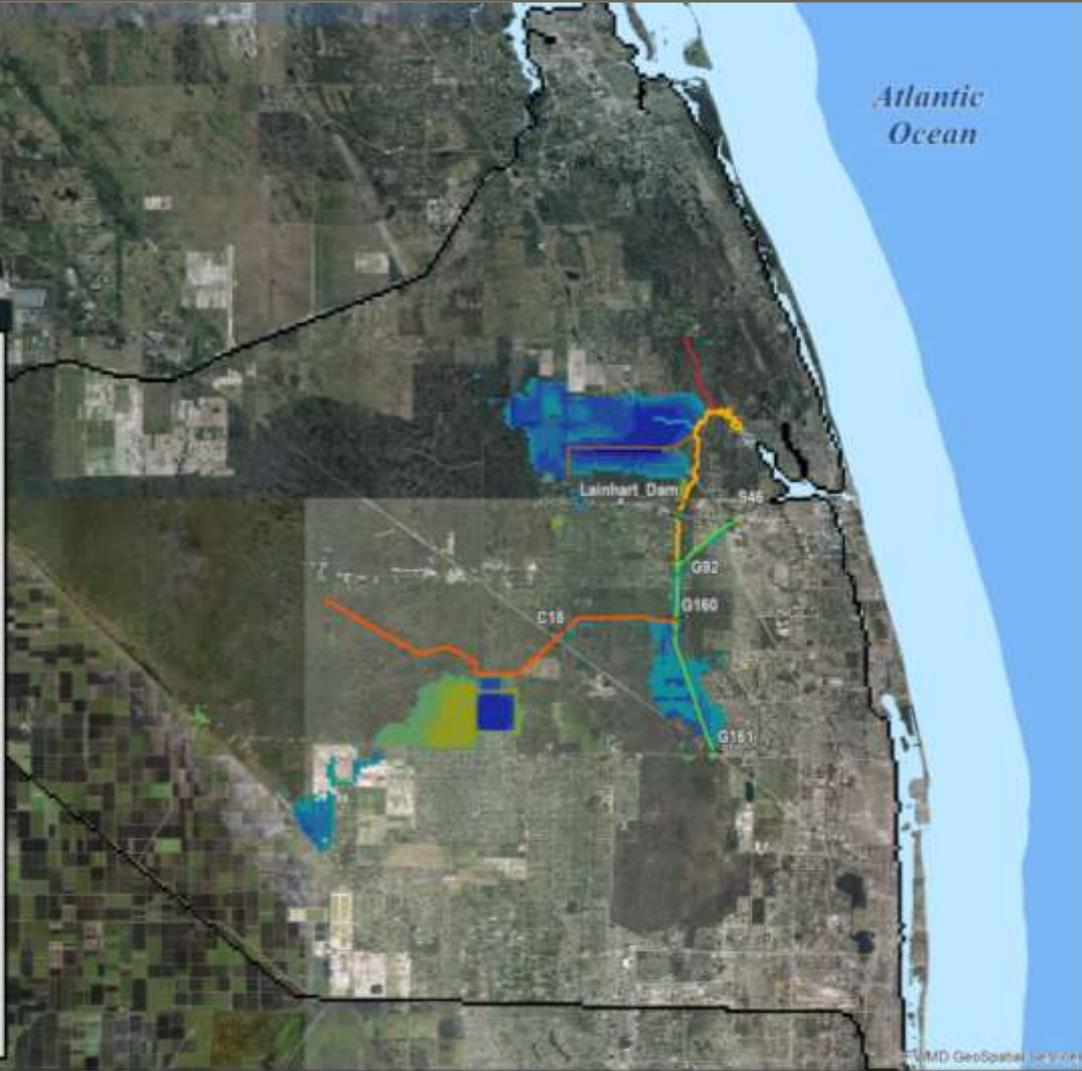
Tributaries

- C-18
- C-18W
- CYPRESS CREEK
- HOBE GROVE DITCH
- KITCHING CREEK
- NW FORK OF LOXAHATCHEE

ALT2 - 2070FWO Avg (11/01)

