



July 7, 2023

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Sent Via e-mail to jbeck@usbr.gov

Subject: Comments on June 5, 2023, Trinity River Division (TRD) Draft Preliminary Alternatives for Section 7 consultation of the Central Valley Project (CVP)

Dear Ms. Beck,

Thank you for the opportunity to comment on this document.

The document states “*These Draft Preliminary Alternatives for the Trinity River Division represent Reclamation’s effort to date to incorporate information received from interested*

parties. Draft Preliminary Alternatives are not finalized and have not undergone modeling or legal sufficiency review. The alternative development process will continue to be refined.”

Previous comments submitted by Save California Salmon, California Sportfishing Protection Alliance, Pacific Coast Federation of Fishermen’s Associations, and Institute for Fisheries Resources on January 13, 2023, have not been incorporated into the present alternatives. Please consider the previous comments resubmitted as Attachment 1 to these comments and consider development of alternatives using these suggestions.

The 1955 Trinity Act, which authorized the construction and operation of the TRD (P.L. 84-386), and the 2000 Trinity River Record of Decision (ROD) along with the Endangered Species Act are existing constraints on the operations of the CVP. These federal laws and regulations set minimum flows and releases that are guaranteed and Section 3406(b)(23) (now 21) of the CVPIA provide the monies and performance goals for the restoration and preservation of the Trinity River fishery:

The Trinity River Restoration Program (TRRP) was created by the Trinity [ROD](#) in 2000, which outlines the plan for restoration of the Trinity River and its fish and wildlife populations. It was the result of nearly 20 years of studies of the Trinity River and its fishery resources that culminated in the [Trinity River Flow Evaluation Final Report \(Flow Study\)](#). The Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Environmental Impact Report (Trinity EIS/EIR), completed in 2000, was the NEPA (National Environmental Policy Act of 1969) document upon which the ROD was based, and it was done as a separate EIS.

However, two of the alternatives will not likely pass “*legal sufficiency*” because they would harm the Trinity River rather than implement the ESA and the authorizing legislation for the TRD. For this process to begin to satisfy ESA requirements for restoration of the fishery resources of the Trinity River, all alternatives must at least potentially enhance/recover the fishery resources of the Trinity River. The needs of the fish and wildlife resources of the Trinity River must have priority over other out-of-basin needs, as stated in the authorizing legislation for the TRD of the CVP, P.L. 84-386, Section 2. Out-of-basin needs include water supply, power generation and supporting ESA needs of the Sacramento River and Delta.

There is no federal statute that supports your proposal to subordinate your duties to protect and restore the Trinity River fishery to the operations of the CVP and State Water Project (SWP) as presented in the purpose and need statement. The continued operations of the federal and state project are governed by the Long-Term Operations Agreement as authorized pursuant to the 1986 Coordinated Operations Act. That Act does not subordinate protection and restoration of the Trinity River’s imperiled salmonids to the ‘continued operation’ of the CVP and SWP and yet this appears to be the main thrust of this ‘biological assessment’ purpose and need statement. Looking at the record, this purpose and need statement has not changed since December 2022.

Further, despite legal requirements to do so, there is no evidence in the biological assessment documents that Reclamation allowed the Tribes to function as a Co-Lead Agencies under NEPA. Two key elements appear to be missing entirely: the alternatives must be measured

against overarching federal requirements to meet (1) the tribal trust needs as a priority while balancing other uses, and (2) the fish and wildlife needs of the Trinity River. One might also note, the health of the Trinity River and Klamath Basin watershed determines sport, commercial and tribal fishing take from California to the Washington border and as such any fish management plan for the Trinity would need to address adherence to conservation measures required to implement from the Magnuson-Stevens Fishery Conservation and Management Act (MSA) rather than be focused solely on successful operation of the CVP and SWP.

Certain Alternatives contemplate relaxation of ROD requirements for annual Lewiston release volumes. Where is the evidence to suggest this approach can succeed biologically and meet Federal tribal and statutory obligations for fish and wildlife restoration and mitigations? The consequences of existing TRRP “adaptive management” have not been shown and are unknown to date. Enshrining new experiments is biologically hazardous and contrary to the ESA.

