PROPOSED LORS HAB DEVIATION WEBINAR

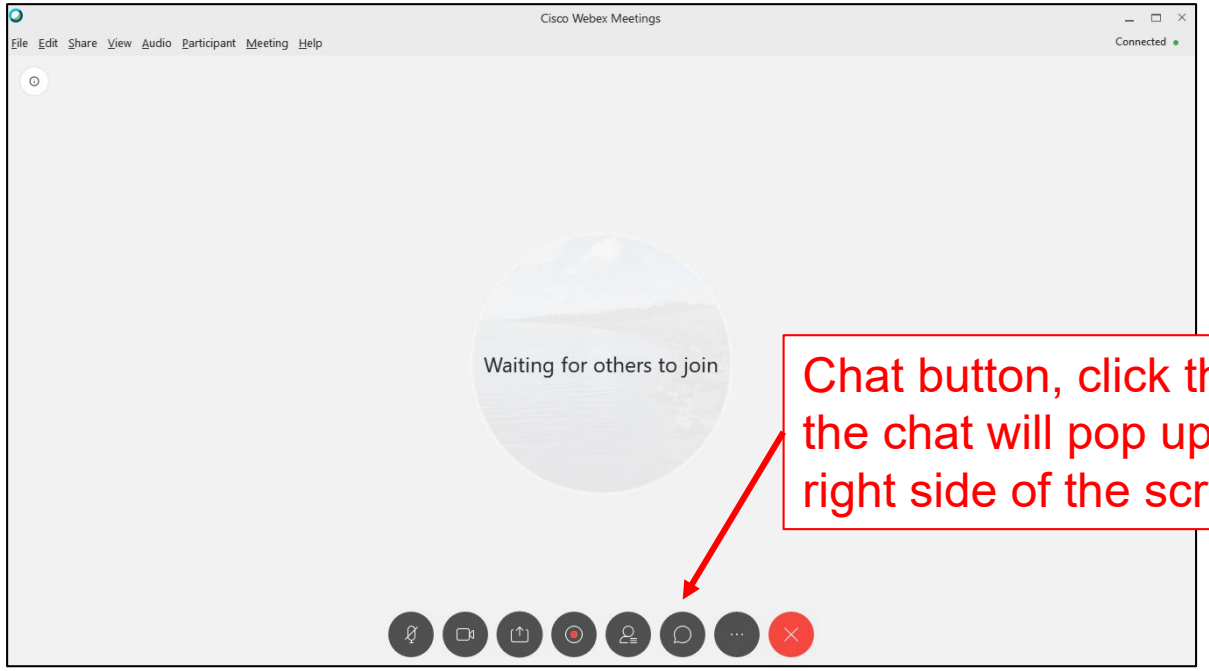
Savannah Lacy, P.E.

Jacksonville District
Water Management Section
21-July-2020

US Army Corps of Engineers®

HOUSEKEEPING

- All lines have been put in listen only mode for the presentation.
- We will have the remainder of the hour (until 2:00 pm) after the presentation for comment
- After the presentation there will be a comment period, which will be facilitated through the chat function of the webinar. If you would like to make a comment, please enter your name and who you represent into the chat. We will call each commenter in an orderly fashion. Due to the number of commenters please keep your comment to 2 minutes or less.
- Comments should officially be made in writing by July 30th, 2020
  - 2020LORSHABEAComments@usace.army.mil



Chat button, click this and the chat will pop up to the right side of the screen

AGENDA

1. Need & Intent
2. Authority
3. Timeline
4. Comparison to AOF
5. Operational Strategy Overview
   a) General Plan
   b) Constraints
   c) Water Banking
6. Modeling Results and the Analysis of Effects
   a) Lake Okeechobee Water Levels
   b) Water Supply
   c) Northern Estuaries
7. Key Takeaways
8. Comment Period

NEED & INTENT

NEED

- 2016 and 2018 algal blooms both covered over 80% of Lake Okeechobee
- 2016 and 2018 blooms caused environmental and economic damage in both the St. Lucie and Caloosahatchee Estuaries
- 2018 coupled with intense Red Tide Event on Gulf Coast exacerbated adverse conditions in the Caloosahatchee
- There are health risks associated with contact with blooms which are toxin producing

INTENT

To reduce the risk of exacerbating potential health concerns associated with algal blooms in Lake Okeechobee, the St. Lucie, and Caloosahatchee estuaries while not impacting other project purposes.

AUTHORITY

The Corps may consider water quality in its operations of the C&SF Project. Section 203 of the Flood Control Act of 1968, Public Law 90-483, approved House Document Numbered 369, 90th Congress, 2d Session, which modified the C&SF Project and explicitly states that water quality is an operational consideration. It states:

“Although the report does not make recommendations specifically for water quality control, the problems associated with water use are of particular concern and the maintenance of optimum and desirable water quality is a prime objective in the operation of the project. Engineering and operation methods to evaluate and minimize the concentration of pesticides, herbicides, and nutrients and their effects on fish and wildlife in the conservation areas, Lake Okeechobee, and in the Everglades National Park will be employed to the maximum practicable extent. Water-quality control is a vital function in proper water resource management and will be incorporated in operational procedures as may be dictated by results of continuing investigations in this area in cooperation with affected State and Federal agencies.”

While the Corps does not have general authority to implement pollution control measures for the C&SF Project, it can incorporate operational methods to minimize nutrients and their effects on fish and wildlife to the maximum practicable extent.

TIMELINE

July 2019:

- Draft Environmental Assessment released for public comment
- Received 500+ comments

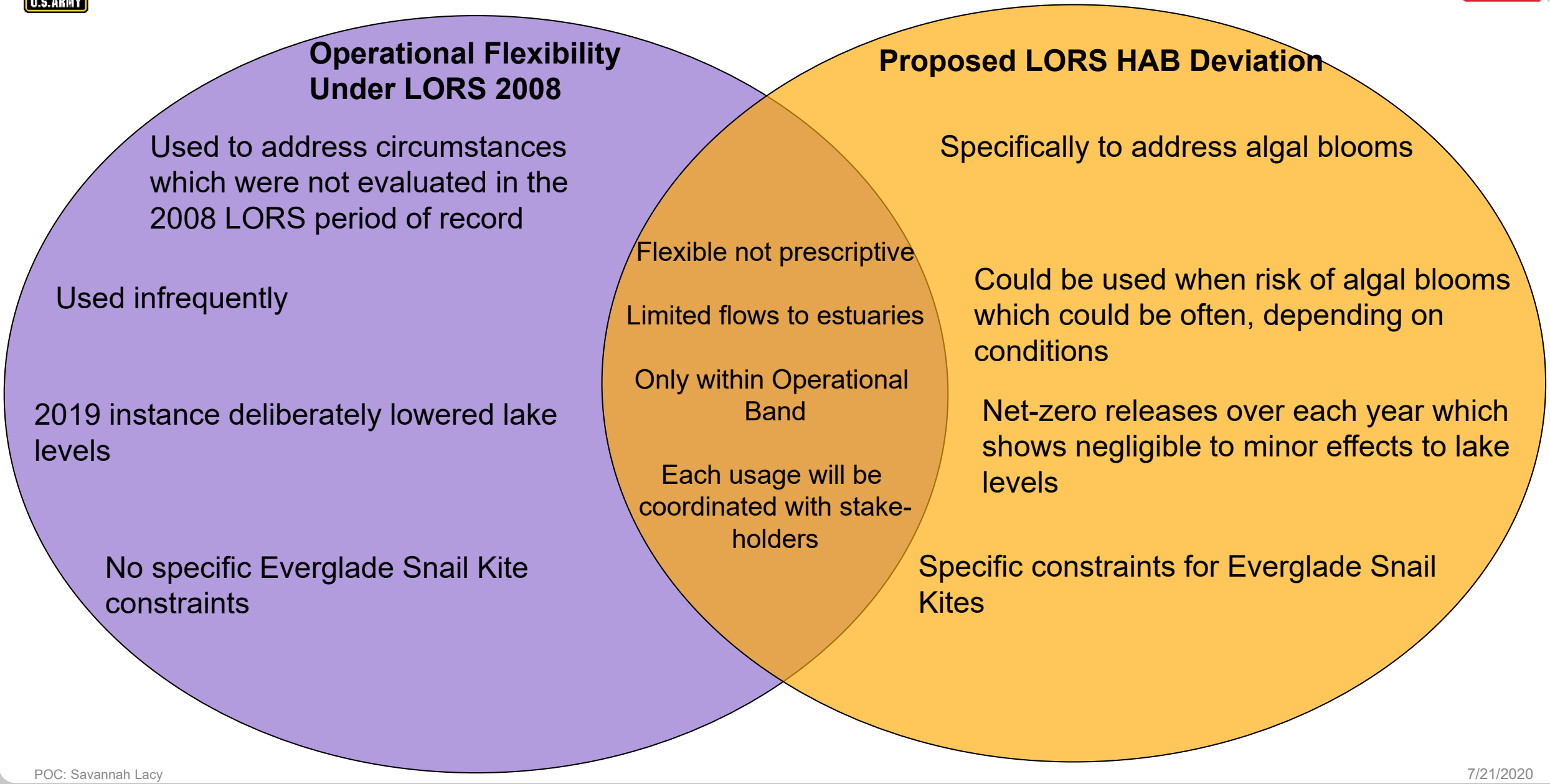
Winter 2019-2020

- Modeling and further analysis performed in response to comments
  - Deviation operations modeled illustrate operations and complete a more thorough analysis of effects

