

LOXAHATCHEE RIVER WATERSHED RESTORATION PROJECT

Project Delivery Team Meeting

April 26, 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

*Trusted Partners Delivering Value
Today for a Better Tomorrow*



U.S. ARMY



US Army Corps
of Engineers

BUILDING STRONG

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

Last Large Freshwater Wetland
Corridor in Project Area

Vulnerable estuarine habitats



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Array of Alternative Plans to be Evaluated

Dr Brad Foster



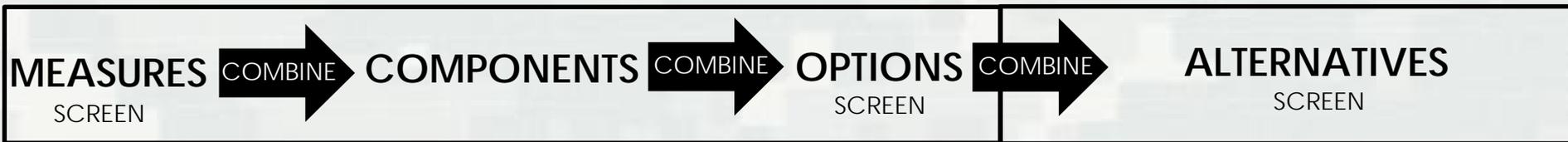
Review: Plan Formulation



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DEVELOP BY FLOWWAYS RECOGNIZING INTERDEPENDENCE

INTEGRATE OPTIONS ACROSS FLOWWAYS



- 100 Management Measures screened to 90
- Measures combined into 47 Components
- 18 Options (6 for FW1, 7 for FW2, 5 for FW3)
- Retained two to three Options per flowway, screened the rest
- Combined the Options into 13 Alternatives
- 13 Alternatives screened to 5 Alternatives



Major Features of the Focused Array of Alternatives



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Alternative	Deep Storage in L-8 Basin	Shallow Storage in L-8 Basin	C-18W Basin Storage	Aquifer Storage and Recovery (ASR)	Primary Delivery Route	Secondary Delivery Route	FW 3 Features
2	None	4,300 ac-ft	7,200 ac-ft	2 wells at C-18W storage	FW2	FW1	Full range
5	None	None	9,500 ac-ft	4 wells at C-18W storage	FW2	FW1	Full range
10	44,000 ac-ft	None	7,200 ac-ft	None	FW1/FW2		Limited
12	25,000 ac-ft	5,000 ac-ft	Increased wetland elevations to support natural storage	None	FW1/FW2		Full range
13	None	6,500 ac-ft	Increased wetland elevations to support natural storage	4 wells at L-8 storage	FW2	FW1	Full range



