

LOXAHATCHEE RIVER WATERSHED RESTORATION PROJECT

Project Delivery Team Meeting

May 31, 2017

Federally designated as a National Wild and Scenic River, the Loxahatchee River and its watershed are homes to 33 federally threatened and endangered species, 20 federally protected migratory bird species, and 30 additional State's species of concern

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Today for a Better Tomorrow***



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U.S. Army Corps
of Engineers

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One of the Last Old Growth Cypress
Floodplains in the SE Florida

Last Large Freshwater Wetland
Corridor in Project Area

Vulnerable estuarine habitats



Water Supply Constraints



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Project Objectives & Constraints



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Objective 1: Restore wet & dry season flows of water to the Northwest Fork of the Loxahatchee River and the river floodplain

Objective 2: Restore estuarine communities in the Loxahatchee River Estuary

Objective 3: Increase spatial extent & function of remaining natural areas

Objective 4: Restore connections among the Loxahatchee River headwater natural areas to improve hydrology, sheetflow, hydroperiods, natural storage, & vegetation communities

Objective 5: Restore native plant & animal species abundance & diversity

Constraints: State and Federal laws & regulations; WRDA 2000 Assurances of Project Benefits requirements; water quality/nutrients; pre-existing compensatory mitigation sites

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- Plan formulation objectives are restoration-focused
- Water supply evaluated for
 - Savings clause
 - Project assurances

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Project Assurance & Savings Clause Requirements



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- Federal and State law require the following protections: Project Specific Assurances- WRDA 2000 Sec. 601(h)(4)(A); Sec. 373.470, F.S.
 - Identify water for the natural system
 - Identify water for other water-related needs
- Savings Clause – WRDA 2000 Sec. 601(h)(5) ; Sec. 373.1501, F.S.
 - Elimination or transfer of an existing legal source (user) must be addressed
 - Maintain existing level of flood protection



Water Supply



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- Existing and Future Without Project Conditions (2014B and 2070B)
 - PWS permitted allocations are assumed.
 - SFWMD water supply and regulatory staff provided input on permit conditions to ensure permit limitations, such as wellfield caps, were applied.
 - Process builds regulatory constraints into demands since the regulatory process has vetted demands for wetland protection, saltwater intrusion, etc.
 - Regional Water Availability Rule



Regional Water Availability Rule



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- Authority – 373.223(1) and 373.042, F.S.
- Component of recovery strategy for Everglades and Loxahatchee River
- Ensures water for Everglades/Loxahatchee River restoration is not allocated away
 - Restricts impacts from withdrawals over levels that existed prior to April 2006
 - Requires seeking sources that are not dependent upon the Everglades for recharge for additional water supply
 - Alternative water supply solutions include using reclaimed water to recharge the surficial aquifer system (SAS) or drawing water from the deeper Floridan Aquifer



Water Supply



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- Agricultural/Golf/Landscape demands per AFSIRS
 - Individual irrigation/non-PWS permits are derived using an AFSIRS approach for demands, which computes usage based on climate-driven need
- Water supply and water shortage policy issues currently being resolved
 - Model-wide, and
 - Modeling of City of West Palm Beach's system, including
 - Control level for flow deliveries into GWP
 - Replacement water for G161
 - Regionally imposed Lake Okeechobee cutbacks for Clear Lake withdrawals

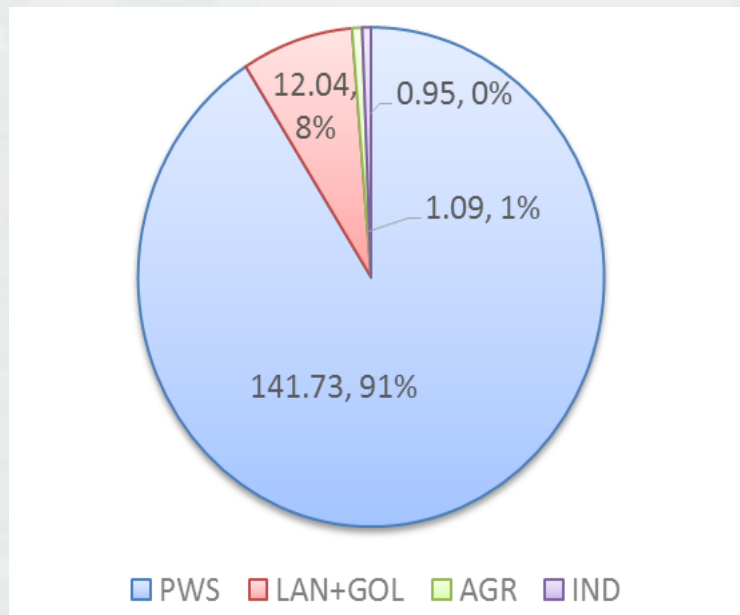


Water Supply



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- PWS represents ~90% of surficial aquifer system (SAS) consumptive use in LRWRP area



