FINDING OF EMERGENCY AND INFORMATIVE DIGEST: PROPOSED SCOTT RIVER AND SHASTA RIVER WATERSHEDS EMERGENCY REGULATION

JANUARY 2025

LIST OF ATTACHMENTS

ATTACHMENT 1: FISCAL IMPACT STATEMENT

LIST OF ABBREVIATIONS AND ACRONYMS

AF	acre-feet
BSID	Big Springs Irrigation District
BLW	Big Springs Lake west end

BSE	Big Springs East
BSW	Big Springs West
Board	State Water Resources Control Board
C	Celsius
CA	California
CDTFA	California Department of Tax and Fee Administration
CDFW	California Department of Fish and Wildlife
CDWR	California Department of Water Resources
CEFWG	California Environmental Flows Working Group
CFGC	California Fish and Game Commission
cfs	cubic feet per second
DPS	Distinct Population Segment
DWR	Division of Water Rights
eAR	electronic Annual Report
ETa	actual evapotranspiration
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
eWRIMS	electronic Water Rights Information Management System
ft	feet
gpcd	gallons per capita per day
KMP	Klamath Mountain Province
KNF	Klamath National Forest
LCS	Local Cooperative Solution

1. Finding of Emergency

1.1 Executive Summary

Western North America has been experiencing an ongoing and persistent drought over the past 20 years. Across California and within the Klamath Basin, the water years from 2013-2015 and 2020- 2022 were some of the driest on record. The Scott and Shasta Rivers, important tributaries to the Klamath River, continue to experience lingering drought effects. Even after near to slight above average precipitation in the watersheds in water years (WYs) 2022-2023 and 2023-2024, as well as implementation of emergency regulations, instream flow dedications, and irrigation conservation measures, substantial restoration work, and groundwater recharge efforts, the Scott River and Shasta River watersheds—and the salmon generations living in and returning to them—continue to experience drought effects. During the driest years, these included lowered groundwater levels, earlier and prolonged tributary disconnections, declining fish populations, impeded salmonid migration, and impacts to water quality. Increases in weather extremes on a global and more local scale, as well as the extended drought conditions, exacerbate water challenges and heighten the risk of continued drought effects in 2025.

California and the Scott River and Shasta River watersheds are facing an uncertain hydrologic future that is driven by climate change and extreme hydrologic conditions. While most of California is no longer considered to be in a drought, Siskiyou County, which encompasses the Scott River and Shasta River watersheds, remains one of the regions experiencing significant water challenges. WYs 2019-2020, 2020-2021, and 2021-2022 constitute one of the driest three-year periods on record in California, which came on the heels of another three-year severe drought in WYs 2013-2014, 2014-2015, and 2015-2016 (National Drought Mitigation Center, 2023). These consecutive extended periods of extreme dry conditions have reduced water resources and threatened water resiliency in California. During these years, the water supply in many parts of California was insufficient to meet a significant portion of water demands and ecological needs. During WY 2022-2023, California received significantly above average precipitation throughout most of the state. Northern California, and specifically the Scott River and Shasta River watershed, did not experience the same level of precipitation and is still experiencing drought related impacts including lower groundwater levels, longer periods of stream disconnection, and decline in salmon populations as discussed later in this section. On March 24, 2023, Governor Newsom signed an executive order repealing specific emergency drought provisions in certain watersheds. The executive order specifically noted, however, that severe drought conditions in the Klamath River watershed had not abated and that continued action was needed to abate drought harm to native fish in the Klamath Basin: the region is still subject to the drought proclamation and emergency drought provisions (Newsom, 2023). During WY 2023-2024 the Scott River and Shasta River watersheds received near-average precipitation and snowfall. Governor Newsom signed another executive order on September 4, 2024, removing

19 counties from the drought state of emergency. The state of emergency remains in effect for 39 counties where significant impacts from the multiyear drought persist, including the Scott, Shasta and Klamath River watersheds (Newsom, 2024a).

Water supply shortage is an ongoing concern in the Scott River and Shasta River watersheds. Addressing the severe water shortage in these watersheds requires continued urgent action to ensure water supplies are and will remain available to meet all beneficial uses, including minimum instream flows for fish, minimum human health and safety needs, and minimum livestock watering needs.

The Scott and Shasta Rivers are crucial sources of water in Siskiyou County and have immense economic, ecological, and cultural importance. The Scott and Shasta watersheds provide water for agriculture, domestic users, the environment, fire protection, municipalities, tribal nations, and recreation. These watersheds are home to fish that are listed as threatened under the state and federal Endangered Species Acts (ESAs), as well as fish that hold significant cultural importance to California tribes and that are vital to the commercial and recreational fishing economy. Protecting these fish populations requires immediate actions, including continued implementation of minimum instream flows. In addition to meeting baseline minimum fish flows, ensuring water is available to meet minimum human health and safety and livestock needs remains of utmost importance with provisions in the regulation to provide for diversion of water for such purposes.

It is imperative that water right holders and claimants who do not have water available at their priority of right, and do not provide water for minimum human health and safety or minimum livestock watering needs, cease diversions of water that is needed for minimum instream flows to protect fish and more senior water rights, or implement other actions designed to provide equivalent or better protection to the fishery. Specifically, immediate action is needed to ensure the reasonable use of water in the Scott and Shasta watersheds—two high priority tributaries to the Klamath River that provide critically important habitat for the commercially significant and culturally important fall- run Chinook salmon (Trihey & Associates, 1996; SWRCB, 2020), Klamath Mountains Province (KMP) steelhead (steelhead), and the Southern Oregon/Northern California Coast (SONCC) coho salmon (coho salmon). The SONCC coho salmon is listed as a threatened species under both the federal and state ESAs and is identified as being at high and moderate risk of extinction in the Shasta River and Scott River, respectively (NMFS, 2014).

The State Water Resources Control Board (State Water Board or Board) may need to curtail water diversions if flows decrease or threaten to decrease below the California Department of Fish and Wildlife (CDFW) drought emergency minimum flow recommendation (detailed below) so that water is available for minimum flows for migration, rearing, and spawning of fall-run Chinook, steelhead, and SONCC coho salmon in the Shasta River and Scott River.

The proposed Scott River and Shasta River Emergency Regulation (Proposed Emergency Regulation or Proposed Regulation) for consideration re-adopts, with minor amendments, the currently effective regulation drought emergency regulation in the Scott and Shasta River watersheds, California Code of Regulations, title 23, § 875 et seq, adopted by the Board on December 19, 2023 and which went into effect on January 31, 2024 (Current Emergency Regulation, Current Regulation or 2024 Regulation) [1] (SWRCB 2024c). The Current Regulation is similar to the expired Klamath River Drought Emergency Regulation that was adopted on August 17, 2021 (2021 Regulation), readopted with revisions on June 29, 2022 (2022 Regulation). (SWRCB, 2021b, 2022b). Except as noted below in the summary of changes, the Proposed Emergency Regulation maintains the same baseline flow requirements as the Current Regulation, as well as the same authority for the Deputy Director to issue curtailment orders in order of priority to protect such flows, the same reporting requirements, the same informational order authority, the same exceptions to curtailment orders, and the same local cooperative solution options. Unlike the Current Emergency Regulation, but similar to the 2022 Emergency Regulation, the Proposed Regulation includes language allowing the continuation of existing curtailment orders, and of existing certifications, petitions and approvals of exceptions to curtailment. The Proposed Regulation allows for CDFW to propose alternative flows in the Shasta watershed not only when those flows provide "equal or better protection" as in the Current Regulation, but also, for a limited time, to evaluate whether alternative flows can provide such protection. The Proposed Regulation also includes updates and clarifications related to Local Cooperative Solutions (LCSs) including allowing for multi-year proposals, clarifying information and application requirements, addressing inspection procedures, clarifying and modifying metering requirements, setting forth more structure regarding late LCS submittals, and specifically addressing restoration and access as benefits for CDFW to consider in determining whether an LCS provides "equal or better" protection. The Proposed Regulation adds additional clarity that water diversion for firefighting can continue under a human health and safety exception. The Proposed Regulation also makes a minor modification to the inefficient livestock watering provisions to address fish passage into tributaries, in addition to the current requirements regarding tributary hydrologic connection. Finally, the Proposed Regulation deletes text related to penalty amounts, as new legislation has passed that changes penalty amounts effective January 1, 2025.

This document makes findings and provides evidence of emergency and the need for the Proposed Emergency Regulation. These include information on recent conditions in the Scott River and Shasta River watersheds, State Water Board and North Coast Regional

[1] The Board adopted the Current Regulation during the Board Meeting on December 19, 2023, but the Regulation did not go into effect until it was approved by the Office of Administrative Law on February 1, 2024. The Current Regulation is referred to as the 2024 Emergency Regulation and referenced as SWRCB, 2024, as it was not effective in calendar year 2023.

Water Quality Control Board's (North Coast Regional Water Board; collectively, the Water Boards) response to the ongoing emergency in these watersheds, benefits observed under the Emergency Regulation, outreach and interaction in the watersheds, and the status of SONCC coho salmon, steelhead, and fall-run Chinook salmon. The findings and evidence regarding the need for the proposed Emergency Regulation include an overview of water rights legal framework, the need for protective baseline minimum fishery flow requirements, a policy overview and discussion of the effect of the proposed changes to the regulation, descriptions of the watersheds, the interconnectedness of the groundwater and surface water, and information on livestock watering efficiency. The document's informative digest section summarizes existing laws and regulations, consistency with existing state and federal regulations, and more in-depth information on the data and methodology for issuing and lifting curtailment orders under proposed Sections 875. The document concludes with a list of information relied on, statements on local mandates and California Environmental Quality Act (CEQA) exemption, a list of funding opportunities that could support cooperative agreements and livestock watering efficiency, and a summary of fiscal costs. The Fiscal Impact Statement is included as Attachment 1. As such, the document meets the requirements for a digest described in Government Code section 11346.5, subdivision (a)(3).

1.2 Governor Newsom's Drought Emergency Proclamations

On April 21, 2021, Governor Gavin Newsom declared a drought state of emergency under the provisions of the California Emergency Services Act (Gov. Code, section 8550 et. seq.), in Mendocino and Sonoma counties due to drought conditions in the Russian River watershed (Newsom, 2021e), and directed state agencies to take immediate actions to bolster drought resilience across the state. On May 10, 2021, Governor Newsom expanded the drought proclamation to include counties in the Klamath River, Sacramento-San Joaquin Delta, and Tulare Lake watersheds (Newsom, 2021b). The May 2021 Proclamation directed the State Water Board, in part, to consider emergency regulations to curtail water diversions when water is not available at water right holders' priority of right. Additionally, to ensure critical instream flows for species protection, the proclamation directs the State Water Board and CDFW to evaluate minimum instream flows and other actions to protect salmon, steelhead, and other native fish in critical systems in the state and work with water users and other parties on voluntary measures to implement those actions. To the extent voluntary actions are not sufficient, the State Water Board, in coordination with CDFW, is to consider emergency regulations to establish minimum drought instream flow requirements. For purposes of approving these emergency regulations, the May 2021 Proclamation suspended CEQA (Pub. Resources Code, § 21000 et seq.) (Newsom, 2021b).

