



— BUREAU OF —  
RECLAMATION

# Klamath Project January 2023 Temporary Operating Procedure

**Klamath Project, Oregon-California  
Interior Region 10 - California-Great Basin**



## **Mission Statements**

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

## Summary

Reclamation is preparing to release its Temporary Operating Procedure (TOP). The TOP will be effective from January 20, 2023, through March 31, 2023, unless Reclamation determines that all BiOp minimums can be satisfied under the terms of the current IOP.

Due to the extraordinary hydrologic conditions that currently exist in the Klamath Basin and are expected to persist until at least April 1, 2023, the Bureau of Reclamation is proposing to operate to a Temporary Operating Procedure (TOP) in response to said hydrologic conditions, which would be in effect from January 13 to April 1. Key elements of the TOP are as follows:

- The objective of this TOP is to achieve a March 31 Upper Klamath Lake elevation of 4142 feet (BOR datum) in order to meet ESA requirements for suckers. An additional 0.4 feet of storage is required to meet BiOp objectives for a Surface Flushing Flow in the Klamath River. The March 31 target elevation, therefore, is 4142.40 feet. This is the “TOP goal.”
- Manage Link River Dam (LRD) mean daily releases between January 13<sup>th</sup> and March 31<sup>st</sup> to achieve the TOP goal. Reductions in UKL releases through Link River Dam may result in reductions in Klamath River flows at Iron Gate Dam (IGD) of up to 30% below current BiOp minimums. No reductions in UKL releases would occur if Reclamation determines the TOP goal can be met without them, although Reclamation may override programmatic IOP flows to maintain current BiOp minimums to do so. LRD releases would not fall below established BiOp minima (300 cfs for February, 200 cfs for March) to avoid fish stranding in the Link River.
- Habitat survey data (described below) would be used on a weekly basis to inform adaptive management decisions to increase or decrease the IGD flow reduction target, managing impacts to the river system and releases from LRD.
  - First, Reclamation would collaborate with the US Fish and Wildlife Service, the National Marine Fisheries Service (collectively the Services), and Tribes within the Klamath Basin to develop (and augment, as necessary) habitat survey programs, focusing on key habitat locations within the Klamath River mainstem and UKL. Survey data and previous technical analyses would inform the adaptive management of IGD flow targets for the performance period. It is anticipated that

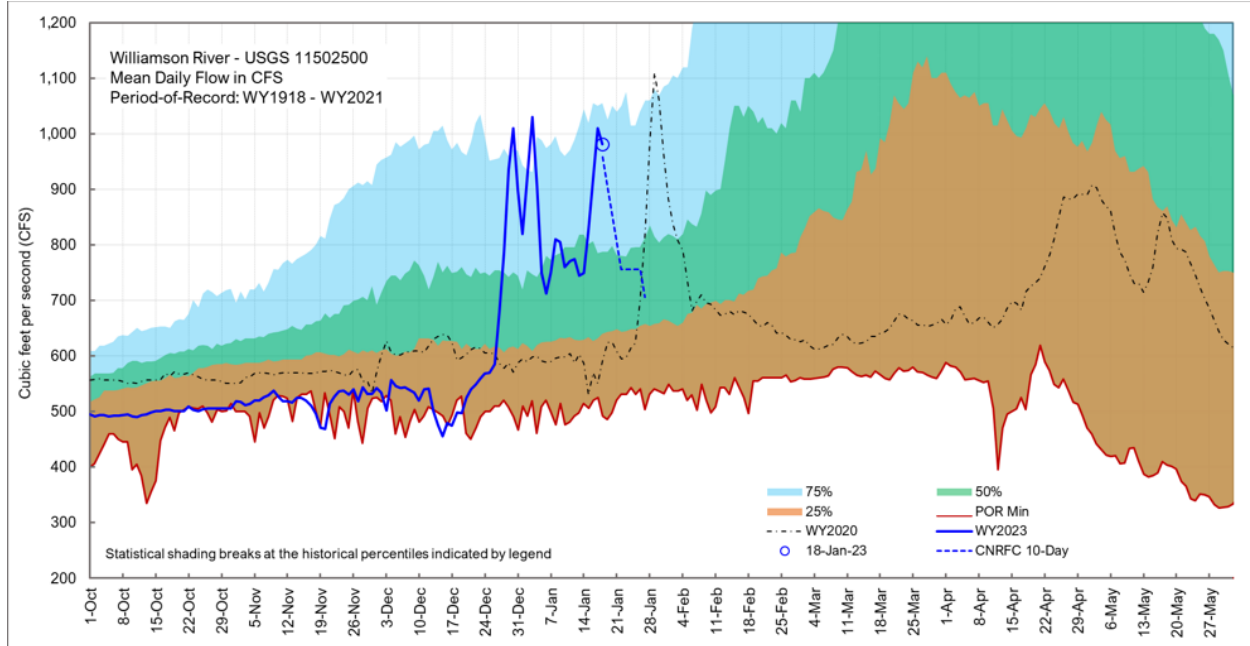
survey results for habitat and fish health would be collected and analyzed on a weekly basis to inform proposed weekly operational adjustments.