July 2020

- Draft Revised Supplemental Environmental Assessment released for public comment including an additional modeling appendix
  - Minor changes to Operational Strategy
  - Additional information and references added to EA based on comments and modeling

COMPARISONS



OPERATIONAL STRATEGY

If any of these are true, then USACE could implement HAB operations

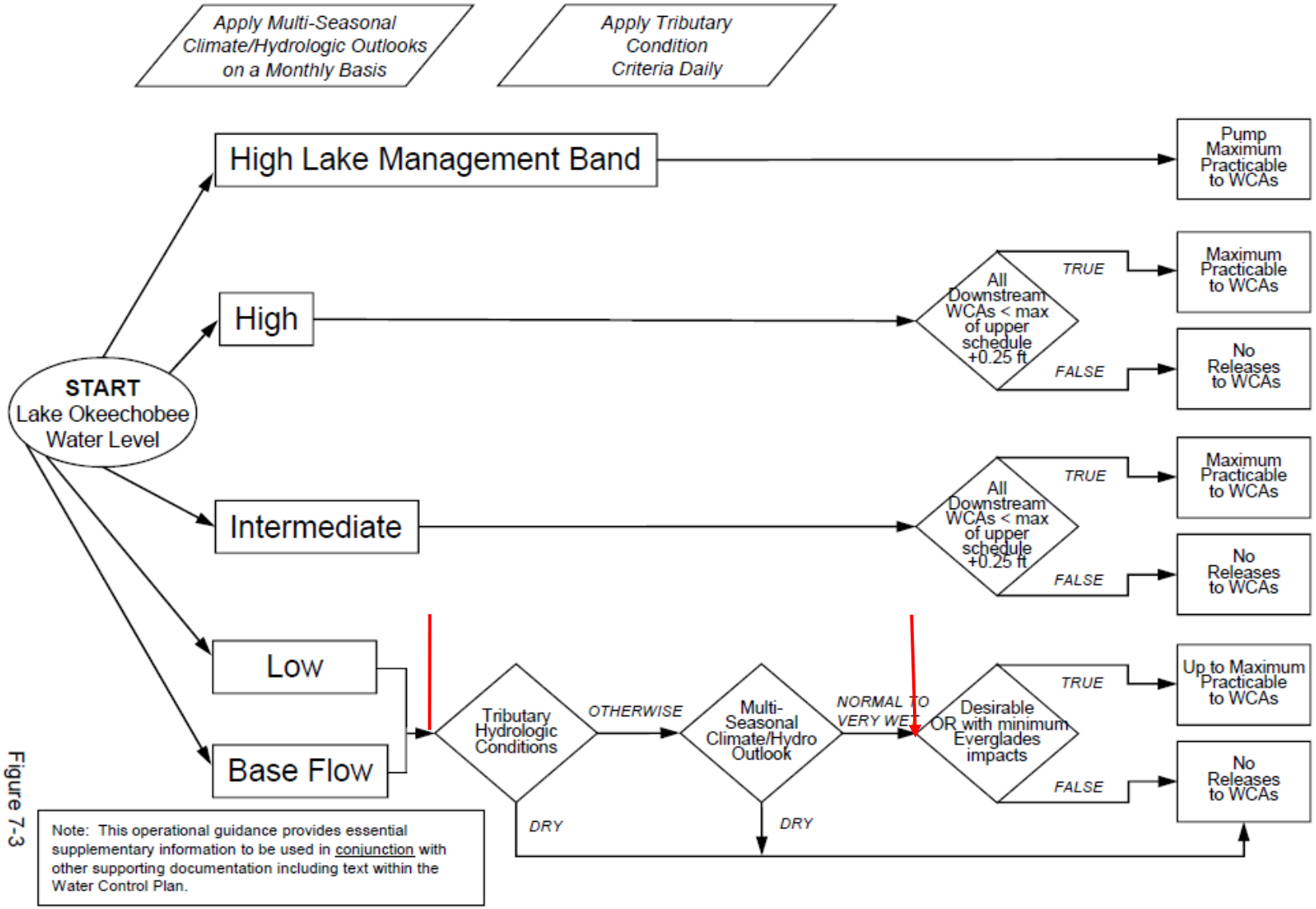
- If a HAB currently happening in lake, canals, or estuary
- If state of emergency declared for a HAB
- If a HAB is forecasted
- If a HAB has occurred in last 12 months and caused environmental or economic harm

HAB Operations:

- Coordinate with agencies
- Could make releases higher than LORS guidance in advance of HAB (limited to 2,000 cfs at S-79 and 730 cfs at S-80) which will be banked in a water bank
- Could reduce or hold back releases recommended by LORS guidance during a HAB and would use the water bank as a guide
- Track releases as water bank, such that releases made above and below LORS guidance would balance out to zero over one year (1 Feb – 1Dec) - having no net impact to water supply, dam safety, or other project purposes

2008 LORS

Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas



Note: This operational guidance provides essential supplementary information to be used in conjunction with other supporting documentation including text within the Water Control Plan.

Figure 7-3

2008 LORS

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)

