

Operations & Engineering Workgroup

January 10, 2024



Agenda

1.1 – Review updates to the Reservoir Emergency Drawdown analysis (deferred from October 11, 2023 meeting)

1.2 – Review considerations related to the Project Cost Estimate update

1.3 – Review status of Operations Plan Version 2

1.4 – Review Charter Document (Attachment A)

Engineering and Construction Manager's Report

- Status report on Contract Strategy Sub-Workgroup
- Future Agenda Items: status of geotechnical investigations, CAISO and DSOD coordination

Agenda Item 1.1

Reservoir Emergency Drawdown Analysis Update

Henry Luu

DSOD Drawdown Requirement

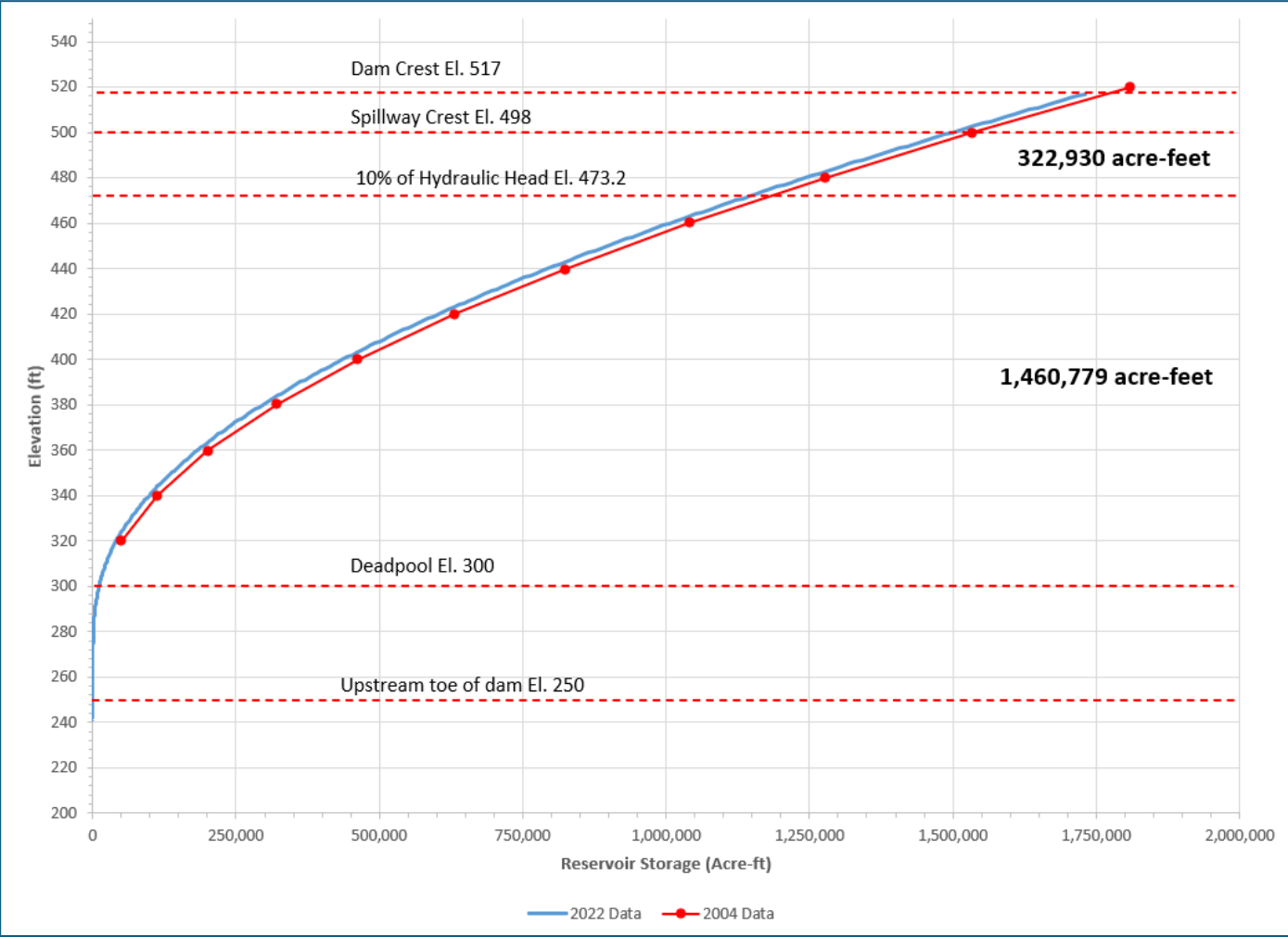
*“For reservoirs that impound over 5,000 acre-feet of water, the outlet system should be capable of lowering the **maximum storage depth by 10 percent within 7 or 10 days and draining its full contents within 90 or 120 days**, respectively, depending on factors such as downstream and seismic hazard, dam construction methods and age, known deficiencies, and type of dam; as determined by the Division.”*