Head Difference (Feet NGVD)

- 24
- 23 - -15
- 14 - -12
- 11 - -10
- 9 - -5
- 4.9 - -2
- 1.9 - -1
- 0.90 - -0.50
- 0.49 - 0.50
- 0.51 - 1.0
- 1.1 - 2.0
- 2.1 - 5.0
- 5.1 - 10
- 11 - 12



- Types of Graphics:
- Water Level Difference Maps
 - Dry Day (02/1985)
 - Wet Day (07/1992)
 - Average Day (11/2001)

ALT2 - 2070FWO Avg (11/01)

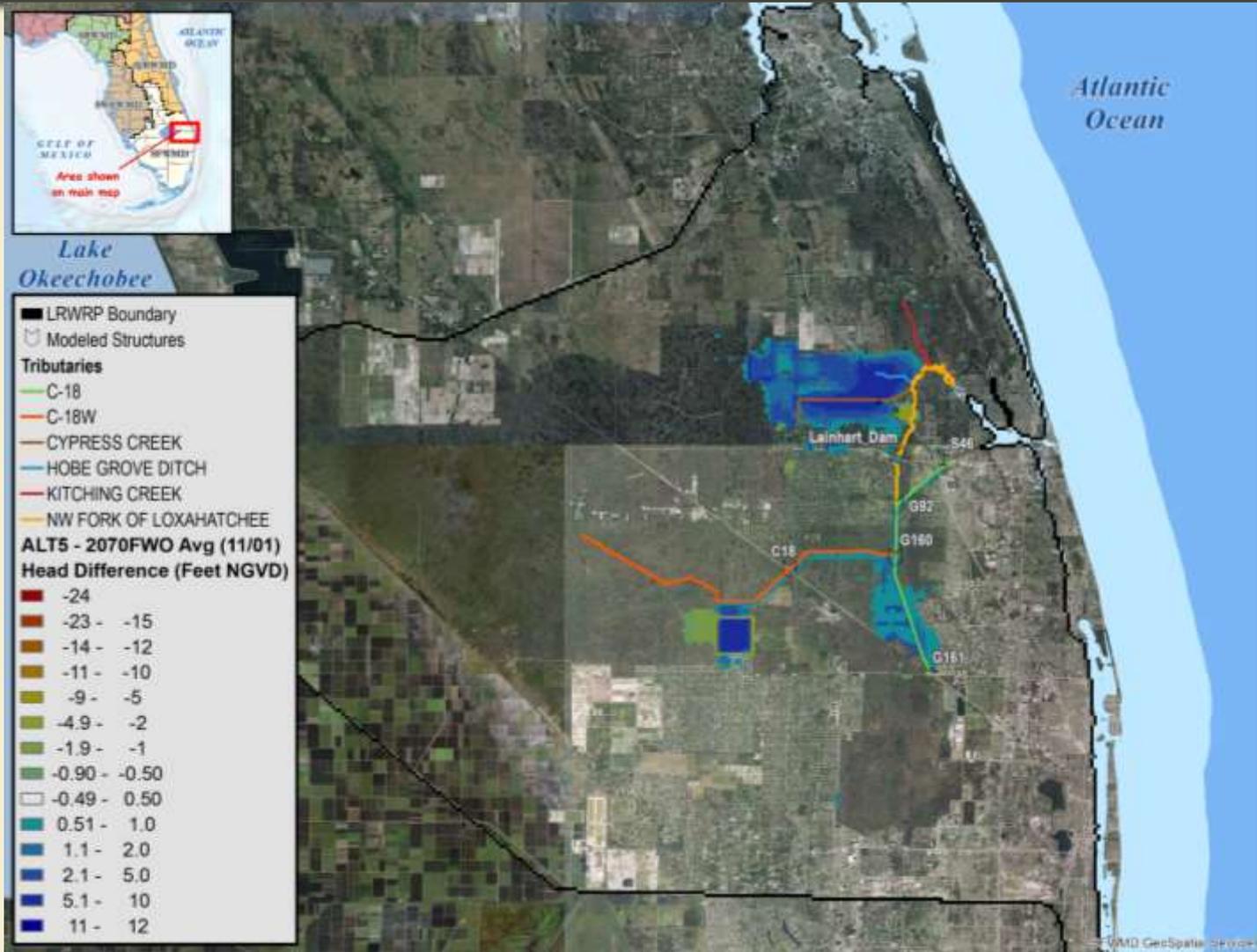
Head Difference (Feet NGVD)

