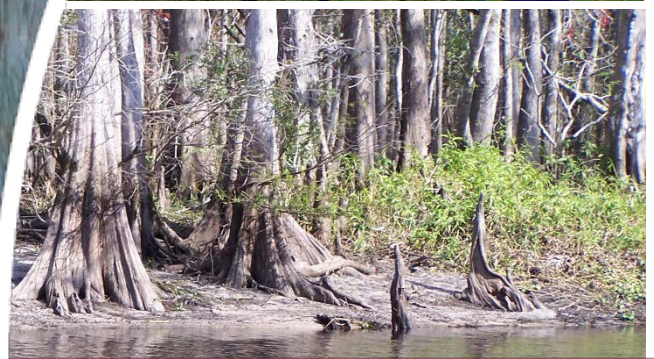
LAKE OKEECHOBEE WATERSHED RESTORATION PROJECT (LOWRP)

Project Delivery Team Meeting

September 27, 2017



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MEETING AGENDA

LAKE OKEECHOBEE WATERSHED RESTORATION

INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

- Welcome and Introductions- Gina Ralph (USACE)
- Opening Statement to Landowners- (SFWMD)
- Final array of alternatives overview and the USACE planning process- Lisa Aley (USACE)
- Model results presentation- Water Wilcox (SFWMD)
  - Water supply analysis- Kris Esterson (SFWMD)
- Rough order of magnitude cost development – Joel Gaillard (USACE)
- Geotechnical explorations status update – Joel Gaillard (USACE)
- Cultural resources considerations for alternatives analysis – Robin Moore (USACE)
- Environmental considerations for alternative analysis- Gretchen Ehlinger (USACE)
- Economic analysis- Kevin Wittman (USACE)
- Public Comment Period
- 15 minute break
- PDT Group Exercise- lead by Gina Ralph (USACE)
- PDT group exercise report out
- 15 minute break
- Overview of exercise- Lisa Aley (USACE)
- Public comment period
- Closing remarks (SFWMD and USACE)
- Adjourn





LAKE OKEECHOBEE WATERSHED
INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Final array of alternatives and USACE planning process overview





ALTERNATIVE OVERVIEW

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Final Array of Alternatives

Above-ground Reservoirs and Aquifer Storage and Recovery (ASR) Wells

Alternative 1Br

Reservoir Component
- K-05 Revised
- Approx. 14,600 acres
- 198,000 acre-feet of storage

Aquifer Storage and Recovery
- 80 ASR wells
- 448,000 acre-feet of storage per year

Preliminary Project Cost Estimate: $1.8 billion

Alternative 2A

Reservoir Component
- K-05 North, K-05 South and K-42
- Approx. 26,500 acres
- 361,000 acre-feet of storage

Aquifer Storage and Recovery
- 110 ASR wells
- 616,000 acre-feet of storage per year

Preliminary Project Cost Estimate: $3.2 billion

Alternative 2B

Reservoir Component
- K-05 North and K-42
- Approx. 20,300 acres
- 276,000 acre-feet of storage

Aquifer Storage and Recovery
- 70 ASR wells
- 392,000 acre-feet of storage per year

Preliminary Project Cost Estimate: $2.4 billion

Alternative 2Cr

Reservoir Component
- K-42 Revised
- Approx. 14,600 acres
- 195,000 acre-feet of storage

Aquifer Storage and Recovery
- 65 ASR wells
- 364,000 acre-feet of storage per year

Preliminary Project Cost Estimate: $1.7 billion

Tentatively Selected Wetland Restoration Sites

Goals and Objectives:
- Improve hydrology of impacted wetlands
- Enhance historic floodplains

Preliminary Project Acreages and Cost Estimates:
- Kissimmee River Center: Approx. 1,200 acres, $24 million
- Paradise Run: Approx. 4,100 acres, $85 million

The Lake Okeechobee Watershed Restoration Project is part of the Comprehensive Everglades Restoration Plan (CERP) being conducted by the U.S. Army Corps of Engineers and the South Florida Water Management District.

Reservoir, ASR and wetland locations are currently under evaluation and are subject to further refinement based on cost-benefit analysis.

www.saj.usace.army.mil

sfwmd.gov

www.sfwmd.gov/LOWRP

ASR well(s)

Reservoir

ALTERNATIVE EVALUATION CRITERIA

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USACE Principles and Guidelines Criteria

- **Efficiency:** Uses a cost effective/incremental cost analysis to identify plans that maximize environmental benefits compared to costs
- **Effectiveness:** Extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities
- **Acceptability:** Workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. Can be legal, technical, financial, environmental, political, or institutional.
- **Completeness:** Extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects

ALTERNATIVE EVALUATION CRITERIA CONTINUED

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USACE 'Four Accounts'

- **National Economic Development:** Consider increases in economic values of goods and services resulting from a project
- **Environmental Quality:** Non-monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of ecosystem restoration plans
- **Regional Economic Development:** Changes in regional economic activity resulting from this alternative
- **Other Social Effects:** Including but not limited to community impacts; life, health, and safety factors;

LAKE OKEECHOBEE WATERSHED
INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Modeling Results





Lake Okeechobee Watershed Restoration Project Ongoing Progress

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- The Lake Okeechobee Watershed Restoration Project (LOWRP) performed extensive screening-level modeling using RESOPS in late 2016 to identify feasible features and sizes that could meet project objectives of improving Lake Okeechobee, L.O. watershed and Northern Estuary conditions.
- Detailed hydrologic modeling using RSMBN is currently underway in support of LOWRP.
- Detailed RSMBN model baseline scenarios representing the Existing Condition (ECB) and Future Without LOWRP (FWO) were released on February 2, 2017.
- A first round of three alternatives with potential LOWRP project features modeled in RSMBN was released on March 8, 2017 and a second round of four alternatives was released on June 21, 2017.
- A third round of four alternatives (two revised from round 2) with potential LOWRP project features modeled in RSMBN was released on September 22, 2017 and a summary presentation is being made today (September 27, 2017).
- It is anticipated that review and ecological & economic evaluation of these outcomes will help to inform identification of a Tentatively Selected Plan (TSP).

Model Assumptions & Setup

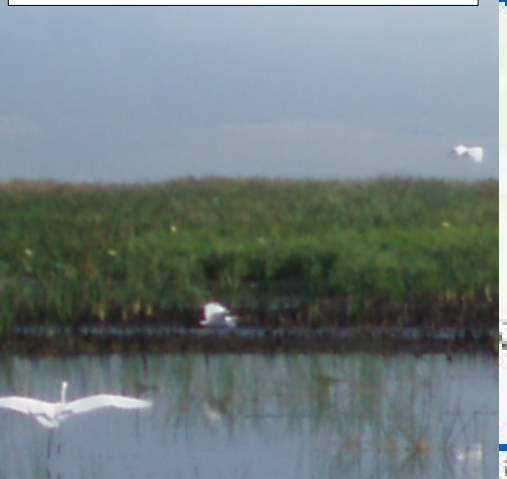
Alternative 1BR

ALT1BR Assumes:
198 kac-ft storage at K05 Reservoir locations +
80 ASR as shown (25 ASR [15:10] co-located at K05)

K05 13,298 ac

Reservoirs assumed 15 ft maximum depth

Reservoir capacity accounts for site topography



Taylor Creek
5 ASR
[5 UFA]

L-63N
5 ASR
[5 UFA]

TC West
10 ASR
[5:5]

S-191
10 ASR
[5:5]

KR ASR Expansion
5 ASR
[5 UFA]

C-40
10 ASR
[5:5]

C-41
10 ASR
[5:5]

SR-70
Okeechobee
Glades
Brighton Reservation
Lake Okeechobee
Okeechobee Waterway/Rim Ca
Moore Haven
Pahokee

Note: Each ASR is assumed to be 5 MGD capacity

Total Wells [UFA:APPZ]
UFA = Upper Floridan Aquifer
APPZ = Avon Park Permeable Zone

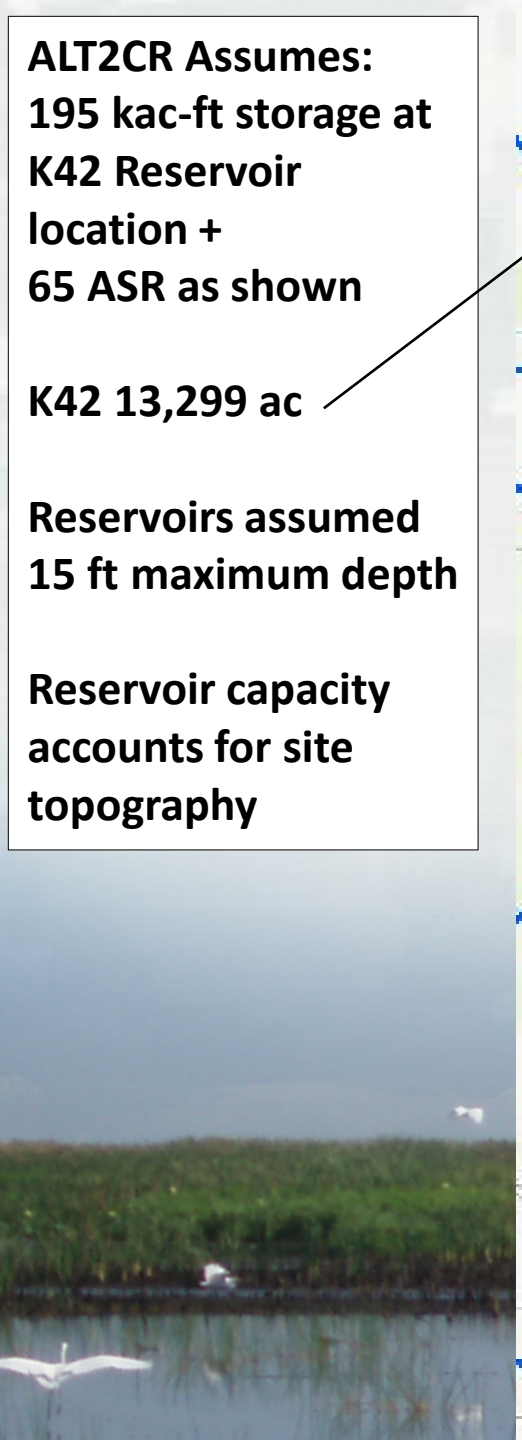
Alternative 2CR

ALT2CR Assumes:
195 kac-ft storage at K42 Reservoir location +
65 ASR as shown

K42 13,299 ac

Reservoirs assumed 15 ft maximum depth

Reservoir capacity accounts for site topography



Taylor Creek
5 ASR
[5 UFA]

L-63N
5 ASR
[5 UFA]

Paradise Run
10 ASR
[10 UFA]

TC West
10 ASR
[5:5]

S-191
10 ASR
[5:5]

KR ASR Expansion
5 ASR
[5 UFA]

C-40
10 ASR
[5:5]

C-41
10 ASR
[5:5]

SR-70
Glades
Brighton Reservation
Lake Okeechobee
Okeechobee Waterway/Rim Canal
Moore Haven
Pahokee
Glades

Note: Each ASR is assumed to be 5 MGD capacity

Total Wells
[UFA:APPZ]
UFA = Upper Floridan Aquifer
APPZ = Avon Park Permeable Zone