These guidelines are evaluated on a case-by-case basis, particularly for very large reservoirs that are in excess of 100,000 acre-feet.

2021 Emergency Drawdown Modeling

- Drawdown criteria:
 - 10% drawdown within 7-days
 - Deadpool elevation is the lowest storage depth
- Evaluated up to 4 release locations:
 - Inlet/Outlet (I/O) to Funks Reservoir and TRR East
 - Sites Dam
 - Emergency release structure in the vicinity of Saddle Dam 3 (no longer considered)
 - Emergency release structure in the vicinity of Saddle Dam 5 (no longer considered)
- Maximum flow of 20,700 cfs split unevenly
 - I/O = 16,000 cfs
 - Sites Dam = 4,700 cfs

Updated Data and Coordination with DSOD



Risk and Safety Considerations for an Emergency Drawdown Even Flow Split

- Emergency drawdown actions are rare and very unlikely
- However, if one is required, an even flow split reduces risk of potential dam failure(s) due to an inability to adequately drawdown the reservoir
 - Implementation of even flow split is strongly preferred by DSOD
- Greater flexibility to control intermittent releases

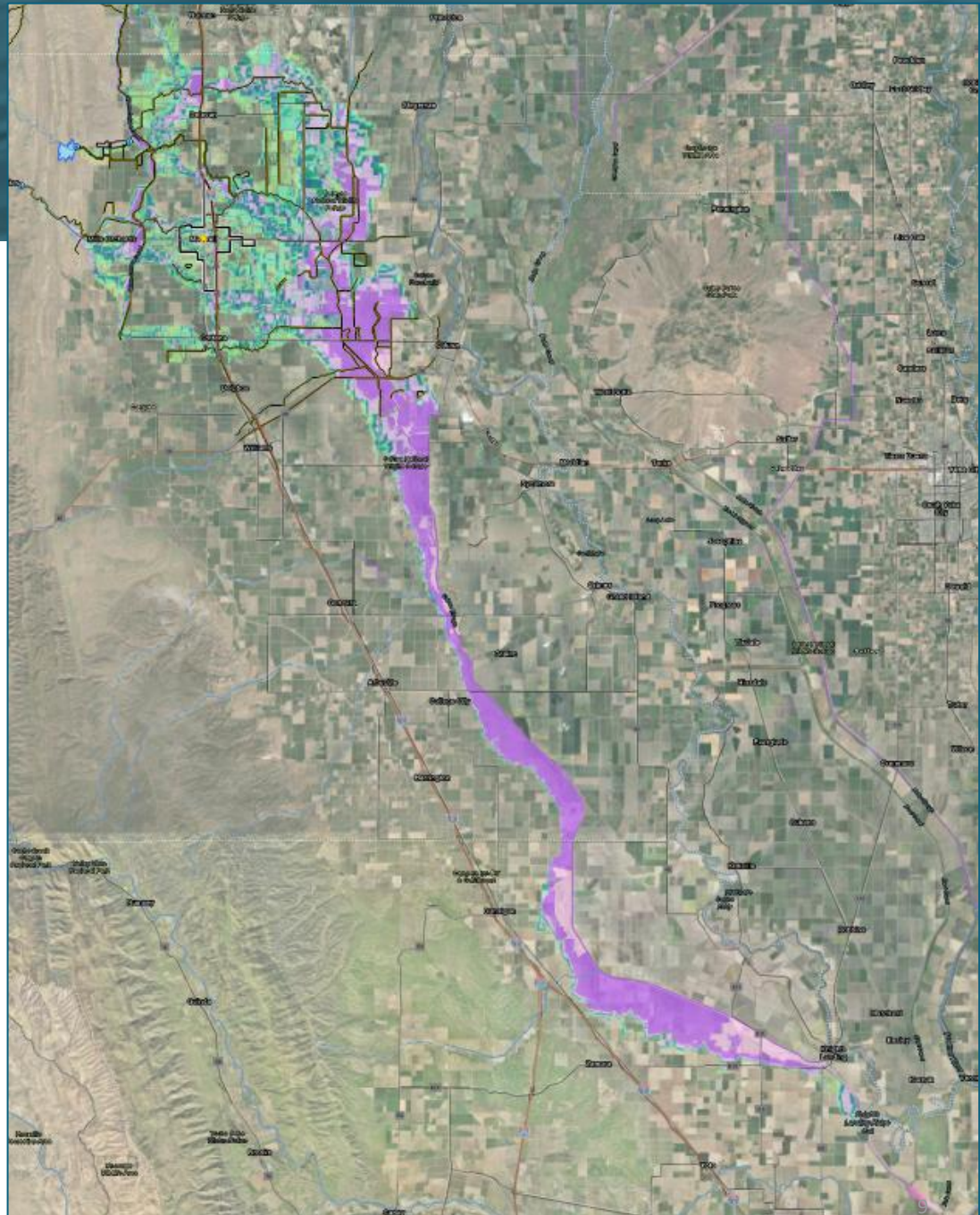
Drawdown Duration	Day 1 Total Discharge (cfs)	I/O (cfs)	Sites Dam (cfs)
7-day (2021)	20,700	16,000	4,700
10-day (2023)	16,100	8,050	8,050