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- 0.49 - 0.50
- 0.51 - 1.0
- 1.1 - 2.0
- 2.1 - 5.0
- 5.1 - 10
- 11 - 12

Overview of Alternative 5

Flowway 1	Flowway 2	Flowway 3
Unrestricted Flows into GWP from Regional System	C18W – Impoundment 9,500 acre-feet	Fill Drainage Ditches in Gulfstream East
20 cfs to G-161 from GWP	East Corbett Weir at 21 ft NGVD	Culpepper Control elevations at 19.5 - 20.1 ft NGVD
1.4:1 make up water	4 ASR Wells at C-18W Impoundment	Regrade Shiloh Farms
Northlake Weir at 19 ft NGVD	Seepage Collection Canal with pump station @ 250 cfs	Weir at Hobe Grove Ditch at 7.5 ft NGVD
Projected Demands for WPB	MO Connector Canal pump station @ 205 cfs	Weir in Kitching Creek at 12.5 ft NGVD
		Flow Through Marsh
		Remove Drains in Nine Gems
		50 cfs pump station and spreader swale
		Cypress Creek Weir at 13 ft NGVD

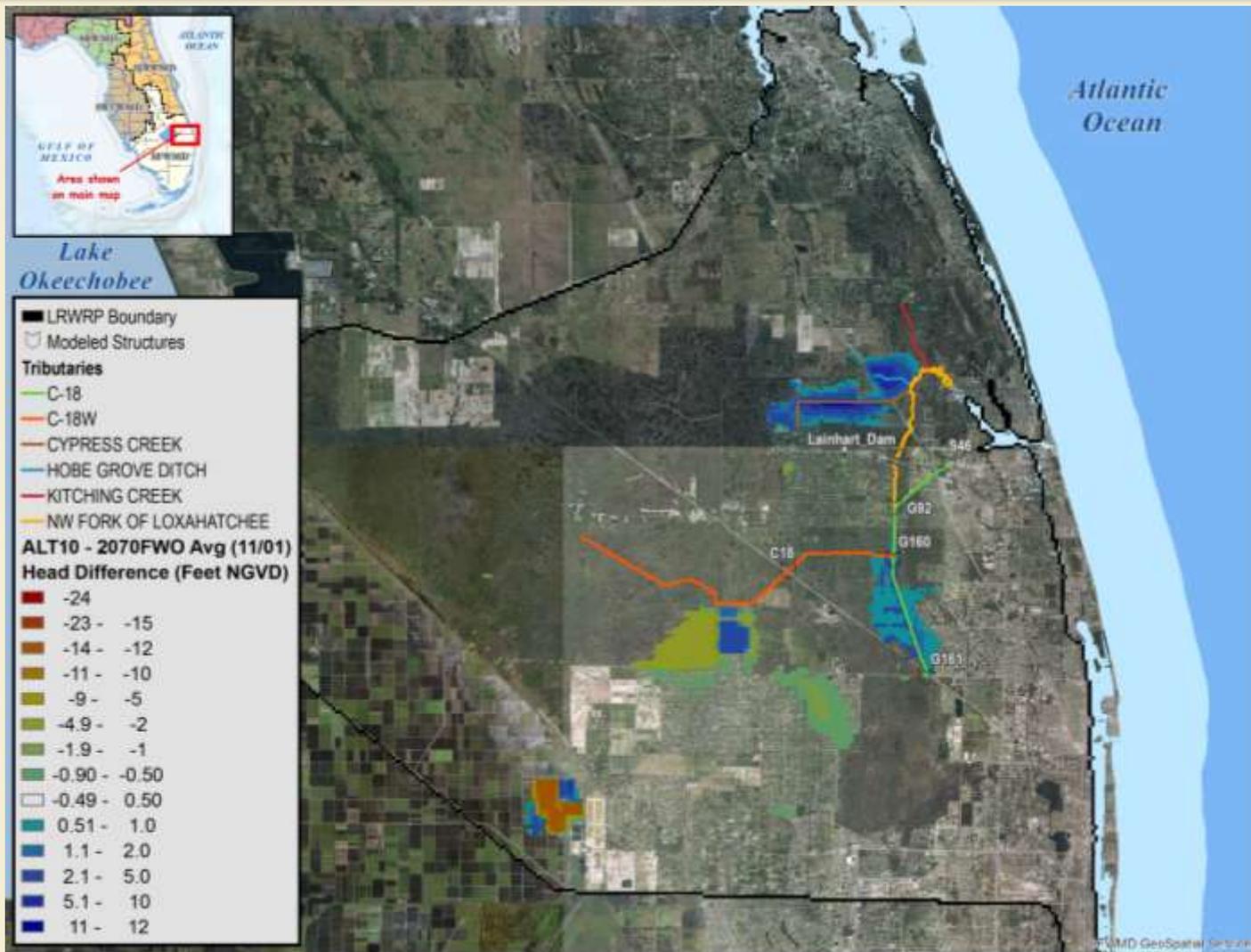
Alternative 5 Difference Map



Overview of Alternative 10

Flowway 1	Flowway 2	Flowway 3
Unrestricted Flows into GWP from C-51 Phase II Reservoir	C18W – Impoundment 7,200 acre-feet	Fill Drainage Ditches in Gulfstream East
Force Main delivering 50 cfs to G-161	East Corbett Weir at 21 ft NGVD	Culpepper Control elevations at 19.5 - 20.1 ft NGVD
1.4:1 make up water	Seepage Collection Canal with pump station @ 250 cfs	Weir at Hobe Grove Ditch at 7.5 ft NGVD
Northlake Weir at 19 ft NGVD		Weir in Kitching Creek at 12.5 ft NGVD
Projected Demands for WPB		Cypress Creek Weir at 13 ft NGVD
C-51 Phase II Reservoir – 44,000 acre-feet		
ITID Runoff to C-51 Phase II Reservoir increased from 274 cfs to 1,100 cfs		