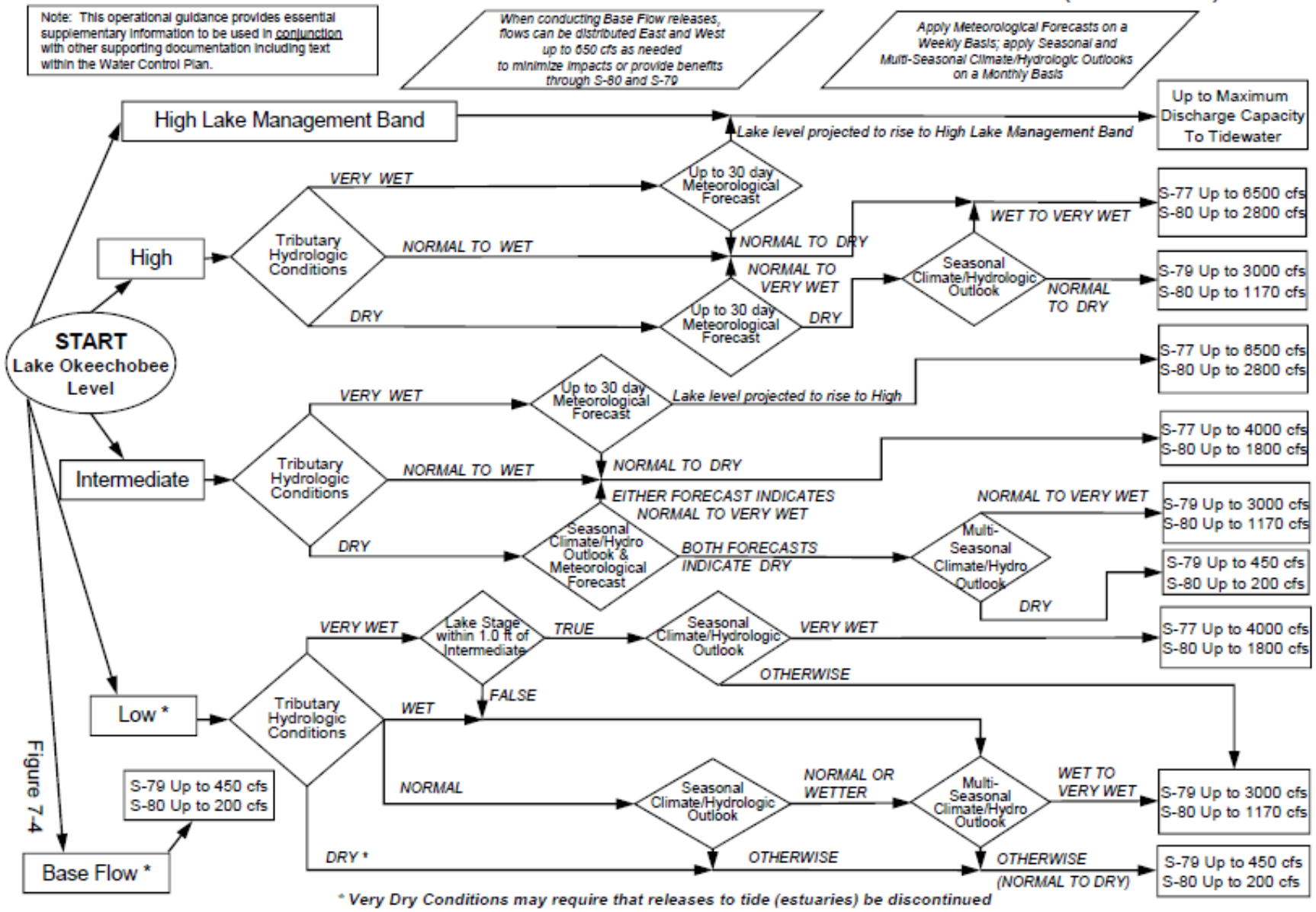
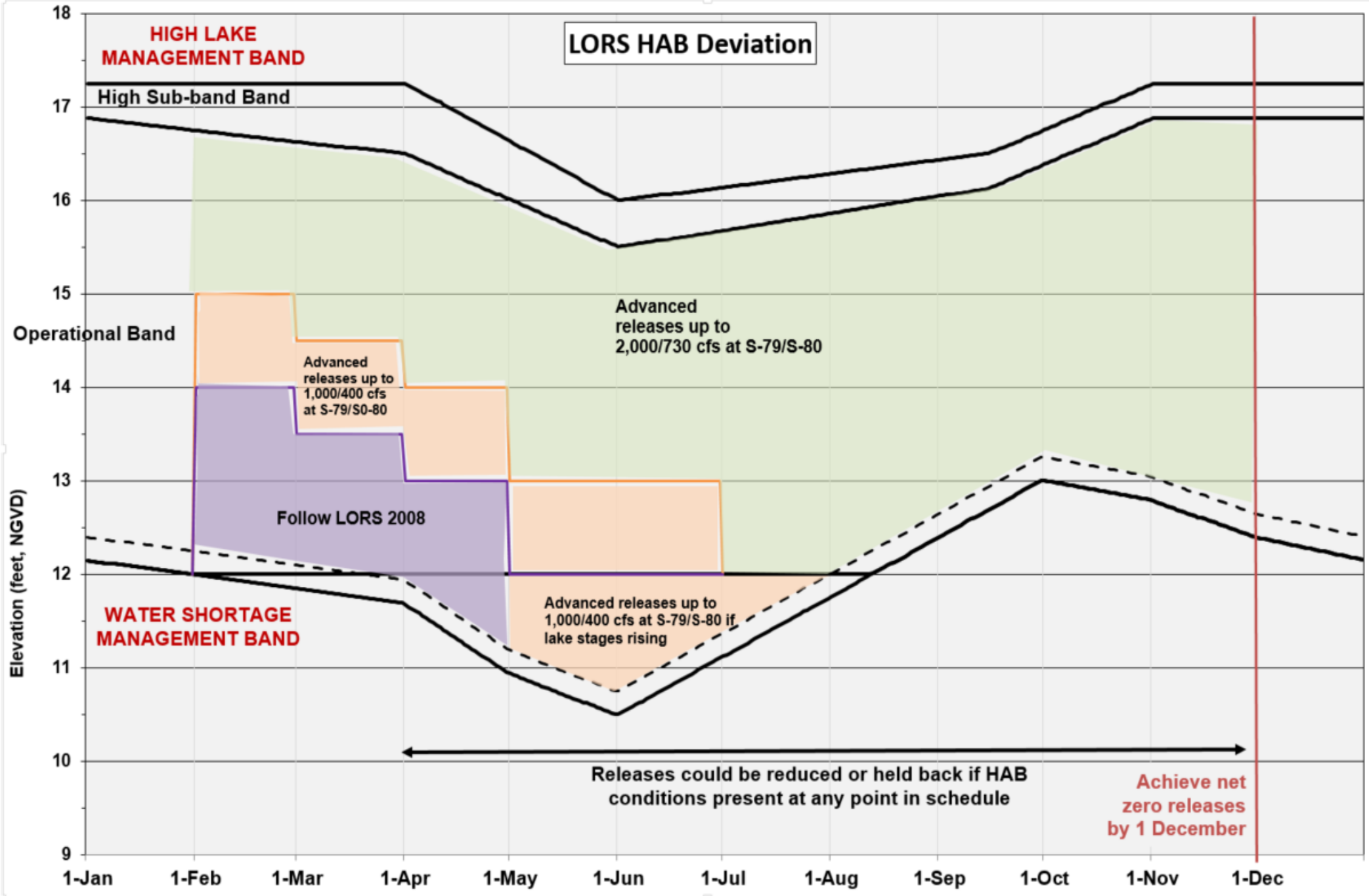


Figure 7-4


LORS HAB Deviation
HIGH LAKE MANAGEMENT BAND
High Sub-band Band
Operational Band
Advanced releases up to 2,000/730 cfs at S-79/S-80
Advanced releases up to 1,000/400 cfs at S-79/S0-80
Follow LORS 2008
Advanced releases up to 1,000/400 cfs at S-79/S-80 if lake stages rising
WATER SHORTAGE MANAGEMENT BAND
Releases could be reduced or held back if HAB conditions present at any point in schedule
Achieve net zero releases by 1 December
Elevation (feet, NGVD)
18
17
16
15
14
13
12
11
10
9
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec

ADDITIONAL CONSTRAINTS

Endangered Everglade Snail Kites

- Accounting period (1 Feb – 1 Dec) corresponds to snail kite nesting period to help ensure no net effects on stage at critical times
- No releases below 12 feet unless the lake is rising
- Recession rates will be taken into account during nesting season to avoid high unnatural rates (maintain <0.5 ft/month)

Water Supply

- Stop releases if lake fell within 0.25 feet of Water Shortage Management Band
- Releases would not be made if La Niña, drought, or significantly below normal rainfall is forecasted
- No releases below 12 feet unless the lake is rising

Water Quality

- Releases south are and will be made within the constraints of Stormwater Treatment Area storage and treatment capacity
- Releases to tide are made below harm thresholds for estuary salinity

Flood Risk Management

- Releasing less than LORS will be a unique decision each time and will be informed by current and forecasted lake levels as well as rainfall and tropical forecasts

IMPLEMENTATION

- Intention to begin taking action under the deviation operations will be communicated publically and the Corps will coordinate with federal, state, and local agency on when to begin and the magnitude of the advanced releases to be done.

- Lake Okeechobee Periodic Scientist Calls could be used for deviation coordination purposes. The Corps is committed to meeting with stakeholders to gather information on current conditions and observations regularly and especially throughout any deviation operations.

- After the deviation operations are implemented for the first time, the Corps will evaluate the performance of the strategy, identify outcomes, challenges, and conclusions in a memo to the South Atlantic Division Commander and may request changes to or an extension of the deviation based on that analysis.

- The Corps may also terminate the deviation at any time

WATER BANKING

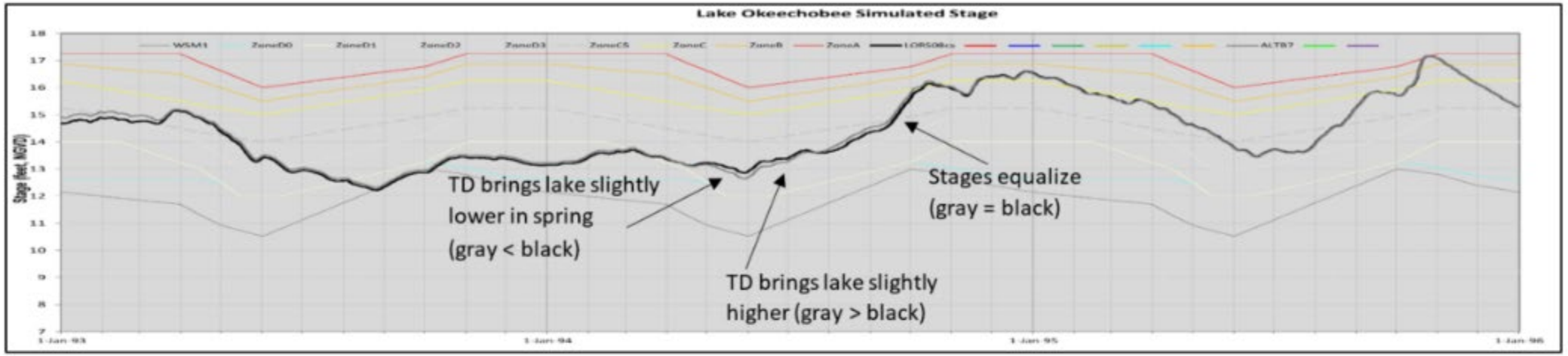
Week of	LORS Part D guidance (cfs)	Actual Releases made (cfs)	Delta Guidance/ LORS (cfs) (-) above LORS (+) below LORS	Duration (days)	Delta - Guidance/ LORS (ac-ft)* (-) above LORS (+) below LORS	Cumulative Water Account** (ac-ft)
27-Mar-18	650	2,730	-2,080	7	-28,872	-28,872
3-Apr-18	650	2,730	-2,080	7	-28,872	-57,745
10-Apr-18	650	2,730	-2,080	7	-28,872	-86,617
17-Apr-18	650	2,730	-2,080	7	-28,872	-115,490
24-Apr-18	650	2,730	-2,080	7	-28,872	-144,362
1-May-18	650	2,730	-2,080	7	-28,872	-173,235
8-May-18	650	2,730	-2,080	7	-28,872	-202,107
15-May-18	650	2,730	-2,080	7	-28,872	-230,980
22-May-18	4,170	4,170	0	7	0	-230,980
29-May-18	5,800	5,800	0	7	0	-230,980
5-Jun-18	5,800	5,800	0	7	0	-230,980
12-Jun-18	5,800	5,800	0	7	0	-230,980
19-Jun-18	4,170	4,170	0	7	0	-230,980
26-Jun-18	4,170	4,170	0	7	0	-230,980
3-Jul-18	5,800	5,800	0	7	0	-230,980
10-Jul-18	4,170	0	4,170	7	57,884	-173,096
17-Jul-18	4,170	0	4,170	7	57,884	-115,212
24-Jul-18	4,170	0	4,170	7	57,884	-57,329
31-Jul-18	4,170	0	4,170	7	57,884	555
7-Aug-18	4,170	4,170	0	7	0	555
					Total (ac-ft)***	555