The No Action alternative, if modified to include the 1955 Trinity Act’s Proviso 2, is the only legally appropriate alternative for this biological assessment. This would include the required 50,000 AF for Humboldt County. The rest of the alternatives would violate the 2000 ROD, the 1999 Flow Study, CVPIA, the Lower Klamath ROD, and the 1955 Trinity Act. Reclamation has still failed to complete the TRRP channel rehabilitation and watershed/tributary construction projects to increase natural production and to renovate the Trinity River Hatchery for mitigation production despite the fact these requirements were imposed more than 20 years ago.

Based on the draft alternatives presented in the June 5 document, we find that the Purpose and Need Statement distributed at the December 15, 2022 interested parties meeting to be inadequate to meet the legal requirements to protect and restore the Trinity River:

“The purpose of the Proposed Action considered is to continue the operation of the CVP and the SWP, for authorized purposes, in a manner that:

-Meets requirements under federal Reclamation law; other federal laws and regulations; and State of California water rights, permits, and licenses pursuant to Section 8 of the Reclamation Act

-Satisfies Reclamation contractual obligations and agreements

-Implements authorized CVP fish and wildlife project purposes, including the CVPIA

Operation of the CVP and SWP is needed to meet multiple authorized purposes including flood control and navigation; water supply; fish and wildlife mitigation, protection, and restoration and enhancement; and power generation. Operation of the CVP and SWP also provides recreation and water quality benefits.”

It is clear that Alternatives 1 and 4, in particular, would harm the Trinity River and in no way meet the requirement to restore Trinity River fisheries to pre-dam levels, per P.L. 98-541, as amended by P.L. 104-143 as follows:

“Trinity Basin fisheries restoration is to be measured not only by returning adult anadromous fish spawners, but also by the ability of dependent tribal, commercial, and sport fisheries to participate fully, through enhanced in-river and ocean harvest opportunities, in the benefits of restoration.”

The TRD, while integrated into the CVP, has always had specific protections embodied in the 1955 Trinity Act. Section 2 of P.L. 84-386 directed the Secretary of the Interior to “adopt appropriate measures to insure the preservation and propagation of fish and wildlife.”

According to a 1993 Interior Solicitor’s Opinion, the Tribal Trust Doctrine dictates that with the federally reserved fishing rights of the Hoopa Valley and Yurok Tribes, there are property rights associated with the flows of the Trinity River.¹ These rights date back 10,000 years, making them senior to any water rights obtained by the BOR for the CVP.

The Central Valley Project Improvement Act, P.L. 102-575 (CVPIA) acknowledged the difference between the Trinity River² and Central Valley³ streams by having separate fishery restoration goals for each basin, and the Trinity ROD was the result of a separate EIS. The primacy of the waters of the Trinity River for use in the Trinity River Basin is explained in a 1979 opinion by Interior Solicitor Leo Krulitz on the water contract and drought shortage provisions with the Grasslands Water District:

...in authorizing the Trinity River Division in 1955, Congress specifically provided that in-basin flows (in excess of a statutorily prescribed minimum) determined by the Secretary to meet in-basin needs take precedence over needs to be served by out of basin diversions.⁴

Neither the 2009 nor the 2019 CVP BiOps included the Trinity River and SONCC salmon, confirming the need, given the continuing decline in salmon populations over the past two decades, for a separate, reinitiated consultation and EIS for the Trinity River in addition to the current EIS and Reinitiation of Consultation for the entire CVP.

Comments on Reclamation’s June 5, 2023 Trinity Alternatives.

Alternative 1. Water Quality Control Plan

There is no legitimate reason to include Alternative 1 with its 340,000 acre-feet (AF) release volume into the Trinity River. This is not consistent with current legislative, administrative, and judicial decisions. As stated in CVPIA 102-575 Section 3406(b)(23) (now 21), the Trinity River Flow Evaluation was to be completed “... *in a manner which ensures the development of recommendations, based on the best available scientific data, regarding permanent instream flow requirements and Trinity River Division operating criteria and procedures for the*

¹ See 1993 Solicitor’s Opinion on Tribal Fishing Rights, Page B13. Accessed at https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/PC_FFA&IGFR/part2/pcffa_94.pdf

² CVPIA Section 3406(B)(23) now 3406(B)(21 from WIIN Act).

³ CVPIA Section 3406(B)(1).

⁴ See Memorandum from Interior Solicitor to Assistant Secretary Land and Water Resources, regarding proposed contract with Grasslands Water District, 12/7/1979, Page B-13, accessed at https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/PC_FFA&IGFR/part2/pcffa_96.pdf

restoration and maintenance of the Trinity River fishery. If both the Secretary and the Hoopa Valley Tribe concur in these recommendations, the Secretary shall implement them accordingly.”