Water Use Types

PWS: Public Water Supply

LAN+GOL: Landscaping and Golf Courses

AGR: Agriculture

IND: Industrial

*2014 Actual Pumpage (in MGD and Percentage)



Flood Protection



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- Tools
 - LECSR-NP
 - HEC-RAS
 - Previous modeling
- Multiple graphic types used for analysis
 - Flow transects
 - Difference maps
 - Stage profiles, hydrographs, duration curves
 - Additional data points
 - SIRWCD, ITID, Ranch Colony, Airport, Eastern Loxahatchee Slough Communities
 - Reservoir seepage, C18 Canal constraints



Flood Protection



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- Transect graphics not all intuitive
 - Net budget files will be available for more detail
 - Transects still intuitive will be identified
- Revision of difference maps
 - More granular comparison
- Additional data points created
- Need for additional PM Sets
 - Compare ECB with Alternatives
 - Savings clause screening
 - Savings clause assessment
- HEC-RAS model run findings

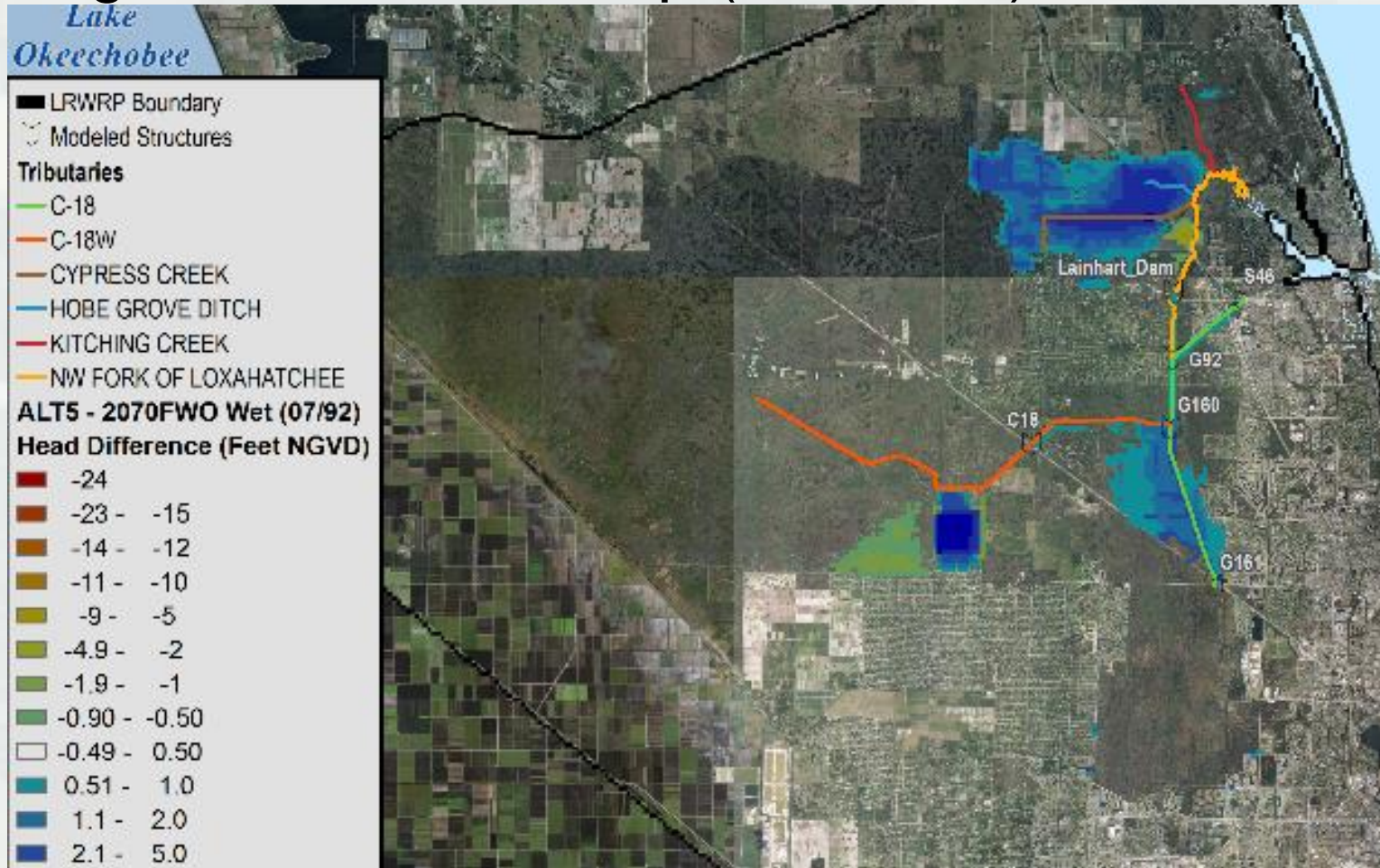


Flood Protection



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- Original difference map (Alt.5 Wet)