- In addition, Reclamation would analyze the California-Nevada River Forecast Center's (CNRFC) Upper Klamath Lake (UKL) forecast inflows and UKL forecast inflows from the Natural Resources Conservation Service (NRCS). Based on these analyses Reclamation will modify operations, as necessary, to achieve the TOP goal.

### **Background & Current Conditions**

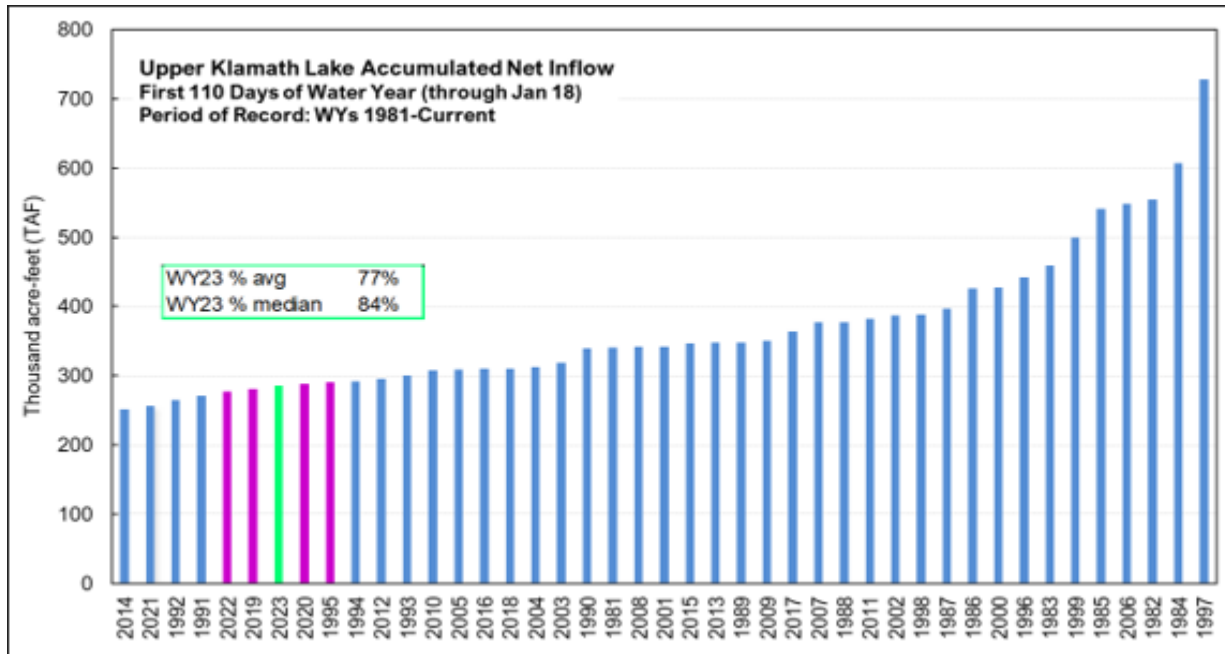
The 2023 Water Year started significantly drier than normal, but wet weather in December has temporarily offset the consistent dryness experienced so far this water year. Accumulated water year precipitation in the Klamath Basin had been below average through December 22—resulting in exceptionally low inflows to UKL—the recent wet weather boosted the accumulated water year precipitation to 100% of normal as of January 19. The recent weather patterns have also impacted accumulated snowpack. There was an average of 11.1 inches of snow water equivalent (SWE) at SNOTEL sites on January 19. Soil moisture in the Sprague River sub-basin is at 121% of median and the Williamson River sub-basin is at 84% as of January 19. This is compared to 73% and 61% of median during 2021 for the Sprague and Williamson, respectively. In 2020, the comparable values were 26% and 88%. The lower soil moisture values within the Williamson sub-basin help explain why tributary inflows appear decoupled with precipitation. Furthermore, groundwater pumping for agricultural and domestic wells during the last few years has lowered the groundwater table in the upper basin, based on information from Klamath County Emergency Management, also likely affecting baseflows. Flows in the Williamson River, which account for approximately 50% of total inflow to UKL in any given year, have now broken records for minimum flows in the river during the 104-year period of record for 21 days so far from October 1 through January 19.