Refinements to Alternatives



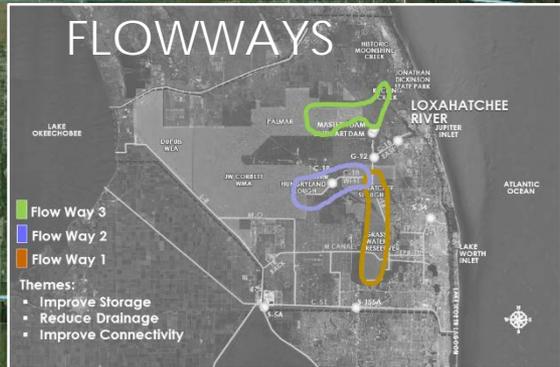
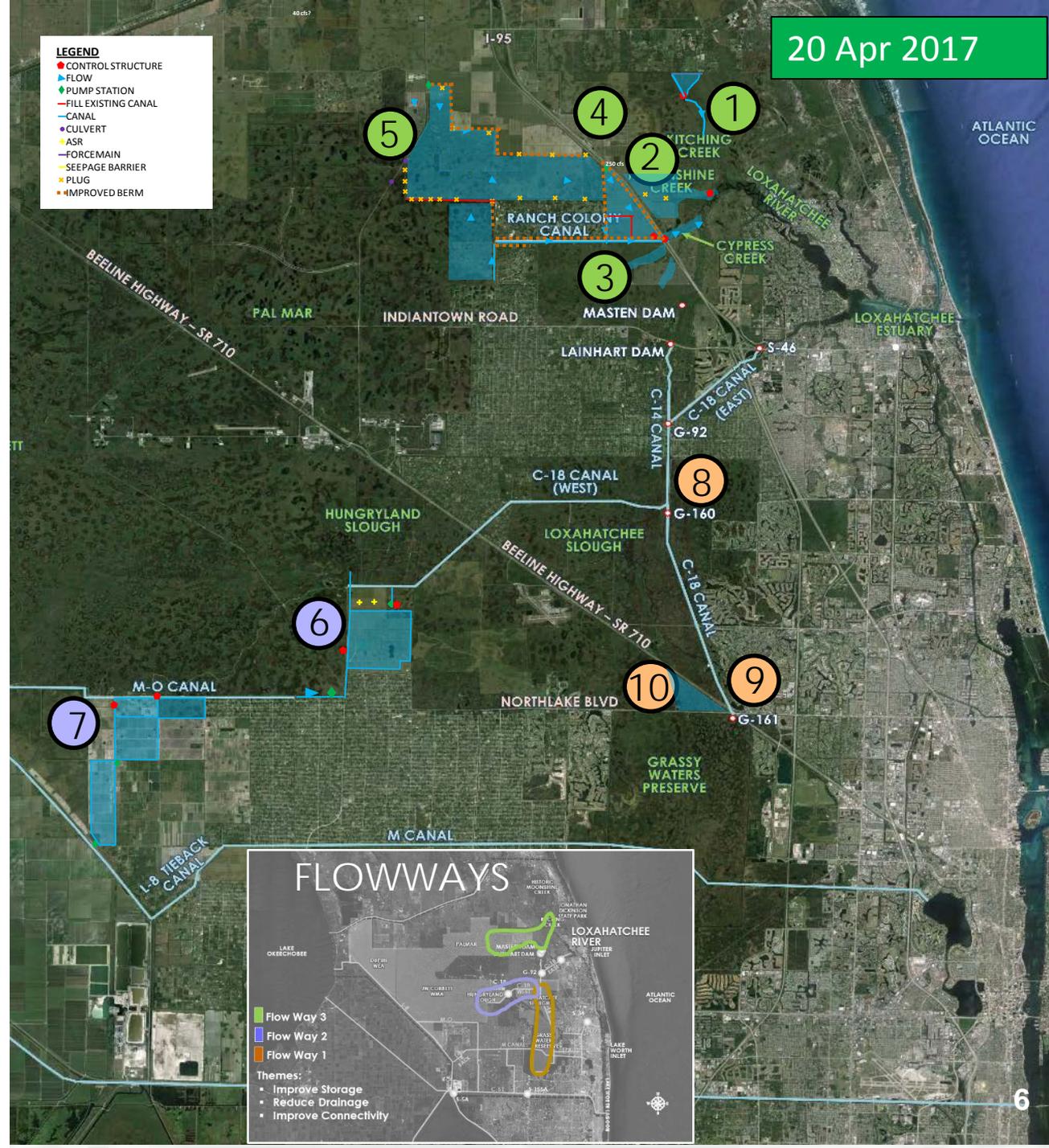
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- From Apr 2016 to Nov 2016
 - Developed additional details for storage facilities, ASRs, conveyance canal dimensions and locations, recommended weir heights and locations, seepage management methods, and other minor changes
 - Modeling assumptions revised; initial modeling
 - Initiated cost estimates for construction, operations and maintenance, and real estate
- From Nov 2016 to Apr 2017
 - Additional topo data for Flowway 3 required recalibration
 - Modified natural storage alternative 13