On July 8, 2021, Governor Newsom further expanded the emergency proclamation to include nine additional counties and urged increased water conservation of at least 15 percent compared to 2020 levels (Newsom, 2021c; Newsom, 2021a). On October 21,

2021, Governor Newsom expanded the drought declaration statewide and required additional drought emergency planning measures for local water supply agencies (Newsom, 2021d). On March 28, 2022, Governor Newsom affirmed the continued state of drought emergency for California, extended authorities under prior drought proclamations, and required additional actions regarding drinking water supplies and water reliability, as well as groundwater recharge projects (Newsom, 2022). On March 24, 2023, Governor Newsom repealed many provisions of the above-noted drought proclamations in light of significant precipitation, particularly in the Sierra Nevada range (Newsom, 2023). However, the executive order specifically found that the severe drought conditions in the Klamath River watershed had not abated, and that continued action is needed to abate drought harm to native fish in the Klamath River watershed. On September 4, 2024, Governor Newsom signed an executive order rolling back the drought emergency for 19 counties and narrowing some of the provisions. (Newsom, 2024b). The drought state of emergency was left in effect for 39 counties where significant impacts from multi-year drought persist. The Scott, Shasta and Klamath watersheds remain under the state of emergency.

2. Emergency Defined

Water Code section 1058.5 grants the State Water Board the authority to adopt drought emergency regulations for specific purposes in certain years. The specific purposes of such drought emergency regulations can be to: “prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water, to promote water recycling or water conservation, to require curtailment of diversions when water is not available under the diverter’s priority of right, or in furtherance of any of the foregoing, to require reporting of diversion or use or the preparation of monitoring reports.” Per Water Code section 1058.5, drought emergency regulations must be “adopted in response to conditions which exist, or are threatened, in a critically dry year immediately preceded by two or more consecutive below normal, dry, or critically dry years or during a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions.” As described above, the May 2021 Proclamation declared a state of emergency covering the Klamath River watershed based on drought conditions. The drought emergency in the Klamath River watershed was confirmed again in March 2022, March 2023, and acknowledged again on September 4, 2024 (Newsom, 2022, 2023, 2024a). The Governor terminated the drought proclamation for most of California but left 39 counties still subject to drought provisions, which encompasses the Klamath River watershed and the two relevant tributaries, the Scott River and Shasta River watersheds (Newsom, 2024b).

Emergency regulations adopted under Water Code section 1058.5 remain in effect for up to one year and may be renewed if the Board finds that drought conditions as defined

remain in effect. Section 1058.5, subdivision (b) provides that, notwithstanding Government Code sections 11346.1 and 11349.6, the Board's finding of emergency in connection with an emergency regulation promulgated under Water Code section 1058.5 is not subject to review by the Office of Administrative Law (OAL).

Government Code section 11346.1, subdivision (a)(2), requires that, at least five (5) working days prior to submission of the proposed emergency action to OAL, the adopting agency provide a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After submission of the proposed emergency to OAL, OAL must allow interested persons five (5) calendar days to submit comments on the proposed emergency regulations as set forth in Government Code section 11349.6. The information contained in this finding of emergency provides the necessary information and factual basis to support the State Water Board's emergency rulemaking under Water Code section 1058.5 and also meets the applicable requirements of Government Code sections 11346.1 and 11346.5.

3. Evidence of Emergency

Western North America has been experiencing periods of severe drought for the last 20 years. Water Years 2019-2022 were one of the driest three-year periods on record, similar to the recent 2014-2016 drought, both of which caused significant drought related impacts throughout California. During these severe droughts, the water supply is insufficient to meet a significant portion of water demands and ecological needs. During Water Years 2022- 2023 and 2023-2024 most of California received above-average precipitation. On March 24, 2023, Governor Newsom repealed many provisions of the above-noted drought proclamations in light of significant precipitation, particularly in the Sierra Nevada range (Newsom, 2023). On September 5, 2024, Governor Newsom terminated the drought state of emergency for an additional 19 counties but left 39 counties in effect, due to lingering drought effects (Newsom, 2024b). The executive order specifically found that the drought conditions in the Klamath watershed had not abated, and that continued action is needed to abate drought harm to native fish in the Klamath watershed. Two priority tributaries to the Klamath River, the Scott and Shasta Rivers continue to experience lingering drought impacts and uncertain hydrologic future that may include more drought years. The following sections provide a detailed review of hydrologic conditions and forecasts in the Scott and Shasta watersheds.

3.1 Recent and Forecast Precipitation and Flow

Since WY 2019-2020, the Scott and Shasta River watersheds have experienced three consecutive years of below- average precipitation (WYs 2019-2020, 2020-2021, 2021-2022) followed by two WYs of near average precipitation (WYs 2022-2023 and 2023-2024).

3.1.1 Scott River Watershed

3.1.1.1 Water Years 2019-2024

Historical rainfall has shown a decreasing trend in the Scott River watershed. The recorded rainfall at the Fort Jones station operated by the US Forest Service shows an average reduction of more than 3 inches in the total annual rainfall. The average total annual rainfall from 1941 to 1998 was 21.8 inches, which decreased to 18.5 inches from 1999 to present.

Table 1 compares recent precipitation data in the Scott River watershed to long-term trends. Specifically, Table 1 compares May 1st snow water equivalent and annual precipitation for WYs 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, and 2023-2024 data.

Table 1. Scott River: Percent of average snow water equivalent and annual precipitation. Data source: CDWR (2023).

Scott River	Percent of Average May 1st Snow Water Equivalent	Percent of Average Annual Precipitation	
Water Year	Average of Middle Boulder 1, Middle Boulder 3, Etna Mountain, Dynamite Meadow, and Swampy John precipitation gages (1946-present)	Callahan precipitation gage (1943-present)	Fort Jones precipitation gage (1935-present)
2017-2018	7%	62%	58%
2018-2019	135%	142%	100%
2019-2020	11%	53%	35%
2020-2021	25%	76%	54%
2021-2022	12%	88%	63%
2022-2023	138%	156%	95%
2023-2024	84%	145%	73%
2024-2025	–	6% of average October[2]	31% of average October[3]

[2] In November 2024, Scott River watershed received a significant storm. The precipitation data of that storm has not yet been reported by USGS for the Callahan gage. The Callahan gage data was last updated on 12/3/2024.

[3] In November 2024, Scott River watershed received a significant storm. The precipitation data of that storm has not yet been reported by USGS for the Fort Jones gage. The Fort Jones gage data was last updated on 12/3/2024.

3.1.1.2 Streamflow in Fall 2024

The United States Geological Survey (USGS) Scott River gage near Fort Jones (USGS gage no. 11519500, USGS Fort Jones Gage) is about 21 miles upstream of the outlet of the Scott River watershed and represents the observed (impaired) flow of the watershed. In the past four years (WYs 2019-2023), the Scott River has experienced three consecutive severely dry water years (WYs 2019-2020, 2020-2021, and 2021- 2022) followed by two near-average water years (WYs 2022-2023 and 2023-2024) (Figure 1). As recorded at the USGS Fort Jones Gage, flows and precipitation during the recent three-year drought (WYs 2019-2020 to 2021-2022) was the lowest in the period of record, October 1941-present (USGS 2024a). Figure 1 shows the monthly streamflow and precipitation near Fort Jones in the Scott River watershed to demonstrate the surface hydrology of the watershed in recent decades and daily time series of flow and precipitation near Fort Jones and emergency minimum flows in the Scott River watershed for WY 2023-2024, as of December 2, 2024. As shown in Figure 1(C), as of November 27, 2024, with the exception of part of Upper Klamath Basin, the rest of the Klamath Basin including the Scott River and Shasta River watersheds is no longer classified as in a drought (National Drought Mitigation Center, 2024).

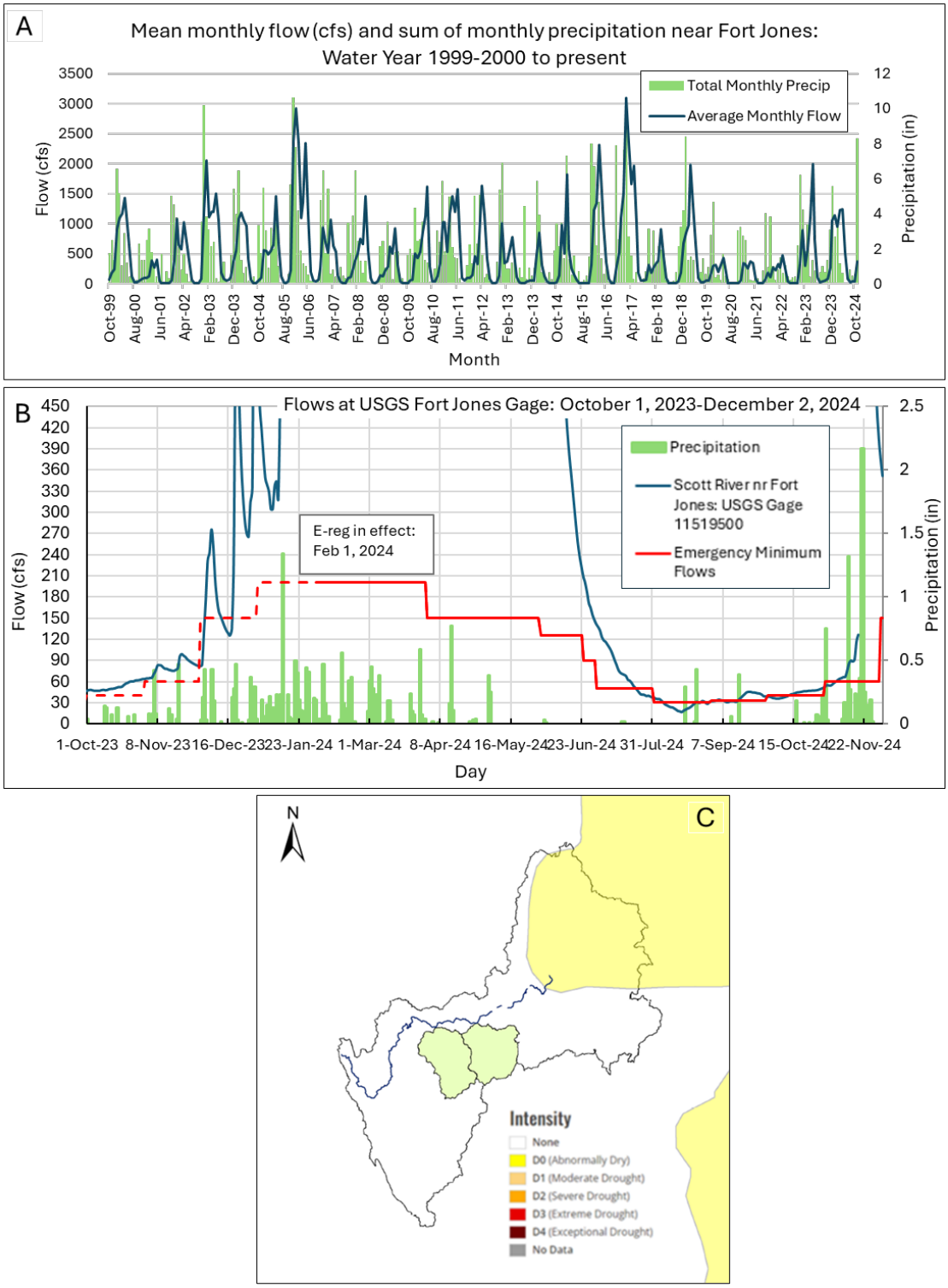


Figure 1. Monthly time series of flow and precipitation near Fort Jones in the Scott River watershed for WY 1999-2000 to present (A); Daily time series of flow and