The Secretary of the Interior and the Hoopa Valley Tribe did concur on the recommendations of the Trinity River Flow Evaluation, as evidenced by the co-signing of the 2000 ROD for the Trinity River Mainstem Fishery Restoration EIS/EIR. The proposed Alternative 1 in this document was evaluated during the NEPA process as the mechanical restoration alternative that led to the 2000 ROD. There is no need to evaluate “the effectiveness of non-flow measures versus addressing stressors by restrictions of water operations” for the Trinity River component of this consultation, because the priority needs for the Trinity River fishery resources, as identified in federal law, and the ineffectiveness of non-flow actions, have already been evaluated as part of the EIS that led to the 2000 Trinity ROD .

Alternative 1 does not include the components of previous NEPA efforts or flow-based needs including Trinity ROD flow requirements, a minimum pool of 600,000 AF, lower Klamath Flow augmentation releases and enforcement of Water Right Order 90-5, and the 1990 North Coast Basin Plan water temperature plan objectives. In response to a question during the June 13 WIIN Act meeting, Reclamation stated that alternative 1 for the Central Valley operation of the CVP would include WRO 90-5. Why is this not the case for the Trinity River?

As written, Alternative 1 for the Trinity River would require a Water Right Change Petition to the State Water Resources Control Board to eliminate WRO 90-5 protections for the Trinity River.

Clearly the present Alternative 1 for the Trinity River would roll back hard-fought protections that are currently required by law to protect and restore the Trinity River and its fishery. It is our understanding that under CVPIA Section 3406(b)(21), the Hoopa Valley Tribe would have to agree to a reduction in flows under Alternative 1. We do not see how the Tribe would agree to make such a reduction.

We recommend that Alternative 1 be discarded and that a separate EIS for the Trinity River reconsultation be initiated.

Alternative 2. Multi-Agency Deliberation.

Though Alternative 2 uses the Trinity ROD flow volumes, it appears to contemplate changing the Flow Study prescriptions established by the ROD.

In addition, the minimum pool recommendations to protect the fishery resources of the Trinity River in Alternative 2 are inadequate. The goal should be to have enough cold water in Trinity Lake to withstand a multiyear drought such as 1928-34 and still meet downstream temperature requirements to keep salmon healthy pursuant to Fish and Game Code sections 1505 and 5937, and pursuant to federal law requiring protection and restoration of Trinity River and its dependent fisheries.

CVPIA Section 3406(b)(19)(now 17 from WIIN Act) required that Reclamation “reevaluate existing operational criteria in order to maintain minimum carryover storage at Sacramento and Trinity River reservoirs to protect and restore the anadromous fish of the Sacramento and Trinity Rivers...” This process should also fulfill that incomplete mandate of CVPIA.

A 1.2 million acre-feet (MAF) starting minimum pool is not adequate to protect fish during a 1928-34 simulated drought (see Kamman Memo of 5/22/98 - Attachment 2). The revised minimum pool levels during a multi-year drought should be 1.5 MAF first year, 1.3 MAF second year, 1.1 MAF third year; 1 MAF 4th year, 900k AF 5th year, 825k AF 6th year and 750k AF 7th year.

The minimum pool for Trinity Reservoir pertaining to the “Trans-basin Diversion Season” should be 1.5 MAF.

In the section of Alternative 2 entitled “Restoration Flow Releases,” there is no justification for the date on which 50% of the flow would have passed Lewiston as a performance metric. This stated objective of this alternative is “shift flows earlier ... for fisheries benefits” and meet the biological and physical objectives of the TRRP...” However, it is unclear how this alternative will address those objectives and the validity of the 50% flow metric. In addition, the alternative’s flow shift would violate the ROD.

Method 1 - Trigger Based Flows should include (to replace the 11,000 cfs release) an additional high flow rule of 14,000 cfs to evaluate the effectiveness of this higher flow level at meeting geomorphic and riparian objectives. Constraints for implementing a 14,000 cfs release would need to incorporate protection of infrastructure when addressing flow accretion in the mainstem Trinity.

Method 2 – Gage Based Flow Algorithm, should expand constraints need to include, as a priority, biologically-supported base flows throughout the year to meet minimum habitat and temperature standards and not just the infrastructure/operations constraints. The maximum Lewiston discharge should also increase to 14,000 cfs.