ALTERNATIVE 2

20 Apr 2017

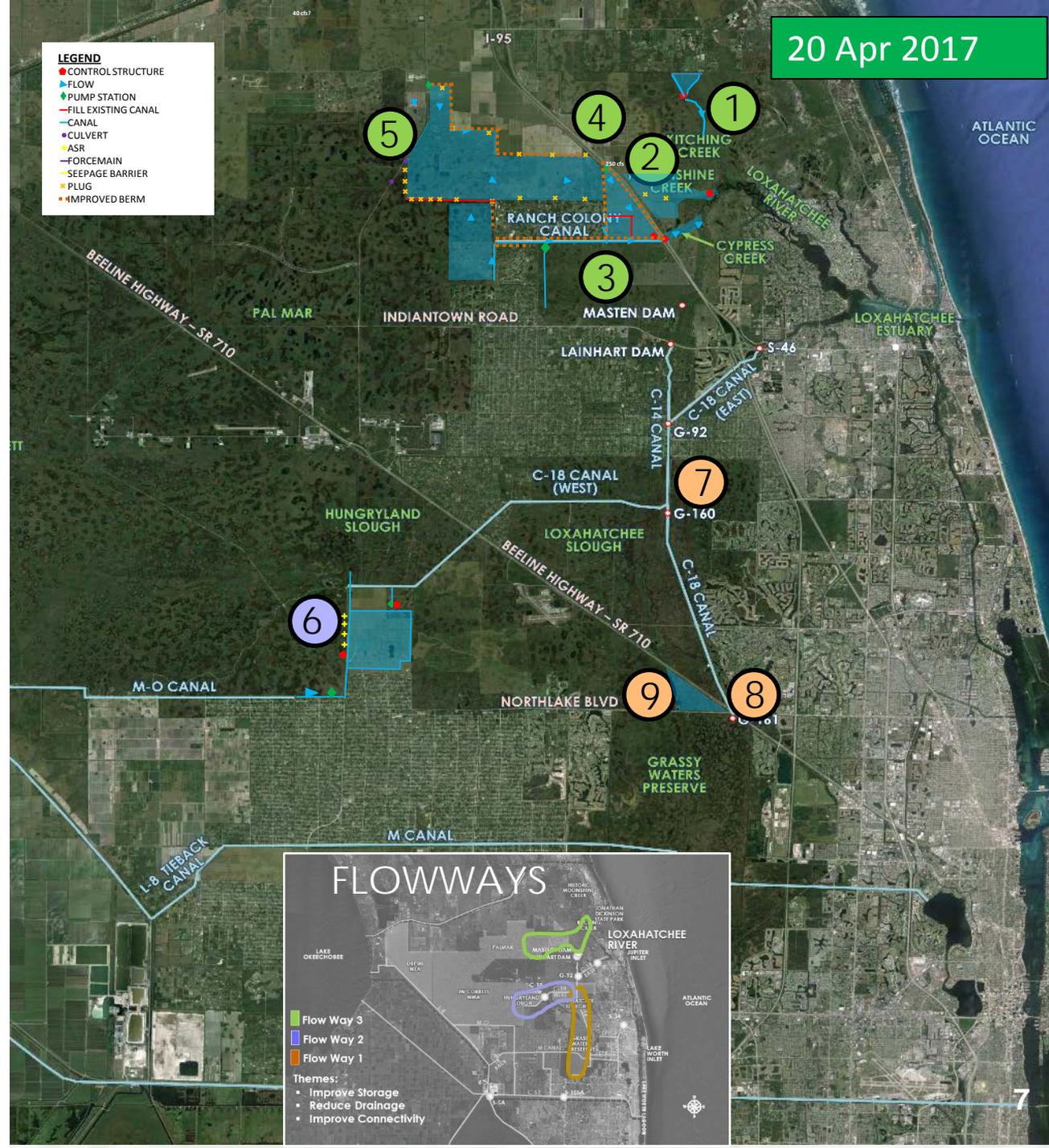
- Kitching Creek (Hydration)**
Spreader canal; weir/plug (Jenkins Ditch)
- Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography
- Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir to raise control elevation, raise berm at Ranch Colony; automate twin 84" culverts; regrade CC southern forks
- Gulfstream West (Restoration & Reduce over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump, construct flow through marsh to attenuate flows
- Palmar East (Restoration & Connectivity)**
Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm to redirect drainage to GW flow- through marsh via north Nine Gems canal
- C-18W Reservoir (7,200 ac/ft & 2 ASR wells):**
Above-ground reservoir; inflow pump; discharge structure; seepage control; M-O Canal connector and pump
- L-8 Basin Shallow Storage (4,300 ac/ft; includes pumps & channels)**
- G-160 Structure (Reduce Over-drainage):**
improve Hydroperiod in Loxahatchee Slough
- G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough
- GWP Triangle (Connectivity)**