precipitation near Fort Jones and emergency minimum flows in the Scott River watershed for WY 2023-2024 as of December 2, 2024 (B); and regional drought condition as reported by US Drought Monitor (https://droughtmonitor.unl.edu/) as of November 27, 2024 (C). Streamflow data source: USGS Fort Jones (USGS gage no. 11519500; USGS, 2024a). Precipitation data source: PRISM Climate Group (2024). Precipitation is estimated at the location of USGS gage (with the assumption that it represents the pattern of rainfall of the Scott River watershed).

As of December 2, 2024, USGS Fort Jones Gage is 352 cubic feet per second (cfs). The average flow of WY 2024-2025 (i.e., since October 1, 2024) at the gage has been 204 cfs (USGS, 2024a).

In the year 2024, flows at USGS Fort Jones were above the proposed emergency minimum flows until July 23, 2024 (Figure 1B). Throughout the summer, flows have been below the minimum flow requirements 44% of time (USGS, 2024a). The average of shortfall (the difference between the minimum flow requirement and the daily flows) in this time was 6.2 cfs. In the period of July 23, 2024, to September 30, 2024, thirty-nine days of total seventy days, flows have been above the minimum flow requirements.

In WY 2024-2025, as of December 2, 2024, except for twelve days in October 2024 (October 1 to October 12) and six days in November 2024 (November 1 to November 6) flows at USGS Fort Jones Gage were above the minimum flow requirements of 40 cfs, 60 cfs, and 150 cfs of October, November, and December, respectively (USGS, 2024a). The average of shortfall (the difference between the minimum flow requirement and the daily flows) in this time was 2.9 cfs.

Figure 2 shows a flow probability exceedance analysis of the full record, 1941-present, of streamflow data for the Scott River USGS gage near Fort Jones and the average annual streamflow for WYs 2017-2018 through 2023-2024. For WY 2022-2023, and WY 2023-2024, the annual average flows are 515, and 556 cubic feet per second (cfs), which is about 86 percent, and 93 percent, respectively of the long- term average annual flow of October to September (598 cfs) for the period October 1941-September 2024. The average annual flow for WY 2023-2024 is represented with dotted lines to make it different from WY 2018-2019. Flows during WY 2023-2024 represent a near-average year, with flows in the lowest 54 percent of the period of record. WYs 2019-2020, 2020-2021, and 2021-2022, are the most recent years of severe drought, were very dry, with flows in the lowest 10 percent of the period of record. WYs 2017-2018, and 2018-2019 are those years where no emergency regulation was in effect, with flows in the lowest 15 percent, and 45 percent, respectively of the historical period of record.

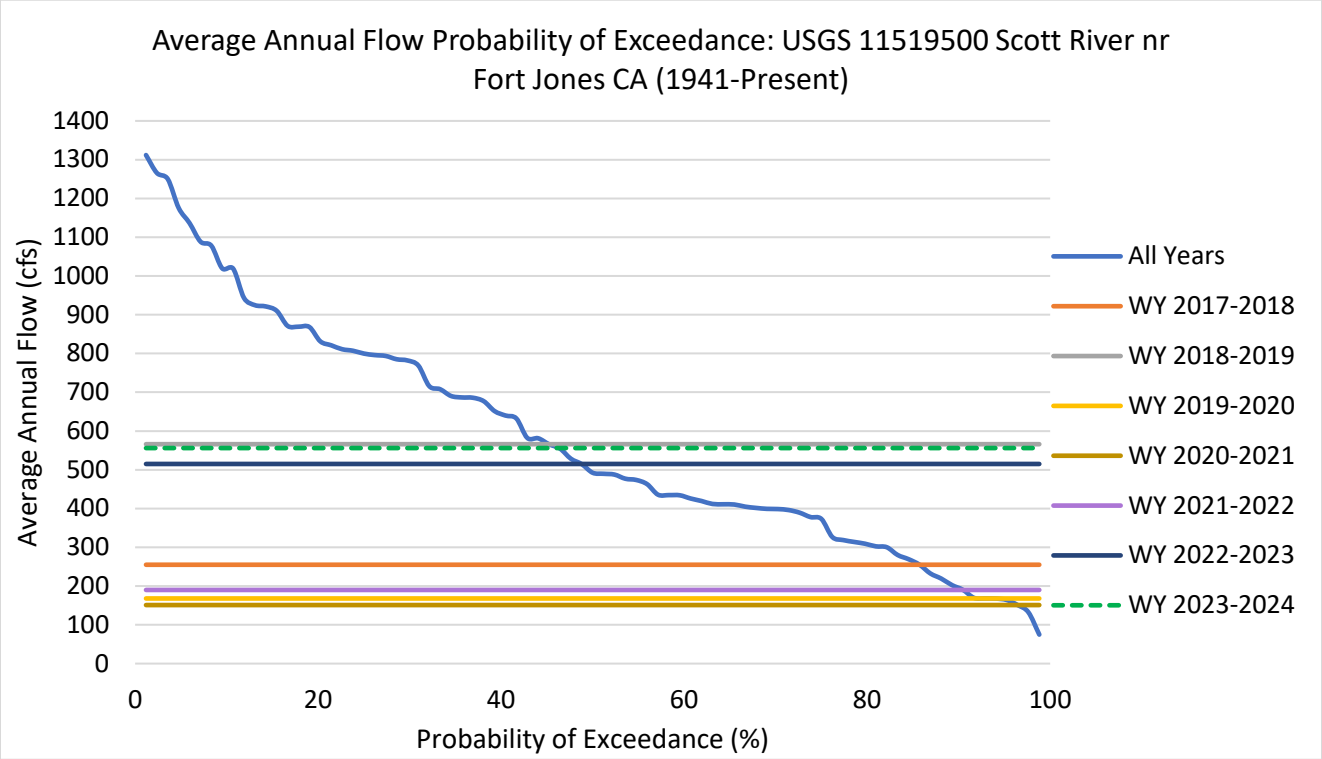


Figure 2. Probability of exceedance of average annual impaired flow at USGS Fort Jones Gage (USGS Gage no. 11519500) and annual average flow for WYs 2017-2018 through 2023-2024. Streamflow data source: USGS (2024a).

3.1.1.3 Streamflow Forecast for WY 2024-2025

Long-term forecasting of flows in the Scott River watershed is challenging due to uncertainties in future climate conditions. As shown in Figure 3, the National Weather Service (NWS) Climate Prediction Center has forecasted equal chances of above or below average precipitation for most of WY 2024-2025. The most recent forecast, issued on December 19, 2024, forecasted precipitation in early winter 2025 leaning above normal, and for the rest of winter and early spring 2025 of equal chances of being above-, below-, and near-normal conditions. The NWS Climate Prediction Center has forecasted California's air temperature to have equal chances of being above-, below-, or near-normal conditions for WY 2024-2025 (NWS, 2024).

WY 2024-2025 is predicted to be a La Niña year, with La Niña expected to persist and peak during the winter. However, its impact on weather in the Scott River and Shasta River watersheds remains unclear.

