Coyote Valley Dam Raise Reconnaissance-Level Analysis

May 22, 2019

Raise Coyote Valley Dam Scenario

Modeling Scenarios Updated 2/21/19		Russian River & Lake Mendocino Alternatives					
		Current Ops	Lake Mendocino FIRO (Hybrid) with Fish Flow EIR Ops	Raise Coyote Valley Dam	Raise Coyote Valley Dam with FIRO	Reduce Russian River Water Demands	PVID Storage
Potter Valley Project Alternatives	Current Ops	Baseline: Existing Climate (n=1) Baseline FC: Future Climate (n=4)					
	PVP Decommission	Scenario 1: Existing Climate (n=1)	Scenario 3: Existing Climate (n=1)	Scenario 5: Preliminary analysis with Existing Climate			
	PVP Revised Ops		Scenario 4: Existing Climate (n=1)				
	Lowered Scott Dam						
	Run-of-the-River +		Scenario 2: Existing Climate (n=1) Scenario 2FC: Future Climate (n=4)				

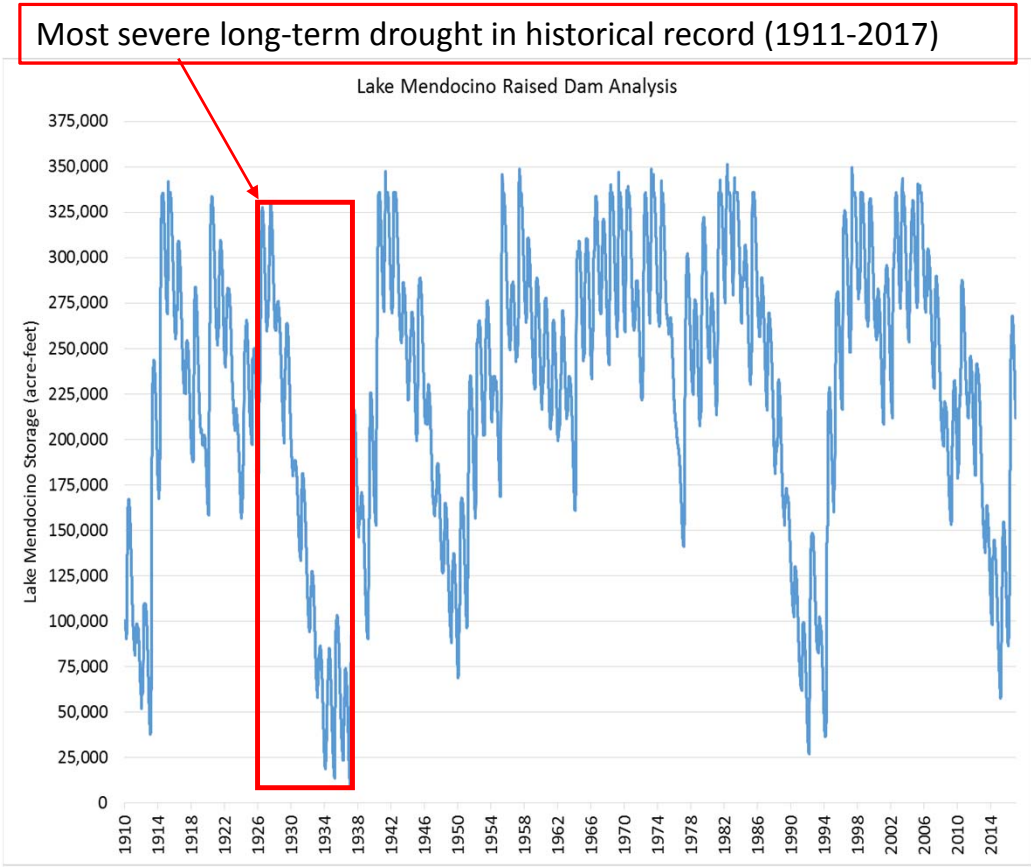
Rationale for water supply analysis

- Lake Mendocino HEC-ResSim simulation used for analysis, but with simplified assumptions due to uncertainties in Corps flood operation assumptions and other operational issues at this time.
- This is a preliminary analysis to better understand what potential storage volume would be needed for a reliable water supply given historic droughts.
- The analysis addresses the question of “how much total storage would be needed to prevent the reservoir from drying up under the worst sequence of drought years on record”

Now let's create a Lake Mendocino with enough storage(336,000 ac-ft) to survive the most severe drought