Operational Considerations in LOWRP

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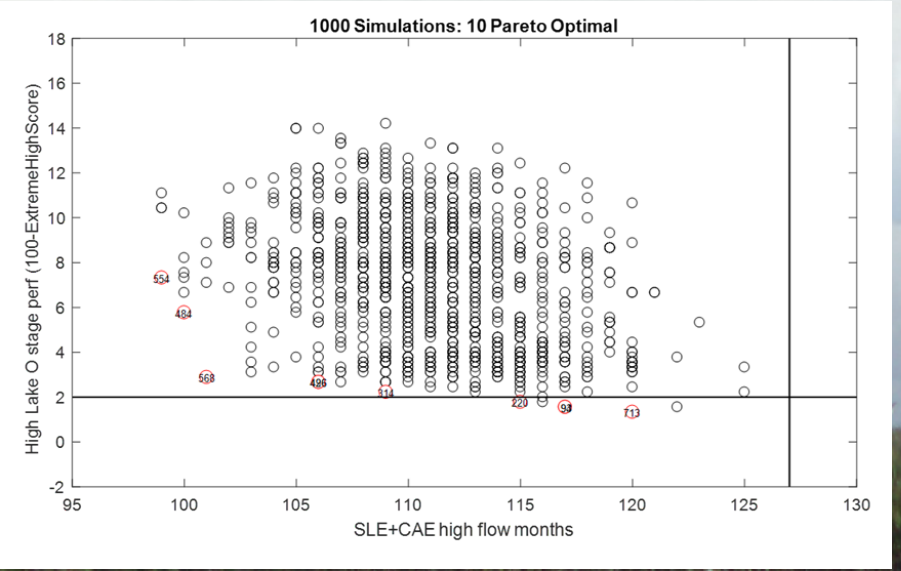
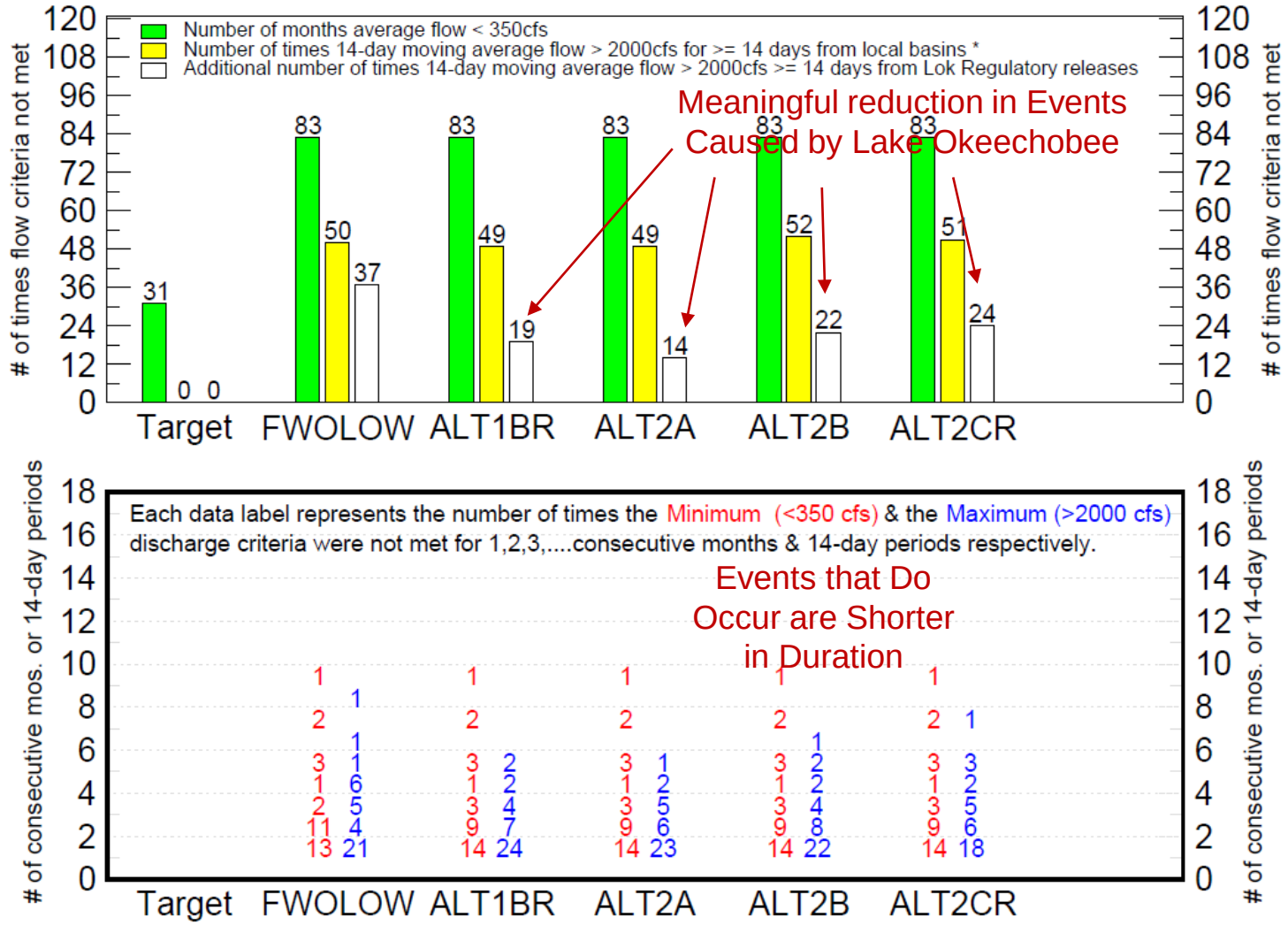
- In addition to infrastructure assumptions, there is a need to define rules for diverting water to and recovering water from reservoir and ASR storage.
- Also, as storage is added and system infrastructure capability is increased, it makes sense to develop optimized Lake Okeechobee schedule rules that work with storage and focus on the events beyond what storage or conveyance south can handle.
- Approximately 30 parameters affecting the Lake Okeechobee decision outcomes (e.g. “up-to” limits, classification of tributary conditions, etc…) along with a variety of storage diversion and recovery lines were analyzed.
- Constrained and unconstrained Latin Hypercube sampling techniques were used to explore 10,000 unique operational strategies per ALT.
- Selected operations were identified using acceptable performance criteria (e.g. Lake O and Estuary PMs) and Pareto analysis.



Model Results Summary

Number of times Salinity Envelope Criteria NOT Met for the St. Lucie Estuary (mean monthly flows 1965 - 2005)



RECOVER Performance Measure

Run date: 09/19/17 10:00:07
RSMBN
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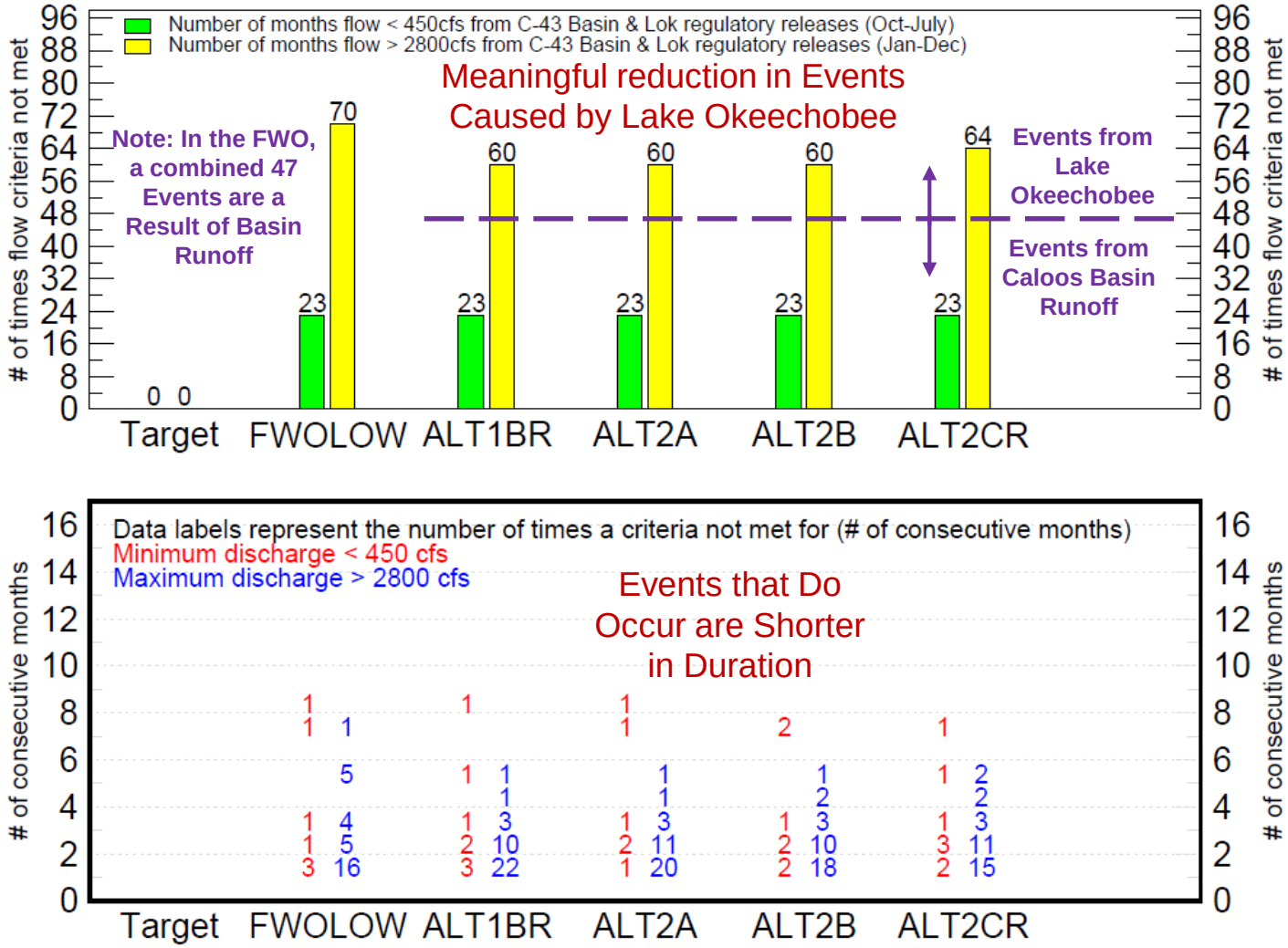
Number of times Salinity Envelope Criteria NOT Met for the Calooshatchee Estuary (mean monthly flows 1965 - 2005)



RECOVER Performance Measure

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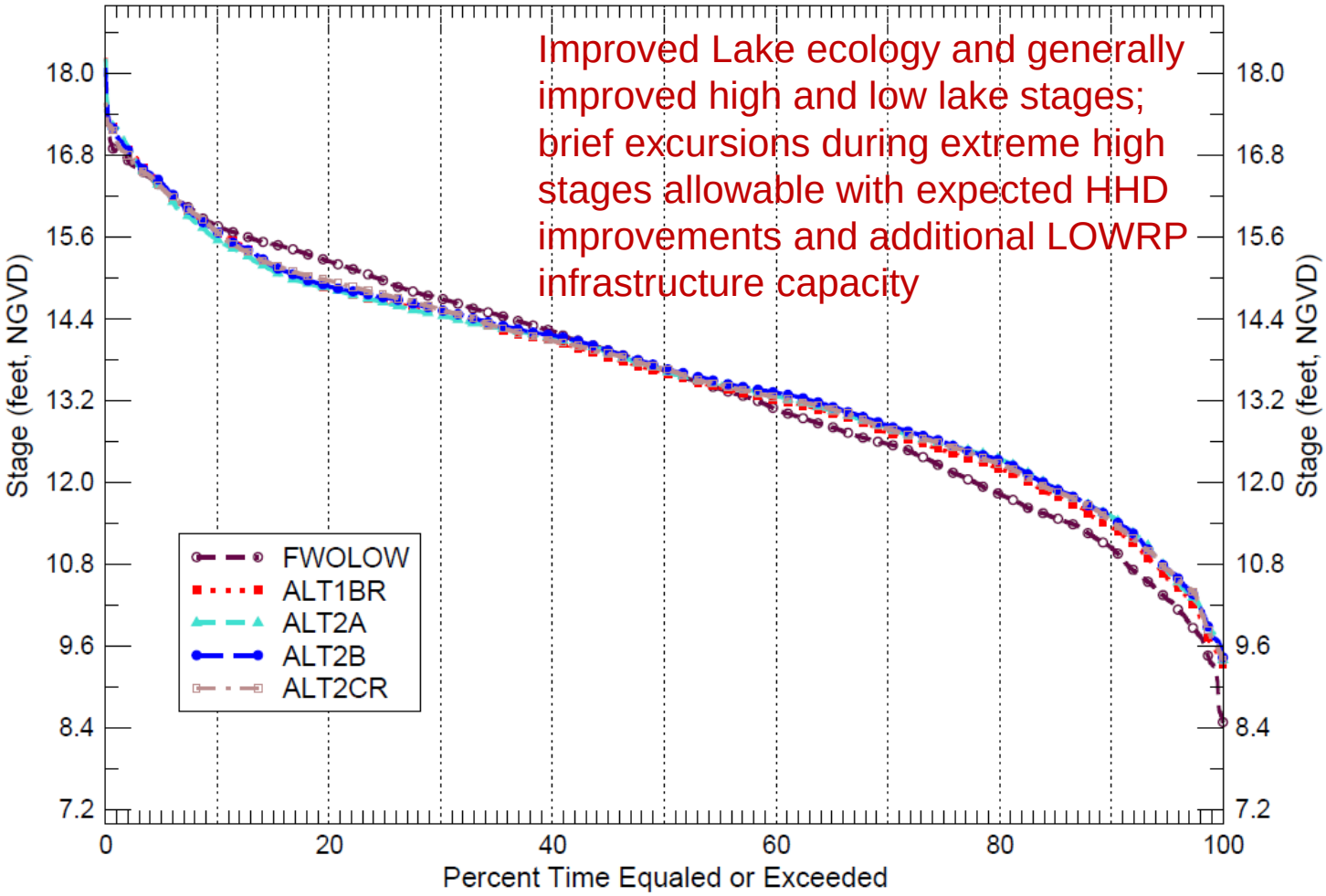
Stage Duration Curves for Lake Okeechobee