**Figure 1.** Williamson River Flows in WY 2023.



The low tributary flows led to net inflows to UKL through December 21 that represent the lowest volume in the 41-year period of record. However, since December 22, tributary flows have increased to more expected levels due to ongoing precipitation which have contributed to a healthy increase in UKL inflows (Figure 2). It is important to note that, even with wetter conditions, accumulated UKL net inflow ranks 7<sup>th</sup> driest relative to the period of record. UKL elevations have increased by just 0.13 feet between October 1 and December 21, compared to an average increase of 0.23 feet during this same period. The seasonal forecast shows the usual results of La Nina conditions persisting, though waning, through the winter with wetter than normal conditions for the Pacific Northwest and drier than normal conditions to the south. This is the third winter in a row with La Nina conditions, and the previous two La Nina cycles in 2021 and 2022 produced drought conditions in the Klamath Basin. The Klamath Basin remains in a severe to extreme drought status, which would extend to a fourth consecutive year of if current forecasts are realized.

**Figure 2.** Cumulative UKL net inflows



Hydrologic forecast data products Reclamation typically uses for fall/winter operations planning are produced by the CNRFC and are kept updated to cover a full year. To determine the approximate accuracy of the CNRFC forecasts so far during Water Year 2023, Reclamation compared forecasted versus actual net inflows. The median (50%) forecast from the start of October proved too optimistic, as the observed inflow volume was slightly below the 75% probability of exceedance (POE) forecast. The 75% November 1st forecast also proved to be inaccurate as inflows lagged. However, the 25% POE December 1 forecast was a better estimate for the month due to on-going forecast adjustments and higher observed inflows.

In acknowledgement of these demonstrated extreme hydrologic conditions and multiple forecasts predicting their continuation, Reclamation has invoked the “meet and confer” provisions of the existing BiOp. Reclamation has met multiple times with the Services to discuss taking potential actions this winter to better manage the system under these extraordinary hydrologic conditions. In addition, Reclamation has updated models of several scenarios that are shown below.

### **Fall/Winter Operations Plan**

The Fall/Winter Operations Plan consists of an operational strategy supported by collection and analysis of field data that informs a weekly adaptive management effort.