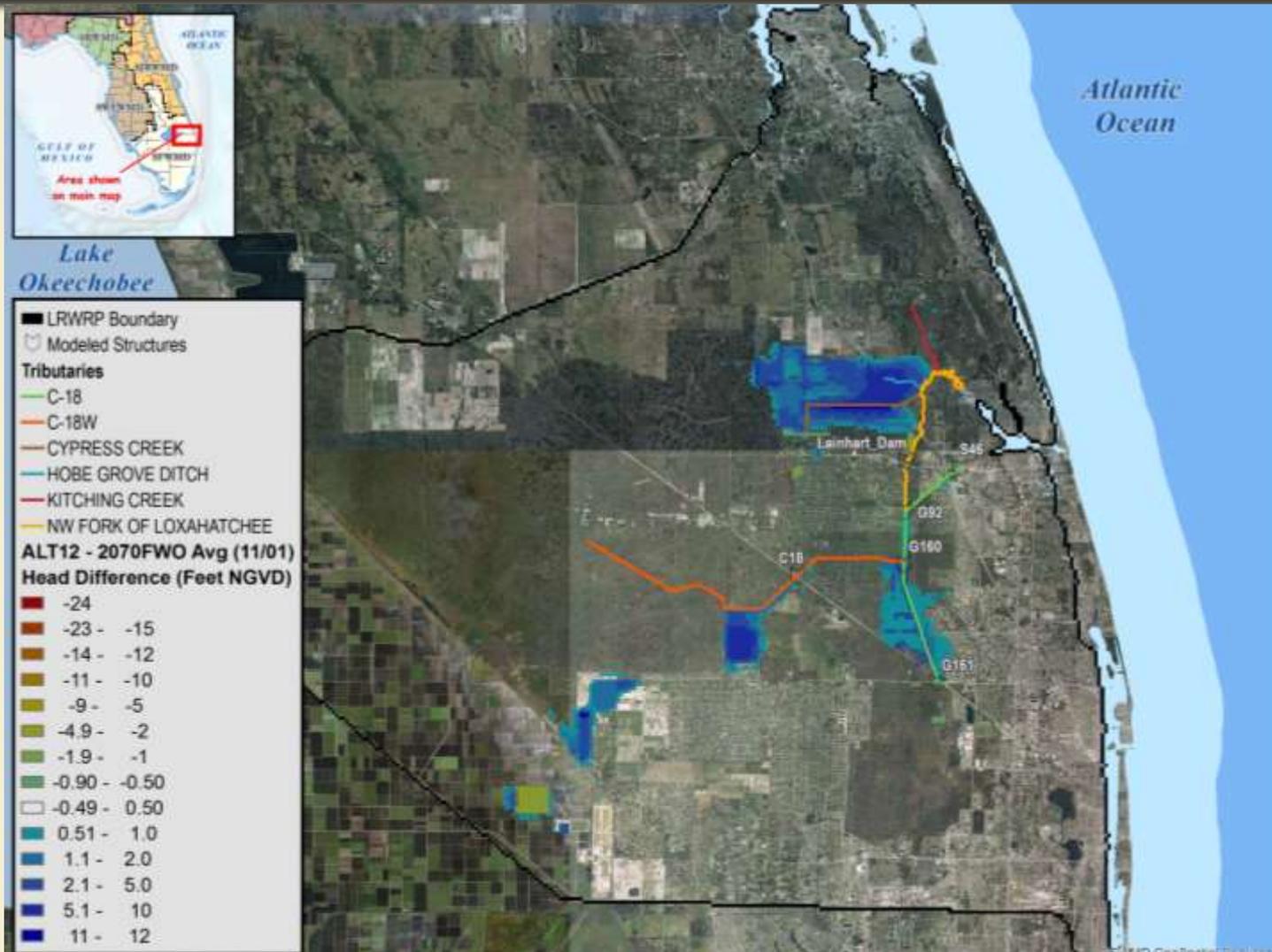
Alternative 10 Difference Map



Overview of Alternative 12

Flowway 1	Flowway 2	Flowway 3
Unrestricted Flows into GWP from Regional System	C18W – Natural Storage	Fill Drainage Ditches in Gulfstream East
20 cfs to G-161 from GWP	East Corbett Weir at 21 ft NGVD	Culpepper Control elevations at 19.5 - 20.1 ft NGVD
1.4:1 make up water	L-8 Shallow Reservoir 5,000 acre-feet	Regrade Shiloh Farms
Northlake Weir at 19 ft NGVD	MO Connector Canal pump station @ 180 cfs	Weir at Hobe Grove Ditch at 7.5 ft NGVD
Projected Demands for WPB	Preferred Flow Path to C-18 West Canal at 50 cfs	Weir in Kitching Creek at 12.5 ft NGVD
Force Main delivering 50 cfs to G-161	C-18 Weir with elevation 18.5 ft NGVD	Flow Through Marsh
C-51 Phase II Reservoir 25,000 acre-feet		Remove Drains in Nine Gems
		Cypress Creek Weir at 13 ft NGVD