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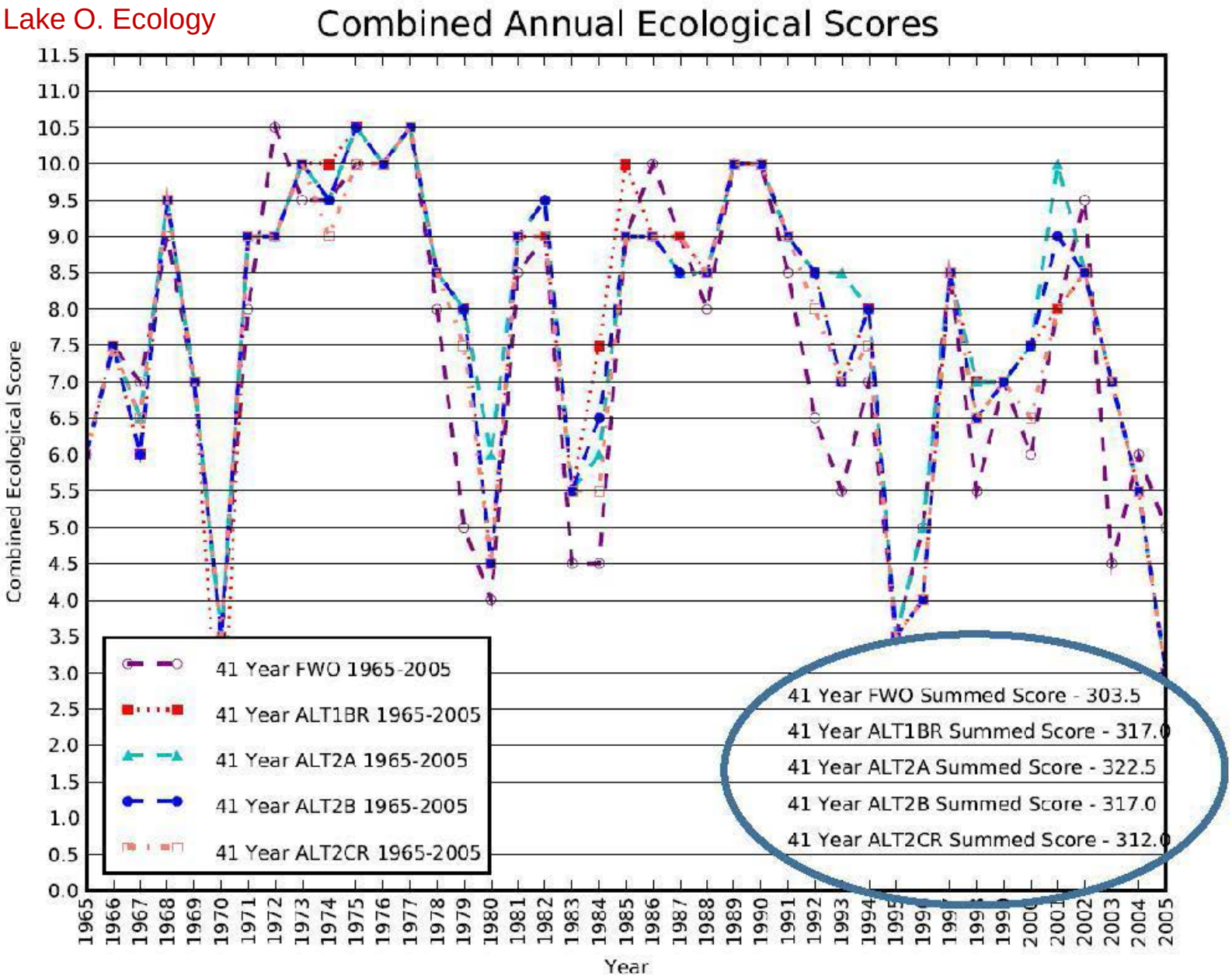
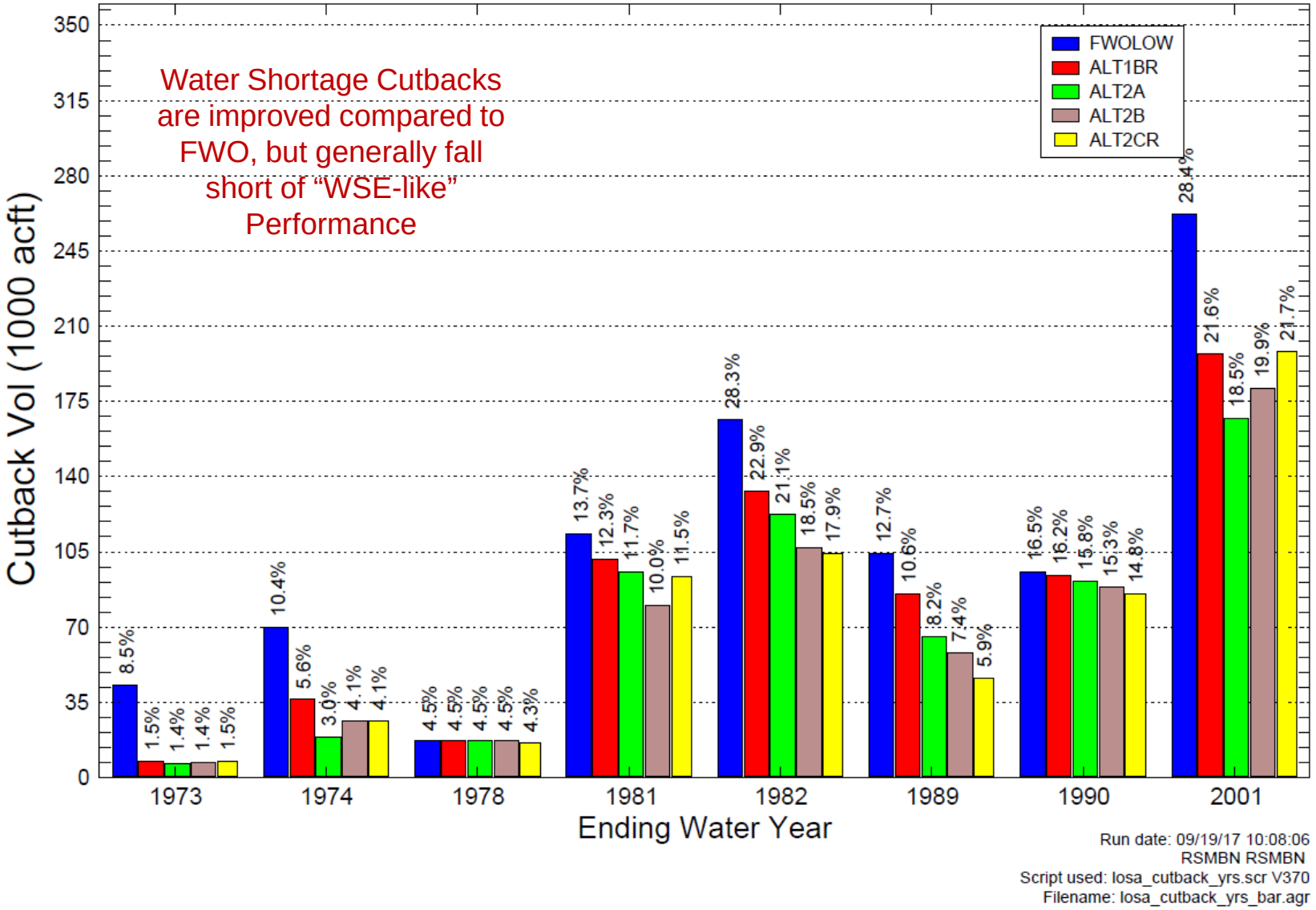
RSMBN P.O.S. 1965 - 2005

Higher Scores = Improved Lake O. Ecology



Water Year (Oct-Sep) LOSA Demand Cutback Volumes

for the 8 Years in Simulation Period with Largest Cutbacks



Different Storage Features are Providing Different Benefits (Example)

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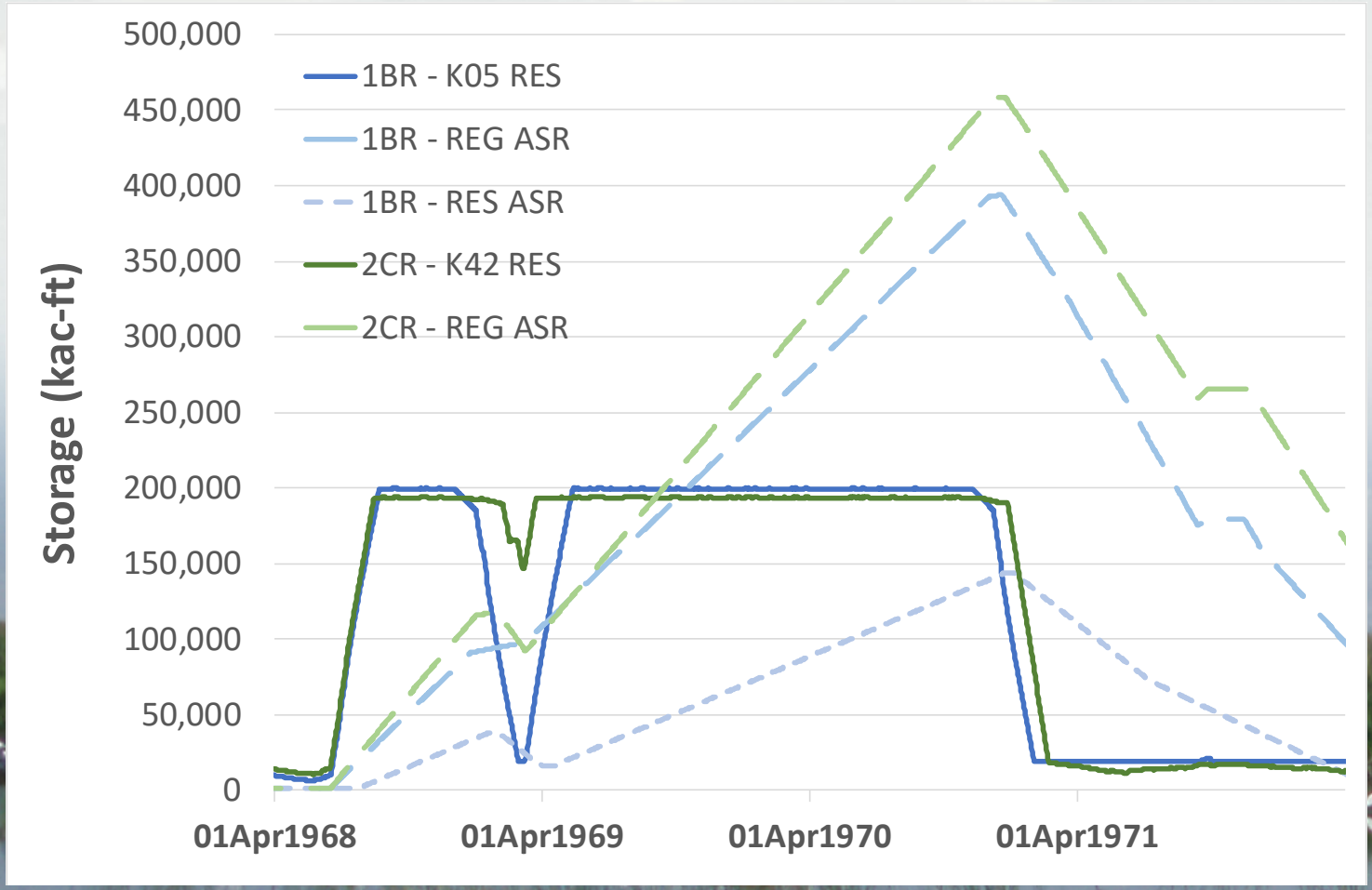
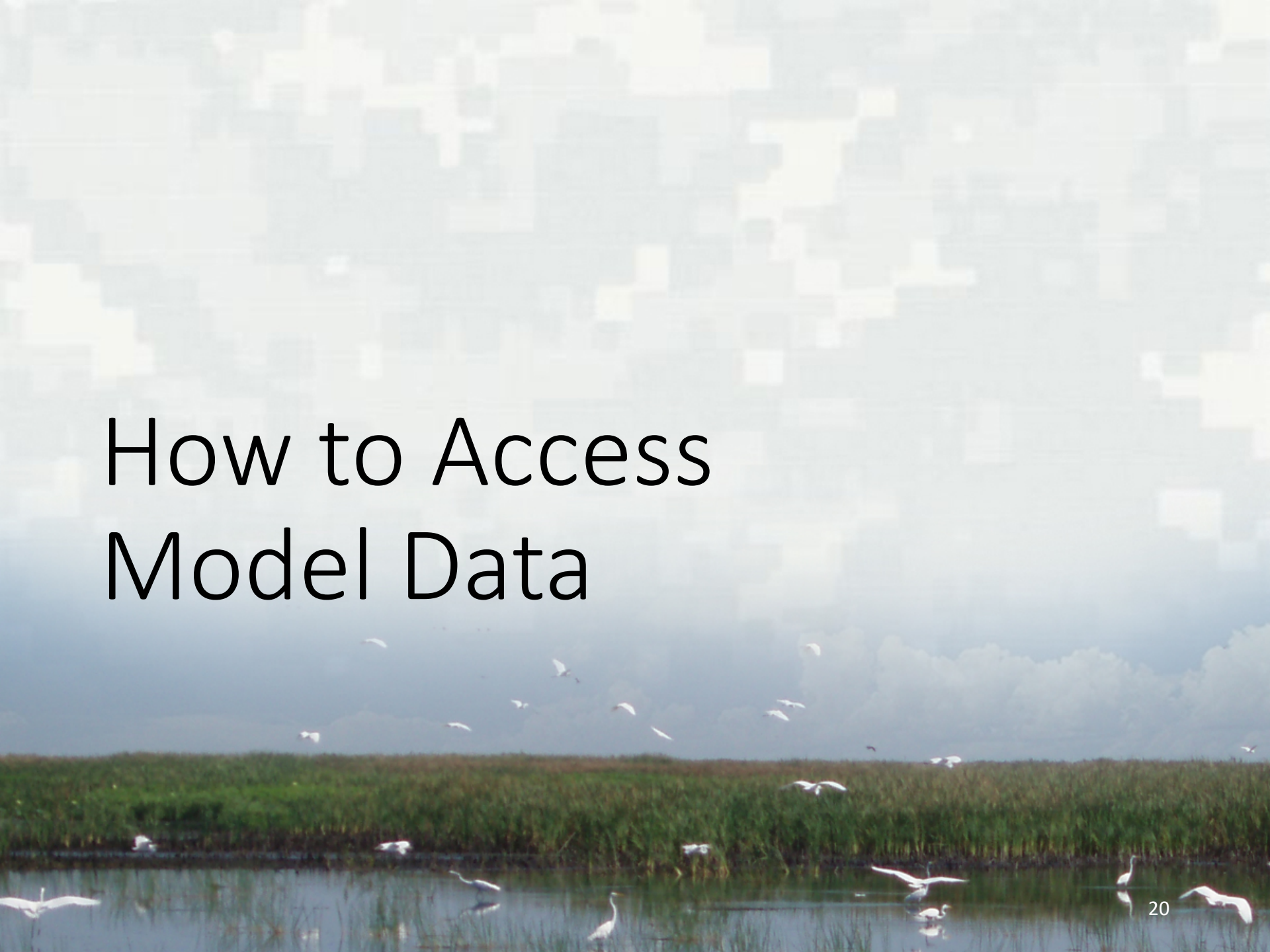
The operational means to achieve "optimal" outcomes for each alternative is unique. The ASR-assisted K05 Reservoir in Alt1BR is operated more frequently than the K42 Reservoir in Alt2CR. However, regional ASR is utilized more frequently in Alt2CR compared to Alt1BR.