The temperature management section should present the dates for the “TRRP’s adopted temperature objectives at Lewiston gage” in a table. It is also unclear if Alternative 2 would meet Water Right Order 90-5 and North Coast Basin Plan temperature objectives. If not, this alternative would require a Water Right Change Petition to the State Water Resources Control Board to modify or eliminate WRO 90-5.

We recommend that a separate EIS for the Trinity River reconsultation be initiated and Alternative 2 as modified above be included.

Alternative 3 – Modified Natural Hydrograph

Though Alternative 2 uses the Trinity ROD flow volumes, it appears to contemplate changing the Flow Study prescriptions established by the ROD.

This alternative needs to add a “Temperature Management” section. It should also require minimum flows necessary to meet habitat and water temperature needs, including those for holding State-listed spring-run Chinook.

As written, Alternative 3 appears to violate WRO 90-5 and North Coast Basin Plan temperature requirements. It would require a Water Right Change Petition to the State Water Resources Control Board to modify or eliminate WRO 90-5.

Summer flows less than 450 cfs would have potentially devastating impacts on the whitewater boating industry in Trinity County as well as the in-river diversion by the Hoopa Valley Tribe.

We recommend that a separate EIS for the Trinity River reconsultation be initiated and Alternative 3 as modified above be included.

Alternative 4 – Risk-Informed Operations

Alternative 4, like Alternative 1, is inconsistent with the legislative, administrative, and judicial decisions dictating the release of flows into the Trinity River, and it should be eliminated.

Alternative 4 would reduce Trinity ROD releases to rebuild carryover storage but does not constrain Trinity exports to the CVP. This approach would incentivize maximum exports to the CVP at the expense of instream flows, creating a perpetual drought for the Trinity River and Trinity Lake.

We recommend that Alternative 4 be discarded and that a separate EIS for the Trinity River reconsultation be initiated.

We support the addition of a “local alternative” that would include the following elements, in addition to retaining the legally required Trinity River ROD flow provisions:

Trinity Lake Storage Management:

Planning Minimum Pool

Allow no exports of water from the Trinity River Basin to the Sacramento River that would leave storage in Trinity Reservoir less than a minimum carryover storage that meets downstream temperature requirements during a simulated 1928-34 drought (per Kamman memo of 5/22/98), as follows:

- First Year 1.5 MAF
- Second Year 1.3 MAF
- Third Year 1.1 MAF
- Fourth Year 1 MAF
- Fifth Year 900,000 AF
- Sixth Year 825,000 AF
- Seventh Year 750,000 AF
- 50,000 AF of the minimum storage should be reserved for water allocated to Humboldt County and other downstream users as stated in Proviso 2 of the 1955 Act

Diversion Season

Same as the No Action Alternative.

Variable Instream Flows

Restoration Flow Releases

Same as No Action Alternative but allow for carryover of ROD flows to subsequent water year(s). No summer cutbacks.

Winter Flow Releases

Maintain ROD requirements. A new ROD, with full environmental review and regulatory process, would be necessary in order to change the volumes and timing of flow stated in the ROD, including approval by the Hoopa Valley Tribe if annual flow volumes are changed.

Base Flows

Same as No Action Alternative.

Lower Klamath Flow Augmentation Releases

Same as the No Action Alternative.

Temperature Management

Reclamation would be required to petition the SWRCB to amend its eight Trinity River water permits meet all North Coast Basin Plan downstream temperature objectives, plus revised temperature objectives at Lewiston, including for coho salmon and holding spring-run Chinook, based on current best available science. Seek Congressional authorization, or identify other reliable regulatory path, for full investigation of temperature control structures and alternatives at Trinity and Lewiston dams.

Governance

We support evaluation of a new management structure for the Trinity River Restoration Program to replace the Trinity Management Council (TMC) that would be a Federal Advisory Committee with members that include the public, agencies, and Tribes. Unlike the TMC, the new structure should not allow closed meetings, and there should be specific conflict of interest requirements for voting members. Recommendations on flows and funding would be made to the Interior Secretary, as is the case with the TMC.

In summary, the proposed alternatives for operation of the TRD are not sufficient to conduct a valid NEPA analysis and ESA Section 7 consultation for Trinity River Coho salmon (Southern Oregon/Northern California Coast ESU), the Southern Resident Killer Whale DPS, or the Southern Pacific Eulachon DPS. Including the Trinity/TRD with the CVP/SWP consultation without incorporating the priority protections for the Trinity River into the Purpose and Need Statement violates the legislative, administration and judicial protections that are in place for the Trinity River. For these reasons, and many others listed above, we recommend that a separate EIS for the Trinity River reconsultation be initiated.

