

# LAKE OKEECHOBEE SYSTEM OPERATING MANUAL (LOSOM)

## PROJECT DELIVERY TEAM (PDT)

June 25, 2020  
Web Meeting

U.S. Army Corps of Engineers  
Jacksonville District



US Army Corps  
of Engineers®





# INTRODUCTION



- Welcome to the June 2020 PDT meeting for the Lake Okeechobee System Operating Manual
- Attendance –
  - PDT please type your name and agency into the chat
  - Public please type your name and organization into the chat
- Housekeeping Items:
  - All phones will be on mute unless you are have been unmuted by the facilitator
  - Question and comments will be taken via request to the facilitator or through the chat function
  - Please state your name and who you are representing before making a statement or asking a question



# STATEMENT OF INTENT



- The intent of this forum is to allow federal, state and local agencies, and tribal governments to exchange views, information or advice relating to proposed Lake Okeechobee, C&SF operations and the potential impacts to the surrounding areas.
- This meeting is not a forum for official policy discussion or formulation.
- The PDT performs technical staff functions. Members are encouraged to participate and share their technical skills and knowledge.
- Comments from the public will be accepted at a designated time that is separate from the interagency discussions.



# AGENDA



1. Introduction
  - a) Housekeeping 1:00 PM – 1:10 PM
  - b) Elected Official and Public Comment 1:10 PM – 1:30 PM
  
2. Performance Measure Package and Review 1:30 PM – 1:40 PM
3. Sub-Team Updates 1:40 PM – 2:15 PM
  - a) Plan Formulation and Modeling
    1. Overall summary of where we are in process
    2. Plan comparison Table of planning conditions
  - b) Water Supply
  - c) Water Quality
    1. Update on Algal Bloom Risk Metric
  - d) Environmental
    1. Update on pending PMs and process to finalize
  
4. PDT Comment 2:15 PM – 2:30 PM
5. Public Comment 2:30 PM – 2:45 PM
6. Break 2:45 PM – 2:55 PM
7. Period of Record Extension(make 1 hr) 2:55 PM – 3:55 PM
8. PDT Comment 3:55 PM – 4:10 PM
9. Public Comment 4:10 PM – 4:25 PM
10. Schedule Look Ahead & Closing Remarks 4:25 PM – 4:30 PM



# PERFORMANCE MEASURE PACKAGE REVIEW



## EXCERPT FROM PERFORMANCE MEASURE SUMMARY TABLE

Category	Performance Measure /Evaluation Metric	Description	Conceptual Plan Analysis	Iteration 1-3 Initial array, balanced array, selected plan	NEPA effects	Additional Information Requests	Documentation Sheet
Environmental	RECOVER PM: Lake Okeechobee Lake Stage	Measure of lake stages incorporating seasonal targets and recovery strategies	X	X	X		Yes
Recreation	Recreation in Lake Okeechobee	# of days in period of record when lake stage is < 11ft	X	X	X		Yes
Water Supply	Water supply deliveries to Lower East Coast (LEC)	Quantification of water supply deliveries to LEC		X	X		Yes