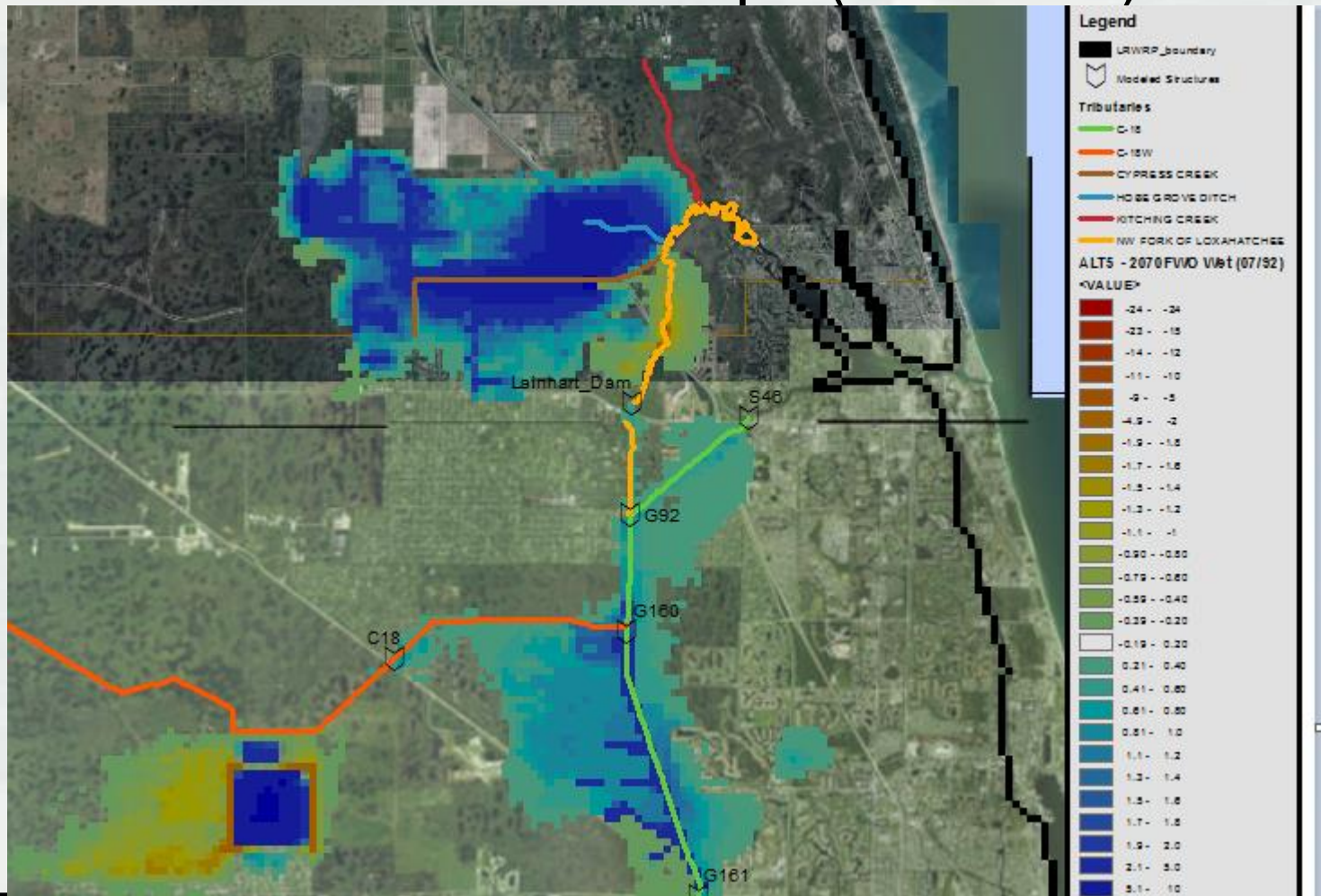


Flood Protection



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- Revision of difference maps (Alt.5 Wet)