How to Access Model Data



Available LOWRP Modeling Data

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September 22nd Release of LOWRP 3rd round Alternatives Array

- FWO vs ALT1BR vs ALT2A vs ALT2B vs ALT2CR Performance Measures for RSMBN (e.g. Lake O., Northern Estuaries, LOSA)
- Other Indicators (e.g. water budgets, hydrographs, etc…) for RSMBN
- ALT1BR, ALT2CR model output for RSMBN (new alternatives)
- Spreadsheets summarizing operations optimization

Available LOWRP Modeling Data (cont)

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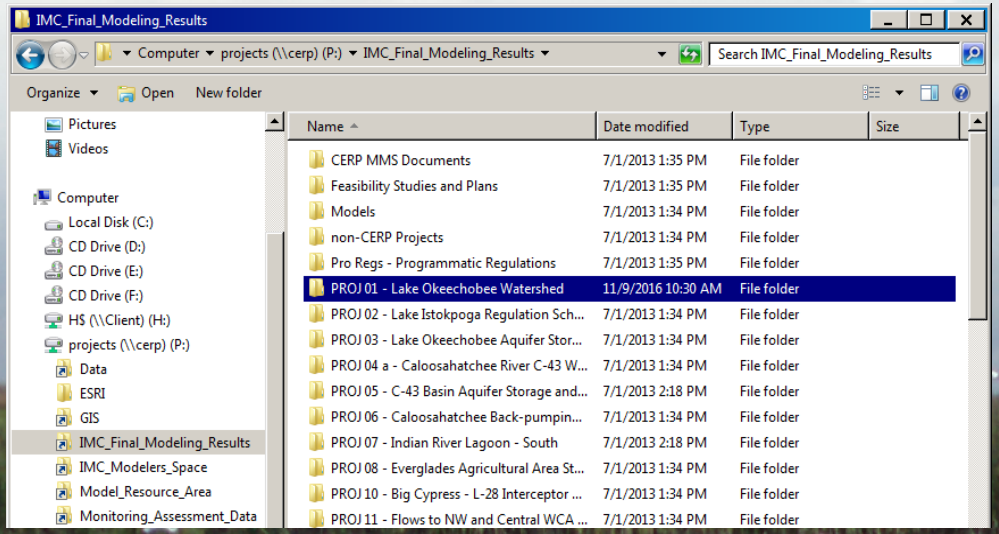
- LOWRP Modeling data is permanently archived and available on the CERPZone Data Archival Storage and Recovery (DASR) system.
  - Step by step instructions previously provided to PDT or available upon request.
- For a short time, data is also available via ftp at:

  ftp://ftp.sfwmd.gov/pub/LOWP/



Acknowledgements: LOWRP Hydrologic Modeling Team

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- Alaa Ali
- Clay Brown
- Sandeep Dabral
- Jaime Graulau-Santiago
- Harold Hennessey-Correa
- Veera Karri
- Fahmida Khatun
- Kenneth Konyha
- Cal Neidrauer
- Raul Novoa
- Randy VanZee
- Naiming Wang
- Walter Wilcox

Water Supply

Water Supply Performance

3rd Round Alternatives Array: ALT1BR, ALT2A, ALT2B, ALT2CR

- Evaluated using a suite of metrics including RECOVER's WS-1 performance measure.
- All alternatives improve water supply performance compared to FWO
- All alternatives pass Savings Clause screening

RECOVER WS-1 Performance Measure

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Water Supply Performance for LOWRP 3rd Round Alternatives Array

Simulation	Cutback Total (kaf)	Severity Score	Number of water years with at least 1 cutback
ECB	857	13	8
FWO	707	12	8
Alt1BR	462	6	6
Alt2A	382	2	5
Alt2B	365	4	6
Alt2CR	384	4	6

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INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Rough Order of Magnitude Costs





Cost Contingency Development

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- The project was broken up into separable elements
- Each element was assigned a risk and likelihood in a matrix
- The matrix determined the contingency percentage for each element
- The overall contingency is dollar weighted by element
- Each element is assigned the same contingency for each alternative, although dollar weighting leads to different overall contingencies for each alternative

Contingency Range per Element: 20-60%

ROM Cost

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Alternative	Cost
Alternative 1Br	$1,787,220,000
Alternative 2A	$3,191,295,000
Alternative 2B	$2,393,416,000
Alternative 2Cr	$1,713,952,000

Overall Contingency Range: 44-45%

LAKE OKEECHOBEE WATERSHED
INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Geotechnical Explorations





Geotechnical Data Collection

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- Exploration has been completed for K-42 and the data is being analyzed
- The soils at the K-42 are sandy, indicating a high expected seepage rate
- Exploration at K-05 is ongoing and is expected to be complete in two weeks

Geotechnical Data Collection Locations

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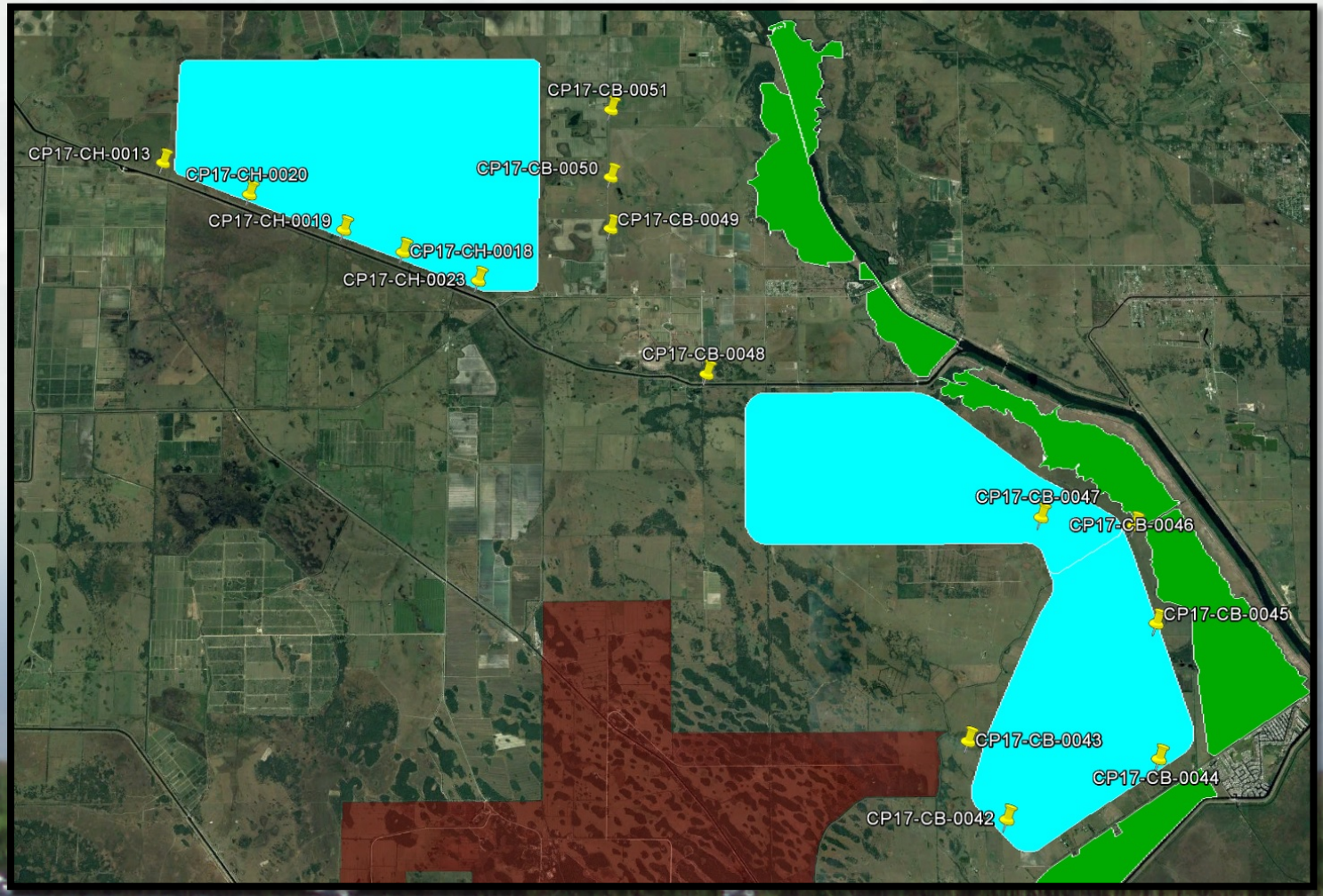

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Cultural Resources





Cultural Resource Considerations

Archaeological Survey

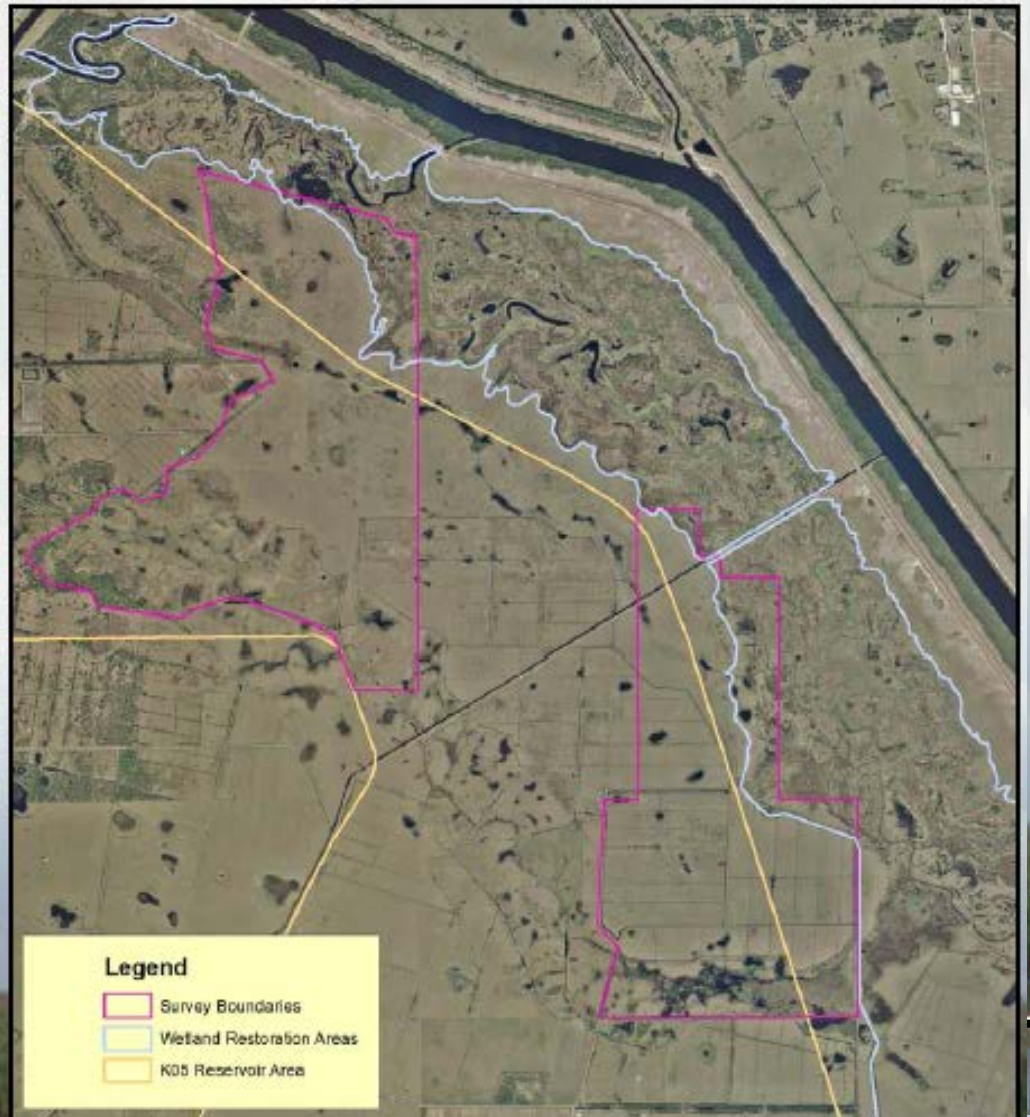
- Only SFWMD lands
- Focus in the K05
- 2,700 acres in survey
- Intensive Field Survey
- SCOPE developed with input from STOF

Timeline:

July 10 – Background research began

Aug 1 – fieldwork begins

Mid-Sept – fieldwork complete



Cultural Resource Considerations

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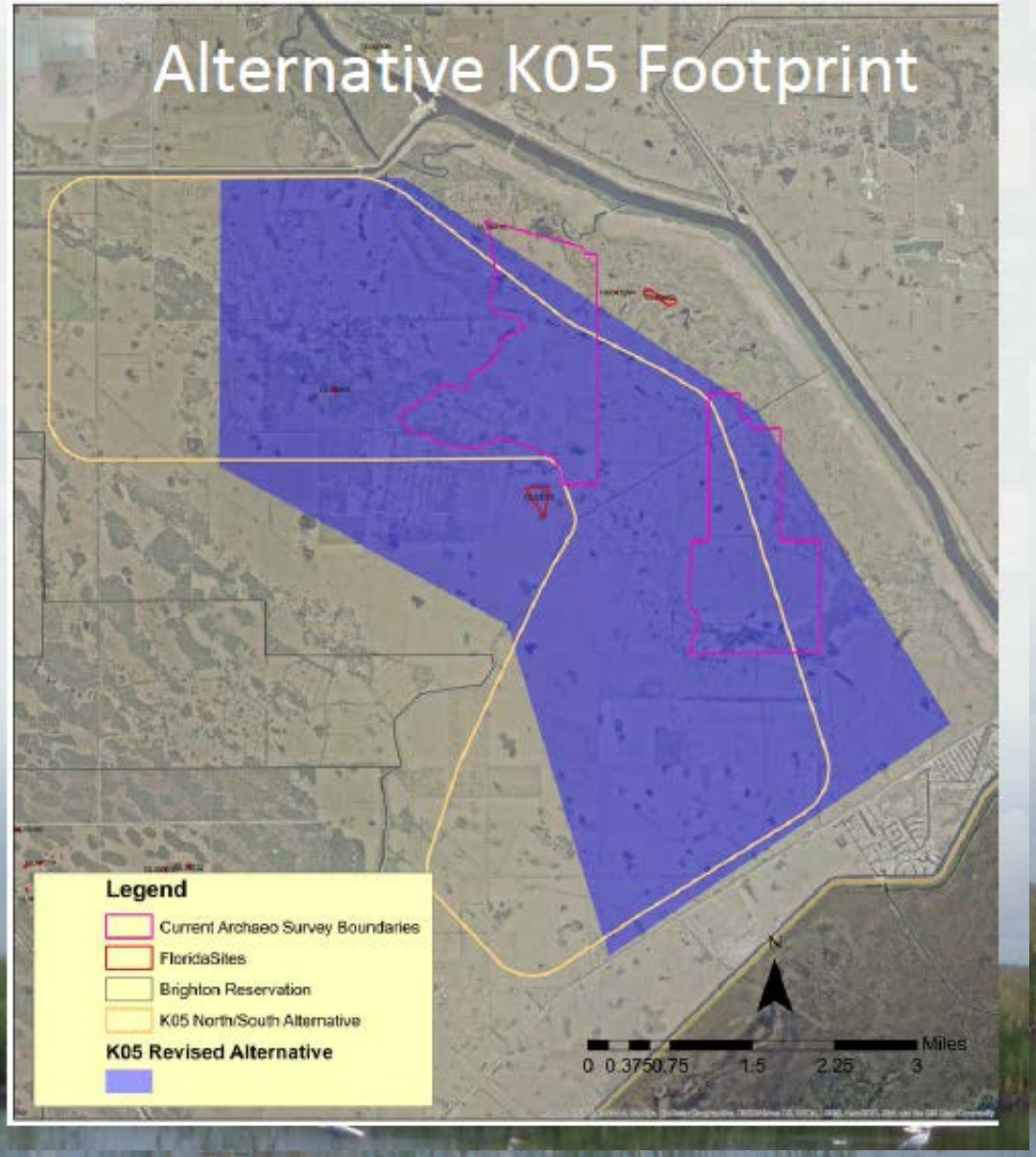