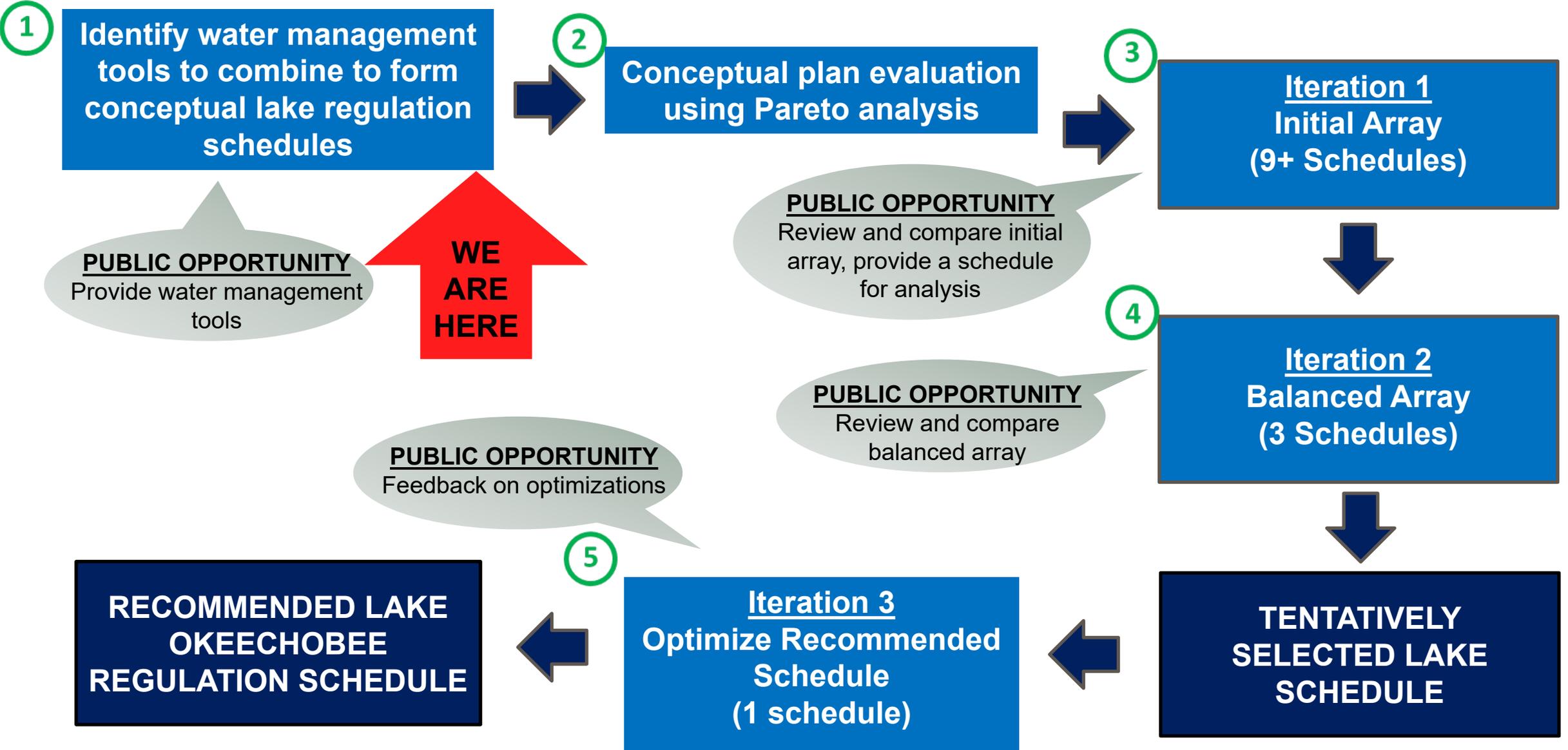
**Feedback requested by 17 July**



# SUB-TEAM UPDATES



# LOSOM PLAN FORMULATION PROCESS



Project Feature/ Operational Scenario	Existing Condition Baseline (ECB) 2019	No Action 2022	No Action 2025
Lake O Schedule	Lake Okeechobee Regulation Schedule 2008 (LORS08) with extended period of record (1965-2016)	Same as ECB 2019	Same as ECB 2019
Lake O Regulatory Releases South	60k ac-ft (average annual flow to Central Flowpath)	<u>Updated</u> average annual flows south to Central Flowpath + COP	<u>Updated</u> average annual flows south to Central Flowpath + COP + A-2 STA (grow-in only)
HHD Rehabilitation	Partial HHD Rehab (no change to operations - subject to LORS08)	HHD Rehab Completed (no change to operations - subject to LORS08)	Same as No Action 2022
Kissimmee River Restoration (KRR)	Restored reaches / pools of Kissimmee River as of 2019	KRR Construction Complete, Revised Headwaters Schedule (2020)	Same as No Action 2022

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>Stormwater Treatment Areas (STAs) &amp; Flow Equalization Basins (FEBs)</b>	<p>EAA STAs designed to reduce total phosphorus (TP) concentration in surface water runoff prior to discharging this water into the Everglades Protection Area (EPA). Effective Treatment Areas:            STA-1E = 4994 ac,            STA-1W = 6544 ac,            STA-2 = 15495 ac,            STA-3/4 = 16327 ac,            STA-5/6 = 13685 ac,            All STAs = 57045 ac.</p> <p>A-1 FEB provides 60,000 ac-ft of storage to attenuate peak stormwater flows prior to discharging into STA 2 &amp; STA3/4. L-8 FEB provides 45,000 ac-ft of storage to attenuate peak flows in eastern flowpath.</p>	<p>Same as ECB 2019 + STA-1W Expansion Phases 1 &amp; 2</p>	<p>Same as No Action 2022 + A-2 STA (grow in only)</p>