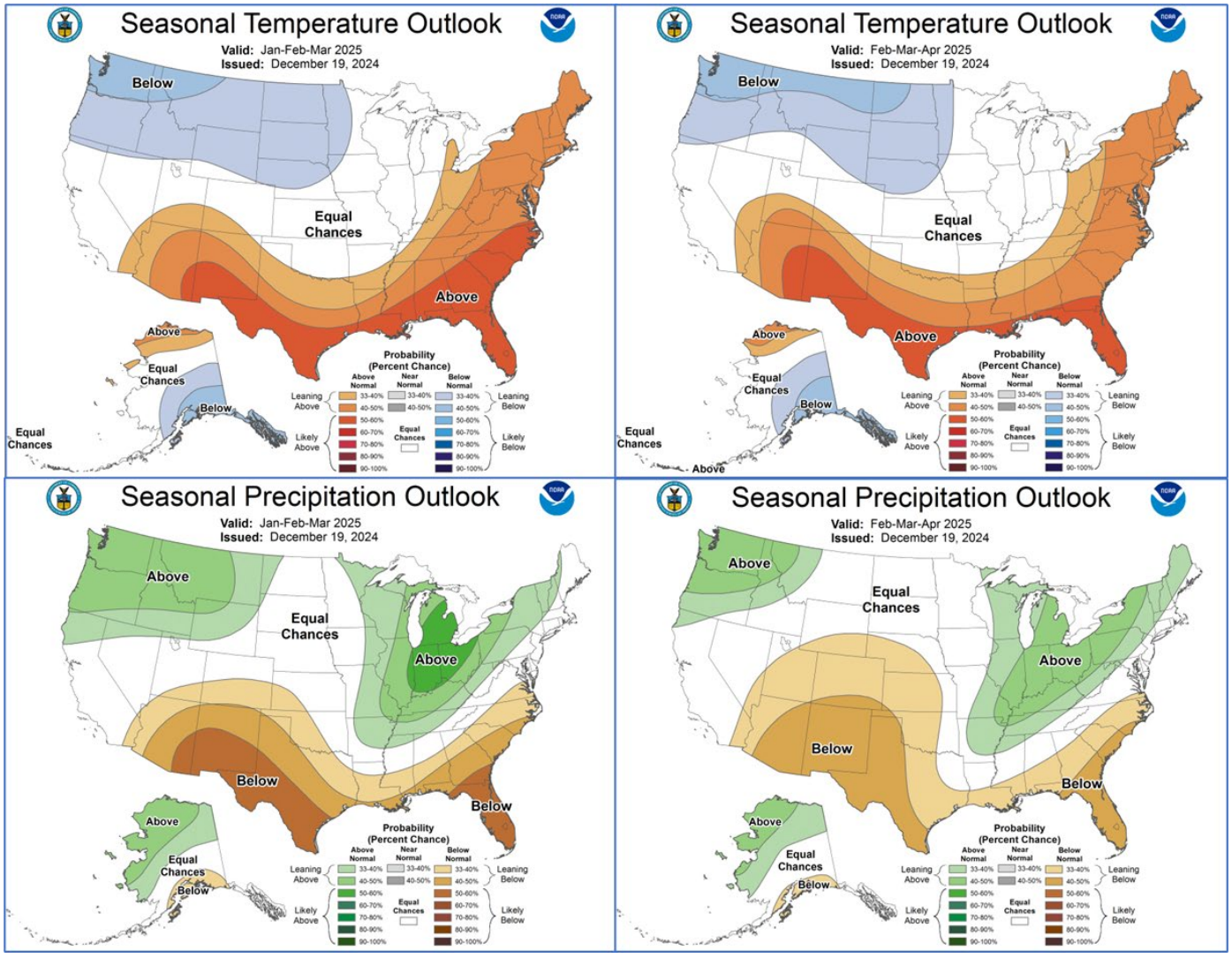


Figure 3. Seasonal precipitation outlook issued by National Weather Service Climate Prediction Center on December 19, 2024. Source: NWS (2024).

Figure 4 shows historic water years in the Scott River that are similar to what is expected in 2025. Based on the range of flows, curtailment of diversions and LCS conservation efforts are needed to achieve the proposed monthly emergency minimum flow requirements throughout 2025.

As reported by NWS, there are equal chances of above- or below-average precipitation for most of WY 2024-2025 (NWS, 2024). Under these conditions, the best estimate for the range of expected flows of WY 2024-2025 is derived using historical flows. Two filters were applied to select appropriate historical years: 1) Only historical years after WY 1999-2000 were considered, as data from earlier WYs are assumed not to represent current average flows due to changes in land use and climate; 2) To account for the effect of fall

baseflow conditions on the annual hydrograph, only years with October flows similar to the current October flows (latest baseflow data before the November 2024 storm) were included. For the historical flow data analysis, the significant storm event in November 2024 was excluded as it was not considered representative of the fall baseflow pattern. Instead, the most recent monthly average data from October was used. Years with October flows significantly higher or lower than those in October 2024 were excluded from the analysis.

In the seven selected WYs, the monthly average streamflow during October was approximately 43 cfs, aligning with the average flow of October 2024. Forecasting next year's flows is not exact science and requires assumptions to be made. With this we expect the flows to fall somewhere in the range of the WYs shown in Figure 4. Based on the range of flows, curtailment of diversions and LCS conservations are needed to achieve the proposed monthly emergency minimum flow requirements throughout 2025.

Fall and winter flows on the Scott River are influenced by the timing and volume of precipitation events and the groundwater levels. Essentially, if groundwater levels are too low, surface flows sink below the riverbed and the river disconnects. Once this occurs, fall or winter precipitation is required to both raise groundwater levels and provide sufficient surface flows to reestablish connection. The overall precipitation received for the year and the amount of groundwater pumping has a significant role in the groundwater levels and the amount of precipitation needed for reconnection to Klamath River. Depending on the WY type and the amount of groundwater pumping, if precipitation arrives early in the fall, which sometimes occurs in dry years, the minimum flow requirements could be met in October. In dry years, groundwater levels are typically lower. More fall precipitation would be needed to recharge groundwater and sustain increased streamflow on the Scott River and its tributaries. Decreased groundwater pumping (Harter, 2021b), as well as earlier precipitation, would provide for earlier reconnection of the stream system.

Groundwater levels in September 2024 and October 2024 (as well as the groundwater levels in September and October 2023) were the highest, for their respective months, since September 2019 (UC Davis, 2024). Therefore, even with October 2023 and 2024 precipitation less than fall 2022 precipitation, Scott River watershed tributaries were connected to the mainstem of the Scott River, earlier than last years. More information on groundwater levels and stream response can be found below in Section 5.3, 5.4, and 5.5.

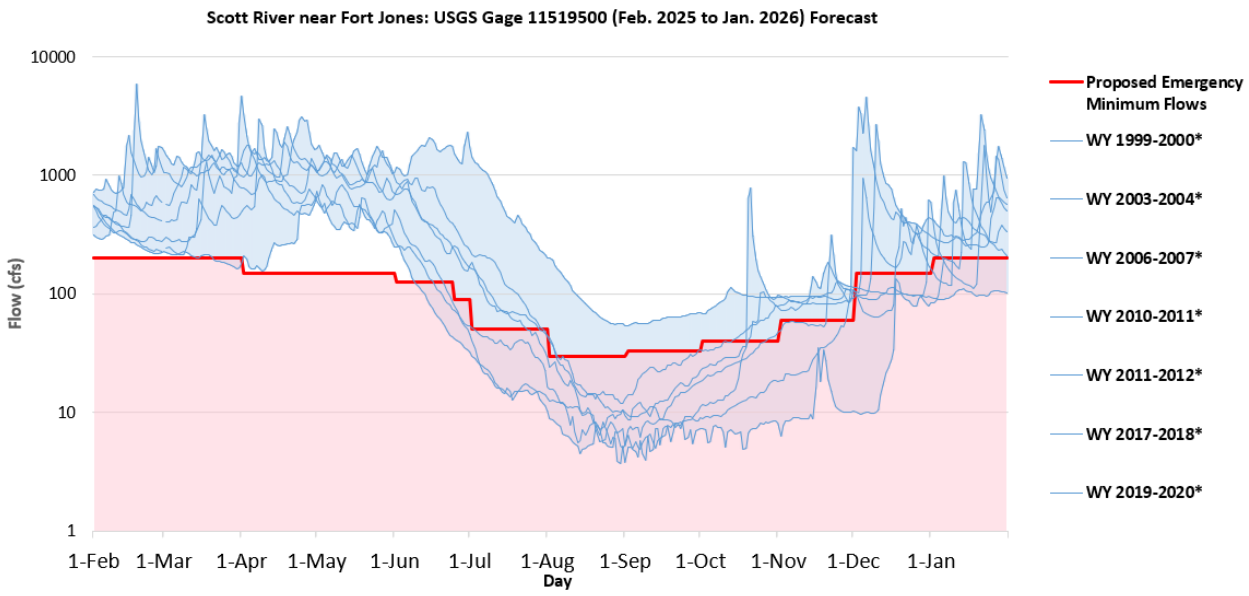


Figure 4. Forecasted monthly average flow range for Scott River gage near Fort Jones (USGS gage no. 11519500). * Graph starts in February of listed water year, and ends January of the following (for example line WY 1999-2000 shows flows of February 2000 to January 2001).

Streamflow data source: USGS (2024a).

As previously reported, there is a high uncertainty regarding the hydrologic conditions in the Scott River and Shasta River watersheds for future seasons, particularly from July through September 2025. This uncertainty underscores the need to rely on historical data to predict the expected hydrologic conditions for spring and summer 2025. To address this, twenty-five hydrographs of daily flows at USGS Fort Jones gage, spanning June to December from 2000 to 2024, were analyzed (Figure 5) to predict the probability of a summer-fall flow shortfall impacting fish populations.

As demonstrated by Figure 5, there are only four years where hydrographs demonstrate summer flows meeting or exceeding the minimum flow requirements: 2003, 2006, 2011, and 2017. These years share common characteristics, including both a near-average or above average April 1st snowpack, measured by Snow Water Equivalence (SWE), and continued snowfall through May, with May 1st snowpack levels at least 30% above average SWE (188%, 247%, 174%, and 133% in 2003, 2006, 2011, and 2017, respectively). In contrast, most other years since 2000 had lower May 1st snowpack, ranking these years among the highest in cumulative snow water equivalent in the last twenty-five years. While higher snowpack shows a strong correlation with flows, May 1st snowpack levels are not determinative for meeting flows, however, as years with more than 130% of average May 1st snowpack still experienced summer flows below the

minimum flow requirement – summer flows in 2005, 2008, 2010, 2019, and 2023 (with snowpack percentages of 135%, 144%, 191%, 135% and 138%, respectively) fell below the minimum flow requirement at least some of the time.

It is also important to note that there was no LCS program for the full irrigation season prior to 2022. Therefore, all pre-2022 hydrographs shown in Figure 5 represent conditions without the significant watershed-wide demand management adopted by many users in the groundwater LCS program in the Scott Valley. The 2022 LCS measures resulted in less groundwater use, but measurable groundwater improvement was not immediately seen, likely because 2022 was a very dry year preceded by several dry years and the longer time necessary to observe changing groundwater trends. By comparison, the implementation of LCSs in 2023 and 2024 likely improved groundwater conditions, contributing to better summer flow.

Based on the past twenty years of data, the probability of receiving more than 130% of the average May 1st snowpack in the coming year is 36%. However, some years with more than 130% of average May 1st snowpack (e.g. 2005, 2008, 2010, 2019, and 2023) still experienced summer flows below the minimum flow requirement. Consequently, the likelihood of fully achieving sufficient summer-fall flows to meet the minimum flow requirements without a watershed-wide demand management (e.g. LCS participation) is reduced to 16%.

In 2024, the implementation of the Emergency Regulation through curtailments and the groundwater LCS program, combined with near-average hydrologic conditions in 2023 and 2024, contributed to higher-than-average groundwater levels and improved flow conditions. Despite a below-average May 1st snowpack of 84% (Figure 5), the Scott River recorded the fifth-best summer flows for fish (measured by the number of days with USGS Fort Jones gage flows meeting or exceeding the minimum flow requirements) in the past twenty-five years, with better flows than many years with higher cumulative snow water equivalent. Similar to the year 2024, in 2023, the implementation of the Emergency Regulation through curtailments and the groundwater LCS program, combined with near-average hydrologic conditions, contributed to higher-than-average groundwater levels and improved flow conditions. With May 1st SWE of 138%, summer 2024 flows exceeded those of several years with higher or similar cumulative SWE and ranked as the 7th best year in the past 25 years for meeting or exceeding minimum flow requirements during the summer.