Emergency Drawdown Modeling Updates

- Drawdown criteria:
 - 10% drawdown within **10-days**
 - Upstream toe of dam elevation is the lowest storage depth
- Evaluated 2 release locations:
 - Inlet/Outlet (I/O) to Funks Reservoir and TRR West
 - Sites Dam
- Maximum flow of 16,100 cfs split evenly
 - I/O = 8,050 cfs
 - Sites Dam = 8,050 cfs

Modeling 10-day Flows to Yolo Bypass

- Lower flow rates (from 7-day to 10-day)
- Increased flow through Sites Dam has minimal impacts to higher density/residential areas within Maxwell
- Timing of flood peak at the top of CBD for 10-day vs. 7-day takes 6-hours longer due to lower velocities



Next Steps

- Identify approach for addressing model limitations
 - Verify existing infrastructure and routing analyses
 - Analyze emergency drawdown impacts during wet conditions
 - Evaluate potential scenarios of downstream existing infrastructure failures (e.g., levee breach and/or overtopping)
- Collaborate with DSOD to advance required analyses
 - Refine Emergency Drawdown assessment
 - Begin coordinating dam breach evaluations

Questions?



Agenda Item 1.2

Considerations related to the Project Cost Estimate update

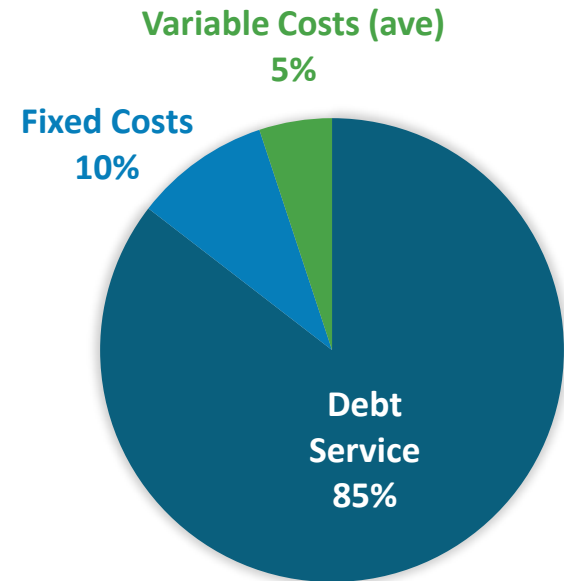
JP Robinette



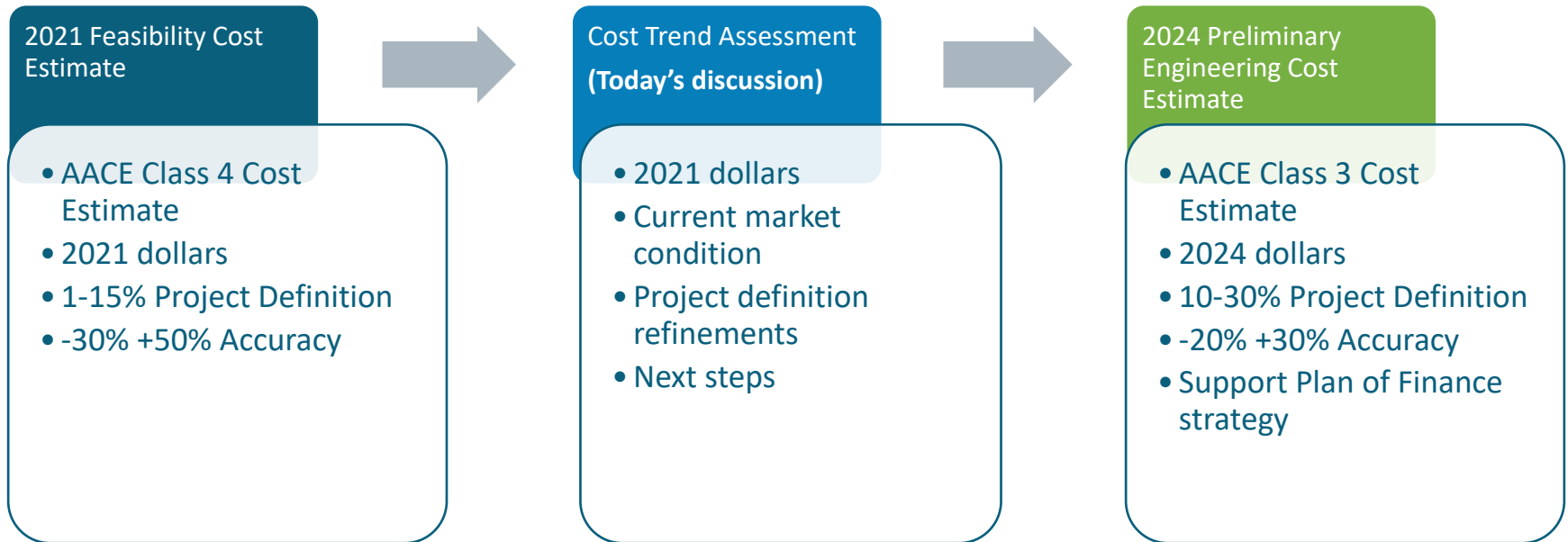
Affordability

- Investor Commitment Decision
 - What do we get?
 - How much does it cost?
 - How do we pay for it?
- Project annual costs
 - Debt service (financing participants)
 - Capital cost
 - Financing costs
 - Fixed and variable O&M costs

FINANCING PARTICIPANTS ANNUAL PROJECT COSTS



Project Cost Estimate Update



Capital Cost factors:

1. Material quantities
2. Labor and other indirect costs
3. Material and labor present cost
4. Escalation through construction

2021 Feasibility Cost Estimate



Alternative 1: **\$3.93 billion**



Alternative 2: **\$3.87 billion**



Contingencies totaled about 15% of overall cost



Non-contract cost is about 13% of overall cost



Environmental Mitigation is about 15% of overall cost

Cost Trend Assessment

- Key cost drivers
 - New mapping/geotech data
 - Project definition refinements
 - Current market condition
- Provides a “snapshot” of areas that will have cost influences
 - Considered in-progress design quantity updates
 - Applied adjusted unit rates representative of current construction assumptions