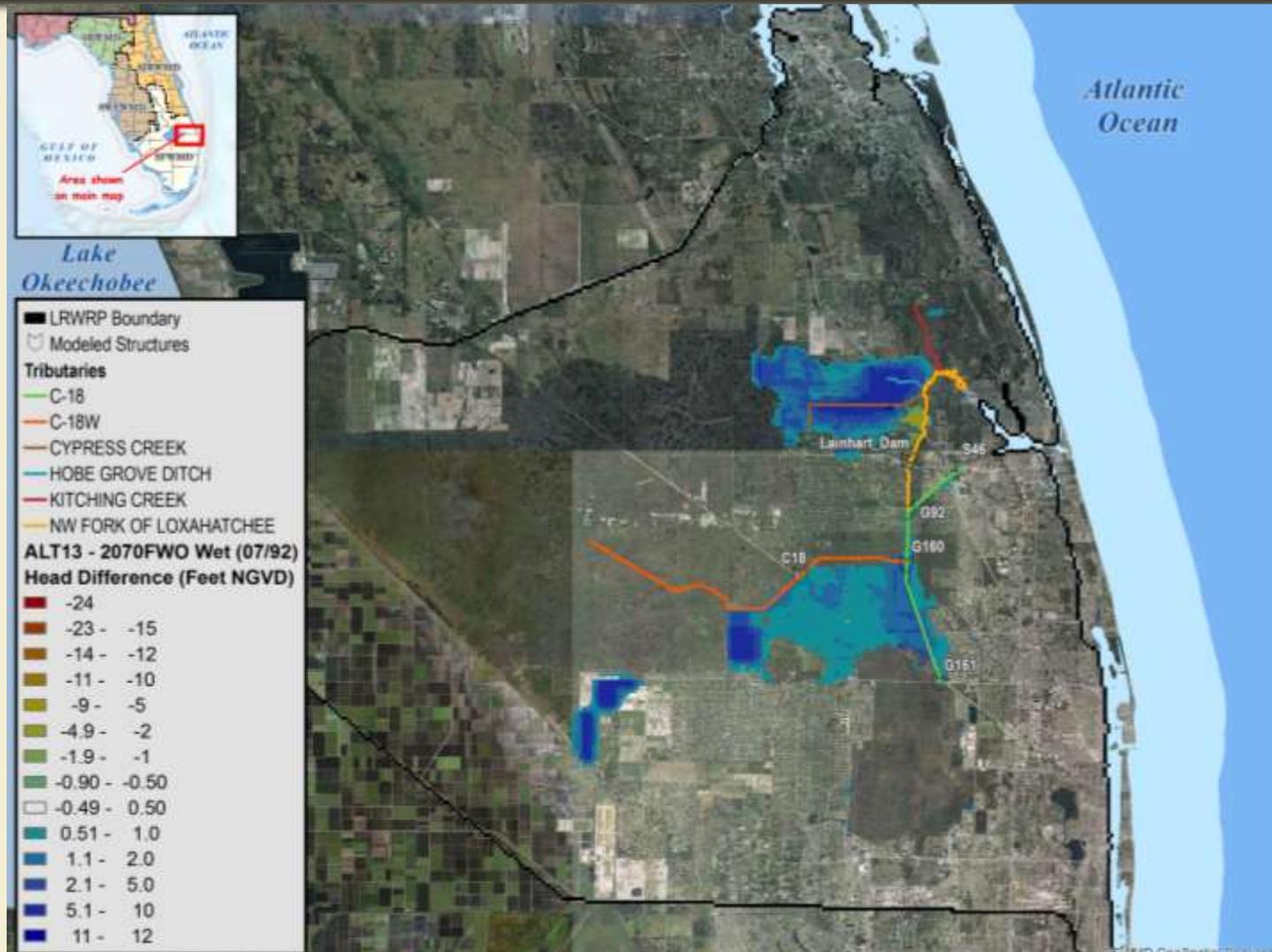
Alternative 12 Difference Map



Overview of Alternative 13

Flowway 1	Flowway 2	Flowway 3
Unrestricted Flows into GWP from Regional System	C18W – Natural Storage	Fill Drainage Ditches in Gulfstream East
20 cfs to G-161 from GWP	East Corbett Weir at 21 ft NGVD	Culpepper Control elevations at 19.5 - 20.1 ft NGVD
1.4:1 make up water	L-8 Shallow Reservoir 6,500 acre-feet	Regrade Shiloh Farms
Northlake Weir at 19 ft NGVD	4 ASR Wells at L-8 Shallow Reservoir	Weir at Hobe Grove Ditch at 7.5 ft NGVD
Projected Demands for WPB	MO Connector Canal pump station @ 205 cfs	Weir in Kitching Creek at 12.5 ft NGVD
	Preferred Flow Path to Avenir at 25 cfs	Cypress Creek Weir at 13 ft NGVD
	Preferred Flow Path to C-18 West Canal at 200 cfs	Remove Drains in Nine Gems
	C-18 Weir with elevation 18.5 ft NGVD	Flow Through Marsh
		50 cfs pump station and spreader swale

Alternative 13 Difference Map



Observations

- **Flowway 1:**
 - **Flows to GWP should be controlled by M-Canal Stage**
 - **Make Up Water should be from L-8 Basin Runoff**
- **Flowway 2:**
 - **Drawdown in Corbett**
 - **Stacking of Water in C-18 Natural Storage**
 - **Seepage Barrier along Lucky Tract (Northern Loxahatchee Slough) not in assumptions table**
- **Flowway 3:**
 - **Over Inundation within all of Flowway 3**

Observations

■ Reservoirs:

- Take water from ITID Upper and Lower Basins
- C-51 Phase II: Water is only from ITID, West Corbett, and L-8 Canal Seepage

■ Other Observations:

- SFWMM Alternative 10 model run was not used as a boundary condition in Alternative 10
- SFWMM uses 2010 Permitted Allocation for all Public Water Supply Demands
- Flows over Northlake Weir are greater than anticipated
- Alternatives have additional water through S-46

Resolutions to Observations

- **Flowway 1**
 - Sensitivity Analysis on M-Canal Stage
 - Use L-8 Basin Runoff for 1.4:1 make up water
 - Use all L-8 Basin Runoff for C-51 Phase II Reservoir