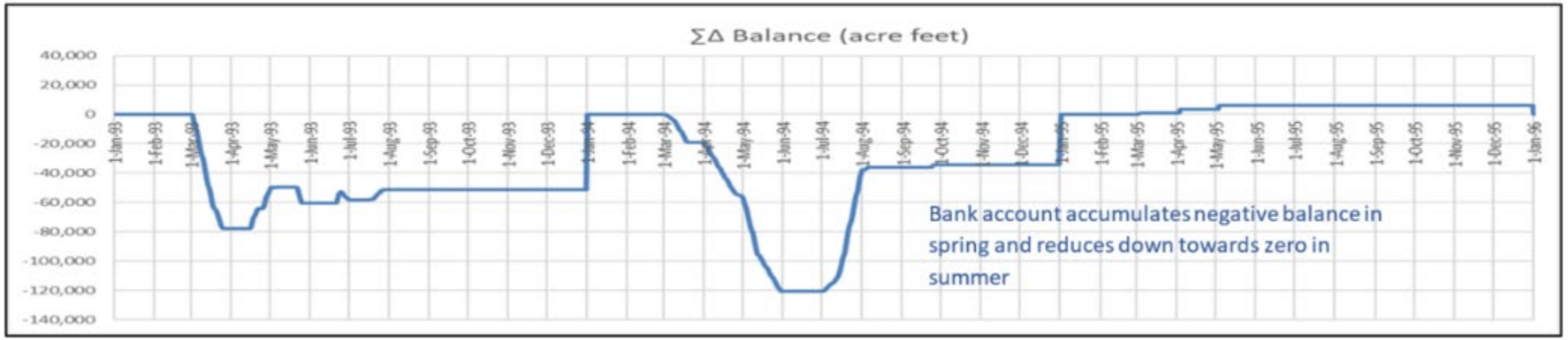
Advanced releases made (Actual > LORS Guidance)

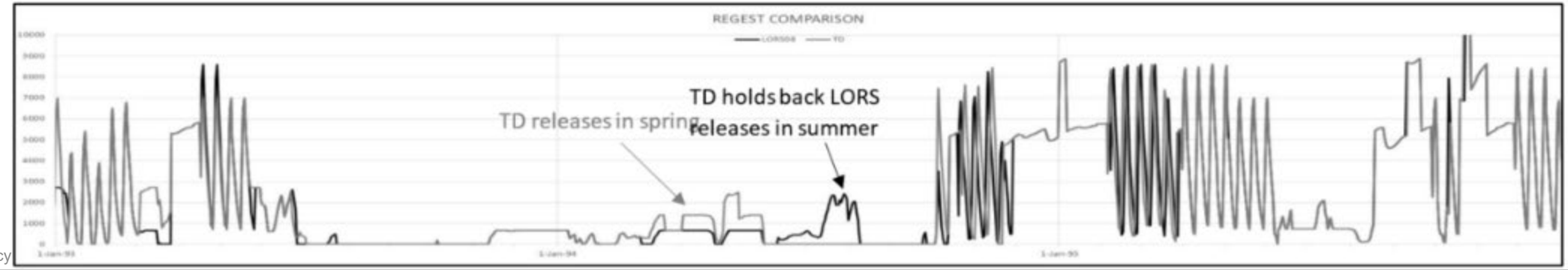
Normal LORS operations

Releases held back for theoretical bloom conditions (Actual < LORS Guidance)

EXAMPLE YEAR 1994







MODELING EFFORT

The Lake Okeechobee Operations Screening (LOOPS) Model (Neidrauer et al. 2006) was used to complete the modeling analysis within this appendix. The LOOPS model is a spreadsheet-based model (Microsoft Excel ©) with a continuous simulation period of 1965-2010.

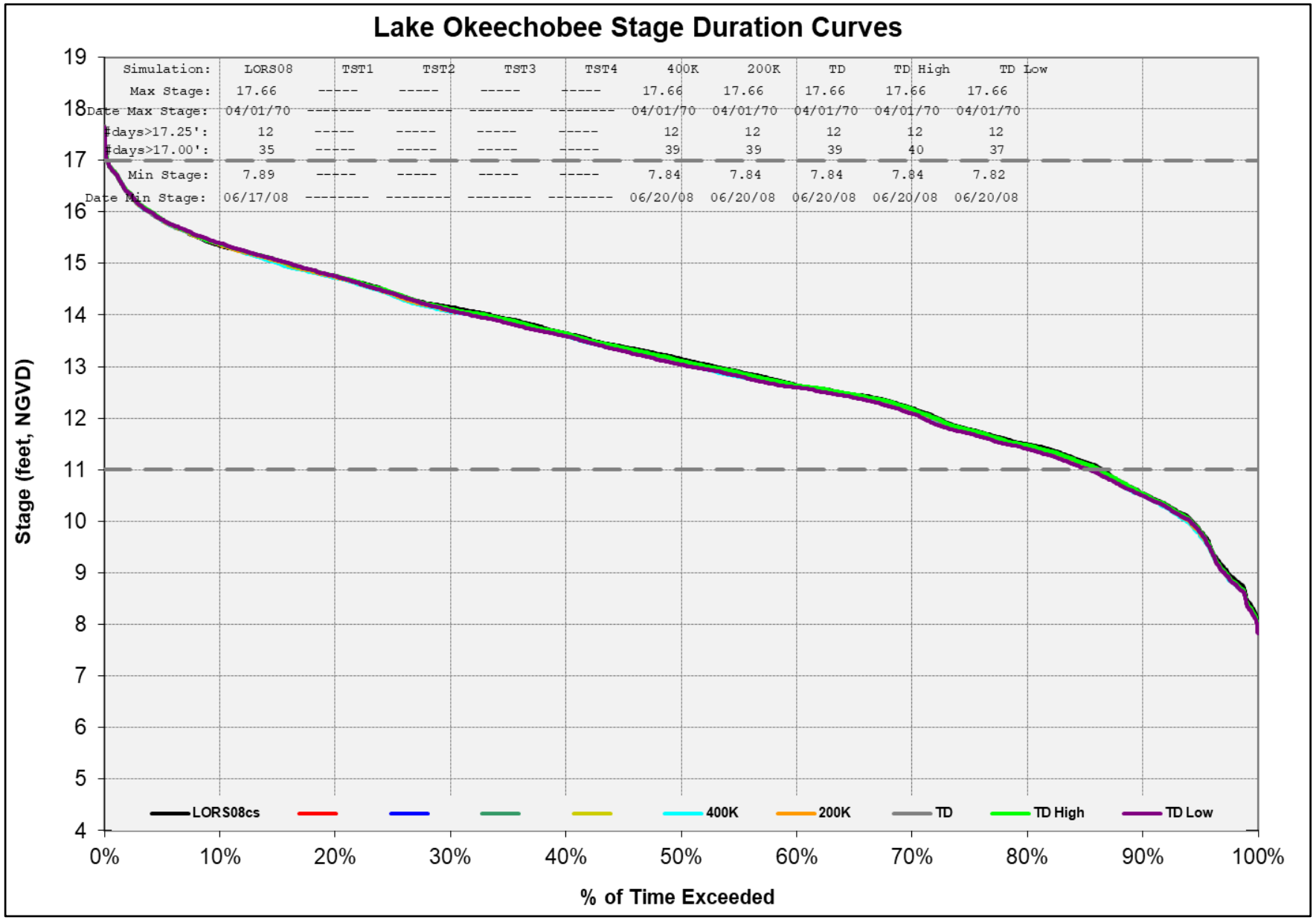
Different Simulations:

- Baseline LORS 2008 assumptions run for entire simulation from start to finish.
- Several different stage criteria were used to hone in on those green, orange, and purple zones I showed you earlier. These are called TD, TD High, and TD Low. I have these criteria on the next slide.
- Several different credit limits were used to test the sensitivity of a credit limit concept – which would put a cap on the volume of advanced releases which could be done in the spring time. These are called 200K and 400K in the plots coming up.