Key Project Definition Refinements



Updated DSOD Emergency Drawdown facility assumptions



Refinement of roads design



Update of pipeline design to reduce seismic influences



Updated assumptions related to the construction of the TRR and Funks pipelines

Example of Quantity Updates

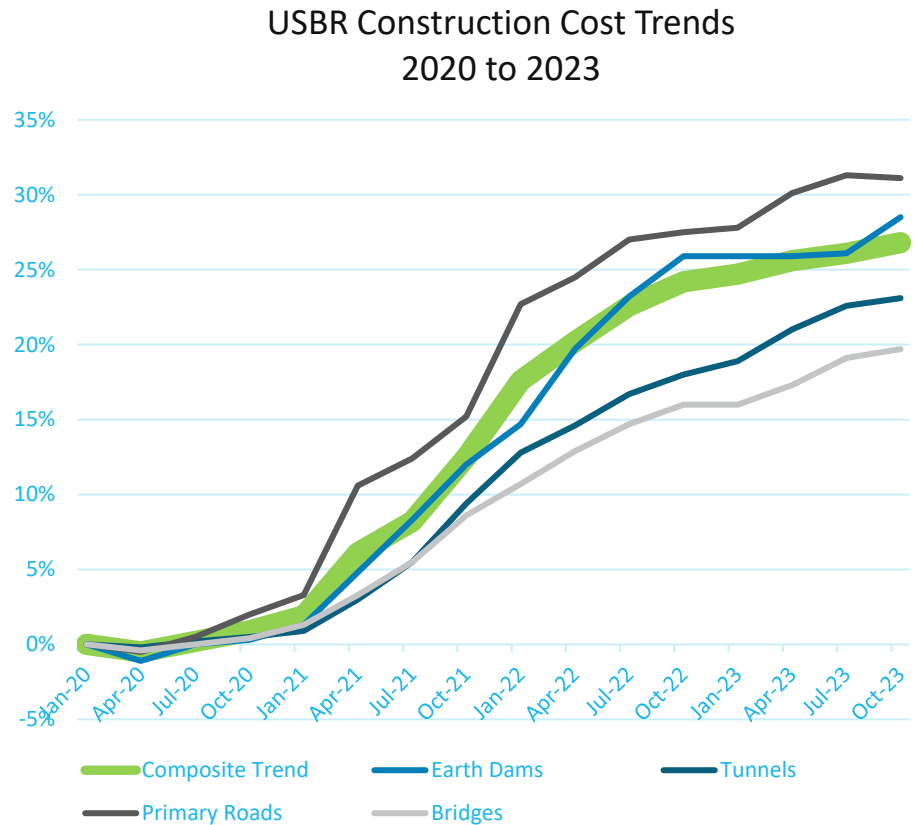
- Concrete & steel for I/O & Diversions **increased** based on design refinements
- Dam excavation volumes **decreased** based on geologic interpretation and recent core boring data
- Dam filter and drain volumes **decreased** based on geotechnical analyses for seepage
- Road quantities **increased** reflective of improved survey quality (project mapping vs. historical USGS topo maps)
- TRR excavation volume **decreased** due to site optimization
- **Increase** cost for added dynamic movement joints on pipelines crossing seismic fault lineaments

Examples of Unit Rate Updates

- Dam Rockfill unit rate **decreased**: recent core borings, dozer trench and geologic interpretation indicate reduced waste
- Dam Core Zone unit rate **increased**: recent geotechnical data and hydrologic analyses found suitable core borrow to be farther away from dam locations and require additional moisture conditioning
- Funks and TRR pipeline unit rate **increased**: consideration for maintaining existing Funks Creek and Reservoir operations during construction resulted in refinement from open trench installation to tunneling

Market Condition

- Significant inflation occurred in the U.S. construction industry within recent years
- An escalation of about **22%** based on composite assessment of USBR Construction Cost Trends between **March 2021 and October 2023**



Cost Trend Observations

- Project definition refinements had minor cost impacts compared to other major projects
 - Significant amount of on-site materials
 - No major changes in geological, geotechnical, or seismicity factors
 - Conservative assumptions in development of the Feasibility design and estimates
- Project cost sensitivities
 - Quantities and location of material sources
 - Fuel and hauling costs
 - Market condition

Cost Trend Summary

- Un-escalated capital cost increased by about 10% (\$380M in 2021 dollars)
 - Reservoir facilities increased by about \$180M
 - Conveyance facilities increased by about \$200M
- Escalating costs to 2024 dollars is anticipated to align with USBR Construction Cost trend reflecting an added increase of over 22%



Considerations Related to the Project Cost Estimate Update



Owner's role in managing cost: scope, level of service, and pace



Value Engineering opportunities such as shifting the Golden Gate Dam to a shorter upstream axis has potential for cost reduction



Other projects on similar construction schedules will compete for resources and could influence construction costs, e.g. High Speed Rail, Delta Conveyance Project, Los Vaqueros, 2028 Olympics, etc.