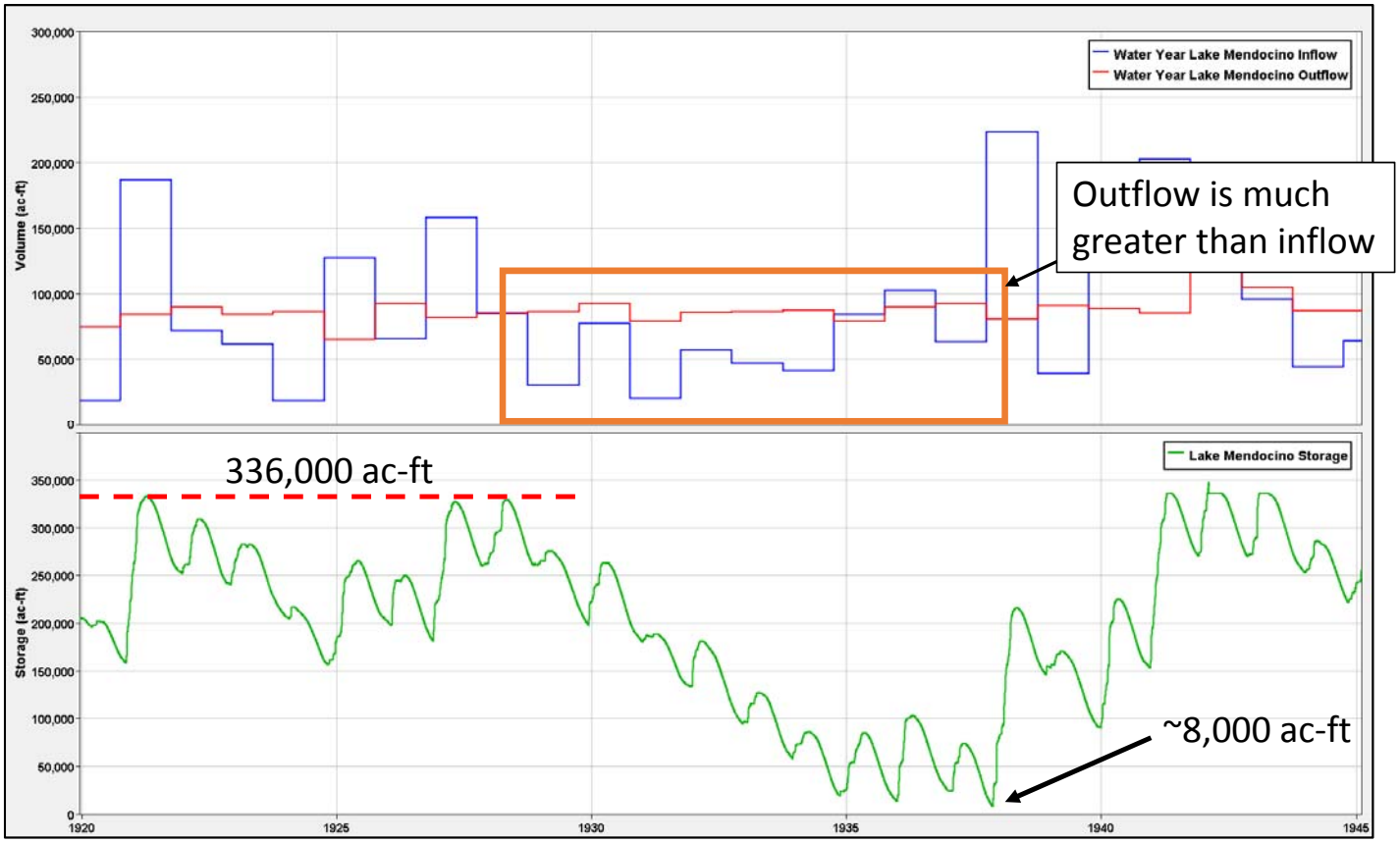
Raised Coyote Valley Dam Analysis Assumptions

- Focus on water supply storage not considering flood storage
- Minimum required Lake Mendocino water supply storage = 336,000 ac-ft
- Potter Valley Project Decommissioned (no water diverted from Eel River)
- 15,320 ac-ft annual PVID pumpback from Lake Mendocino
- No flood pool (anything above 336,000 ac-ft is spilled as a simplified assumption)
- Fish Flow EIR Minimum Flow
- Lake Mendocino Inflow Hydrologic Index rather than Lake Pillsbury index