ADVANCE RELEASE CRITERIA

Month	S79 [cfs]	S80 [cfs]	TD Low Stage [FT NGVD]	TD High Stage [FT NGVD]	TD Stage [FT NGVD]
Credit limit Assumption (ac-ft)			-120,000	-120,000	-120,000
February	2000	730	Stage >14	Stage >15.5	Stage >15
	1000	400	13< Stage<14	14.5< Stage<15.5	14< Stage<15
	LORS	LORS	Stage <13	Stage <14.5	Stage <14
March	2000	730	Stage >13.5	Stage >15	Stage >14.5
	1000	400	12.5< Stage <13.5	>14 & <15	13.5<Stage<14.5
	LORS	LORS	Stage <12.5	Stage <14	Stage <13.5
April	2000	730	Stage >13	Stage >14.5	Stage >14
	1000	400	12<Stage<13	13.5<Stage<14.5	13<Stage<14
	LORS	LORS	Stage <12	Stage <13.5	Stage <13
May/June	2000	730	Stage >12	Stage >13.5	Stage >13
	LORS	LORS	Stage <12	Stage <12	Stage <12

LAKE STAGE ANALYSIS



LORS08cs: Refers to the LORS 2008 Baseline condition. Comparison run where LORS 2008 was used for lake operations in a continuous simulation of the POR. No deviation operations were done at any point in this baseline simulation.

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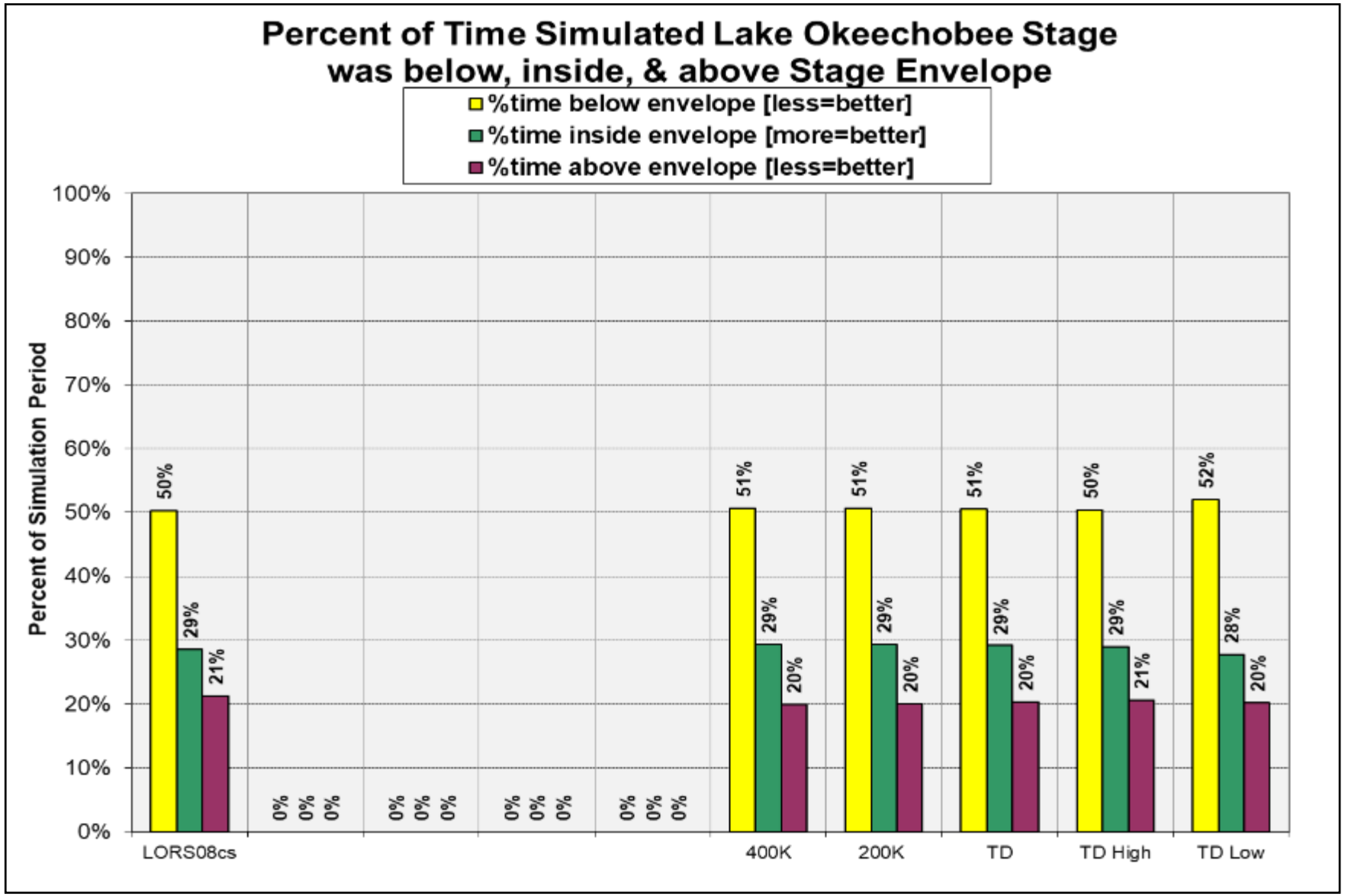

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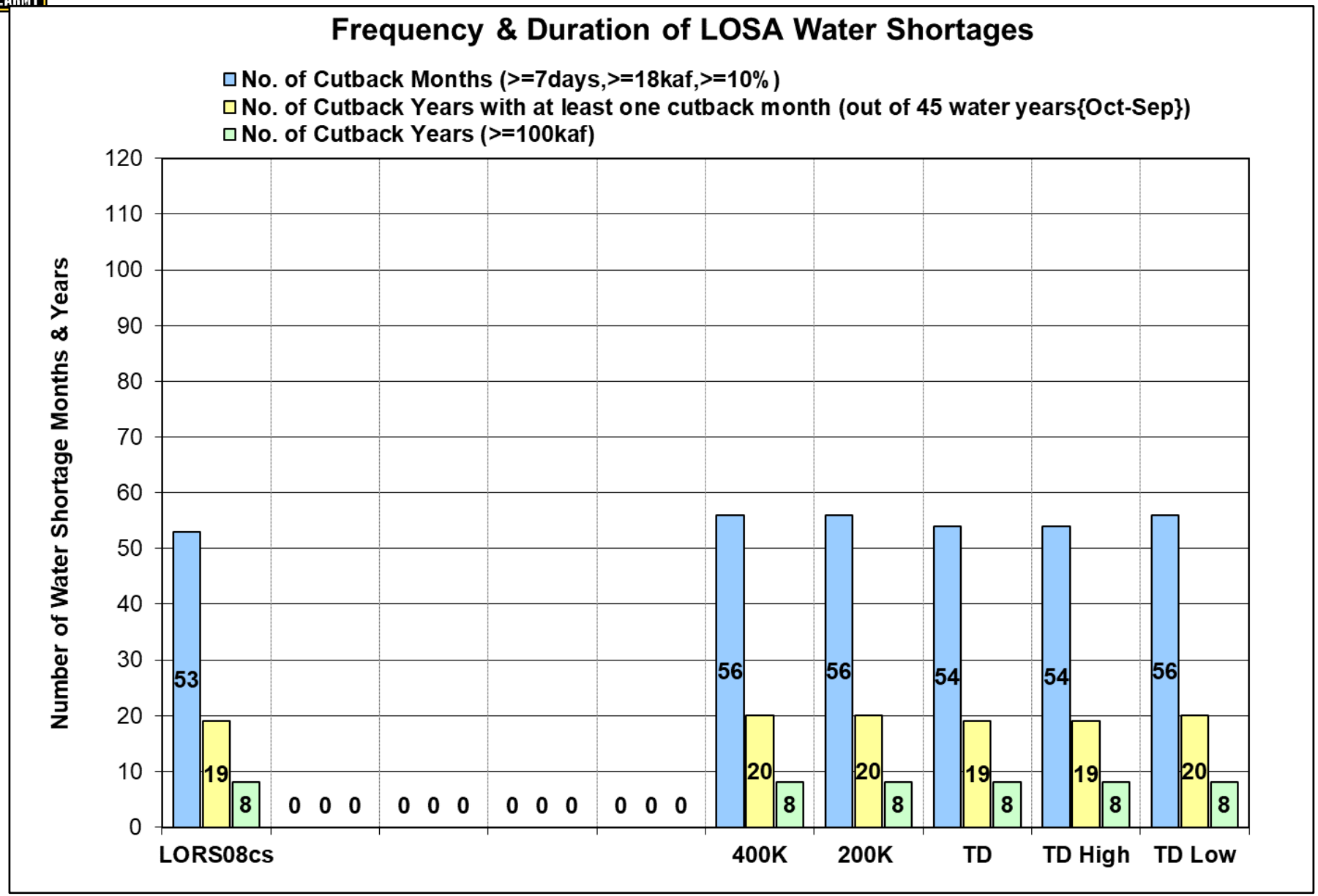
WATER SUPPLY ANALYSIS