ALTERNATIVE 5

20 Apr 2017

1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)
2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir Hobe Grove Ditch; regrade adjacent area to historic topography
3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84" culverts; pump and spreader swale
4. **Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow
5. **Palmar East (Restoration & Connectivity)** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to GW flow-through marsh via north Nine Gems canal
6. **C-18W Reservoir (9,500 ac/ft & 4 ASR Wells):** Above-ground reservoir; inflow pump; discharge structure; seepage control; M-O Canal Connector and pump
7. **G-160 Structure (Reduce Over-drainage: improve Hydroperiod in Loxahatchee Slough)**
8. **G-161 Structure (Connectivity: GWP water to Loxahatchee Slough)**
9. **GWP Triangle (Connectivity)**

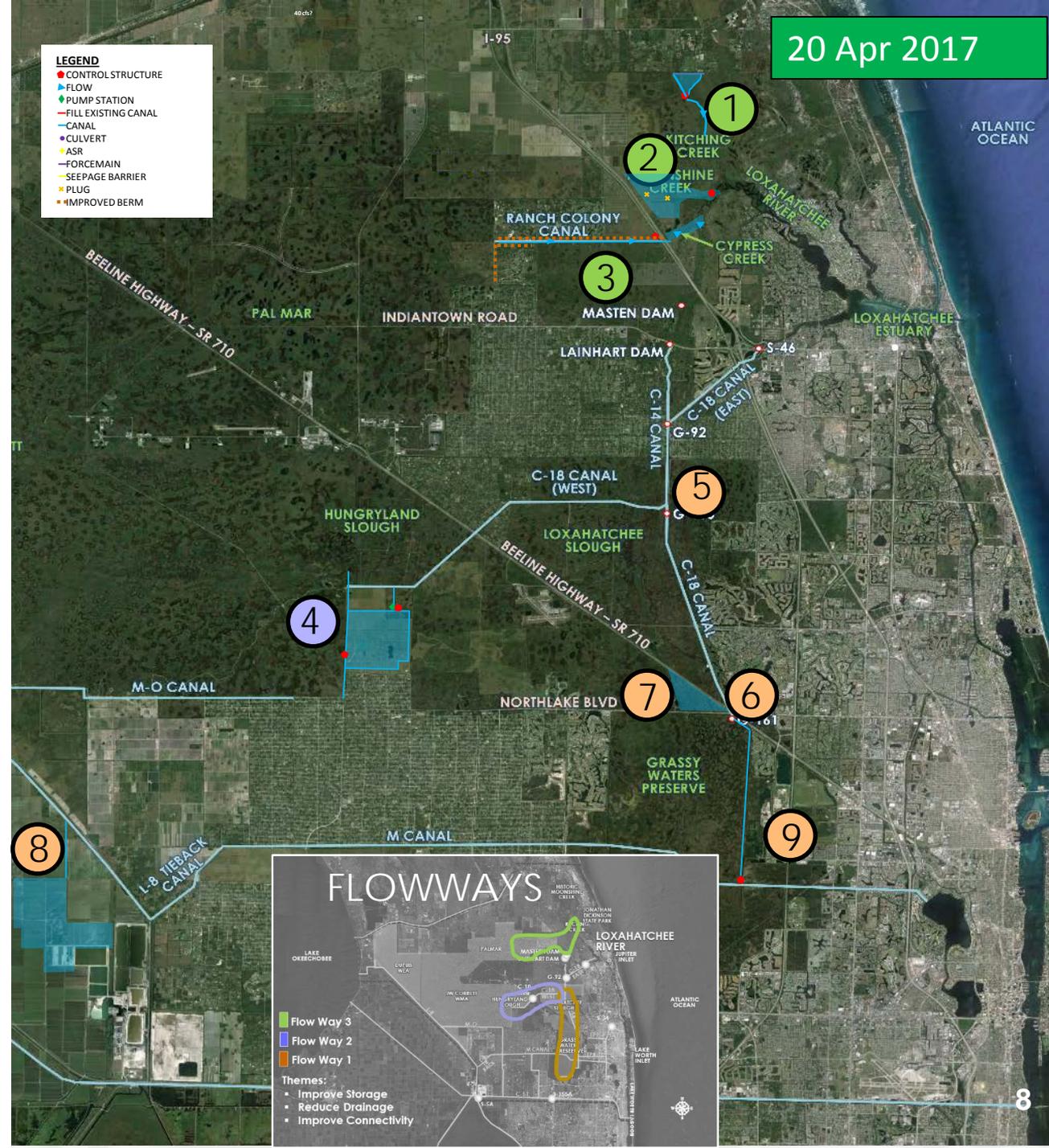


ALTERNATIVE 10