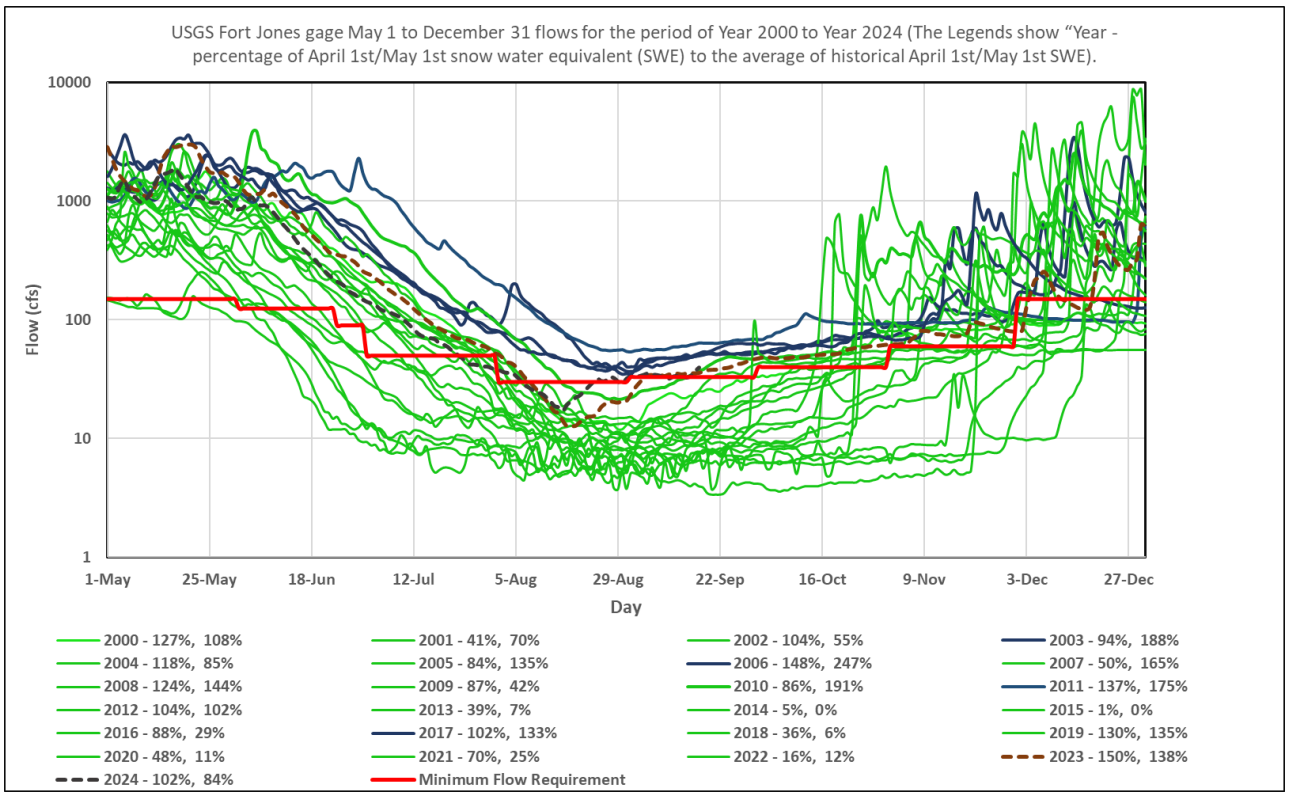


Figure 5. USGS Fort Jones gage May 1 to December 31 flows for the period of Y 2000 to Y 2024. The Legends displays "Year: April 1st-May 1st snow water equivalent (SWE) to the average of historical (1946-2024) April 1st and May 1st SWE averages."

3.1.2 Shasta River Watershed

3.1.2.1 Water Years 2019 to 2024

The average total annual rainfall of Yreka rainfall station operated by US Forest Service has decreased since WY 1982-1983 from 19.8 inches (WY 1982-1983 to WY 1999-2000) to 16.8 inches (WY 1999-2000 to present).

Table 2 compares recent precipitation data in the Shasta River watershed to long-term trends. Specifically, Table 2 compares April 1st SWE and annual precipitation for WYs 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, and 2024-2025 data to the long-term average.

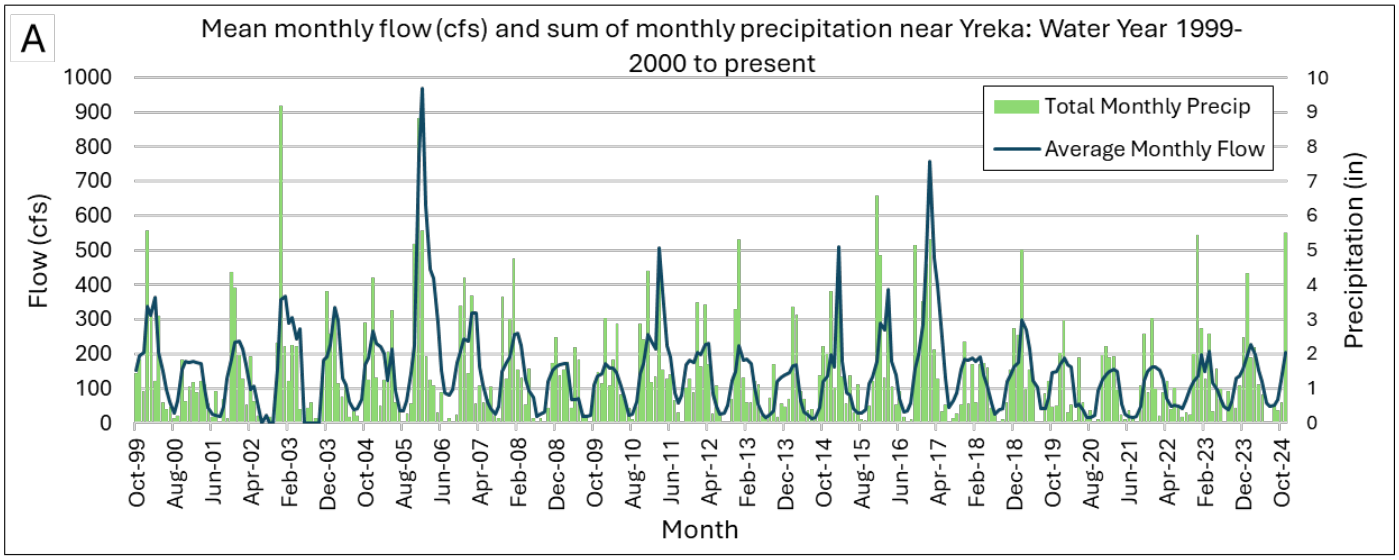
Table 2. Shasta River: percent of average snow water equivalent and annual precipitation. Data source: CDEC

Shasta River	Percent of Average April 1st Snow Water Equivalent	Percent of Average Annual Precipitation
Water Year	Average of Parks Creek, Little Shasta, and Sweetwater precipitation stations (1947-present)	Yreka precipitation gage (1982-present)
2017-2018	64%	62%
2018-2019	153%	103%
2019-2020	58%	52%
2020-2021	91%	62%
2021-2022	32%	76%
2022-2023	162%	108%
2023-2024	100%	70%
2024-2025	_	51% of average October[4]

3.1.2.2 Streamflow in Fall 2024

The USGS Shasta River gage near Yreka (USGS gage no. 11517500, USGS Yreka gage) is near the outlet of the Shasta River watershed and represents the impaired flow of the entire watershed. Similar to the Scott River watershed, in the past five years, the Shasta River has experienced three consecutive severely dry water years (2019-2020, 2020- 2021, and 2021-2022) followed by two near-average water years (2022-2023 and 2023-2024) (Figure 6A). Streamflow data from the USGS Yreka Gage indicates the recent three-year extreme drought (WYs 2019-2020 to 2021- 2022) was the second driest period since WYs 1933-1936. (USGS, 2024c) Figure 6(A) shows that WYs 2019-2020 to 2021-2022 were the driest period in the recent past (defined as since WY 1999-2000). Figure 6(A) through Figure 6(C) shows the monthly flows and precipitation near Yreka in the Shasta River watershed, demonstrating the surface hydrology of recent decades and highlighting daily flow, precipitation, and the emergency minimum flows for 2024 as of December 2, 2024. As shown in Figure 1C, as of November 27, 2024, Shasta River watershed is no longer classified as experiencing a drought (National Drought Mitigation Center, 2024).

[4] In November 2024, Shasta River watershed received a significant storm. The precipitation data of that storm has not been reported by the Yreka gage yet. The Yreka gage data was last visited on 12/3/2024.


A
Mean monthly flow (cfs) and sum of monthly precipitation near Yreka: Water Year 1999-2000 to present
Total Monthly Precip
Average Monthly Flow
Flow (cfs)
Precipitation (in)
Month
Oct-99
Aug-00
Jun-01
Apr-02
Feb-03
Dec-03
Oct-04
Aug-05
Jun-06
Apr-07
Feb-08
Dec-08
Oct-09
Aug-10
Jun-11
Apr-12
Feb-13
Dec-13
Oct-14
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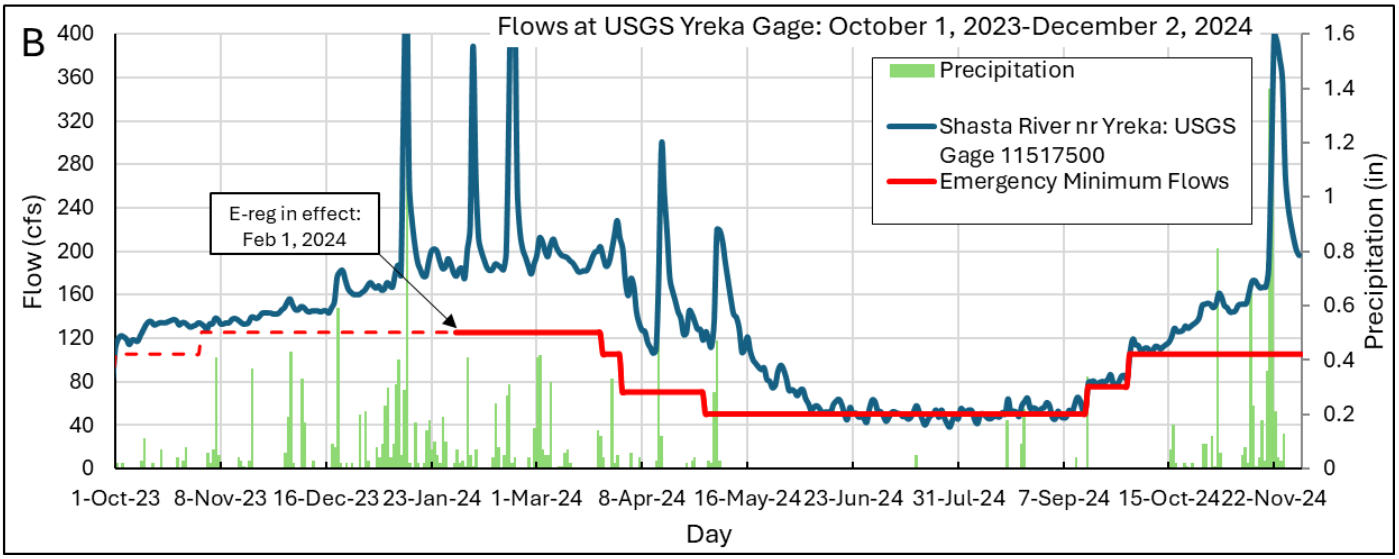
Oct-24