Results of Survey

- Identify archaeological sites in the project area
- Develop information on cultural affiliation, time period, and significance of identified sites
- Determine what sites/areas will be of special concern for both the Tribes, the State, and USACE
- Determine level of effort and ROM costs for options to avoid, minimize, or mitigate important resources
- Inform future siting decisions of features

LAKE OKEECHOBEE WATERSHED
INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Environmental Considerations





Lake Okeechobee Habitat Units and Habitat Unit Lift
Round 3 Modeling

Habitat Units = Habitat Suitability Index (0-1) * Acreage

Lake Okeechobee Habitat Units	ECB	FWO	ALT1Br	ALT2A	ALT2B	ALT2Cr
Ecological PM HUs (acres)	109,052	106,938	111,695	113,633	111,695	109,933
Stage Envelope PM HUs (acres)	25,976	26,906	30,472	31,979	31,469	30,850
Extreme Stage PM HUs (acres)	43,200	42,971	41,651	41,574	42,208	42,695
Total Lake O Habitat Units (acres)	**178,228**	**176,814**	**183,817**	**187,186**	**185,371**	**183,478**

Habitat Unit Lift = Alt Habitat Units – FWO Habitat Units

Habitat Unit Lift	ALT1Br	ALT2A	ALT2B	ALT2Cr
Ecological PM HU	4,757	6,695	4,757	2,995
Stage Envelope PM HU	3,535	5,074	4,563	3,944
Extreme Stage PM HU	-1,320	-1,396	-763	-276
Total Lake O HU	**7,003**	**10,372**	**8,557**	**6,664**

Northern Estuaries Round 3 Habitat Units

Habitat Suitability Index (0-1) * Acreage = Habitat Units

Caloosahatchee Acreage = 70,979 acres

Metric #	PM Metric	ECB	FWO	ALT1Br	ALT2A	ALT2B	ALT2Cr
3.1	Low Flow (< 450 cfs)	0.02	0.405	0.405	0.405	0.405	0.405
3.2	High Flow (>2800 cfs)	0.02	0.145	0.195	0.195	0.195	0.175
	Total	**0.04**	**0.55**	**0.60**	**0.60**	**0.60**	**0.58**
	Caloosahatchee HUs	**2,839**	**39,038**	**42,587**	**42,587**	**42,587**	**41,168**

St. Lucie Acreage = 14,994 acres

Metric #	PM Metric	ECB	FWO	ALT1Br	ALT2A	ALT2B	ALT2Cr
4.1	Low Flow (< 350 cfs)	0.07	0.155	0.155	0.155	0.155	0.155
4.2	High Flow (>2000 cfs)	0.07	0.275	0.385	0.415	0.365	0.355
	Total	**0.14**	**0.43**	**0.54**	**0.57**	**0.52**	**0.51**
	St. Lucie HUs	**2,099**	**6,447**	**8,097**	**8,547**	**7,797**	**7,647**

Northern Estuaries Habitat Unit Lift Round 3 Modeling

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Habitat Units = Habitat Suitability Index (0-1) * Acreage

Northern Estuaries PMs	ECB	FWO	ALT1Br	ALT2A	ALT2B	ALT2Cr
Caloosahatchee Habitat Units (acres)	2,839	39,038	42,587	42,587	42,587	41,168
St. Lucie Habitat Units (acres)	2,099	6,447	8,097	8,547	7,797	7,647
Overall NE Habitat Units (acres)	**4,938**	**45,485**	**50,684**	**51,134**	**50,384**	**48,815**

Habitat Unit Lift = Alt Habitat Units – FWO Habitat Units

Northern Estuaries PMs	ALT1Br	ALT2A	ALT2B	ALT2Cr
Caloosahatchee Habitat Unit	3,549	3,549	3,549	2,130
St. Lucie Habitat Unit	1,650	2,100	1,350	1,200
Total NE Habitat Unit	**5,199**	**5,649**	**4,899**	**3,330**

Round 3 Modeling Habitat Units

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Project Region	ALT1Br	ALT2A	ALT2B	ALT2Cr
Lake O Ecological Indicator	111,695	113,633	111,695	109,933
Lake O Stage Envelope	30,472	31,979	31,469	30,850
Lake O Extreme Stage	41,651	41,574	42,208	42,695
Total Lake Okeechobee	**183,817**	**187,186**	**185,371**	**183,478**
Caloosahatchee Habitat Units	42,587	42,587	42,587	41,168
St. Lucie Habitat Units	8,097	8,547	7,797	7,647
Total Northern Estuaries	**50,684**	**51,134**	**50,384**	**48,815**
Total Habitat Units	**234,501**	**238,320**	**235,755**	**232,293**
Potential HU Lift	**12,202**	**16,021**	**13,456**	**9,994**

Average Annual Habitat Units	ALT1Br	ALT2A	ALT2B	ALT2Cr
Lake Okeechobee AAHU	5,374	8,179	6,668	5,091
Northern Estuaries AAHU	4,939	5,367	4,654	3,164
Total Round 3 AAHU	**10,313**	**13,545**	**11,322**	**8,255**

Environmental Considerations

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- Climate
- Geology & Soils
- Hydrology
- **Water Quality**
- Flood Control
- **Wetlands**
- Vegetation
- **Fish & Wildlife**
- **Protected Species**
- Air Quality
- Noise
- Aesthetics
- Recreation
- Land Use
- Socioeconomics
- Agriculture
- Hazardous, Toxic & Radioactive Waste
- Cultural Resources
- Cumulative Effects
- Unavoidable Adverse Impacts
- Irreversible & Irretrievable Commitments of Resources
- Energy Requirements & Conservation Potential

Wetlands Within Reservoir Footprints

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Existing wetlands (acres) in the reservoirs

FLUCCS Code Description	Alt 1Br	Alt 2A	Alt 2B	Alt 2Cr
Mixed Wetland Hardwoods	1	5	5	0
Mixed Wetland Hardwoods - Mixed Shrubs	45	165	155	135
Cabbage Palm Savannah	0	155	155	155
Freshwater Marshes	1,020	2,576	2,334	1,937
Sawgrass	0	30	30	38
Wet Prairies	73	223	219	269
Emergent Aquatic Vegetation	0	17	17	17
Total Acres of Existing Wetlands in Reservoir Footprints	**1,138**	**3,171**	**2,915**	**2,551**

Wetland TSP (Alt B – Kissimmee River Center and Paradise Run) restores 5,279 acres

Water Quality Sensitivity Analysis

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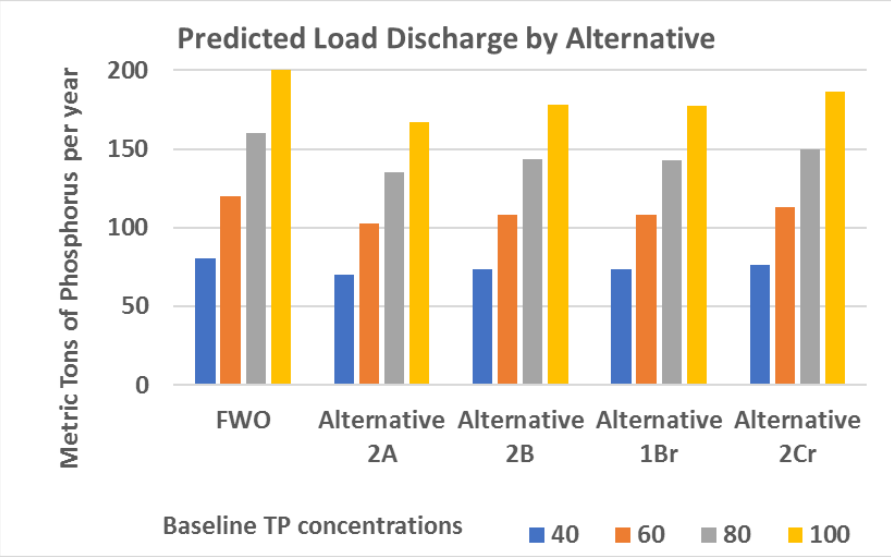
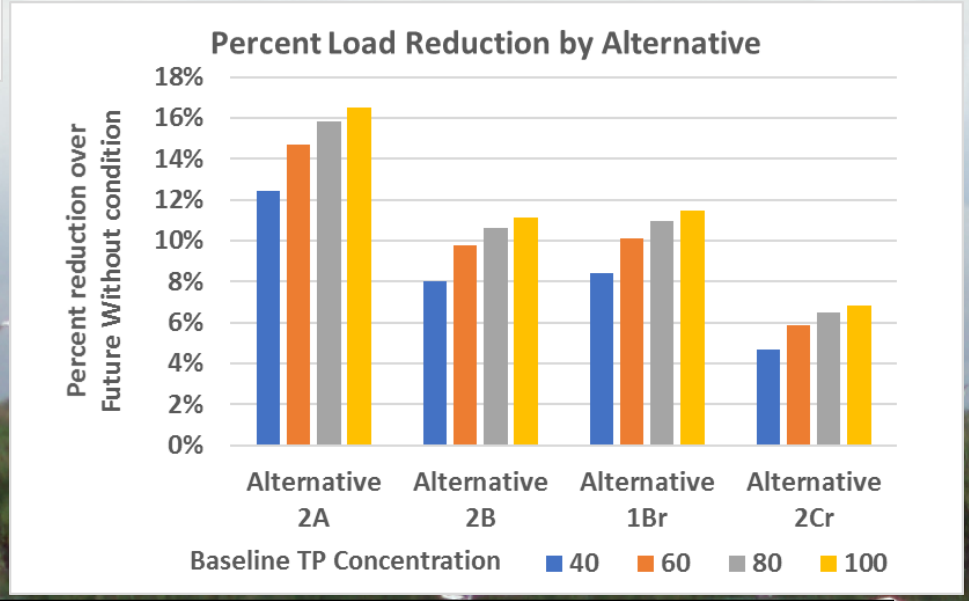


All alternatives for all baseline concentrations reduce total discharge load to the lake in comparison to the Future Without Project Condition



Threatened and Endangered Species

BUILDING STRONG

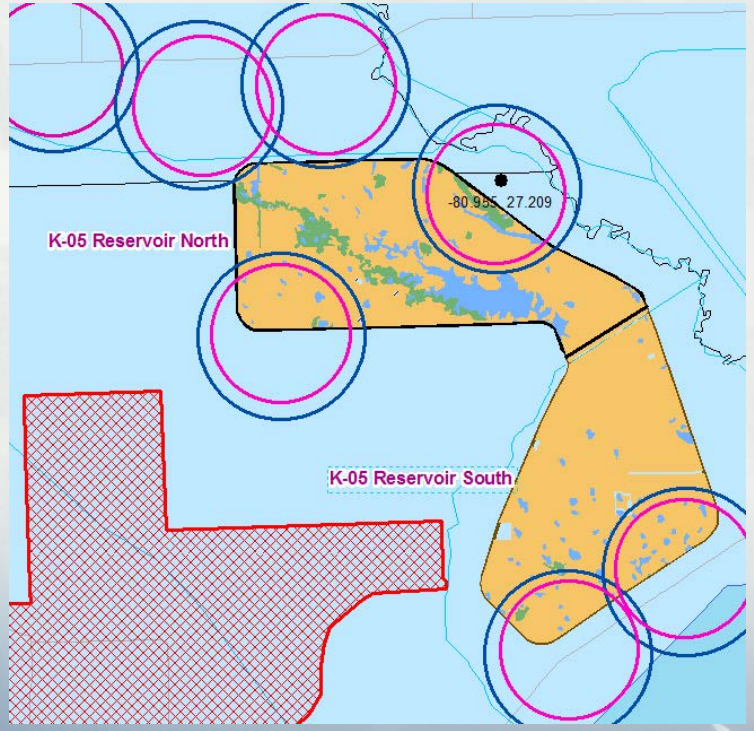
	Effect in Reservoirs	Effect in Wetlands	Effect of ASR operations*	Effect in Lake O	Effect in Estuaries
Snail Kite	- and +	+	- *	+	NA
Caracara	-	- and +	NA	NA	NA
Wood Stork	- and +	+	- *	+	+
FL Grasshopper Sparrow	- **	- **	NA	NA	NA
Whooping Crane (ex pop)	-	+	NA	+	NA
Manatee	NA	NA	-* and +	+	+
Panther	- **	+ **	- *	NA	NA
FL Bonneted Bat	- and +	+	-* and +	+	NA
Indigo Snake	-	-	NA	NA	NA
Okeechobee Gourd	NA	+ **	NA	+	NA
Johnson's Seagrass	NA	NA	NA	NA	+
Smalltooth Sawfish	NA	NA	NA	NA	+