Analyzed various storage capacity needed to maintain positive reservoir water balance for 1930s drought

- Found that ~336,000 ac-ft of storage was needed to avoid storage <2,000 ac-ft during 1930's drought, excluding flood control space needs



Comparison of Lake Mendocino Raised Dam Models

Assumptions

Model Scenario	UC Davis Raised Dam	Water Supply Subgroup Authorized Storage Increase	Water Supply Subgroup Required Storage for Reliable Water Supply
Model Platform	WEAP	ResSim	ResSim
Timestep	Monthly	Daily	Daily
Increased Storage Volume	75,000 ac-ft	75,000 ac-ft	220,000 ac-ft
Guide Curve	Water Control Manual + 75k ac-ft	Water Control Manual + 75k ac-ft	336,000 ac-ft
Hydrologic Index	D1610	D1610	Lake Mendocino Inflow
Minimum Instream Flows	BO (TUC)[1]	BO (TUC)	Fish Flow EIR
Buffer Flows	None	Fish Flow EIR	Fish Flow EIR
Demands[2]	Term 17	Fish Flow EIR	Fish Flow EIR
Dry Spring Condition[3]	Thresholds increased by 75k ac-ft	Thresholds not increased	None
Potter Valley Project	No Tunnel Diversions	No Tunnel Diversions	No Tunnel Diversions
PVID Pumpback	None	15,320 ac-ft annually	15,320 ac-ft annually

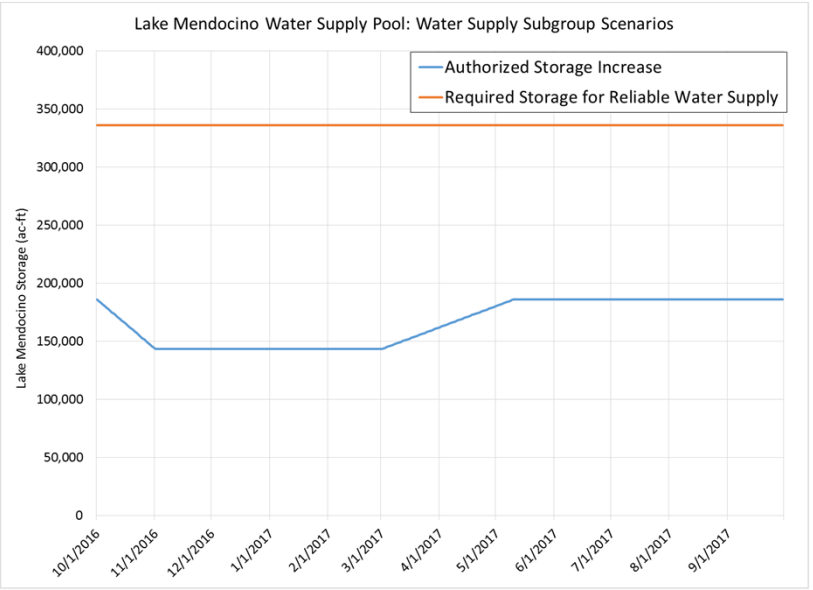
[1]BO (TUC) refers to the requirement in the Biological Opinion that Sonoma Water submit a Temporary Urgency Change Petition to lower min flows from May-Oct

[2]Term 17 demands and Fish Flow EIR demand were calculated using similar datasets so they are very close (<0.5% difference annual average)