Please let us know if you have any questions concerning our comments. We look forward to further collaboration with you on this project.

Sincerely,



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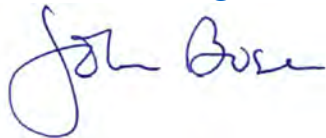


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Attachments:

1. Coalition Scoping comments of 1/13/2023
2. Greg Kamman Memo 5/22/1998



January 13, 2023

To: Mike Dixon, Bureau of Reclamation
mdixon@usbr.gov

Don Bader, Bureau of Reclamation
dbader@usbr.gov

SUBJECT: Scoping Comments concerning Trinity River Division (TRD) of the Central Valley Project (CVP) Endangered Species Act Section 7 Consultation – December 15, 2022, Kick-off Meeting

Dear Mr. Dixon and Mr. Bader;

General Comments:

- During the discussion of the Project Overview, when Dave Mooney was asked if there would be a separate Trinity BiOp he said “yes” but when asked if there would be one NEPA document he replied that he was “not sure.” There should be a separate NEPA document for the TRD of the CVP to ensure that impacts and benefits are not obscured by the operations of the entire CVP, and it is completed in a timely manner.
- What species are going to be covered by this Section 7 consultation? While unauthorized take of Coho salmon in 2021 was the primary event that instigated this Section 7 consultation, two other species have been listed since the 2000 consultation and need to be considered under this consultation, the Southern Resident Killer Whale and Southern DPS of Pacific Eulachon. Additionally, Upper Klamath-Trinity spring Chinook Salmon should also be included in any analyses since they are a candidate species under the Federal ESA and listed as threatened under the California ESA. Tribal trust species such as fall Chinook salmon, sturgeon and lamprey should also be considered.
- On slide 16, under the No Action bullet, a suite of Lewiston water temperature objectives is presented which were adopted by the TMC/TRRP. Since these have not been implemented as legal requirements, it seems like these would be appropriate to include as an alternative or a metric to measure the ability of alternatives to meet with these water temperature objectives. Only the existing Trinity River Temperature Objectives contained in the Water Quality Control Plan for the North Coast Region below should be included under the No Action Alternative.

Trinity River Water Temperature Objectives for Adult Salmonid Holding and Spawning. ¹		
River Reach	Daily Average Not To Exceed	Period
Lewiston to Douglas City Bridge	60° F	July 1-Sept 15
Lewiston to Douglas City Bridge ²	56° F	Sept 15 – Oct 1
Lewiston to North Fork Confluence ²	56° F	Oct 1- Dec 31
<p>1. North Coast Regional Water Quality Control Board (1991) and approved by the U.S. EPA in 1992 as Clean Water Act standards</p> <p>2. Included in Water Right Order 90-5 as water permit condition for operations related to Sacramento River temperature control.</p>		

The EPA’s 1992 approval of the Trinity River Basin Plan temperature objectives and Interim Action Plan identifies that BOR is required to meet the temperature objectives and that diversions to the CVP are “controllable factors.”¹

Purpose and Need:

- The purpose and need should affirm the priority of in-basin uses, explicitly including Trinity River fishery resources and water quality, since the BiOp is for the TRD and not for the CVP and State Water Project. The primacy of the waters of the Trinity River for use in the Trinity River Basin is explained in a 1979 opinion by Interior Solicitor Leo Krulitz on the water contract and drought shortage provisions with the Grasslands Water District:

...in authorizing the Trinity River Division in 1955, Congress specifically provided that in-basin flows (in excess of a statutorily prescribed minimum) determined by the Secretary to meet in-basin needs take precedence over needs to be served by out of basin diversions.²

¹ See 1992 Approval by the United States Environmental Protection Agency of Trinity River Water Quality Objectives, accessed at www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/PCFFA&IGFR/part2/pcffa_97.pdf

² See Memorandum from Interior Solicitor to Assistant Secretary Land and Water Resources, regarding proposed contract with Grasslands Water District, 12/7/1979, Page B-13, accessed at https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/PCFFA&IGFR/part2/pcffa_96.pdf