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>CERP C-44 Reservoir and C-44 STA</b>	<p>Not operational</p>	<p>C-44 reservoir and STA capture and provide water quality treatment to local runoff from the C-44 Basin, return it to C-44 or Lake Okeechobee when conveyance to Lake Okeechobee is possible, and reduce peak flows at S-80.</p> <p>C-44 reservoir will have the capacity to store 50,600 ac-ft of water. C-44 STA is approximately 6,300 acres.</p> <p>Operations governed by the IRL-S PIR DPOM.</p>	<p>Same as No Action 2022</p>

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>Ten Mile Creek Water Preserve Area &amp; STA</b>	As-built Ten Mile Creek Water Preserve Area & STA receives excess water from North Fork Basin to improve the quantity and timing of water deliveries to the North Fork of the St. Lucie River by capturing and storing storm water originating in the Ten Mile Creek Basin.	Same as ECB 2019	Same as ECB 2019
<b>CERP C-23/C-24 STA</b>	Not operational	Same as ECB 2019	Constructed & Operated per the IRL-S PIR DPOM
<b>CERP C-23/C-44 Interconnect</b>	Not constructed/operational	Same as ECB 2019	Constructed & Operated per the IRL-S PIR DPOM

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>CERP C-43 Reservoir</b>	Not operational	Same as ECB 2019	<p>C-43 reservoir will store approximately 170,000 ac-ft of water. It will accept water from the C-43 when flows are over 450 cfs at S-79 and there is storage in the reservoir, and will release when flows are below 450 cfs at S-79.</p> <p>Operated per the C-43 PIR DPOM.</p>

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>L-8 Basin</b>	<p>Lake releases to tide through L-8 consistent with LORS08:</p> <ul style="list-style-type: none"> <li>• No C51 Reservoir</li> <li>• City of WPB and Grassy Waters - Preserve Diversion and Impoundment Permit</li> <li>• G-161 Structure (Normal and Emergency Operations)</li> <li>• G-160 is operated so as to meet recommended target stages within the Loxahatchee Slough</li> <li>• G-92 Meet Lox River MFL</li> <li>• S-46 Water Control Plan</li> </ul>	<p>Same as ECB 2019</p>	<p>Same as ECB 2019</p>

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>CEPP South</b>	Not operational	Removal of Old Tamiami Trail. Structures S-333N, S-631, S-632 and S-633 complete	Same as No Action 2022 + S-355W
<b>Tamiami Trail Next Steps</b>	Phase 1 Bridging Complete	Phase 2 Conspan culverts complete	Phase 2 Roadway raising complete
<b>Water Conservation Area 1 (Arthur R. Marshall Loxahatchee National Wildlife Refuge)</b>	Current C&SF Regulation Schedule (last updated in 1995). Includes regulatory releases to tide through LEC canals.	Same as ECB 2019	Same as ECB 2019

<b>Project Feature/ Operational Scenario</b>	<b>Existing Condition Baseline (ECB) 2019</b>	<b>No Action 2022</b>	<b>No Action 2025</b>
<b>Water Conservation Area 2A &amp; 2B</b>	<p>Current C&amp;SF regulation schedule (last updated in 1989). Includes regulatory releases to tide through LEC canals</p>	<p>Same as ECB 2019</p>	<p>Same as ECB 2019</p>
<b>Water Conservation Area 3A</b>	<p>Everglades Restoration Transition Plan (ERTP) regulation schedule for WCA-3A including incremental updates. L-29 Canal Constraint is 8.5 feet NGVD with 90-day annual duration limit above 8.3 feet</p>	<p>COP Proposed Regulation Schedule for WCA-3A (Zone A). Tamiami Trail Flow Formula for inflows to ENP; L-29 Canal Constraint is 8.5 feet NGVD with 90-day annual duration limit above 8.3 feet</p>	<p>Same as No Action 2022</p>



# WATER SUPPLY SUB-TEAM



- Updates to WS-03BN were sent to the Water Supply Sub-team on June 3 for review.
- Current planning assumptions for STOF Brighton and Big Cypress Reservations water demand will be utilized during the LOSOM Conceptual Plan Evaluation and Iteration 1 phases. Updated assumptions may be utilized for Iteration 2 pending until results from parallel coordination efforts between SFWMD and the STOF become available.