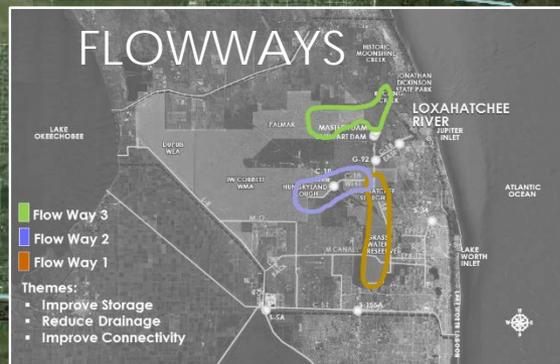
20 Apr 2017

LEGEND

- CONTROL STRUCTURE
- ▶ FLOW
- ◆ PUMP STATION
- FILL EXISTING CANAL
- CANAL
- CULVERT
- ◆ ASR
- FORCEMAIN
- SEEPAGE BARRIER
- ◆ PLUG
- ◆ IMPROVED BERM



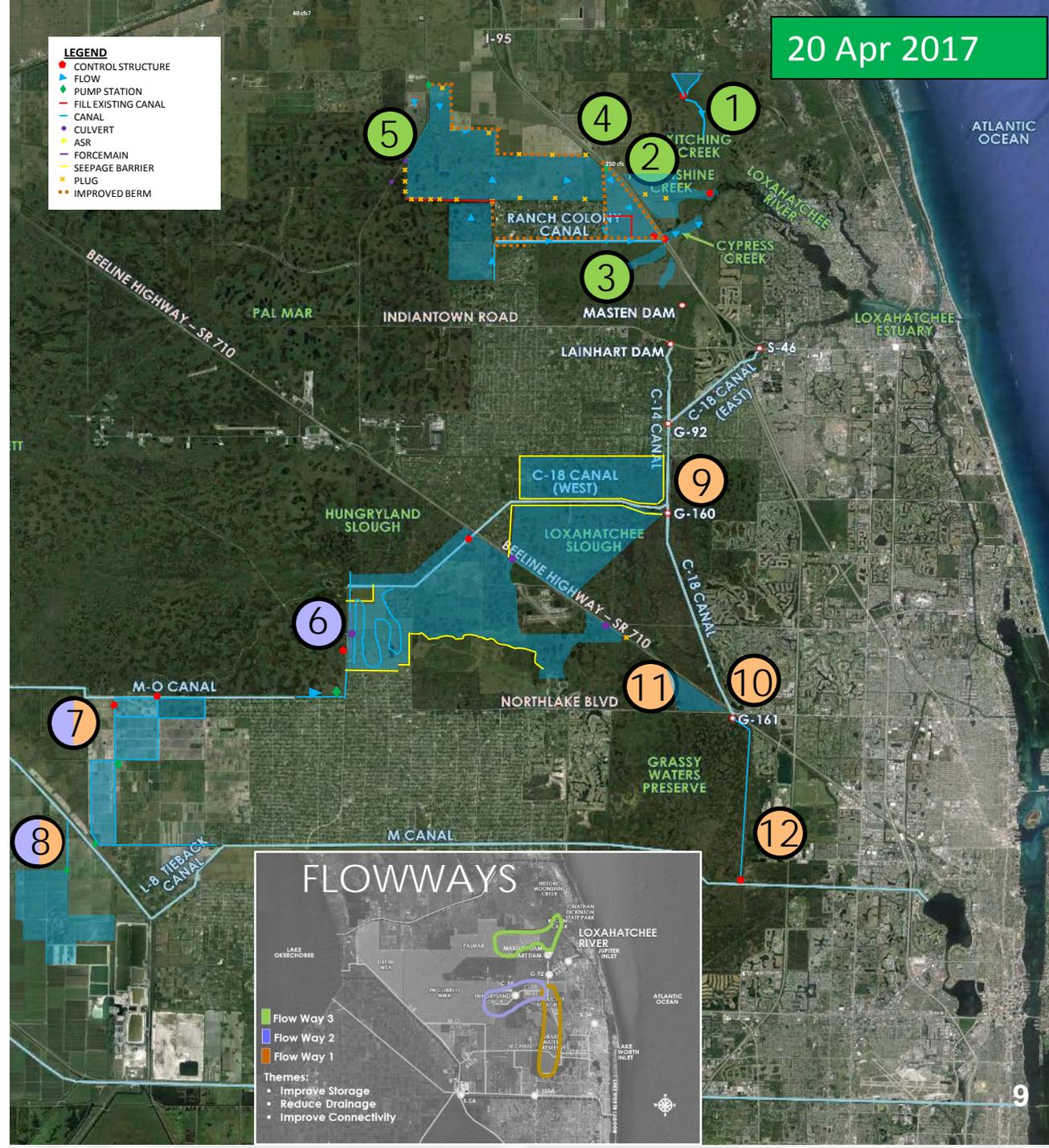
1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)
2. **Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography
3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84" Culverts
4. **C-18W Reservoir (7,200 ac/ft):** Above-ground reservoir; inflow pump; discharge structure; seepage control
5. **G-160 Structure (Reduce Over-drainage: improve Hydroperiod in Loxahatchee Slough)**
6. **G-161 Structure (Connectivity):** GWP water to Loxahatchee Slough
7. **GWP Triangle (Connectivity)**
8. **C-51 Deep Reservoir (Storage):** 44,000 ac/ft; includes pump & channels
9. **Force Main** (pump and pipeline through Grassy Waters Preserve to connect M-Canal to G-161)