B
Flows at USGS Yreka Gage: October 1, 2023-December 2, 2024
Precipitation
Shasta River nr Yreka: USGS Gage 11517500
Emergency Minimum Flows
E-reg in effect: Feb 1, 2024
Flow (cfs)
Precipitation (in)
Day
1-Oct-23
8-Nov-23
16-Dec-23
23-Jan-24
1-Mar-24
8-Apr-24
16-May-24
23-Jun-24
31-Jul-24
7-Sep-24
15-Oct-24
22-Nov-24

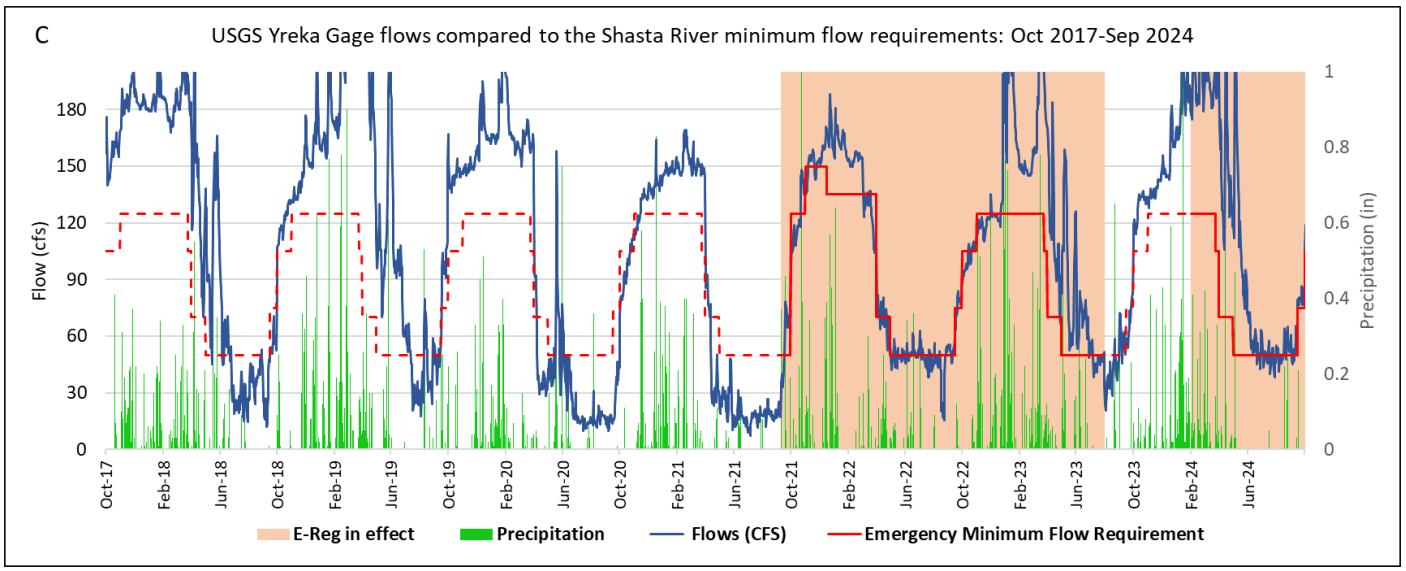


Figure 6. Time series of monthly flow and precipitation near Yreka in the Shasta River watershed from WY 1999-2000 to present (A), time series of daily flow and precipitation near Yreka in the Shasta River watershed and emergency minimum flows for WY 2024 as of November 2024 (B) and time series of daily flow and precipitation near Yreka in the Shasta River watershed and emergency minimum flows for Oct 2017 through Sep 2024 (C). Streamflow data source: USGS Yreka gage (USGS Gage no. 11517500; USGS (2024c)). Precipitation data source: (PRISM Climate Group, 2024). Precipitation is estimated at the location of USGS gage with the assumption that it represents the rainfall pattern of the Shasta River watershed.

Figure 7 shows a flow probability exceedance analysis of the full record, 1933-present, of streamflow data for the USGS Yreka Gage and the annual average streamflow for WYs 2017-2018 through 2023-2024. For the recent WYs 2022-23, and 2023-24, the annual average flows are 112 cfs, and 128 cfs, which are about 71 percent, and 81 percent, respectively of the long-term average of annual flow (158 cfs) for the time-period of October 1988-September 2024. Despite the above-average snow water equivalent measurements in the Shasta River watershed and annual precipitation percentages of 108% and 70% of average, respectively (Table 2), flows at the USGS Yreka gage in WYs 2023-2024, and 2022-2023 were in the lowest thirty-three percent (33%), and twenty-two percent (22%), respectively of the historical period of record (1933–present). The average annual flow for WY 2021-2022 is represented with dotted lines to make it distinct from WY 2019-2020. Further, as a part of recent extreme drought years, flows at the USGS Yreka gage in WY 2019-2020, 2020-2021, and 2021-2022 fell to the lowest eleven percent (11%) of the historical period of record flows at the Yreka USGS gage. In addition, WYs 2017-2018, and 2018-2019 from Figure 7 are those years where no emergency regulation was in effect, with flows in the lowest 30 percent, and 45 percent, respectively of the historical period of record.

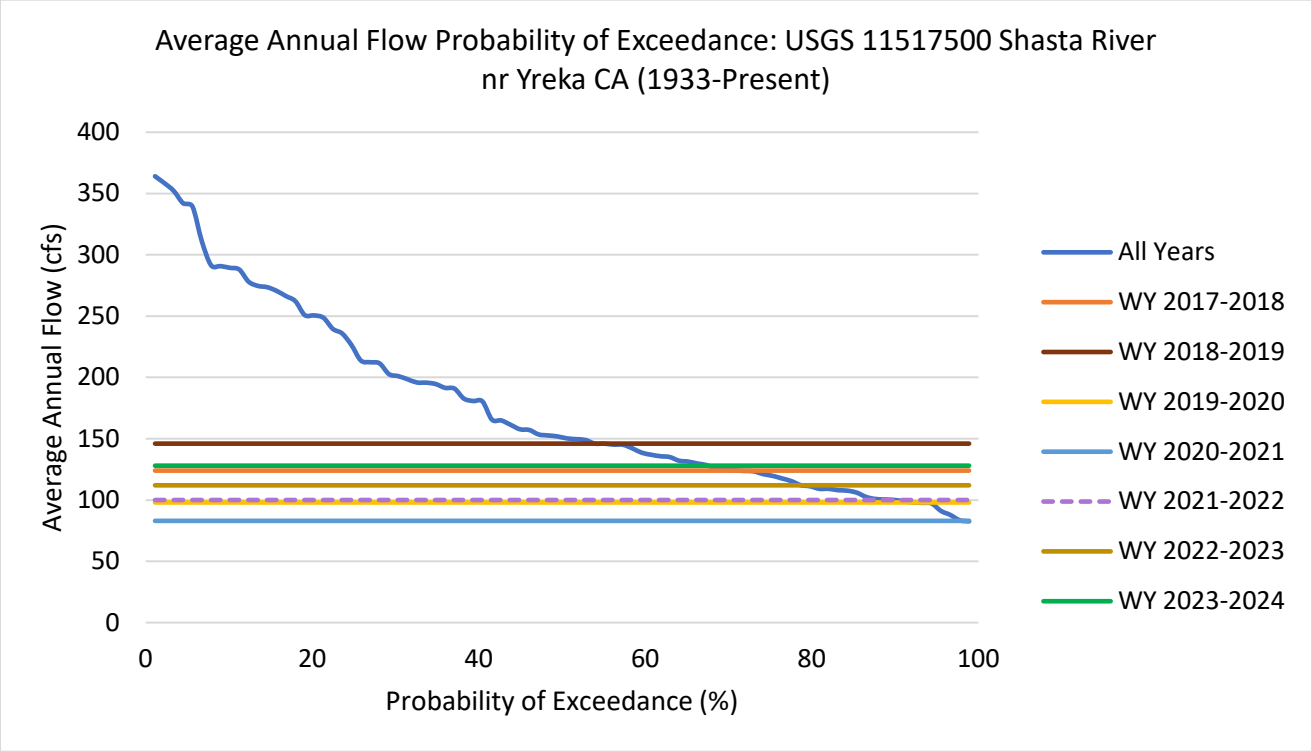


Figure 7. Probability of exceedance of annual impaired flow for Shasta River near Yreka (USGS gage no. 11517500) and annual average flow for WYs 2017-2018 through 2023-2024. Data source: USGS (2024c).

3.1.2.3 Streamflow Forecast for WY 2024-2025

Figure 8 illustrates the forecasted impaired streamflow (i.e., with diversions) for the expected-range scenario in 2025, along with all reference WY lines and the proposed emergency minimum flow requirements. Curtailment of diversions and LCSs are forecasted as needed to achieve the proposed minimum flow requirements during 2025.

Due to the strong correlation between hydrologic conditions of Scott River and Shasta River watersheds, the same method and the same seven years selected for the representative range in the Scott River watershed are used and analyzed for the representative range in the Shasta River watershed. Daily flows in the seven selected WYs are plotted in Figure 8; all the WY lines are represented with the same color. Daily flows are forecast to fall below the minimum flow requirements during the range of period between June 2025 to end of September 2025 for most of the selected WYs.

The Shasta River is primarily fed by large spring sources, making its mainstem less reliant on heavy rains to increase streamflow in the fall compared to the Scott River. Typically, when irrigation diversions cease around October, streamflow in the Shasta

River near Yreka (USGS gage no. 11517500) increases in a pattern that is not dependent of the timing of fall precipitation.