CMAR will provide increased understanding of construction means & methods, schedule, and costs

Next Steps

- The Board has already taken initial actions to control and better forecast capital costs by funding critical path activities
 - Early property acquisition(s)
 - Advancing Golden Gate Dam foundation work
 - Reservoir CMAR procurement
- Upcoming topics requiring input from this Workgroup before completing the 2024 Preliminary Engineering Cost Estimate:
 - Contingencies
 - Escalation
 - Schedule
- Verification of the Preliminary Engineering Cost Estimate
 - Compare assumptions and unit rates with similar major projects
 - Procure a cost estimator to perform an independent cost analysis

Questions?



Agenda Item 1.3

Status of Operations Plan Version 2

Angela Bezzone

Background

- Operations Plan, Version 1 was completed January 2022
 - Presents model results as operational assumptions
 - Based on Alternative 1B of Draft EIR/EIS
- Update will incorporate most recent operational assumptions
 - Alternative 3 in Final EIR/EIS
 - Water right application and Incidental Take Permit application

Hierarchy and Interaction between Documents



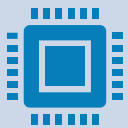
Benefits and Obligations Contract

Grants capacity interests in the Project and a right to water service to Participants and defines obligations



Operations Plan

Describes day to day operations including decision process for when/how to divert and release



Operations Manual (to be developed)

Will explain actual operations and physical project components, such as which valves to open, etc.

Major Ops Plan Components

- Diversions
 - Diversion criteria and facility diversion making
 - Conveyance losses
 - Impounded creek water
- Storage
 - Allocation to storage accounts
 - Reservoir losses (evap, seepage, creek releases)
- Releases
 - Timing and coordination of Participant requests
- Downstream Conveyance
 - Coordination with DWR and Reclamation
 - Capacity limitations

B&OC Policy Issue

- When developing B&OC, one major remaining policy issue was identified:
 - How to address downstream capacity limitations
- B&OC establishes Base/Downstream capacity interest and allocation of costs
- Operations Plan needs to describe how capacity limitations will be addressed through operations

Overarching Capacity Assumption

- Downstream capacity interest is proportionate to Base capacity interest

Example Storage Partner	Base Capacity Interest	Downstream Capacity Interest
A	25%	36%
B	10%	0%
C	10%	14%
D	20%	0%
E	35%	50%
Total	100%	100%

Overview of Concepts and Principles

- Storage Partners with downstream capacity have first priority
 - Are limited to their proportionate Downstream Capacity Interest when capacity is limited
 - Have first priority to move transfer water over Storage Partners without downstream capacity
- Storage Partners without downstream capacity have second priority
 - Would need to use unused capacity and may need to adjust schedule to find that opportunity

Downstream Conveyance Conditions

1. No capacity constraints for Storage Partners with downstream capacity interest
2. Limited capacity for delivery to Storage Partners with downstream capacity interest
3. No capacity constraints when a Storage Partner without downstream capacity interest is transferring to entity who needs downstream capacity
4. Limited capacity when a Storage Partner without downstream capacity interest is transferring to entity who needs downstream capacity

1. No Capacity Constraint – No Transfer

- Storage Partners with downstream capacity interest submit Release Request Forms with no conflicts
 - Storage Partners are not limited to their Downstream Capacity Interest if no capacity constraint exists (e.g., not being fully utilized by others)
- Sites will develop schedule and coordinate with DWR and Reclamation
- If capacity constraints arise later in release season, Sites will coordinate as described under scenario 2

1. No Capacity Constraint – No Transfer

Release Requests and Release Schedule				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	50%	36%	0%
B	0%	0%	0%	0%
C	14%	0%	14%	90%
D	0%	0%	0%	0%
E	50%	10%	50%	0%
Total	100%	60%	100%	90%