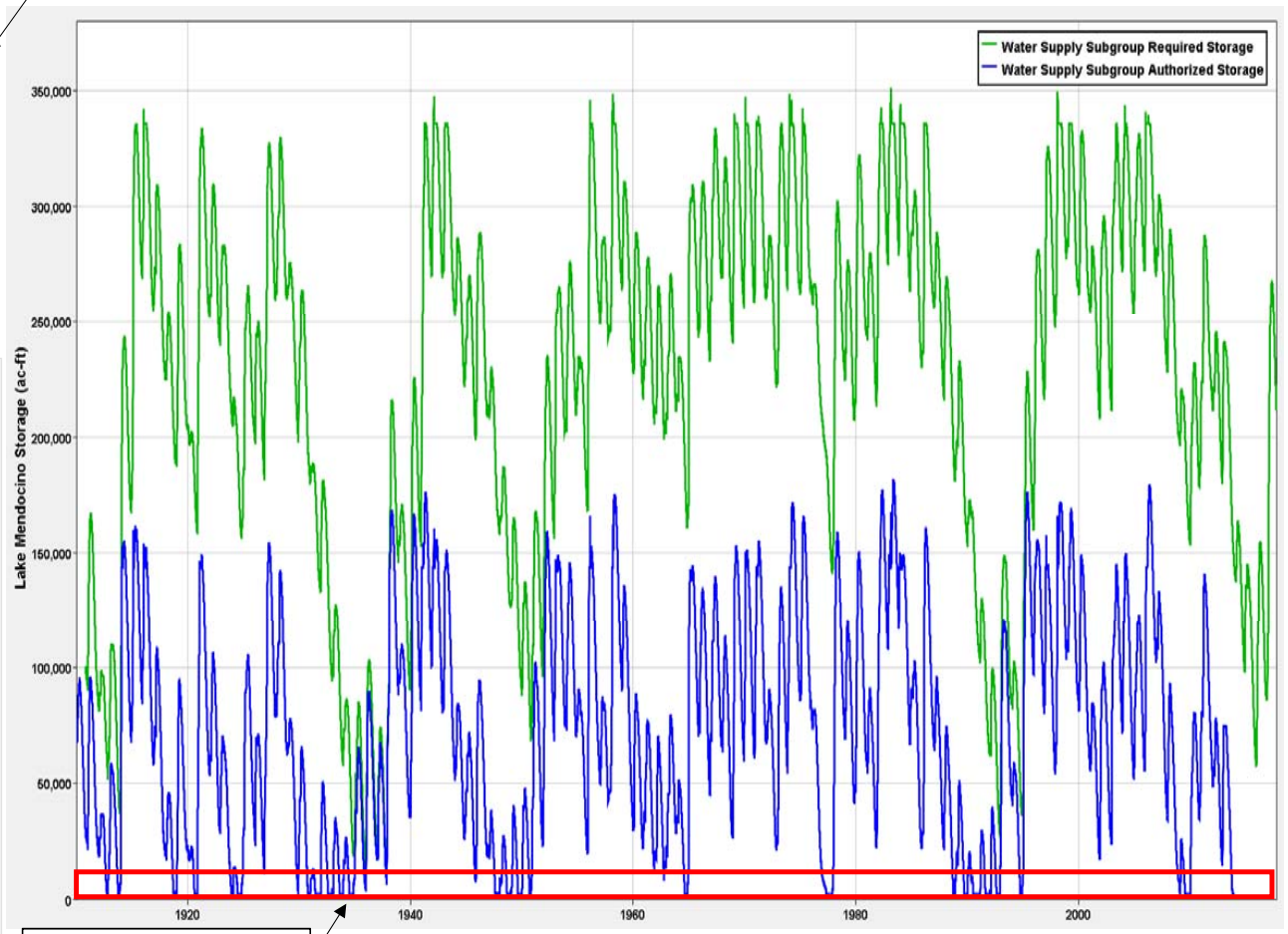
[3]Dry Spring condition is evaluated on May 31st and Oct 1st, with the original thresholds equal to 150k ac-ft combined Lake Pillsbury and Lake Mendocino storage and 30k ac-ft Lake Mendocino storage respectively

Results

Model Scenario	Percent of Time Lake Mendocino Storage < 2,000 ac-ft	Percent of Years Lake Mendocino Storage < 2,000 ac-ft at any point
UC Davis Raised Dam	4%	16%
Water Supply Subgroup Authorized Storage Increase	7%	26%
Water Supply Subgroup Required Storage for Reliable Water Supply	0%	0%



Increased percentage of dry years due to addition of buffer flows, PVID pumpback, and change in Dry Spring Condition



27 years go dry

Take Aways

- Assumptions are very simple; analysis only looks at reservoir storage as a metric
- Additional authorized storage of 75,000 ac-ft still results in Lake Mendocino going dry in about 1 in 4 years if no diversions occur from the Eel River
- Need to add more than 220,000 ac-ft of additional water supply storage (>80 ft dam raise) to make Lake Mendocino reliable if no diversions from the Eel River
- Additional water supply needed is driven by long term droughts (1930s and 1990s); need to create a large enough reservoir that can provide multiple years of carry over storage
- Water Supply Subgroup analysis ignores additional flood storage space, such that 336,000 ac-ft is insufficient when flood control objective are included