# WATER QUALITY SUB-TEAM



- Stakeholder interest in LOSOM treatment of algal bloom risk is high; desire for schedule to address algal bloom risk
- LOSOM team is addressing in several ways:
  - Development of algal bloom risk metric for use in schedule evaluation
  - Incorporating best available science into decision making process for future lake operations
  - Coordination with responsible agencies on monitoring and current activities
  - Future development of predictive tools



# CONCEPTUAL METRIC TO EVALUATE ALGAL BLOOM RISK ON LAKE OKEECHOBEE



- Recognizing that the science and predictive modeling tools for algal blooms/algal bloom risk are under development, this metric is our path forward to evaluate algal bloom risk for the development of LOSOM alternatives until better tools are available. This tool is not intended to guide daily or weekly operational decisions.
- The proposed metric uses chlorophyll *a* (chl *a*) concentration as a proxy/surrogate for estimating phytoplankton abundance and biomass in the water. There is a very large database of chl *a* values and Lake Okeechobee stage data. Preliminary analysis indicates that chl *a* conditions are linked to lake stages.
- Chl *a* concentrations in Lake Okeechobee will be predicted by regression equations developed for the lake's littoral and pelagic regions based on the association of chl *a* with Lake Okeechobee stage
- Two chl *a* thresholds will be used to assess algal bloom risk:
  - ❑ 20 ppb(ug/l) chl *a* -The concentration standard for colored lakes in Florida
  - ❑ 40 ppb (ug/l) chl *a* - Development of TMDL target for Lake O used 40 ppb (ug/l) chl *a* as representative of a moderate bloom condition (normally visible to the unaided human eye). Concentrations of chl *a* above 40 ppb(ug/l) is considered indication of excessive nutrient concentrations.



# CONCEPTUAL METRIC TO EVALUATE ALGAL BLOOM RISK ON LAKE OKEECHOBEE



- Average chl *a* for the time period May through Aug will be determined for each year of the RSM-BN simulations (1965-2016).
- Two set of equations will be used
  - littoral (near shore SW sector) zone
  - pelagic (center of Lake) zone
- Metric for chl *a* would be linked to the state standard for chl *a* (20 ppb(ug/l)). This standard includes criteria for magnitude, duration, and frequency for chl *a* being above 20 ppb.
  - This predictive approach does not allow evaluation of values for magnitude, duration and frequency on a monthly basis.



# POTENTIAL USES OF PREDICTIVE EQUATIONS



- **All these concepts need to be further discussed at the WQ Subteam Level.**
- Tally of events per evaluated model run where chl *a* >20 or 40 ug/L thresholds as a basis of comparison between alternatives.
- Total volume of water delivered over period of record for each alternative to east coast (pelagic zone eqns) and west coast (littoral zone eqns) when chl *a* is above 20 pbb and 40 ppb
- Long-Term Average Mean Chlorophyll-*a*. A criterion of  $\leq 20$  ppb has been adopted by the LOSOM workgroup.
- The % of years with mean chl *a*  $\geq 20$ ppb



# POTENTIAL USES OF PREDICTIVE EQUATIONS



- Mean chlorophyll-a levels computed for longer averaging periods (2-year, 3-year, 5-year, etc.), based upon the 52-year period of record (1965-2016).
- The long-term average risk of exceeding the bloom criterion of 40 ppb, which reflects the effects of monthly and spatial variations within each zone.
- The percent of years with  $\geq 10\%$  risk of exceeding the bloom criterion of 40 ppb.



# NEXT STEPS



- The predictive equations have been developed but the documentation sheet and the exact methods to use the predictive equations are being finalized.
- Most recent compilation of the data used to develop the equations has been reviewed by DOI. Comments being addressed. Once comments addressed, this latest information package consisting of the full data set used and work done to develop the chlorophyll-a predictive equations will be shared with the LOSOM WQ Sub-team for review/input.
- The Jacksonville District will have the Corps Ecosystem Restoration Planning Center of Expertise and the Florida Blue Green Algal Task Force review this metric.
- Metric review will focus on the predictive equations and use of data for plan evaluation



# ENVIRONMENTAL SUB-TEAM



## Performance Metrics – Working on regional consideration of various PMs

### Northern Estuaries –

- Includes St. Lucie and Caloosahatchee estuaries.
- High flows I and II, low flows I and II
- Discussion re adding Lake Worth Lagoon flows
- Caloosahatchee MFL exceedances
- RECOVER salinity envelope – in final review and available about end of June

### Lake Okeechobee –

- RECOVER stage envelope review completed and PM is available for use.
- Lake recession rate/snail kite management PM – in development
- MFL exceedances

## & PM reviews ongoing

### Lake O – continued

- Frequency of < 10 ft, > 17 ft stages
- Daily Lake O stage time series

### Everglades –

- 10-12 RECOVER PMs or other tools; many were used in previous modeling and assessments.
- USACE coordinating with DOI / other stakeholders to evaluate use of various PMs