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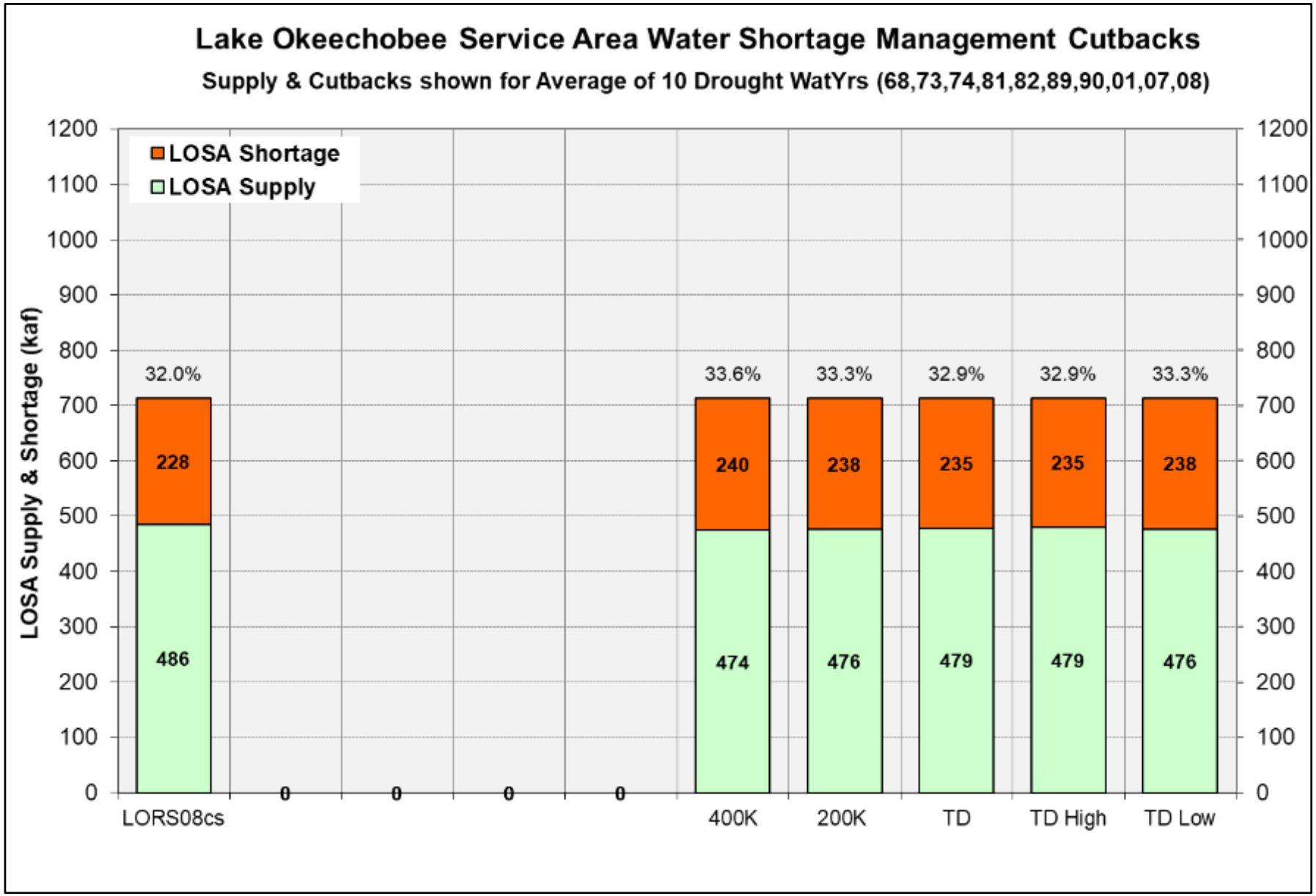

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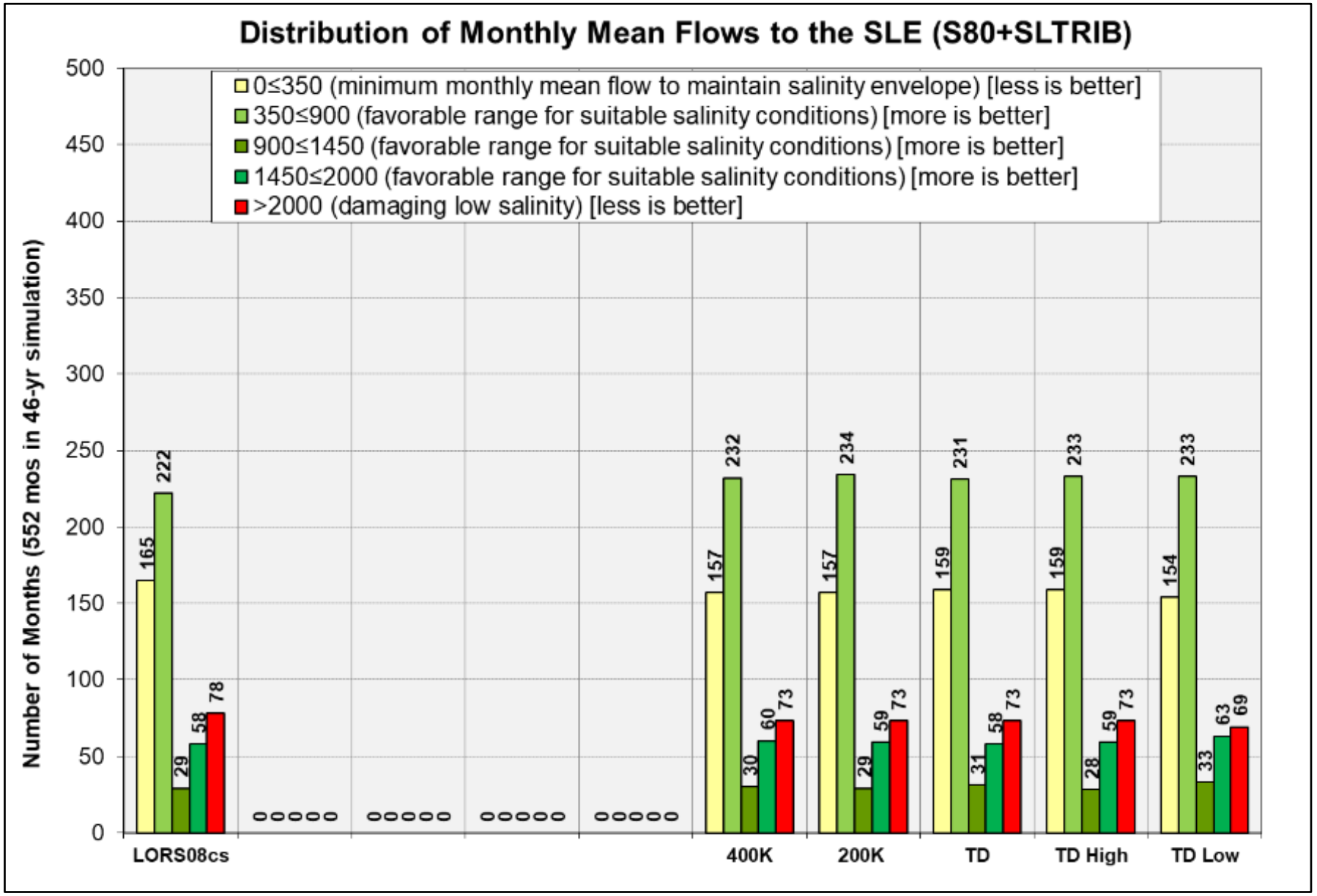
ST. LUCIE ESTUARY