Structure Flow Schematics



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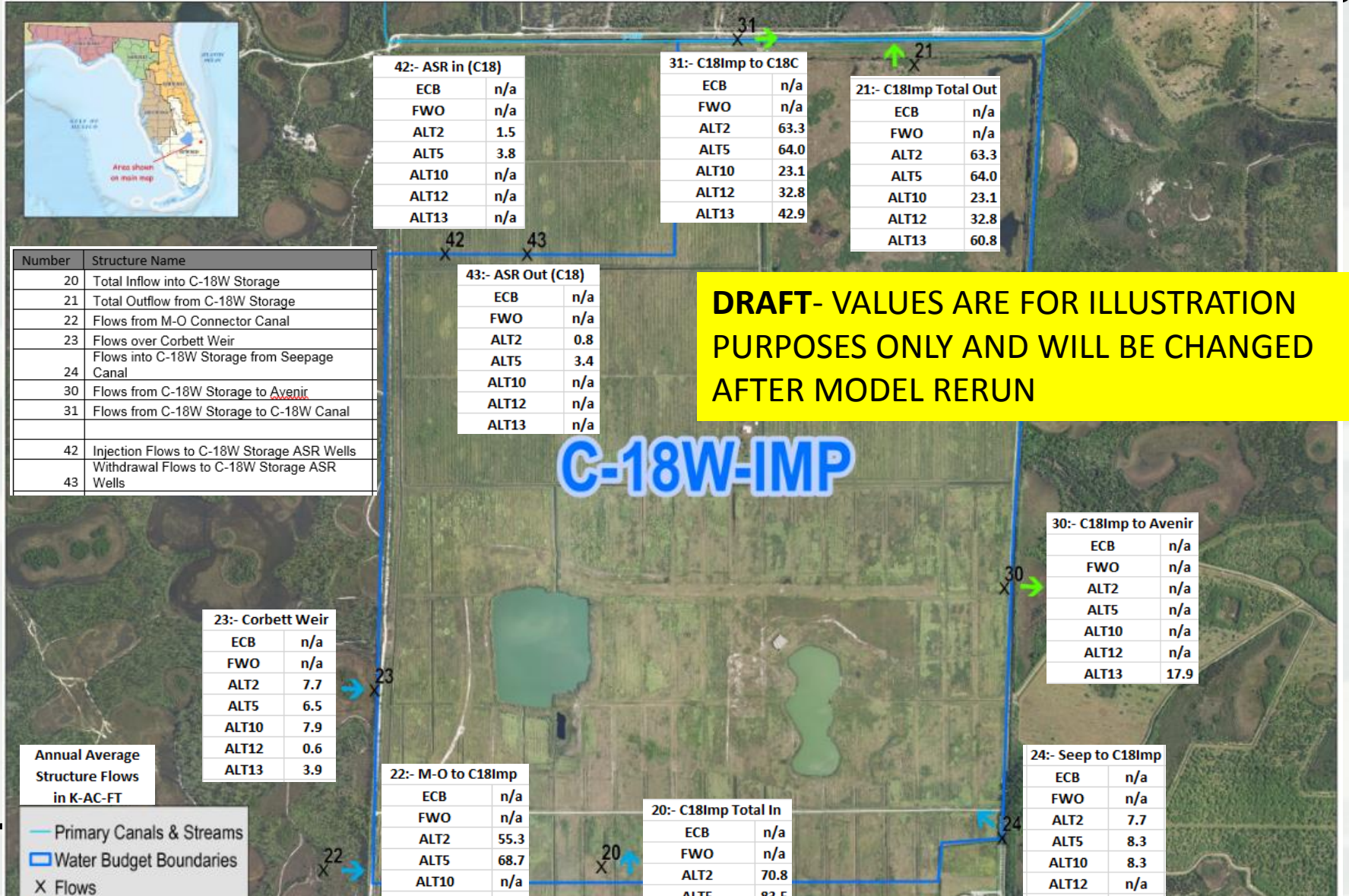
- Schematic Created for Key Areas
 - C-18W Impoundment
 - C-51 Phase II Reservoir
 - Flowway 3
 - Grassy Waters Preserve
 - L-8 Shallow Impoundment
 - LRWRP Overall
- 2 Schematic sets
 - ECB, FWO, all Alts. on same page
 - 1. Average annual flows (kac-ft/yr)
 - 2. Average wet season & average dry season flows (kac-ft/yr)