In 2024, initial curtailment orders were issued in the Shasta River watershed for both surface water and appropriative groundwater on June 7. Curtailment in the Shasta River watershed was largely managed by the Scott Valley and Shasta Valley Watermaster District (Watermaster). USGS Yreka Gage flows (near the outlet of the Shasta River watershed and the compliance point for maintaining minimum fish flow requirement) reflect the watershed diversions changes rapidly (between few hours to few days depending on the distance of the point of diversion from USGS Yreka gage), which makes the effects of the curtailments in the Shasta River watershed significantly different from the curtailments in the neighboring Scott River watershed. Regardless of the hydrologic conditions, curtailments under the emergency regulations have been very effective in the Shasta River watershed. As an example, in the last seven years, average July and August flows at USGS Yreka gage, have improved from 31.4 cfs, 41.6 cfs (as a result of good summer rainfall events), 15.6 cfs, and 17.4 cfs in 2018, 2019, 2020, and, 2021, respectively when no emergency regulation was in effect, to 44.8 cfs, 43.1 cfs, and 50.4 cfs in 2022, 2023, and 2024, respectively, with emergency regulations curtailments in effect (Figure 6 C).

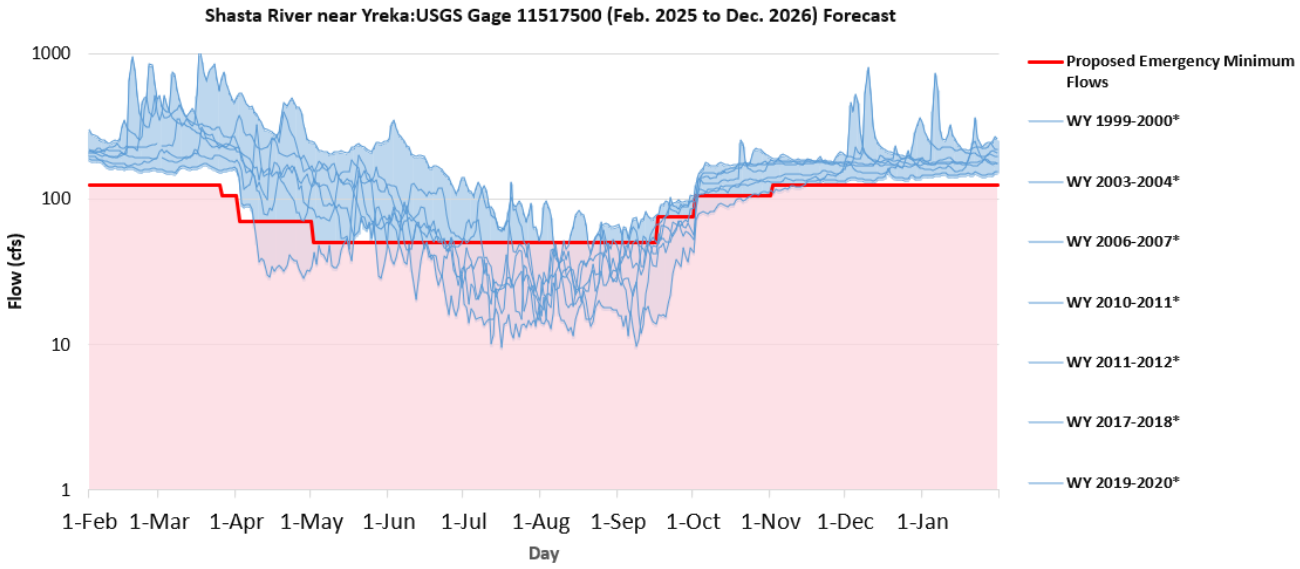


Figure 8. Shasta River average daily impaired streamflow at Yreka gage (USGS gage no. 11517500) forecasted range for February 2025 to January 2026. Maximum Daily flow in March 2011 was 1110 cfs which is beyond the y-axis scale of this

graph. * Graph starts in February of listed water year, and ends January of the following (for example line WY 1999-2000 shows flows of February 2000 to January 2001). Streamflow data source: USGS (2024c).

3.2 Status of Species: Coho Salmon, Chinook Salmon, and Steelhead

The Scott and Shasta watersheds are important steelhead- and salmon-producing streams in the Klamath River Basin and support numerous fisheries including the culturally and commercially significant Upper Klamath Trinity fall-run Chinook Salmon evolutionarily significant unit (ESU), the culturally significant KMP steelhead Distinct Population Segment (DPS), and the culturally significant Southern Oregon/Northern California Coast (SONCC) coho salmon ESU. The SONCC coho salmon is listed as a threatened species under both the federal and state ESAs and is identified as being at high and moderate risk of extinction in the Shasta River and Scott River, respectively (NMFS, 2014). Both coho salmon and Chinook salmon will migrate up the Klamath during fall and early winter months to spawn. Both species will migrate into tributaries including the Scott River and Shasta River watersheds, in search of viable spawning grounds found in smaller, higher tributary habitats. These higher tributary reaches provide a multitude of benefits for spawning and rearing including preferred gravel sizes for redds, appropriate stream gradient, reduced chance of high flow scour, canopy cover, and riparian vegetation providing habitat and refugia for the emerging fry. After spawning the adults die, and the young will hatch and rear for a year in the tributary watersheds. When they reach maturity, the juveniles then move out of the tributaries, enter the mainstem Klamath, and travel to the ocean. The adult fish then typically return three years later to the same tributary where they hatched to spawn.

The Scott River and Shasta River coho salmon are both “core, functionally independent” populations of the SONCC Evolutionarily Significant Unit under the federal ESA, indicating that the Scott River and Shasta River have a critical role in the continuation and recovery of SONCC coho salmon. The SONCC coho recovery plan identifies increasing instream flows as one of the highest priority recovery actions in the Scott River and Shasta River watersheds (NMFS, 2014). The Chinook salmon populations are critical for tribal cultural, spiritual, and nutritional significance, and commercial salmon fishing along the North Coast. It is vital that both these populations are protected during years of drought and given a chance to recover.

Populations of coho salmon in the Klamath River have declined between 52% and 95% from historical levels. Fall-run Chinook salmon populations have declined between 92% and 96%, and spring-run Chinook salmon have declined 98%, compared to historical levels (Belchik, 2023).

Summer-run steelhead within the KMP DPS are a CDFW recognized species of special concern. Steelhead exhibit one of the most complex life histories of any salmonid species. Two reproductive forms of steelhead are recognized, the summer-run (stream- maturing) and winter-run (ocean-maturing), which describes the level of sexual development following return to the freshwater environment. Unlike salmon, steelhead can spawn more than once before they die. Adult winter-run steelhead typically enter the Klamath River from late August to February before spawning, which extends from January through April, peaking in February and March (NRC, 2004). Summer-run steelhead enter freshwater as immature fish from May to July, migrate upstream to the cool waters of larger tributaries, and hold in deep pools roughly until December, when they spawn (NRC, 2004). Juvenile steelhead typically rear in freshwater for one to three years, mostly two, before migrating downstream toward the ocean in spring, primarily during the months of March through May. They then typically reside in marine waters for one to three years prior to returning to their natal stream to spawn as three- or four-year olds. Steelhead have similar habitat requirements to other salmonid species. Like coho salmon, steelhead require adequate flows, temperatures, water depths and velocities, appropriate spawning and rearing substrates, and availability of instream cover and food (Bisson et al., 1988). Declines of steelhead throughout California have been documented in recent decades and have been mainly attributed to habitat degradation (Moyle et al., 2008). Steelhead populations in the Klamath River watershed have declined 67% (population estimate of 130,000) compared to the historical population estimate of 400,000 (Belchik, 2023). The Scott River adult steelhead population estimate in 1965 was 5,000 (Harris 2023a). In 2022, a net total of 18 adult steelhead entered and remained in the Scott River, one of the lowest returns since 2007 (CDFW 2023g). The Shasta River adult steelhead population estimate in 1933 was 8,400 (Harris 2023a). In 2022, a net total of 82 adult steelhead were estimated to have entered and remained in the Shasta River, the third lowest total since 2008 (CDFW 2023e, Harris 2023a). In the Scott River and Shasta River, monitoring adult steelhead migration is challenging because monitoring equipment is removed due to the potential for high flows while migration is still underway. Therefore, the number of observed steelhead should be considered a minimum number of returns and not basin estimates (CDFW 2023g, CDFW 2023e).

On May 3, 2021, CDFW submitted a letter to the State Water Board expressing concern with the recent pattern of critically dry years and low flow conditions in the Scott River and the United States Drought Monitor prediction of an ongoing drought in Siskiyou County (CDFW, 2021c). Dry conditions have led to extreme events that threaten coho and Chinook salmon survival in these watersheds. For example, in the fall and winter of 2020, adult coho and Chinook salmon were unable to pass above the confluence of Oro Fino Creek within the mainstem Scott River, resulting in significant migration delays.

The extended delays raised concerns regarding the potential loss of that year’s run of salmon or “brood year”, the calendar year when the majority of adults from the same

group of offspring return to spawn. Salmon unable to reach the upper tributaries to spawn are forced to spawn in the lower main river. Spawning in the main channel poses a higher risk to the redds and fry, with potential for high flow velocity scouring of redds, decreased availability of suitable gravel sizes, higher summer stream temperatures, and reduced riparian habitat and refugia. All these pose a risk to the successful spawning and rearing for the brood year. Fortunately, outmigration numbers gathered in 2022 indicate that such a drastic loss did not occur (CDFW, 2022a). CDFW's letter notes the importance of a successful brood year, and that cohort failure represents loss of a significant component of the population, increases the potential for extirpation, and greatly impedes natural recovery. CDFW (2021c) further identified the best available scientific information for assessing long-term flow needs, and priority actions, for the protection of Coho and Chinook salmon in the Scott River. On June 15, 2021, with drought conditions worsening and the May 2021 Proclamation, CDFW sent a letter to the State Water Board recommending drought emergency minimum flows for the Scott and Shasta River watersheds and urged the State Water Board to adopt flows in the current drought emergency (CDFW, 2021b). On April 20, 2022, CDFW sent a letter to the State Water Board requesting that the Drought Emergency Regulation be renewed for an additional 12 months, with specific recommendations to update the regulation (CDFW, 2022b).