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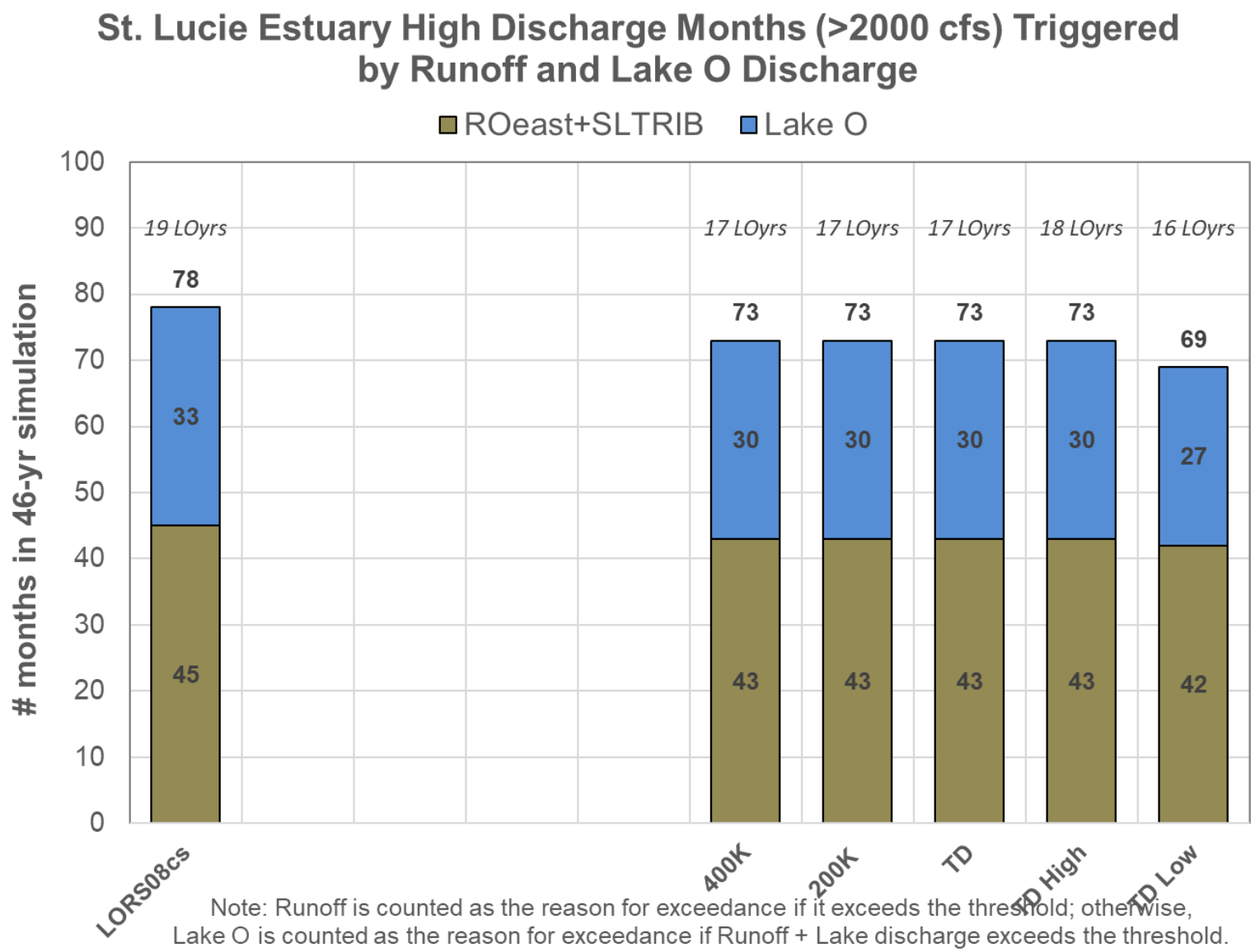

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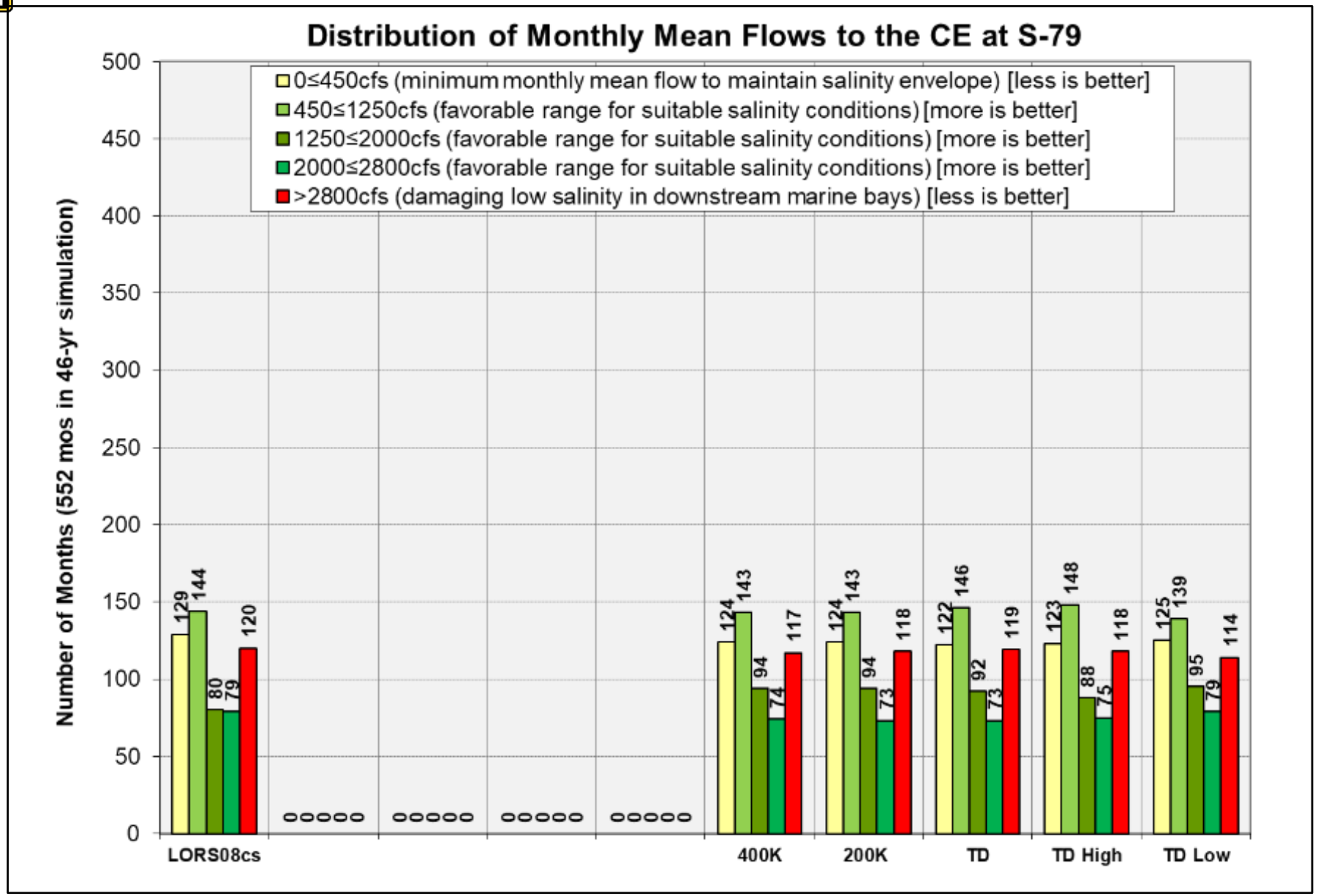

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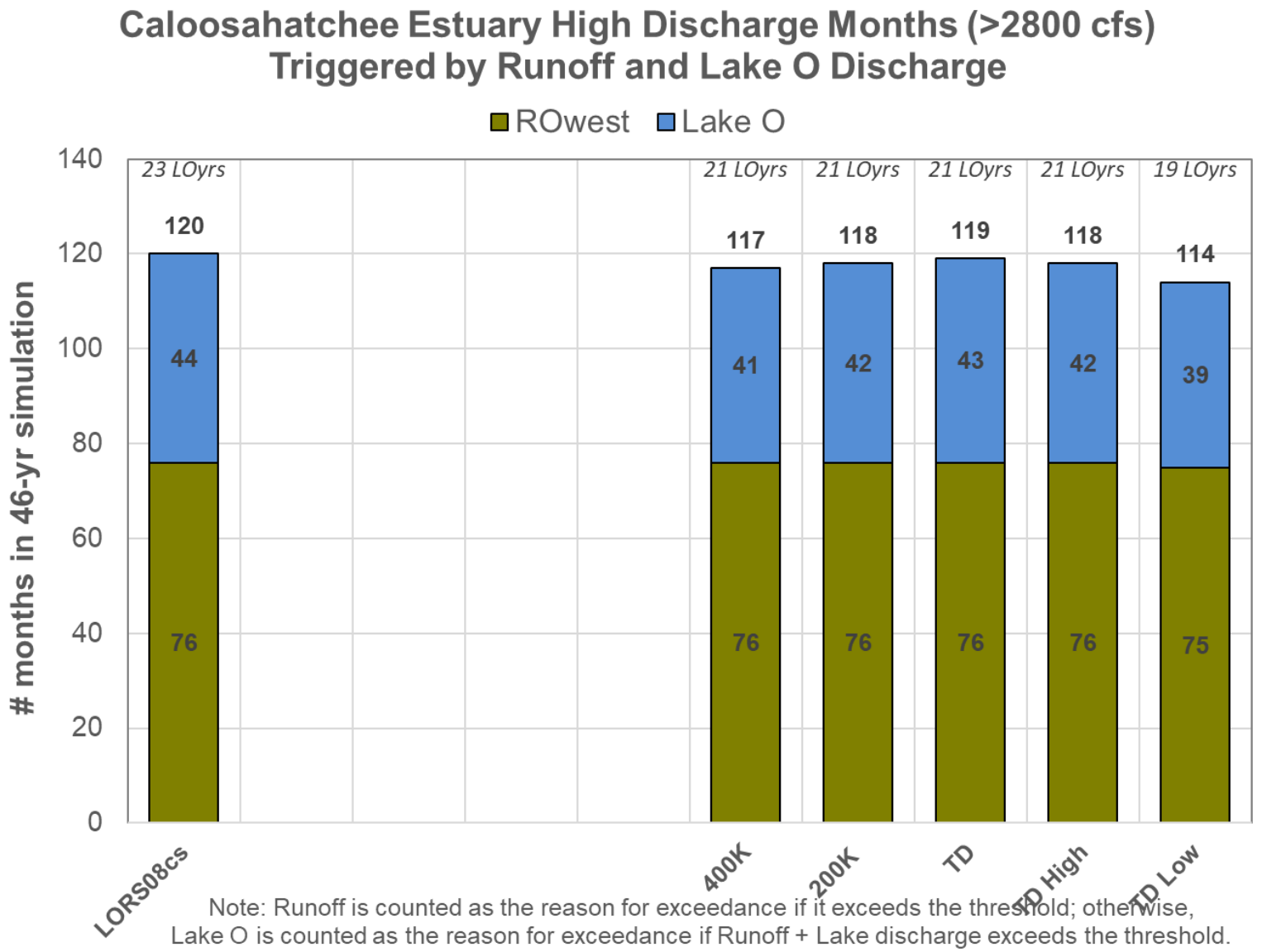