Structure Flow Schematics



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Structure Flow Schematics



DRAFT- VALUES ARE FOR ILLUSTRATION PURPOSES ONLY AND WILL BE CHANGED AFTER MODEL RERUN

Number	Structure Name
5	Flows to Loxahatchee River from Cypress Creek
14	Flows Through Cypress Creek Spreader Swale
15	Flows in Hobe St. Lucie Control District Bypass Canal
16	Inflow into flow-through Marsh
17	Outflow from Flow-Through Marsh
18	Flows from Thomas Pepper Farm
19	Flows from Hobe St. Lucie Unit 2 System
27	Flows through Culpepper Outflow Structures
44	Flows to Cypress Creek from Nine Gems
45	Flows to Cypress Creek from Urban Areas

Annual Average
Structure Flows
in K-AC-FT

— Primary Canals & Streams
X Flows
→ Inflows

18:- TP Farm	
ECB	1.0
FWO	1.0
ALT2	2.3
ALT5	2.3
ALT10	1.9
ALT12	2.3
ALT13	2.3

19:- HSL Unit2	
ECB	10.2
FWO	10.2
ALT2	11.1
ALT5	11.1
ALT10	10.2
ALT12	11.1
ALT13	11.1

16:- FTM In	
ECB	n/a
FWO	n/a
ALT2	13.3
ALT5	13.3
ALT10	n/a
ALT12	13.3
ALT13	13.3

44:- 9Gems to CC	
ECB	6.9
FWO	6.9
ALT2	0.5
ALT5	0.5
ALT10	7.0
ALT12	0.5
ALT13	0.5

45:- Urban to CC	
ECB	
FWO	
ALT2	
ALT5	
ALT10	
ALT12	
ALT13	

27:- Culpepper Out	
ECB	28.6
FWO	28.6
ALT2	28.6
ALT5	28.5
ALT10	27.4
ALT12	28.6
ALT13	28.4

14:- CC Spreader	
ECB	n/a
FWO	n/a
ALT2	n/a
ALT5	5.6
ALT10	n/a
ALT12	n/a
ALT13	5.6

15:- HSL Bypass	
ECB	12.1
FWO	12.1
ALT2	0.1
ALT5	0.1
ALT10	12.1
ALT12	0.1
ALT13	0.1

17:- FTM Out	
ECB	n/a
FWO	n/a
ALT2	11.0
ALT5	10.9
ALT10	n/a
ALT12	11.0
ALT13	10.9

5:- CC to Lox	
ECB	69.1
FWO	69.1
ALT2	71.4
ALT5	70.6
ALT10	66.9
ALT12	71.4
ALT13	70.5



Structure Flow Schematics



LONG

DRAFT- VALUES ARE FOR ILLUSTRATION PURPOSES ONLY AND WILL BE CHANGED AFTER MODEL RERUN



C-51

Dry Season Average
&
Wet Season Average
Structure Flows
in K-AC-FT

- Primary Canals & Streams
- Water Budget Boundaries
- X Flows
- Inflows
- Outflows

DATA SOURCE: Structures flow locations provided by Anuraj/Chandrasekhar May 11, 2017

Number	Structure Name
13	Flows from C-51 Phase II Reservoir to Force Main.
25	Total Inflow into C-51 Phase II Reservoir
26	Total Outflow from C-51 Phase II Reservoir
36	Flows to Grassy Waters Preserve from C-51 Phase II Reservoir
37	Flows to L-8 Shallow Impoundment from C-51 Phase II Reservoir

37:- C51R to L8Sh		
ECB	n/a	n/a
FWO	n/a	n/a
ALT2	n/a	n/a
ALT5	n/a	n/a
ALT10	n/a	n/a
ALT12	32.3	38.8
ALT13	n/a	n/a

26:- C-51Res Total Out		
ECB	n/a	n/a
FWO	n/a	n/a
ALT2	n/a	n/a
ALT5	n/a	n/a
ALT10	40.5	45.2
ALT12	32.3	38.8
ALT13	n/a	n/a

36:- C-51R to GWP		
ECB	n/a	n/a
FWO	n/a	n/a
ALT2	n/a	n/a
ALT5	n/a	n/a
ALT10	30	30.5
ALT12	0	0
ALT13	n/a	n/a

25:- C-51Res Total In		
ECB	n/a	n/a
FWO	n/a	n/a
ALT2	n/a	n/a
ALT5	n/a	n/a
ALT10	36.5	68.2
ALT12	36.3	66.9
ALT13	n/a	n/a

13:- C-51R to FM		
ECB	n/a	n/a
FWO	n/a	n/a
ALT2	n/a	n/a
ALT5	n/a	n/a
ALT10	10.6	14.7
ALT12	0	0
ALT13	n/a	n/a