* Impingement, discharge, or me-Hg effects

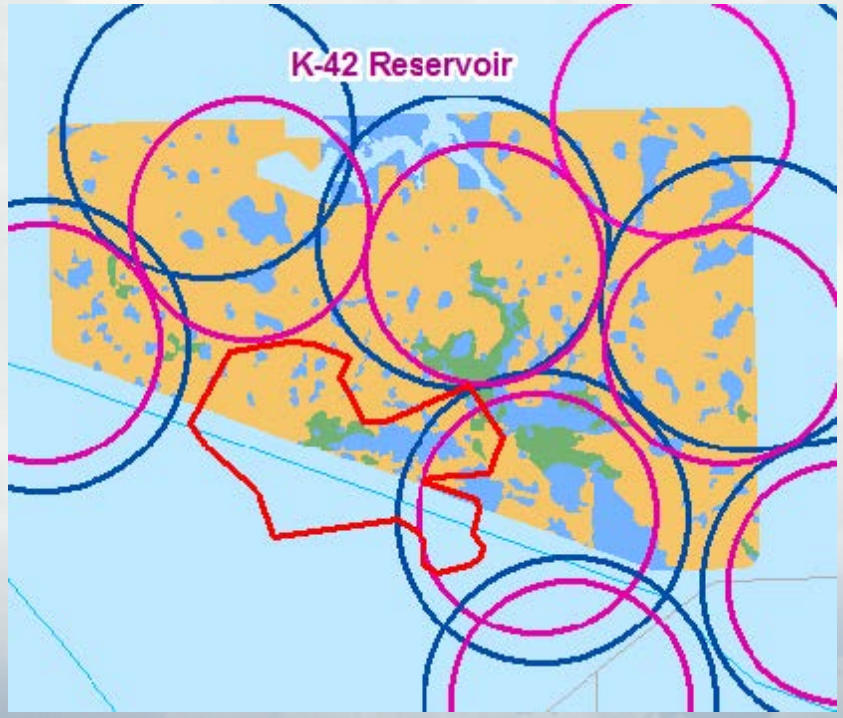
**Potential

Caracara in Reservoir Footprints

BUILDING STRONG



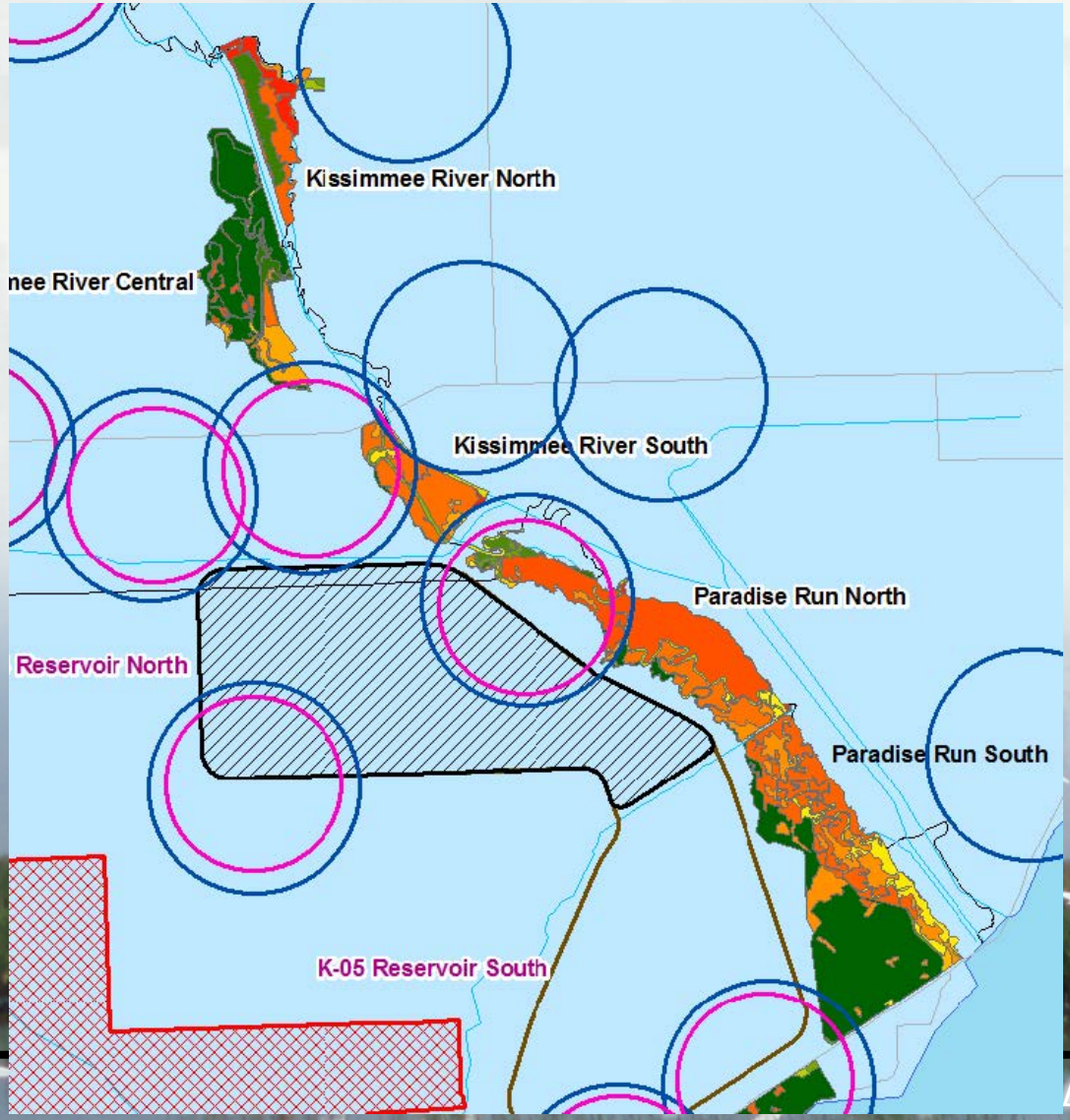
2 or 3 additional caracara home ranges possible in each reservoir footprint (8-10 total).



4 known caracara territories with 3 or 4 possible unknown (7 or 8 total)

Caracara in Wetland TSP Sites

BUILDING STRONG



Potential for 1 or 2 caracara home ranges in Kiss Central, 1 or 2 in Kiss South and 2+ in Paradise Run

Florida Grasshopper Sparrow

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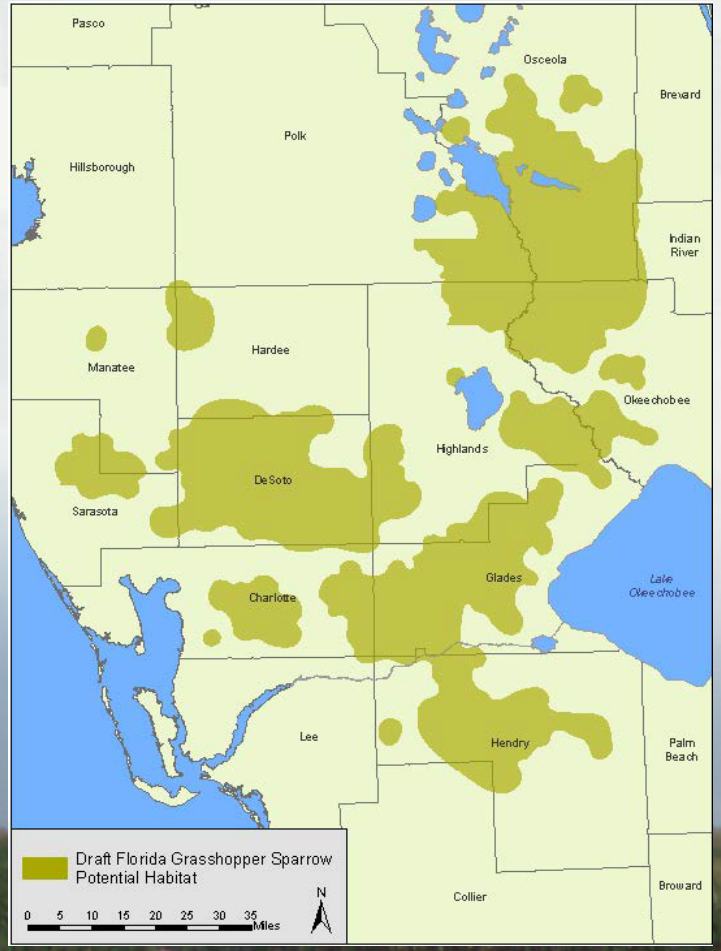
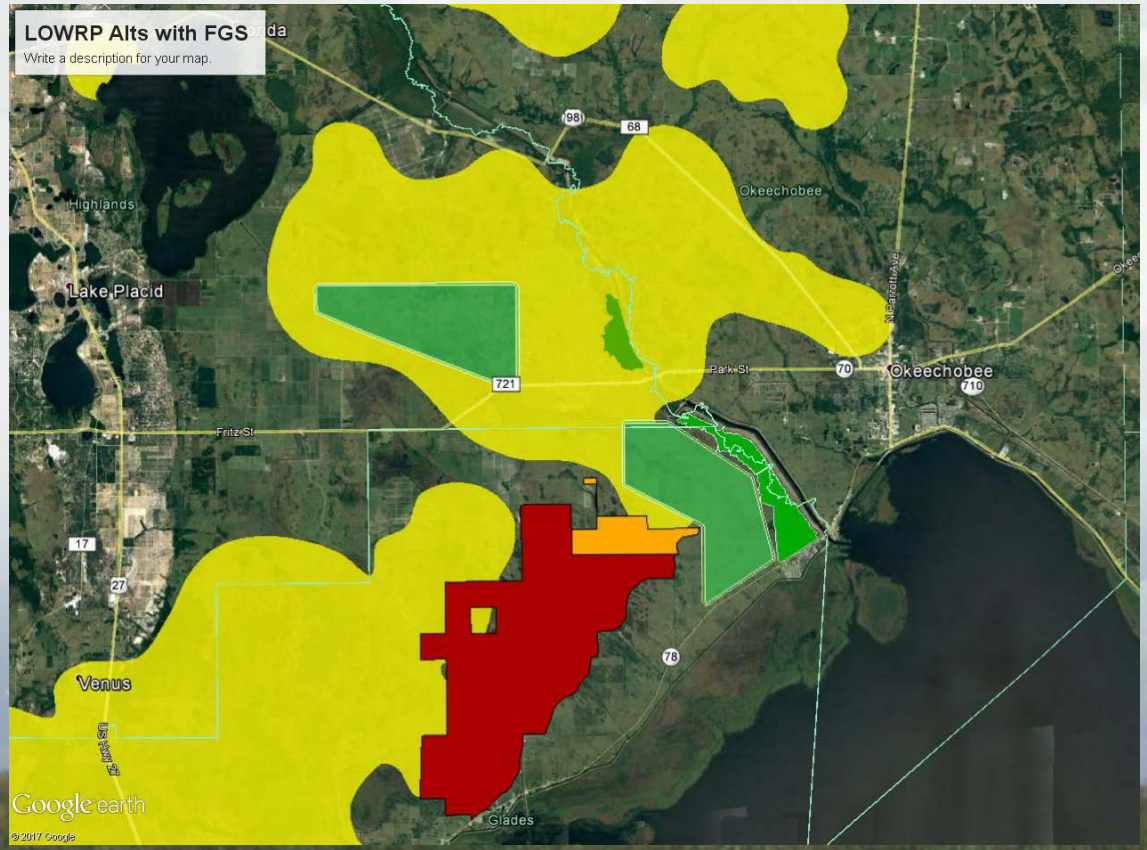
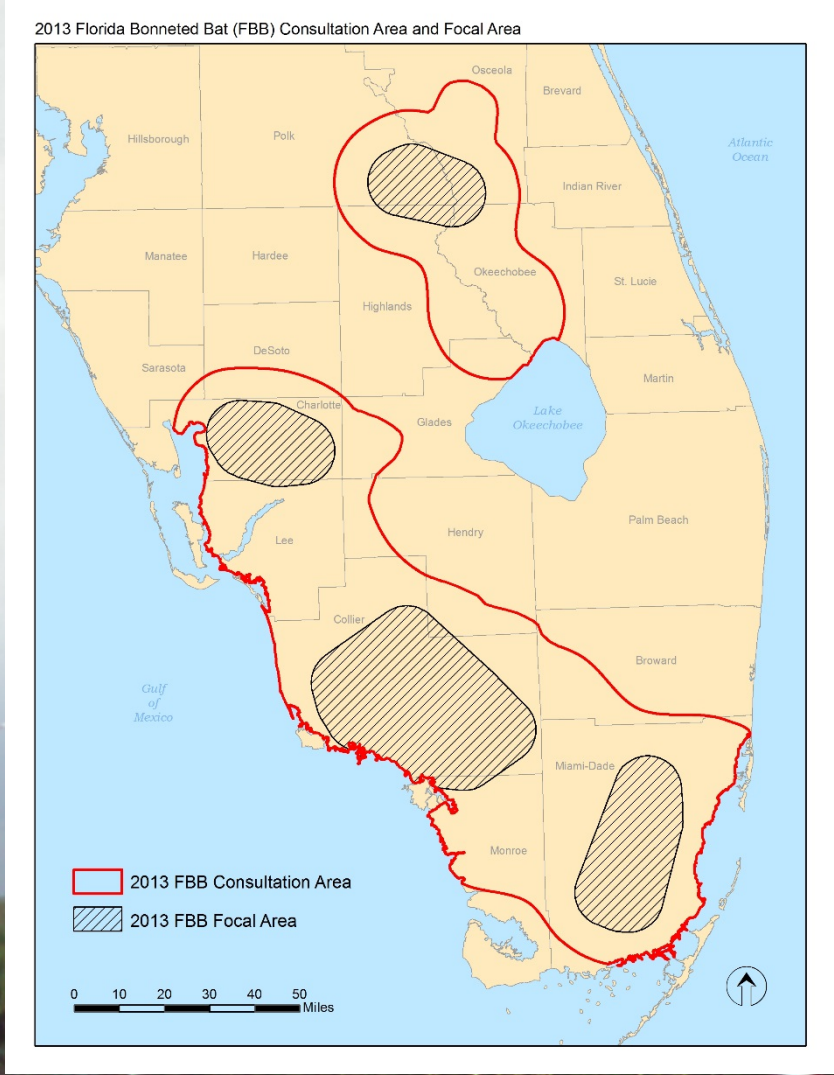
Florida Grasshopper Sparrow Potential Habitat