Example notes:

- Examples are shown in percentages for easy comparison, but Release Requests will be acre-feet per month
- Examples include July-September for simplicity, but releases may occur outside this time frame – the transfer window for Delta Export Facilities is July-November
- Assumed capacity constraint is Dunnigan Pipeline for discussion purposes, but constraints may also exist in Colusa Basin Drain, KLOG, and/or Delta Export Facilities

2. Limited Capacity – No Transfer

- Storage Partners with downstream capacity interest submit Release Request Forms which exceed downstream capacity
 - Storage Partners are limited to their proportionate Downstream Capacity Interest when capacity is limited
- Sites will review Release Requests and develop release schedule equitably
 - Sites will contact Storage Partners about rescheduling releases to alternative months
- May enter this situation if capacity constraints arise later in release season unexpectedly

2. Limited Capacity – No Transfer

Release Requests				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	50%	40%	20%
B	0%	0%	0%	0%
C	14%	30%	10%	0%
D	0%	0%	0%	0%
E	50%	40%	70%	0%
Total	100%	120%	120%	20%

Release Schedule				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	43%	36%	24%
B	0%	0%	0%	0%
C	14%	17%	0%	10%
D	0%	0%	0%	0%
E	50%	40%	64%	6%
Total	100%	100%	100%	40%

3. No Capacity Constraint – With Transfer

- Storage Partners with and without downstream capacity interest submit Release Request Forms with no conflicts
 - Storage Partners may use Downstream Capacity Interest for transfer if not being used by others (i.e., second priority)
- Sites will facilitate setting a rate for use of downstream facilities by a Storage Partner without capacity interest
 - Rate setting may be for a single year or multiple years
 - Intended to compensate those who pay for use of downstream facilities
 - Transferor will be responsible for paying O&M associated with movement of water through all facilities

3. No Capacity Constraint – With Transfer

Release Requests and Release Schedule				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	50%	36%	0%
B	0%	10%	10%	10%
C	14%	0%	14%	14%
D	0%	0%	0%	0%
E	50%	30%	30%	30%
Total	100%	90%	90%	54%

4. Limited Capacity – With Transfer

- Storage Partners with and without downstream capacity interest submit Release Request Forms which exceed downstream capacity
 - Storage Partners with downstream capacity have first priority
 - Are limited to their proportionate Downstream Capacity Interest when capacity is limited
 - Have first priority to move transfer water over Storage Partners without downstream capacity
 - Storage Partners without downstream capacity have second priority
 - Would need to use unused capacity and may need to adjust schedule to find that opportunity
- Sites will review Release Request Forms and develop release schedule options
 - Sites will contact Storage Partners (including those with transfer requests) about rescheduling releases to alternative months in an attempt to meet all Release Requests
 - Storage Partners with capacity interest may agree to reduce their requested release to allow for movement of transfer water
 - Some deliveries may not be possible or will need to be rescheduled

4. Limited Capacity – With Transfer

Release Requests				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	50%	36%	20%
B	0%	10%	10%	10%
C	14%	30%	14%	0%
D	0%	0%	0%	0%
E	50%	40%	45%	40%
Total	100%	130%	105%	70%

Release Schedule				
Example Storage Partner	Downstream Capacity Interest	July	August	September
A	36%	43%	36%	27%
B	0%	0%	5%	20%
C	14%	17%	14%	13%
D	0%	0%	0%	0%
E	50%	40%	45%	40%
Total	100%	100%	100%	100%

Questions?



Agenda Item 1.4

Review Charter Document

JP Robinette

O&E Workgroup Charter Update

- Adjusted end of the Third Amendment to 2019 Reservoir Project Agreement date from December 31, 2024 to December 31, 2025.
- Workgroup discussion: other changes?

Engineering and Construction Manager's Report

JP Robinette

Future Topics

- Contract Strategy Sub-Workgroup status report
- Future Agenda Items:
 - status of geotechnical investigations
 - CAISO and DSOD coordination

Questions?



Thank you!

Next Meeting:

Wednesday, March 13, 2024 (1:30 pm – 3:30 pm)