ALTERNATIVE 12

20 Apr 2017

- Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)
- Moonshine Creek (MC) & Gulfstream East (GE) (Restoration):** Connect HSLCD ditch to MC; clear MC vegetation; weir in Hobe Grove Ditch; regrade adjacent area to historic topography
- Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84" Culverts; regrade CC southern forks
- Gulfstream West (Restoration & Reduce Over-drainage):** Partial backfill & relocate southern end of HSLCD canal; small pump; construct flow through marsh to attenuate flow
- Palmar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm; redirect drainage to flow through marsh via north of Nine Gems canal
- Natural Storage (C-18W Basin):** Restore natural topography; seepage barriers; culverts for Beeline Hwy; backfill interior canals south of C-18W Canal; flow-path through Mecca; M-O Canal connector and pump
- L-8 Basin Shallow Storage (5,000 ac/ft; includes pumps & channels to M-O and M Canals)**
- C-51 Deep Reservoir (Storage):** 25,000 ac/ft, includes pump & channels
- G-160 Structure (Reduce Over-drainage, improve Hydroperiod in Loxahatchee Slough)**
- G-161 Structure (Connectivity) GWP water to Loxahatchee Slough**
- GWP Triangle (Connectivity)**
- Force Main (Conveyance) (pump and pipeline through Grassy Waters Preserve to connect M-Canal to G-161)**