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MODEL ANALYSIS CONCLUSIONS

- Overall the simulations performed similarly to LORS 2008
- Lake levels: Overall no significant change from LORS across POR
- Water Supply: Drought years were examined in depth and effects of the deviation ranged from nonexistent to minor on water supply.
- Estuaries: Overall small ancillary benefits to flow characteristics and large benefits from reducing risk of transporting blooms from the lake to the estuaries or exacerbating algal blooms in the estuaries

Modeling conclusions resulted in two additional criteria added to the operational strategy:

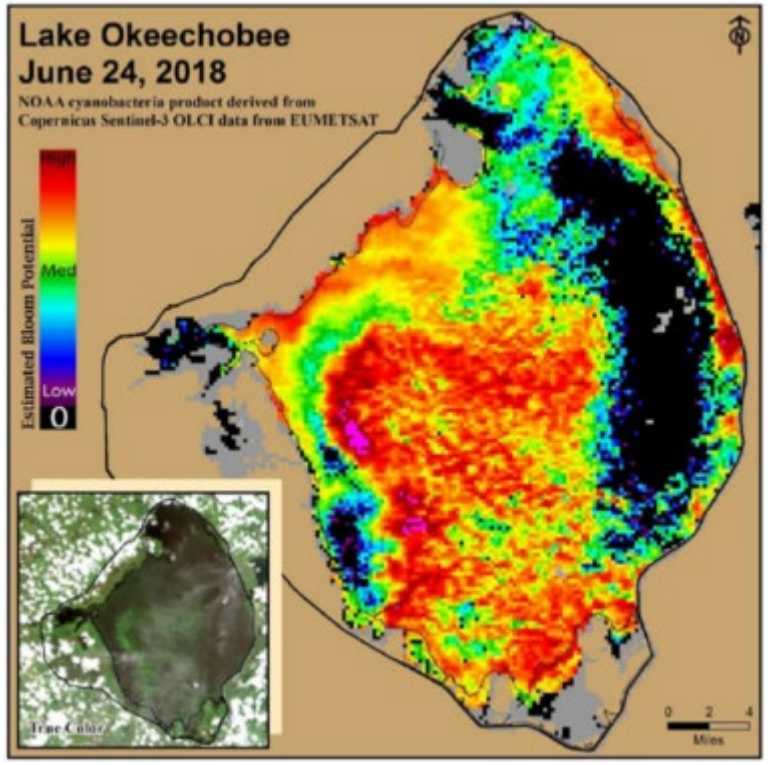
1. *Credit limit concept* – defined each year based on conditions and forecasts which will lay out volumetric guidelines on advanced releases for that instance of the deviation
2. *Stage criteria* - for advanced releases limits lake levels and defines a high and low pulse for advanced releases

KEY TAKEAWAYS

What it is:
Crucially flexible and adaptable plan developed based on experience in 2016 and 2018 in order to approach an important problem which has a high level of uncertainty about timing, intensity, toxicity, spatial location and distribution.

What it is NOT:
Not a plan to deliberately lower lake levels

When:
Likely would not need to be implemented in 2020



REFERENCES

LOOPS Model:
Neidrauer, Calvin J, et al. “A Spreadsheet-Based Screening Model for Evaluating Alternative Water Management Strategies for Lake Okeechobee, Florida.” *A Spreadsheet-Based Screening Model for Evaluating Alternative Water Management Strategies for Lake Okeechobee, Florida | Operating Reservoirs in Changing Conditions*, South Florida Water Management District,2006, ascelibrary.org/doi/10.1061/40875%28212%2935

Revised Supplemental Environmental Assessment:
https://www.saj.usace.army.mil/About/Divisions-Offices/Planning/Environmental-Branch/Environmental-Documents/
(note expand “Multiple Counties” and the deviation documents are located in line 41 of the table)

RECOVER Performance Metrics
https://www.saj.usace.army.mil/Missions/Environmental/Ecosystem-Restoration/RECOVER/RECOVER-Performance-Measures/.

PUBLIC COMMENT PERIOD

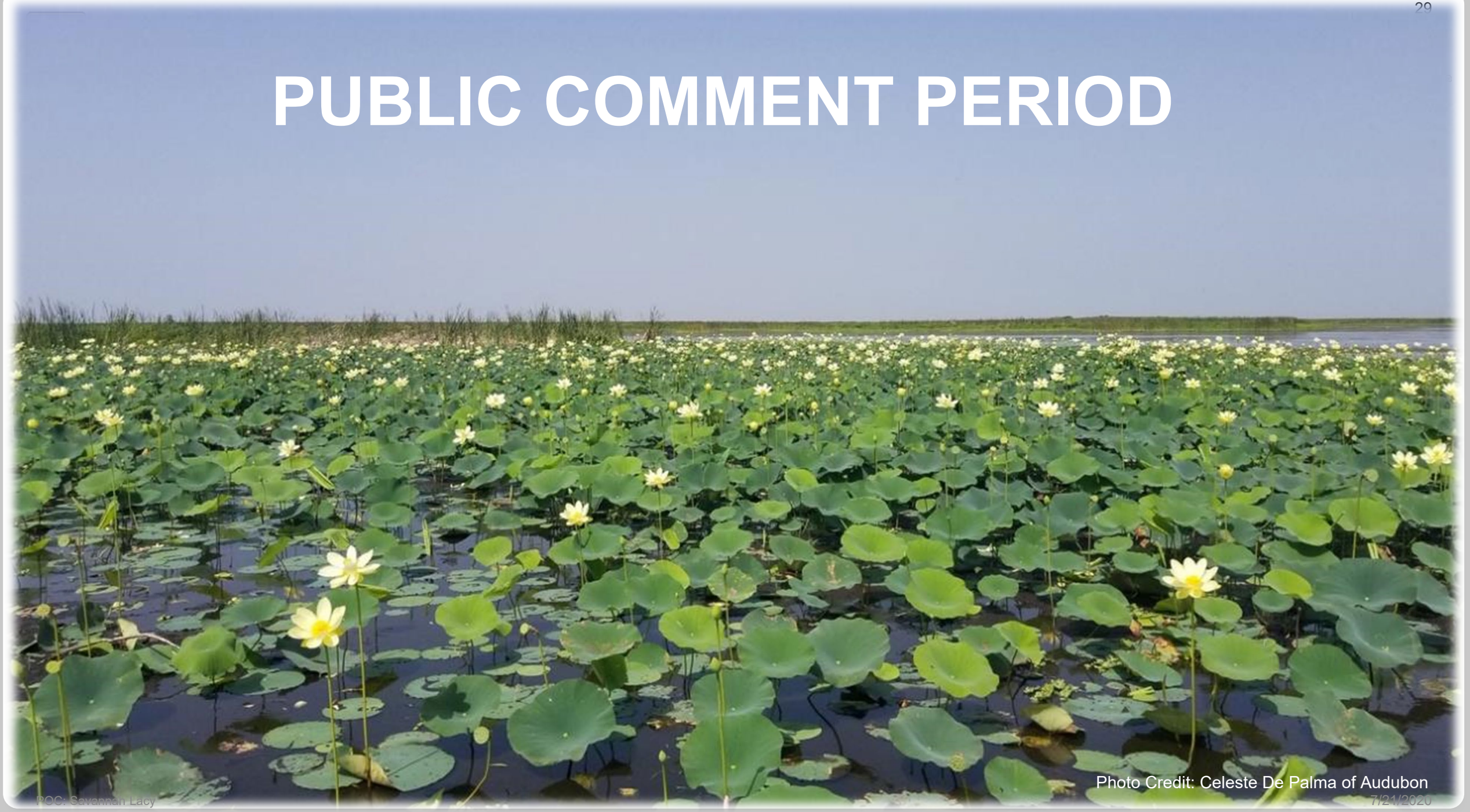


Photo Credit: Celeste De Palma of Audubon