Florida Bonneted Bat

BUILDING STRONG



Eastern Indigo Snake

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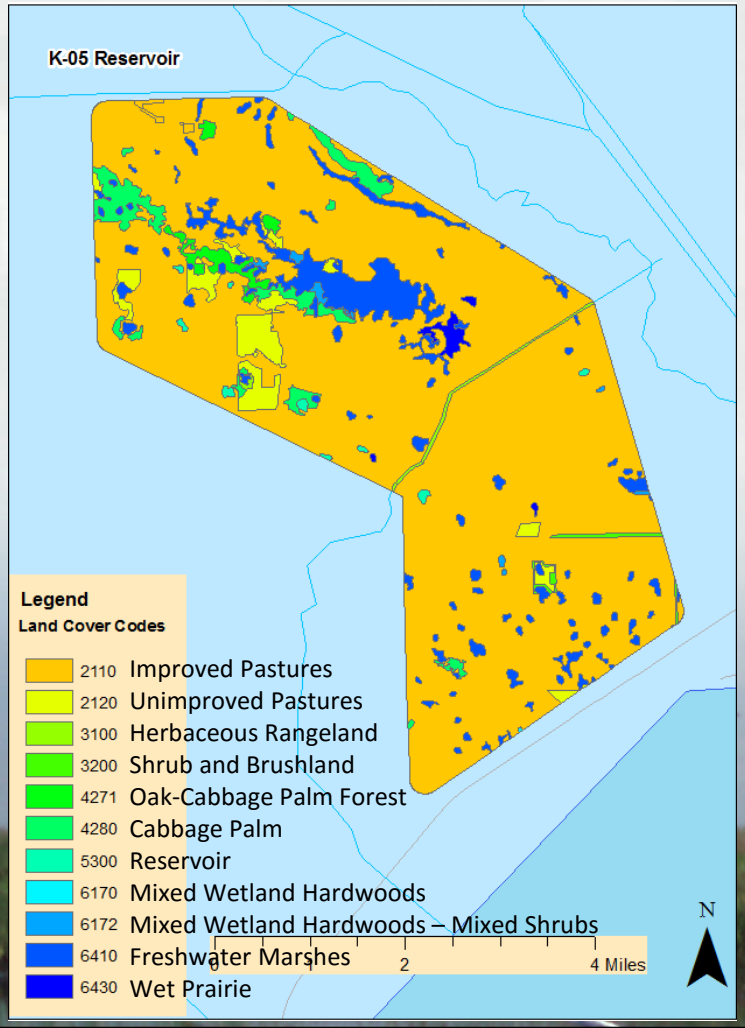
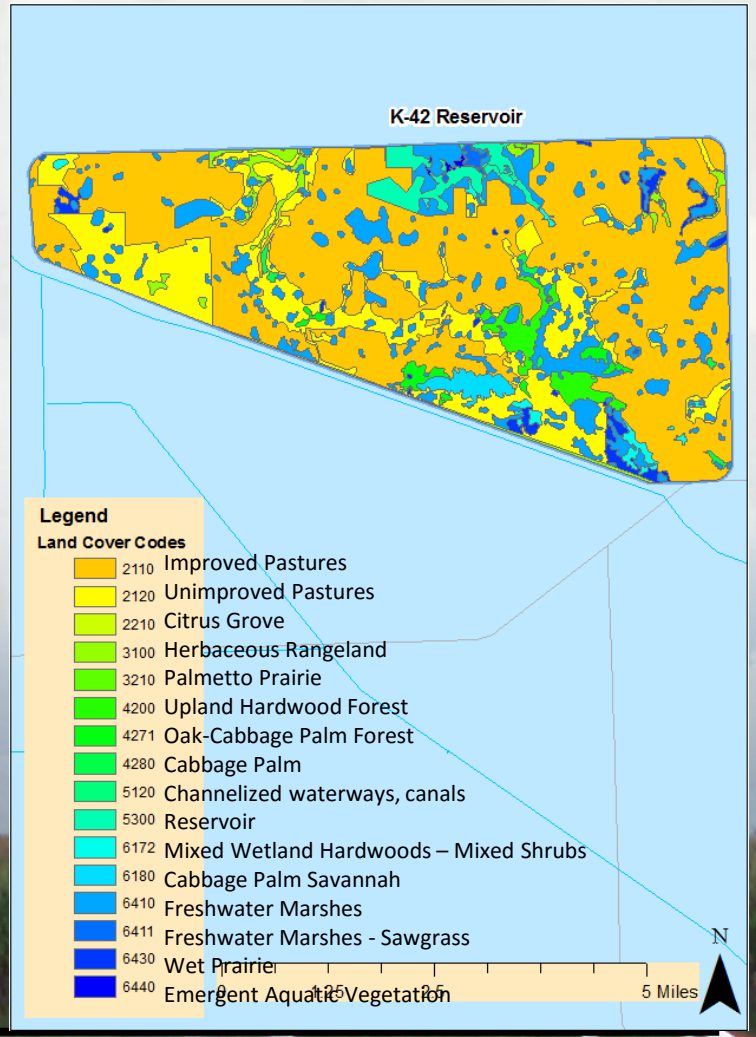
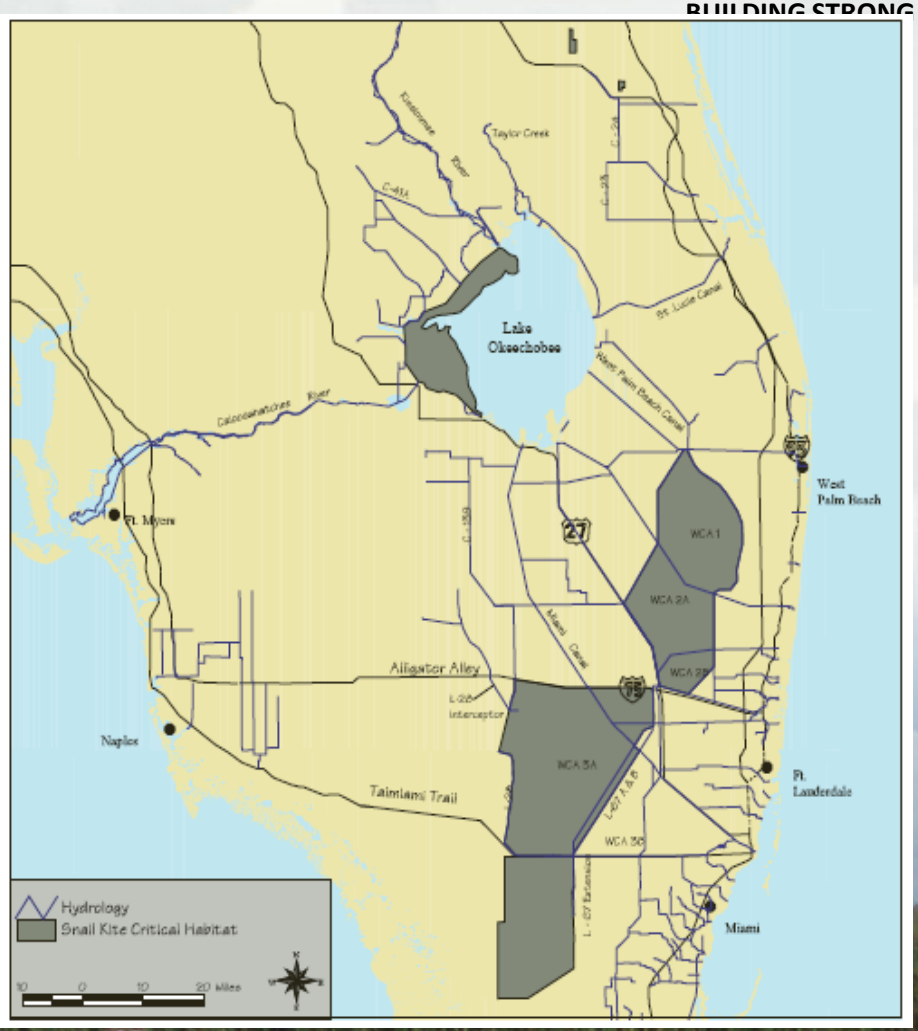
Assumed to be present in any upland habitat with any cover taller than short grass