- Potential new Purpose and Need: *The purpose of the proposed action is to manage (and modify if necessary) the Trinity River Division of the CVP to primarily meet the in-basin needs of the Trinity River watershed, including , fishery resources and other tribal uses, tribal water supply, water quality, and other water supply needs, and secondarily to meet the other needs of the CVP. The need for this action is to minimize the impacts that operation of the TRD has on the fishery resources of the Trinity River and other ESA listed species.*

No Action Alternative:

- No Action Alternative should include the Trinity River Mainstem Fishery Restoration ROD (2000) and the Long-term Plan to Protect Adult Salmon in the Lower Klamath Rider ROD (2017).
- Additionally, the No Action Alternative should include current Trinity River Hatchery operations, since Coho Salmon produced at the hatchery are included in the SONCC ESU.

Potential Alternatives (or components of alternatives):

- Removal of Lewiston Dam. This would prevent warming of water in Lewiston and increase salmonid habitat by approximately 8 miles. A means of lifting water to the Clear Creek diversion and providing water for Trinity River Hatchery operations would need to be developed.
- Construction of a tunnel or pipeline from Trinity Dam to Lewiston Dam to reduce warming of releases into the Trinity River below Lewiston Dam.
- Partial removal or reconfiguration of Lewiston Reservoir to retain its function as an afterbay but to reduce the thermal loading that occurs due to the prolonged transit time of water passing through.
- Utilizing Humboldt County’s contract of at least 50,000 acre-feet of Trinity water to manage river water temperatures, including use for Winter Variable Flows.
- Installation and operation of a temperature control device on Trinity Dam with multi-level selective withdrawal capability to manage the cold-water pools behind Trinity Dam. Water temperature increases in Lewiston Reservoir could still be an issue depending on release magnitudes.
- Increasing a hard minimum carryover storage to 1.2 million acre-feet to increase cold water pool. The development of a cold-water management plan should also be a part of any carryover storage alternatives (probably any alternative in reality) to evaluate the effects of multi-year droughts on cold water availability to protect the fishery resources of the Trinity River.
- The ability to bank and carryover Trinity ROD water from one water year to another.
- Fish passage options should be considered.

The potential alternatives listed above can be combined in various ways to create a more comprehensive alternative. For example, increasing carryover storage with the installation of a temperature control device can be one alternative.

Please let us know if you have any questions concerning our comments and we look forward to collaboration with you in the future on this project.

Sincerely,



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MEMORANDUM

To: Tom Stokely and Mike Deas
From: Greg Kamman
Date: May 22, 1998
Subject: Carryover Storage Analysis
Simulated (1928-1934) Period

Recently, we discussed various methods to simulate an intense drought period as part of the carryover storage analysis. As you are aware, we decided to simulate a series of representative water year-types similar to those experienced during the 1928-1934 drought. The progression of year-types experienced over this period are listed in the second column of the attached tables.

As a first step in completing these simulations, I prepared a series of water budgets that represent the change in storage of Trinity Lake from one year to the next during the 1928-1934 progression of year-types and according to Trinity Division operations¹ associated with each proposed flow alternative. As indicated in column three of these tables, there is a net annual decrease in Trinity Lake storage during dry and critically dry year-types. These values are based on PROSIM output of our representative dry and critically dry year-types (1990 and 1977, respectively). The amount of these annual decreases are quite variable between proposed flow alternatives. The tables also indicate if and when the Lake would go dry under a suite of carryover storage scenarios. For example, when starting with 1250K ac-ft of storage under the No Action alternative, Trinity Lake would go dry after the third year of this representative drought. Only when carryover storage is greater than approximately 1750K ac-ft would there be enough water to last through the entire 7 year period. Even then, the remaining storage may not provide enough cool-water pool to meet downstream temperature objectives.

The Flow Study and 40% Inflow alternatives appear to be the only alternatives which would provide sufficient water over the entire drought period to maintain desired operations. The Flow Study alternative maintains the greatest reservoir storage volumes over this period. Given the poor performance of the 40% Inflow alternative during our previous simulations, we will likely only need to simulate droughts using a couple Flow Study alternative scenarios (maybe 1000K and 1500K ac-ft carryover storage scenarios). At this point, I doubt that there is much reason to try any of the No Action alternative simulations, but we can discuss this in the near future.

¹ It is quite likely that operations would change during drought periods. However, we do not have the knowledge or expertise to define what such changes. Thus, this analysis uses operations consistent with the earlier PROSIM simulations and evaluations.