## **Operations**

Reclamation would evaluate multiple UKL inflow projections representing the most current predicted inflows relevant to the TOP goal, and would incorporate data on tributary flows, precipitation, snowpack, soil moisture content and other factors to adaptively manage releases from LRD to meet the TOP goal. Key considerations include:

- All non-ESA releases of stored water or diversions of live flow from the Klamath River would be stopped immediately and remain shut off while flow reductions are in place. No agricultural or refuge deliveries would be made while flow reductions are occurring.
- At weekly intervals Reclamation would analyze the available hydrologic data and, in concert with information flowing from the habitat survey results detailed below, modify target IGD operations for the following week. Modification would not exceed a maximum of 30% reduction in IGD flows compared to BiOp minimums. Reclamation would modify operations to ensure that habitat impacts remain within acceptable limits, also described below. LRD releases would then be continuously managed to achieve the weekly IGD operational target. LRD releases would not be allowed to fall below established BiOp minima (300 cfs for February, 200 cfs for March) without the concurrence from USFWS that accepted protocols were being followed to avoid fish stranding in the Link River.
- The TOP will remain in effect as long as Reclamation feels there continues to be uncertainty in attaining the TOP goal. Once Reclamation has determined that there is little risk of not meeting these goals, a return to the IOP model will take place.
- No later than April 1, 2023, Reclamation will return to the IOP operations model. If, in Reclamation's professional opinion, extreme hydrologic conditions are expected to continue past April 1, an Annual Operations plan, yet to be developed, would replace the TOP. The Annual Operations plan would include a surface flushing flow, with the timing, volume, duration, and triggers subject to consideration of UKL elevation and predicted inflows at the time of plan development and UKL elevation needed to protect sucker eggs.

## **Habitat Surveys**

- A habitat survey plan, developed collaboratively between Reclamation, the Services, and Tribes within the Klamath Basin on a voluntary basis to coordinate data from habitat

survey programs (new or existing), initially focusing on mapping locations of Chinook salmon redds within the Klamath River mainstem. There is a large amount of uncertainty on what percentage of total redds can be identified by these methods. There are water clarity and flow volumes during certain times that may prevent survey teams from accessing all areas of the river that could limit a complete data set from being developed. Reclamation is still committed to collecting habitat and fish health data as thoroughly as conditions allow and would provide analysis of the data collected to inform operation decisions.

- Additional survey data, in both the Klamath River and Upper Klamath Lake, will be designated for collection based on Reclamation adjustments to operations. This additional data collection will be developed as part of Reclamations adaptive management of the water supply and continuing discussions with Tribal and Stakeholder Subject Matter Experts (SME).


#### **Adaptive Management Use of Habitat Survey Data**

Approximately 24-48 hours following any change in flows, Reclamation would coordinate with the Services and the Tribes to begin surveying activities on the Klamath River and indications of habitat or wildlife changes. The highest chinook spawning density (over 60 percent) in the Klamath River is the reach between IGD and the confluence of the Shasta River and will be one of the key survey areas of interest. Analysis of previous spawning surveys would be undertaken to provide an estimate of impact to salmonids based on different flow reductions. If at any point, a larger impact than predicted is observed in the river, or estimated impacts exceed acceptable risk levels, Reclamation would take immediate action to return flows to the previous week's levels. At the end of each week during the period this TOP is in effect, Reclamation will evaluate the survey data, updated hydrology, discussions with SME's and other impacts to evaluate whether any future changes in flows are warranted. Further flow adjustments would then consider habitat availability, in addition to hydrology. Reclamation may reduce IGD flow targets up to a maximum reduction of 30% of base flows, if risks to the river ecosystem, as indicated by monitoring results and hydrologic modeling, are deemed to be justified to achieve the TOP goal. These risks would be evaluated weekly in conjunction with the FASTA team to



ensure risks to suckers, salmonids, and other threatened species are understood before each week’s decision is made.

**Table 1.** WY2023 Fall-Winter Adaptive Management Strategy – Implementation schedule, methods, & actions

Date	Analysis	Action
Jan 20	Reclamation evaluates forecast models and identifies most likely 4142.40’ target trace and identifies LRD releases to achieve necessary IGD flow targets. Work begins on initiating survey plans	
Jan 20		Once flow reductions take effect (if any), evaluate data concerning condition of spawning, redds, and fry emergence along with updated hydrology to determine if operations changes are needed and within risk tolerance to achieve a 4142.40’ (±0.10’) UKL elevation on April 1.
Jan 27		
Feb 3		
Feb 10		
Feb 17		
Feb 24		
Mar 3		
Mar 10		
Mar 17		
Mar 24		