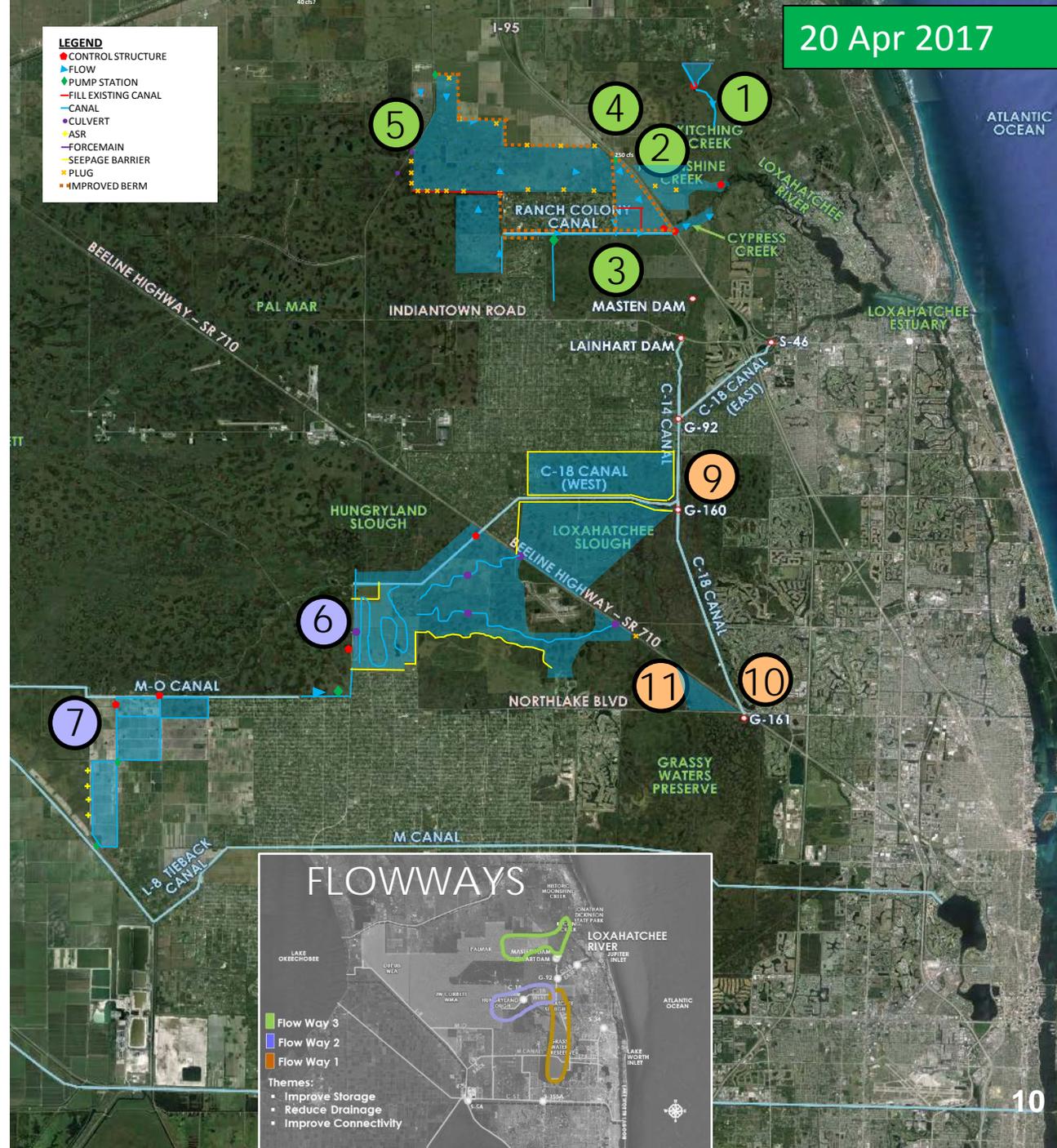


ALTERNATIVE 13

20 Apr 2017

LEGEND

- CONTROL STRUCTURE
- ▲ FLOW
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- FILL EXISTING CANAL
- CANAL
- CULVERT
- ▲ ASR
- FORCEMAIN
- SEEPAGE BARRIER
- ✱ PLUG
- IMPROVED BERM



1. **Kitching Creek (Hydration):** Spreader canal; weir/plug (Jenkins Ditch)
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3. **Cypress Creek Canal (CCC) (Reduce Over-drainage):** Replace CCC weir; raise berm at Ranch Colony; automate twin 84" culverts; pump and spreader swale
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5. **Palmar East (Restoration & Connectivity):** Plug ditches; remove pipes; improve northern berm; construct western berm; improve eastern berm; pumps at Thomas Farm to redirect drainage to GW flow through marsh via north Nine Gems canal
6. **Natural Storage C-18W (Basin Restoration):** Restore natural topography; seepage barriers; culverts for Beeline Hwy; backfill interior canals south of C-18W Canal; flow-paths through Mecca and Avenir; M-O Canal connector and pump
7. **L-8 Basin Shallow Storage (6,500 ac/ft & 4 ASR wells);** includes pumps & channels
8. **G-160 Structure (Reduce Over-drainage: improve Hydroperiod in Loxahatchee Slough)**
9. **G-161 Structure (Connectivity) GWP water to Loxahatchee Slough**
10. **GWP Triangle (Connectivity)**

FLOWWAYS

- Flow Way 3
- Flow Way 2
- Flow Way 1

Themes:

- Improve Storage
- Reduce Drainage
- Improve Connectivity



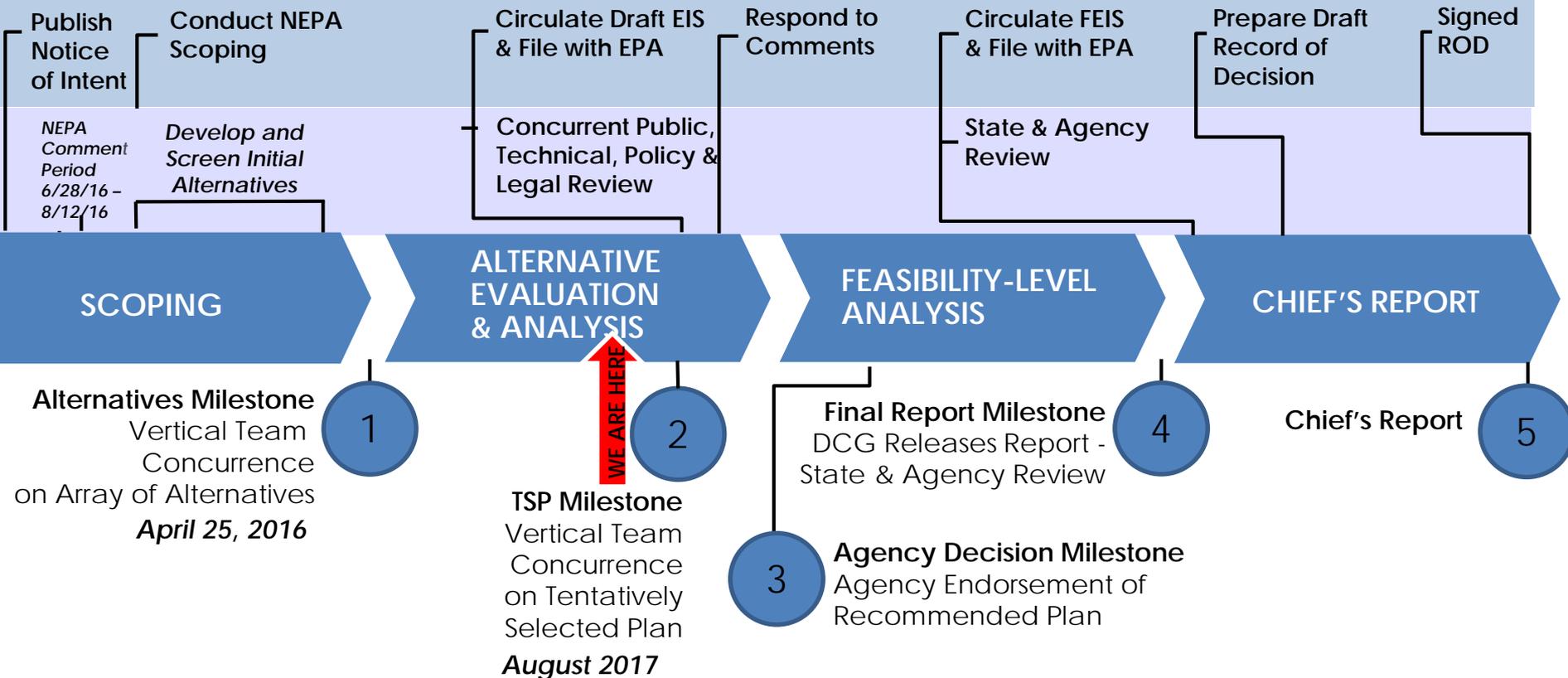
Study Process



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SMART FEASIBILITY STUDY PROCESS

18-36 MONTHS





5 Month Near-Term Schedule



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- 26 April 2017 – PDT meeting, introduce modeling results
- 17 May 2017 – PDT meeting, identify TSP or hybrid plan
- 31 May 2017 – PDT meeting (if needed) identify TSP
- Month of June – USACE, SFWMD, and others, prepare chapters and appendices of PIR
- Month of July – internal team revisions for consistency; independent technical reviews at USACE & SFWMD; coordinate with management and
- 11 August 2017 – TSP Milestone meeting with USACE Headquarters
- September – release Draft PIR/EIS to public, agencies, independent external peer review