- **Flowway 2**
 - Sensitivity Analysis on control elevation of Corbett Weir
 - Update Assumptions table to include seepage barrier near Lucky Tract
- **Flowway 3**
 - Sensitivity Analysis on controls in Flowway 3
- **Reservoirs**
 - L-8 Basin Runoff should include all areas within the L-8 Basin
- **Other Resolutions**
 - Northlake Weir elevation should be 19.2 ft NGVD
 - Adjust structure operations at G-92 and G-160 to allow for additional flow

Sensitivity Model Runs

- **Restricting Flows into Grassy Waters Preserve**
 - Sensitivity Runs to determine the best M-Canal stage
 - Requires concurrence with City of WPB
- **Correcting Over Inundation in Flowway 3**
 - Sensitivity Runs to determine operations and control elevations of features in Flowway 3
 - Requires concurrence with Ecological Subteam
- **Correcting Drawdown Associated with Corbett Weir**
 - Sensitivity Runs to determine best control elevation of Corbett Weir
- **Determining Which ITID Basins to use**
 - Sensitivity Runs to determine difference if just ITID Upper Basin can be used, instead of both basins

Observations Requiring Team Discussion

- **Confirmation of Decision for Public Water Supply and Irrigation Demands for all model runs**
- **Is project water available from both Upper and Lower Basins of ITID?**

Observations Requiring Team Discussion

- What are the sources of water for each of the reservoirs in each of the alternatives?

Alternative	L-8 Shallow Impoundment		C-18W Impoundment	
	Modeled	Intent	Modeled	Intent
2	Inflow from ITID @ 200 cfs Outflow to MO Canal @ 100 cfs		Inflow from Seepage Canal @ 250 cfs and pump station on north side @ 300 cfs Outflow to C-18W @ 200 cfs	
5	N/A		Same as Alternative 2	
10	N/A		Same as Alternative 2	
12	Inflow from C-51 Reservoir @ 200 cfs; Outflow to FW1 @ 100 cfs and MO Canal @ 150 cfs		Inflow @ 250 cfs from West Side	
13	Inflow from ITID @ 200 cfs Outflow to MO Canal @ 170 cfs		Same as Alternative 12	

Questions?