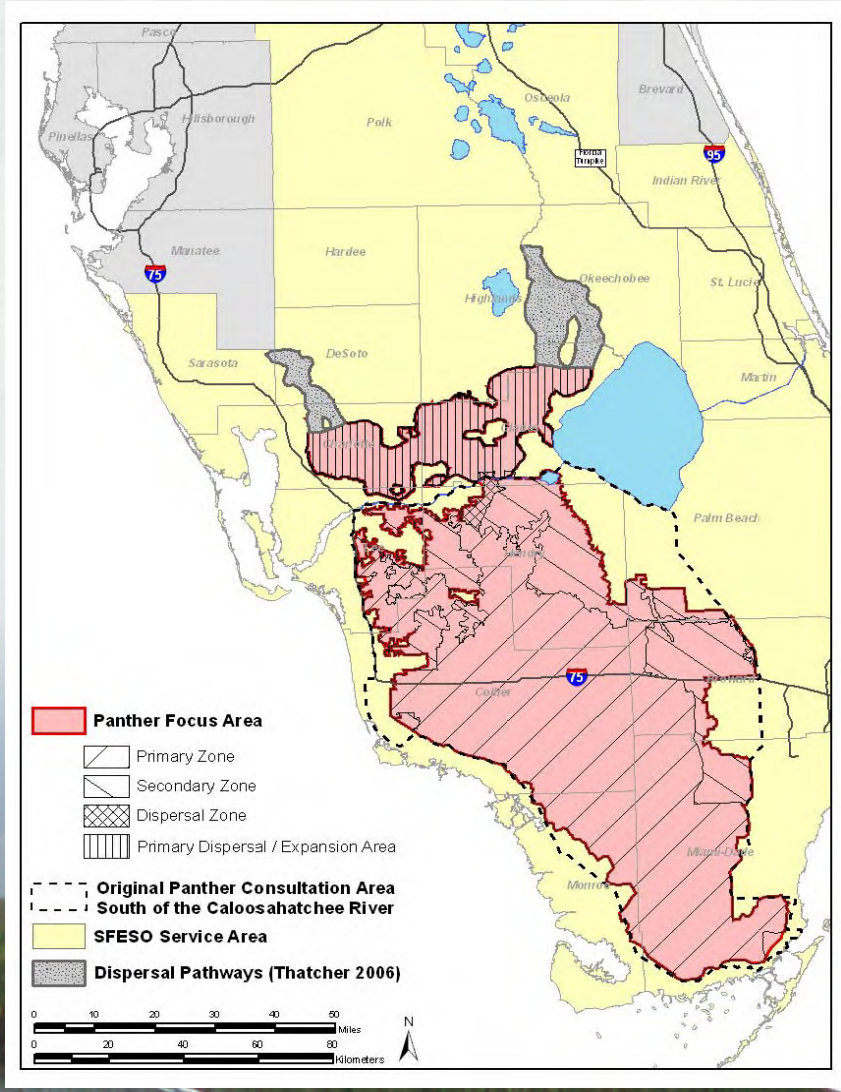


Snail Kite Critical Habitat



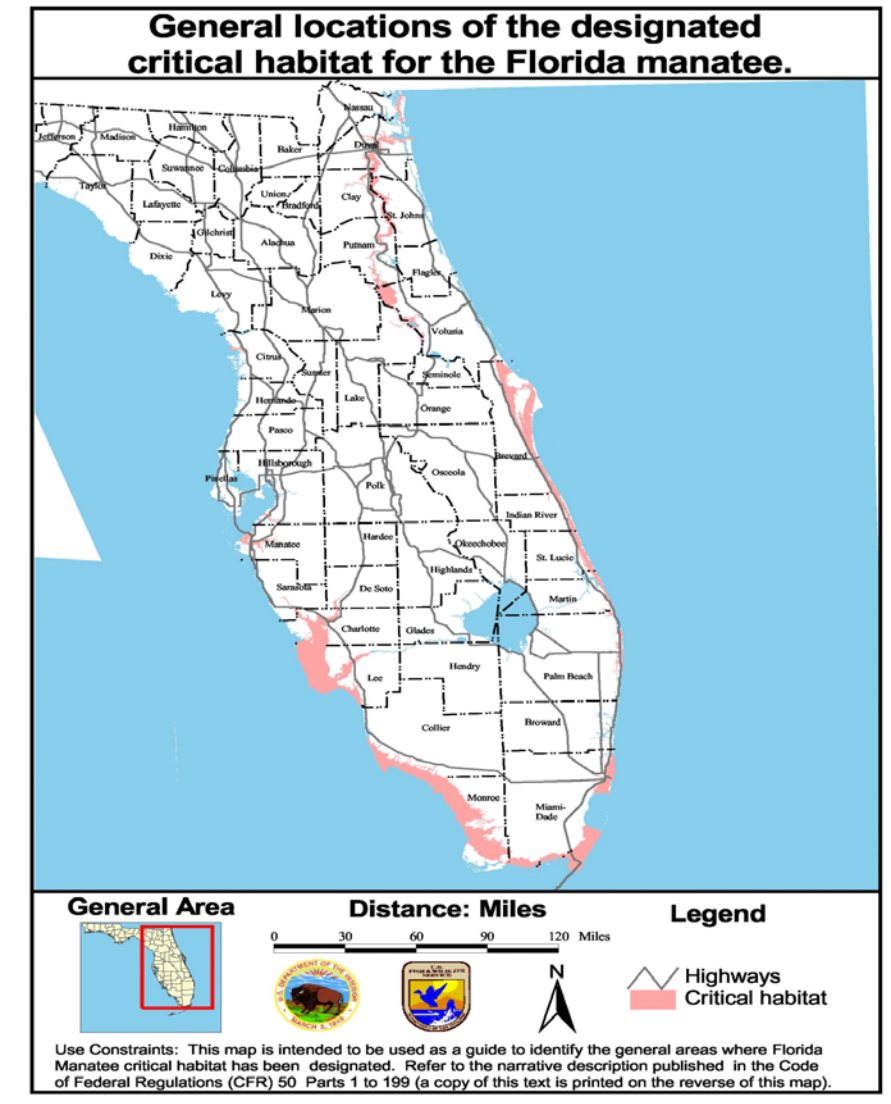
Florida Panther Critical Habitat

BUILDING STRONG



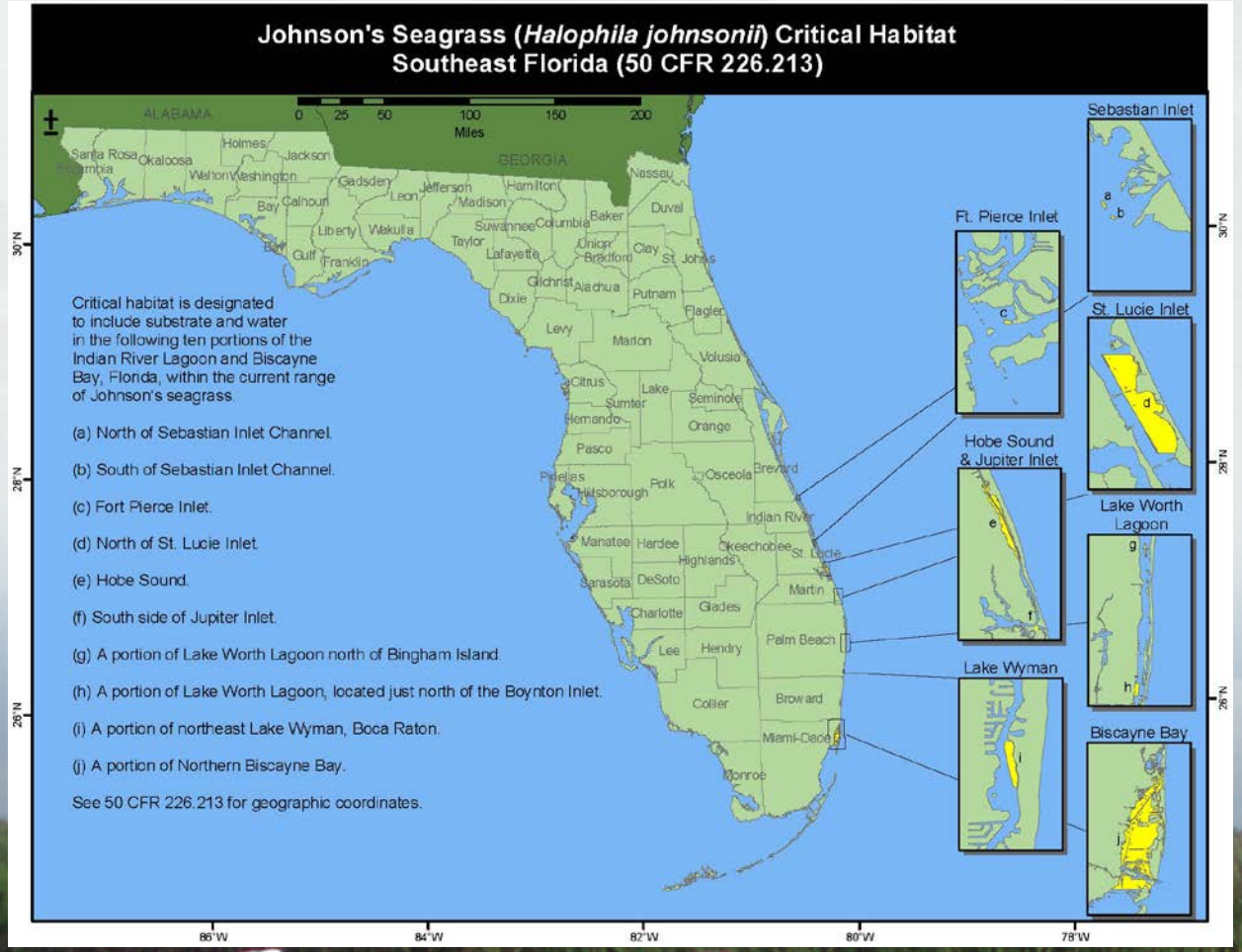
Manatee Critical Habitat

BUILDING STRONG



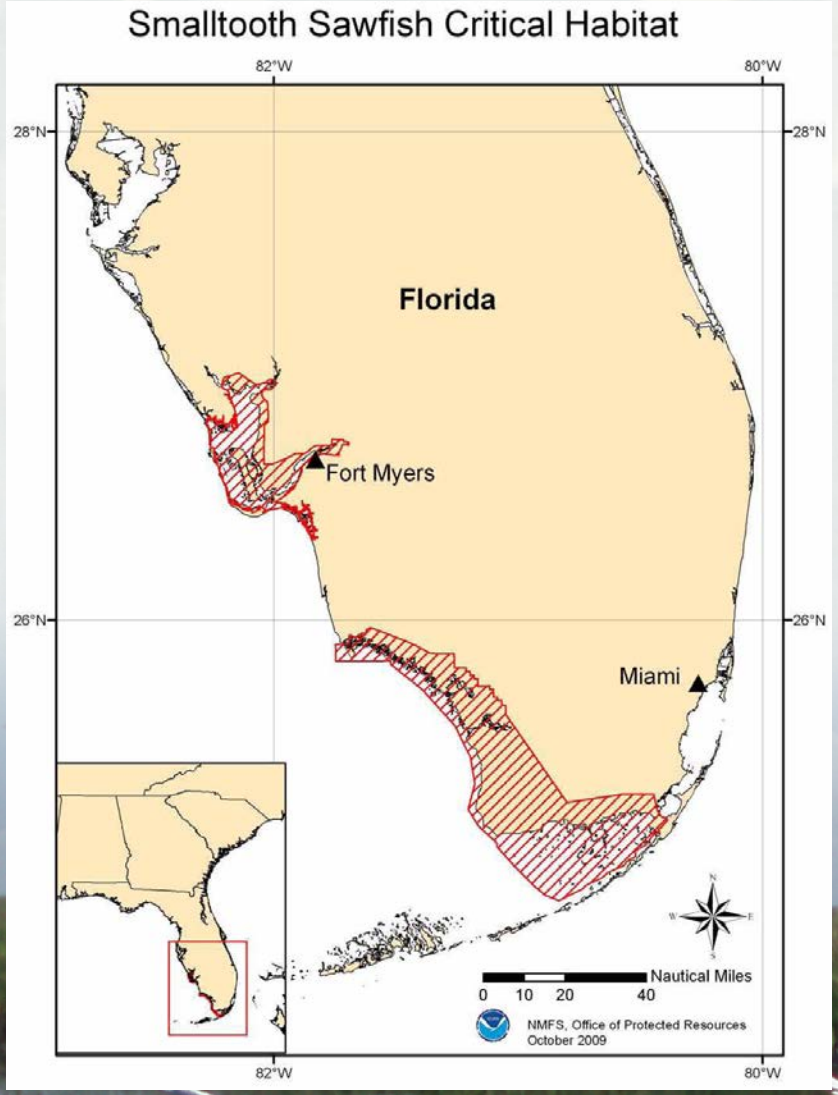
Johnson's Seagrass Critical Habitat

BUILDING STRONG



Smalltooth Sawfish Critical Habitat

BUILDING STRONG



Fisheries Risks

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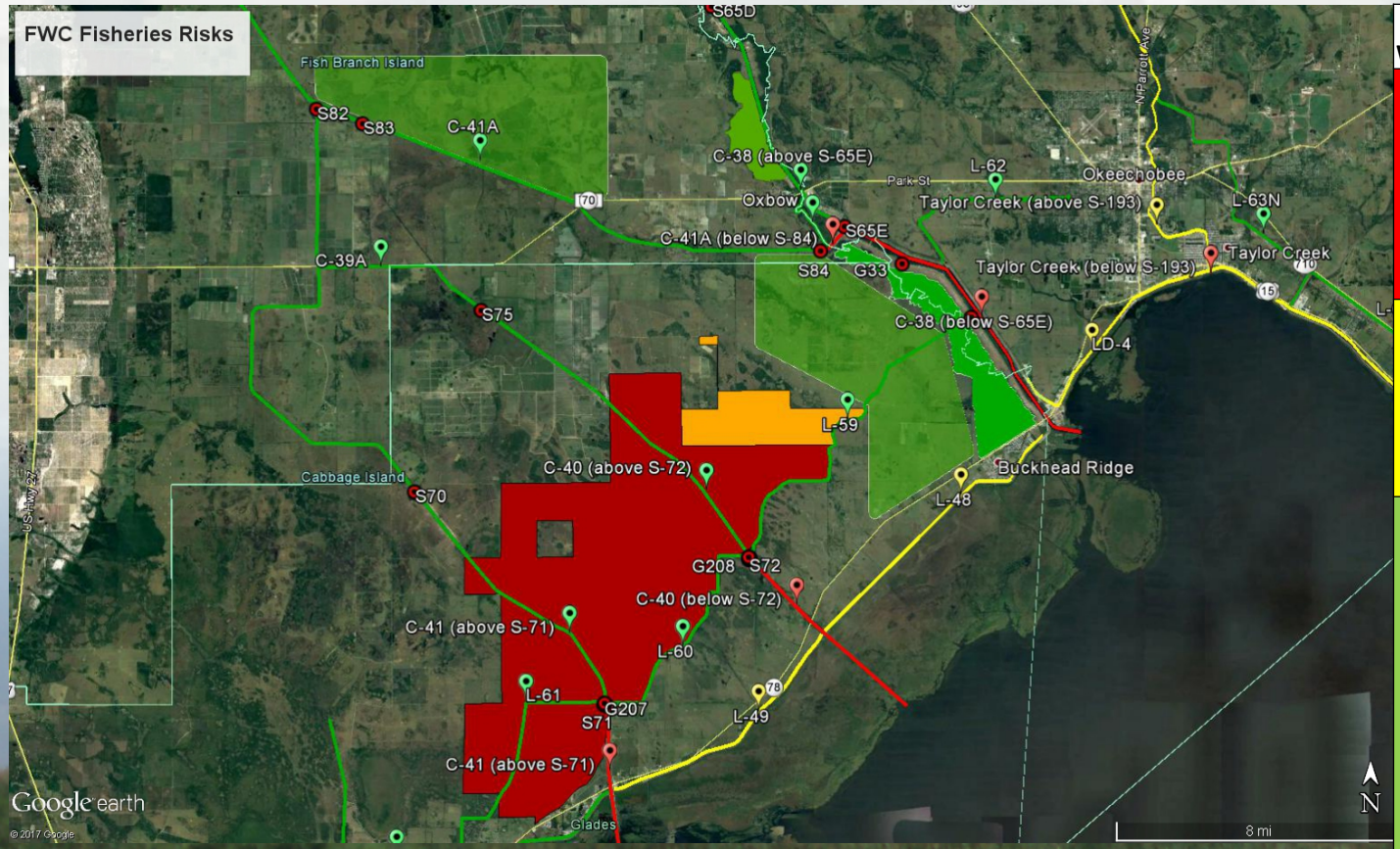

Waterbody or Canal Segment	Risk to Fisheries
C-38 (below S-65E; lower Kissimmee River) C-41A (below S-84) C-41A (above S-68) C-40 (below S-72) C-41 (below S-71) Taylor Creek (below S-193)	Highest Risk
LD-4 (Rim Canal North) L-48 and L-49 (Rim Canal West) C-44 Taylor Creek (above S-193) L-47 (Rim Canal East)	Moderate Risk
C-38 (above S-65E) C-41A L-62 L-59, L-60 and L-61 C-40 (above S-72) C-41 (above S-71) C-39A L-50 LD-3 L-63N L-63S L-64 and L-65	Lowest Risk

LAKE OKEECHOBEE WATERSHED
INTEGRATED FEASIBILITY STUDY & ENVIRONMENTAL IMPACT STATEMENT

Economic Considerations





National Ecosystem Restoration Plan

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- "the plan that meets **planning objectives and constraints** and reasonably maximizes environmental benefits while passing **tests of cost effectiveness** and **incremental cost analyses**, **significance of outputs, acceptability, completeness, efficiency, and effectiveness.**" (ER-1105-2-100 Appendix E, E-41)

"The selected plan **must** be shown to be cost effective and justified to achieve the desired level of output"

How a National Ecosystem Restoration Project is Identified

- Screen out plans that are not cost effective from further consideration.
- Incremental cost analysis reveals changes in cost for increasing levels of environmental output.
- Help decision makers allocate limited resources more efficiently and avoid selection of economically irrational plans.
- Incremental cost analysis reveals changes in costs as levels of environmental outputs increase, assisting in answering the question of whether selecting a more costly alternative is “worth it”

What is a Cost-Effective Plan?

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- An alternative is defined as non-cost effective if:
  1. The *same output* level could be produced by another plan at less cost;
  2. A *larger output* level could be produced at the same cost; or
  3. A *larger output* level could be produced at less cost.

Simply Speaking: DON'T SPEND MORE FOR LESS!
(Defining the output is the hard part)

What is Incremental Cost Analysis?

- A common misconception is that the plan and the output level which minimizes average costs should be selected
- Incremental cost analysis is useful in determining if the extra level of output is “worth it”.
- How do we determine if the increase in costs is worth the increase in benefits?
  - This may relate to acceptability, completeness, efficiency and significance of an alternative or scarcity of a resource

Incremental Cost Analysis – Storage

Alternative 1B is the alternative that costs the least per unit of output. Is there a benefit to a larger plan

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	ALTERNATIVES			
	2C-R	**1B-R**	**2B**	**2A**
	K-42 Revised	*K-05 Revised*	*K-05 North*	*K-05 Original*
			K-42 Original	*K-42 Original*
	65 ASR	*80 ASR*	*70 ASR*	*110 ASR*
Total Implementation Cost	$ 1,713,952,000	$ 1,787,220,000	$ 2,393,416,000	$ 3,191,295,000
Average Annual Implementation Cost	$ 65,041,000	$ 67,822,000	$ 90,826,000	$ 121,104,000
Annual O&M	$ 11,624,000	$ 14,407,000	$ 13,749,000	$ 20,537,000
Average Annual Cost	**$ 76,665,000**	**$ 82,229,000**	**$ 104,575,000**	**$ 141,641,000**
Lake O Benefits	5,091	5,374	6,668	8,179
Estuary Benefits	3,164	4,939	4,654	5,367
Total Benefits	**8,255**	**10,313**	**11,322**	**13,545**
Cost Effective	YES	YES	YES	YES
AAC per AAHU	$ 9,290	$ 7,970	$ 9,240	$ 10,460
Increase in Cost Compared to 1B-R ($)			$ 22,346,000	$ 59,412,000
Increase in Cost Compared to 1B-R (%)			27.2%	72%
Increase in Ecological Benefits Compared to 1B-R ($)			1,008	3,232
Increase in Ecological Benefits Compared to 1B-R (%)			9.8%	31.3%
Incremental Cost per Unit of Output Compared to 1B-R			$ 22,160	$ 18,380
Best Buy	NO	YES	NO	YES
Incremental Cost Per Unit of Output		**$7,970**		**$18,380**

*While a "Best Buy" plan is typically recommended, a smaller or larger plan could also be recommended as long as they are cost effective.

	ALTERNATIVES			
	2C-R	**1B-R**	**2B**	**2A**
	K-42 Revised *65 ASR*	*K-05 Revised* *80 ASR*	*K-05 North* *K-42 Original* *70 ASR*	*K-05 Original* *K-42 Original* *110 ASR*
AAHU	8,255	10,313	11,322	13,545
AAC	$76,665,000	$82,229,000	$104,575,000	$141,641,000
Net Δ AAHU vs **2C-R**		2,058	3,067	5,291
% Δ AAHU vs **2C-R**		24.9%	37.2%	64.1%
Net Δ AAC vs **2C-R**		$ 5,564,000	$ 27,910,000	$ 64,976,000
% Δ AAC vs **2C-R**		7.3%	36.4%	84.8%