### Loxahatchee National Wildlife Refuge

- C-51 canal stages and flows
- Water regulation schedule – stages and periodicity



# ENVIRONMENTAL SUB-TEAM



## Performance Metrics – Working on regional consideration of various PMs

### Florida Bay –

- Flows – evaluating extent of project effects
- Transect 23, followed by Transect 21

### Biscayne Bay –

- Flows – evaluating extent of project effects
- Surface flow to North Biscayne Bay (S-27, S-28), Central (S-22, C-2), South (S-29)

## Approach

PMs are being screened for use in:

- pareto analysis
- as supplemental information
- Iteration 1 – Initial array of alternatives
- Iteration 2 – Balanced array of alternatives
- Iteration 3 – Optimization of selected plan
- NEPA effects analysis



# PDT DISCUSSION



# PUBLIC COMMENT



**BREAK**



# PERIOD OF RECORD EXTENSION



# PDT DISCUSSION



# PUBLIC COMMENT



# SCHEDULE REVIEW

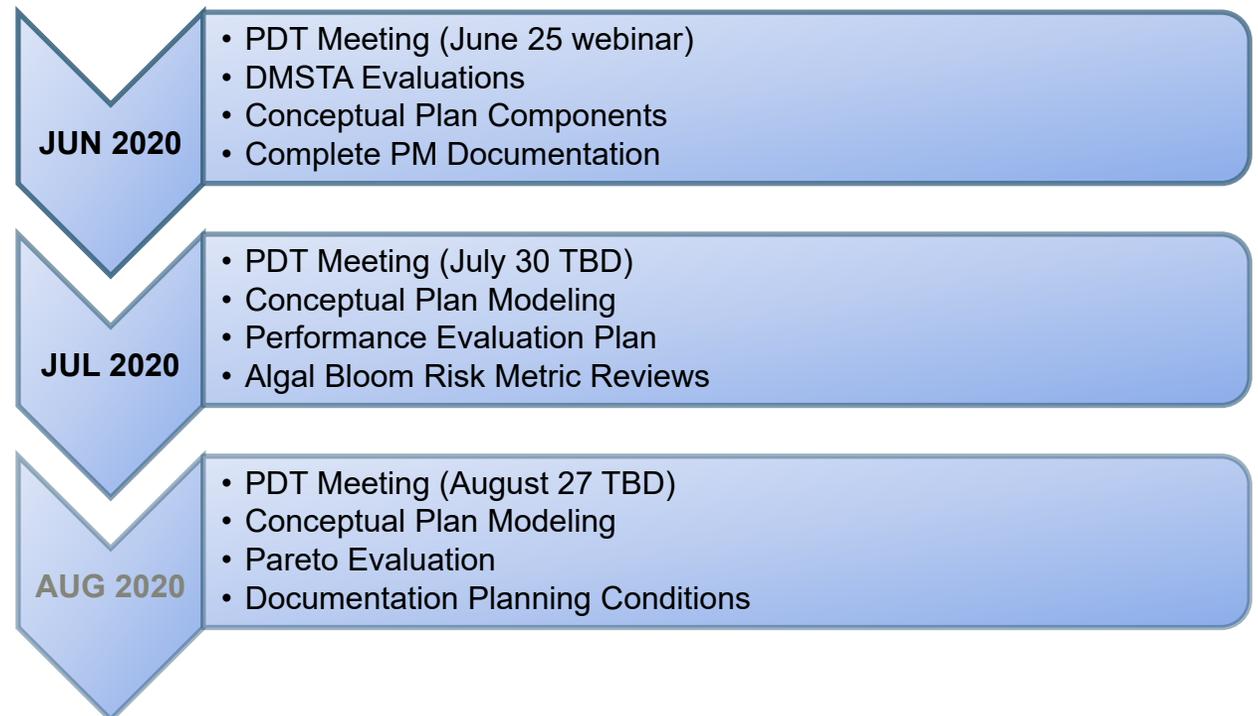


# LOSOM SCHEDULE



## 90 DAY LOOK AHEAD

MILESTONE	DATE
Scoping Meetings (complete)	February - March 2019
Plan Formulation & Performance Evaluation Finalized	June 2020
Evaluation of Alternative Lake Schedules	July 2020 – July 2021
Draft Report Release	January 2022
Final Report Release	July 2022
Record of Decision (ROD)	October 2022





# LOSOM ALTERNATIVE EVALUATION SCHEDULE