NO ACTION ALTERNATIVE

Year	Water Yr-type	An. delta Storage (ac-ft)	750K Cum. Storage (ac-ft)	1000K Cum. Storage (ac-ft)	1250K Cum. Storage (ac-ft)	1500K Cum. Storage (ac-ft)	1750K Cum. Storage (ac-ft)	2000K Cum. Storage (ac-ft)
1928	normal	136,160	886,160	1,136,160	1,386,160	1,636,160	1,886,160	2,136,160
1929	crit. dry	-701,980	184,180	434,180	684,180	934,180	1,184,180	1,434,180
1930	dry	-104,220	79,960	329,960	579,960	829,960	1,079,960	1,329,960
1931	crit. dry	-701,980	-622,020	-372,020	-122,020	127,980	377,980	627,980
1932	dry	-104,220	-726,240	-476,240	-226,240	23,760	273,760	523,760
1933	dry	-104,220	-830,460	-580,460	-330,460	-80,460	169,540	419,540
1934	dry	-104,220	-934,680	-684,680	-434,680	-184,680	65,320	315,320

FLOW STUDY ALTERNATIVE

Year	Water Yr-type	An. delta Storage (ac-ft)	750K Cum. Storage (ac-ft)	1000K Cum. Storage (ac-ft)	1250K Cum. Storage (ac-ft)	1500K Cum. Storage (ac-ft)	1750K Cum. Storage (ac-ft)	2000K Cum. Storage (ac-ft)
1928	normal	-23,515	886,160	1,136,160	1,386,160	1,636,160	1,886,160	2,136,160
1929	crit. dry	-340,823	545,337	795,337	1,045,337	1,295,337	1,545,337	1,795,337
1930	dry	-17,460	527,877	777,877	1,027,877	1,277,877	1,527,877	1,777,877
1931	crit. dry	-340,823	187,054	437,054	687,054	937,054	1,187,054	1,437,054
1932	dry	-17,460	169,594	419,594	669,594	919,594	1,169,594	1,419,594
1933	dry	-17,460	152,134	402,134	652,134	902,134	1,152,134	1,402,134
1934	dry	-17,460	134,674	384,674	634,674	884,674	1,134,674	1,384,674

40% INFLOW ALTERNATIVE

Year	Water Yr-type	An. delta Storage (ac-ft)	750K Cum. Storage (ac-ft)	1000K Cum. Storage (ac-ft)	1250K Cum. Storage (ac-ft)	1500K Cum. Storage (ac-ft)	1750K Cum. Storage (ac-ft)	2000K Cum. Storage (ac-ft)
1928	normal	207,760	886,160	1,136,160	1,386,160	1,636,160	1,886,160	2,136,160
1929	crit. dry	-363,915	522,245	772,245	1,022,245	1,272,245	1,522,245	1,772,245
1930	dry	-89,732	432,513	682,513	932,513	1,182,513	1,432,513	1,682,513
1931	crit. dry	-363,915	68,598	318,598	568,598	818,598	1,068,598	1,318,598
1932	dry	-89,732	-21,134	228,866	478,866	728,866	978,866	1,228,866
1933	dry	-89,732	-110,866	139,134	389,134	639,134	889,134	1,139,134
1934	dry	-89,732	-200,598	49,402	299,402	549,402	799,402	1,049,402

MAXIMUM FLOW ALTERNATIVE

Year	Water Yr-type	An. delta Storage (ac-ft)	750K Cum. Storage (ac-ft)	1000K Cum. Storage (ac-ft)	1250K Cum. Storage (ac-ft)	1500K Cum. Storage (ac-ft)	1750K Cum. Storage (ac-ft)	2000K Cum. Storage (ac-ft)
1928	normal	960	886,160	1,136,160	1,386,160	1,636,160	1,886,160	2,136,160
1929	crit. dry	-343,179	542,981	792,981	1,042,981	1,292,981	1,542,981	1,792,981
1930	dry	-343,610	199,371	449,371	699,371	949,371	1,199,371	1,449,371
1931	crit. dry	-343,179	-143,808	106,192	356,192	606,192	856,192	1,106,192
1932	dry	-343,610	-487,418	-237,418	12,582	262,582	512,582	762,582
1933	dry	-343,610	-831,028	-581,028	-331,028	-81,028	168,972	418,972
1934	dry	-343,610	-1,174,638	-924,638	-674,638	-424,638	-174,638	75,362