On March 10, 2023, the NMFS announced the cancellation of opening the ocean salmon sport fishery between Cape Falcon, Oregon, and the United States-Mexico border through May 15, 2023. The actions were taken to protect Sacramento River fall- run Chinook, which returned to the Central Valley in 2022 at near-record low numbers, and Klamath River fall-run Chinook, which had the second lowest abundance forecast since the current assessment method began in 1997 (CDFW, 2023c). On May 16, 2023, federal regulations went into effect for closure of commercial and recreational ocean salmon fisheries off the California coast. On May 17, 2023, the California Fish and Game Commission acted unanimously to enact a full closure of California's recreational salmon fishing season in the Klamath River Basin and Central Valley rivers no later than July 1, 2023, through its annual process for adjusting seasons and bag limits (CDFW, 2023d; CFGC, 2023)

On July 20, 2023, CDFW submitted a letter in which the agency indicates support for the development of long-term instream flows for the Scott River and for the Shasta River. CDFW noted it's multi-prong fish and wildlife restoration effort across the entire Klamath Basin with Tribal communities and other organizations and provided an assessment of benefits to fish and wildlife resources observed from implementing the emergency drought regulation flows in both the Scott and Shasta Watersheds from 2021 to 2023. CDFW suggests the Water Board consider adopting the flows from the emergency drought regulation as an interim flow backstop against further local Chinook salmon, coho salmon and steelhead cohort declines or at worst extirpation from the Scott and Shasta Rivers (CDFW, 2023f).

In 2024, NMFS closed ocean salmon commercial and recreational fisheries from the Oregon/California border to the U.S./Mexico border and CDFW closed in-river salmon sport fishing in the Klamath River Basin and Central Valley rivers for a second consecutive year (NOAA, 2024; CDFW, 2024c).

On November 20, 2024, CDFW submitted a letter of support for the re-adoption of the Emergency Regulation to protect fish species, including coho salmon, Chinook salmon, steelhead, and other native endemic fish in the Shasta River and Scott River watersheds. CDFW emphasized that the emergency baseline flows provided are intended solely to ensure minimum flow protection for adult and juvenile salmonids during drought conditions and are not intended as the foundation for long-term management considerations. However, CDFW acknowledged that these flow thresholds have contributed to improved habitat conditions for salmonids in both watersheds. CDFW noted that increased surface flows due to the Emergency Regulation were observed during key periods, such as the migration of adult Chinook salmon, coho salmon and steelhead, as well as juvenile rearing and outmigration. In the Scott River, the emergency flows also contributed to improved groundwater elevations, which enabled earlier surface water connection and increased cold-water discharge into the rivers during baseflow conditions, supporting healthy riparian habitat. Furthermore, CDFW continues to support meeting the minimum flow requirements through the development and implementation of LCSs. These efforts have fostered beneficial relationships, discussions, and actions within both watersheds, while providing CDFW staff with greater insight into on-ranch operations and best management practices (CDFW, 2024d).

3.2.1 Scott River Watershed Fishery Status

The periodicity of salmonids in the Scott River watershed is summarized in Figure 9 and described here. CDFW does not perform adult and juvenile salmonid surveys year- round. CDFW tries to perform surveys during the period when a majority of the salmonids for a particular life stage have typically been observed in the watershed over the years. Therefore, the time-period when life stages of salmonids are shown in Figure 9 and described below is when that life stage is typically observed. However, there is potential for a salmonid life stage to occur outside the time periods described below and shown in Figure 9.

In the Scott River, fall-run Chinook salmon migration occurs from September to December and spawning occurs from mid-September through December. Fall-run Chinook fry emergence occurs from November through May and out-migration occurs from February through July. SONCC coho salmon migration occurs from October to January and spawning occurs from October to February. SONCC coho salmon fry emerge from February through June and rear in the stream for approximately one year. The following February through July juvenile coho out-migrate to the ocean.

Adult winter-run steelhead typically enter the Klamath River between August and February, with spawning taking place from January to April and peaking in February and March (NRC, 2004). Summer-run steelhead enter freshwater as immature fish from May to July, migrate upstream to the cool waters of larger tributaries, and hold in deep pools roughly until December, when they spawn (NRC, 2004). Juvenile steelhead typically rear in freshwater for one to three years, most commonly two years, before migrating downstream toward the ocean in spring and summer, peaking in April and May (NRC, 2004). Tributary-specific migration data for steelhead in the Scott River are less well captured than for coho and fall-run Chinook salmon because a large fraction of the adult steelhead migration occurs outside the operational window of the CDFW Scott River Fish Counting Facility (SRFCF) (CDFW 2022d). As previously mentioned, there is potential for a salmonid life stage to occur outside the time periods described below because CDFW does not perform adult and juvenile salmonid surveys year-round. In the Scott River, Steelhead adult migration occurs year-round, spawning occurs from mid-December through May, fry emergence occurs from February through June, and out-migration occurs from February through July.

SONCC coho salmon populations are generally tracked as three separate brood years, with cohorts returning every three years. In the Scott River, brood year strength has been tracked for multiple decades, and the difference in brood year strength in this watershed is notable. When conditions are good during successive brood generations, coho salmon populations can respond quickly, as brood year 2 and year 3 have seen roughly order of magnitude increases in populations since 2008. Likewise, populations can suffer order of magnitude decreases following poor river conditions. Brood year 1 reduced in population size by over 90 percent following the 2013 drought, from 2,644 fish in 2013 to 250 fish in 2016 (CDFW, 2021a). During the 2019 and 2022 returns of brood year 1, estimates of 346 and 238 adults were observed, respectively (CDFW 2023g). These numbers are far below the population level prior to the impact of the 2013 drought. In one generation, the brood year that returned in 2023 decreased 34% from 2020, with a reduction from 1,384 fish in 2020 to 914 in 2023. (CDFW, 2024e). Over five generations, the brood year increased from 143 in 2008 to 914 in 2023 (CDFW, 2024e). The coho salmon populations remain far below the NMFS Recovery Criteria of 6,500 spawners for the Scott River, at times approaching the depensation threshold of 250 spawners, and have a moderate risk of extirpation. Depensatory effects are problems with successful reproduction when the overall population abundance of a species is low. The depensation threshold is the number of spawners that are needed to avoid depensatory effects. A spawning number below the depensation threshold poses a higher risk of extinction (Abrams, 2023).

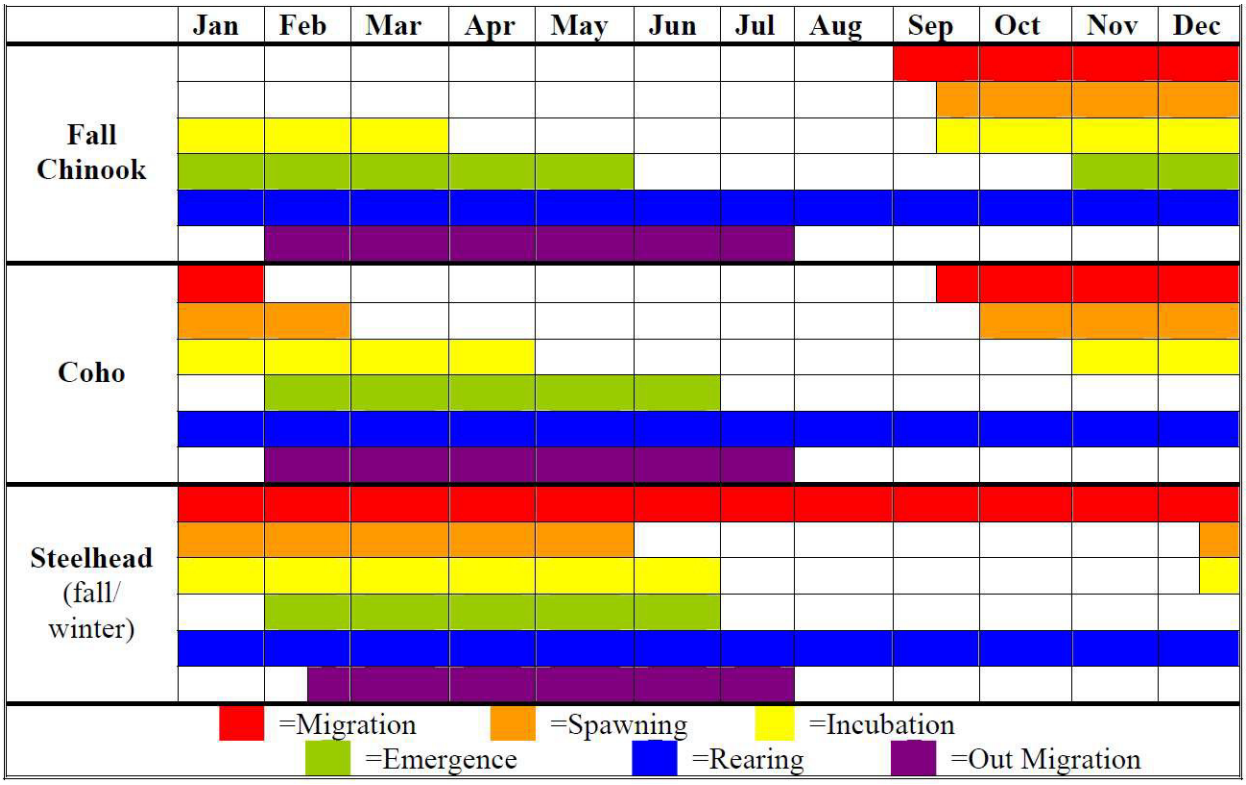


Figure 9. Salmonid periodicity in Scott River watershed. Source: NCRWQCB (2005).

The spatial distribution of annual spawning in the Scott River watershed is an important metric as there is a lower risk of catastrophic loss due to potential redd scour when eggs are deposited throughout the watershed. The tributaries and upstream floodplain provide refuge, cover, and feeding opportunities for juvenile salmonids that are not available in the downstream canyons. Access to more rearing habitat increases potential production, which can in turn increase adult returns (Harris, 2023a).

Low flow barriers in the Scott River degrade the migratory corridor and limit the spatial distribution and diversity of life history strategies. Other limiting factors stemming from altered hydrologic function include stream disconnection and degraded riparian habitat. Stream disconnection results in habitat fragmentation and isolated habitats (Abrams, 2023). Stream disconnection also limits salmon access to crucial spawning grounds and habitat. Chinook salmon that cannot access preferred spawning areas in the Scott Valley are forced to spawn in the Scott River canyon, which poses risks due to the potential for scouring of redds during winter storms. CDFW found this to be the case in 2023 fish surveys, catching unusually high amounts of Chinook sac fry. Typically, the fry will leave the redd once they have completely absorbed their yolk sac and have biologically matured. These high numbers of sac fry indicate that redds were being scoured during high velocity flows in the Scott River canyon (Harris, 2023a).

Since 2008, an average of 65 percent of the Chinook salmon have spawned upstream of the Scott River Fish Counting Facility (location shown in Figure 10). However, in three of the five years (2015, 2018, and 2020) prior to adoption of the 2021 Drought Emergency Regulation (SWRCB, 2021b), more than 68 percent of the Chinook salmon spawning occurred in mainstem canyon reaches downstream of the SRFCF (82%, 68%, and 69%, respectively), which corresponds with the three lowest October flow years to date (CDFW, 2021a).

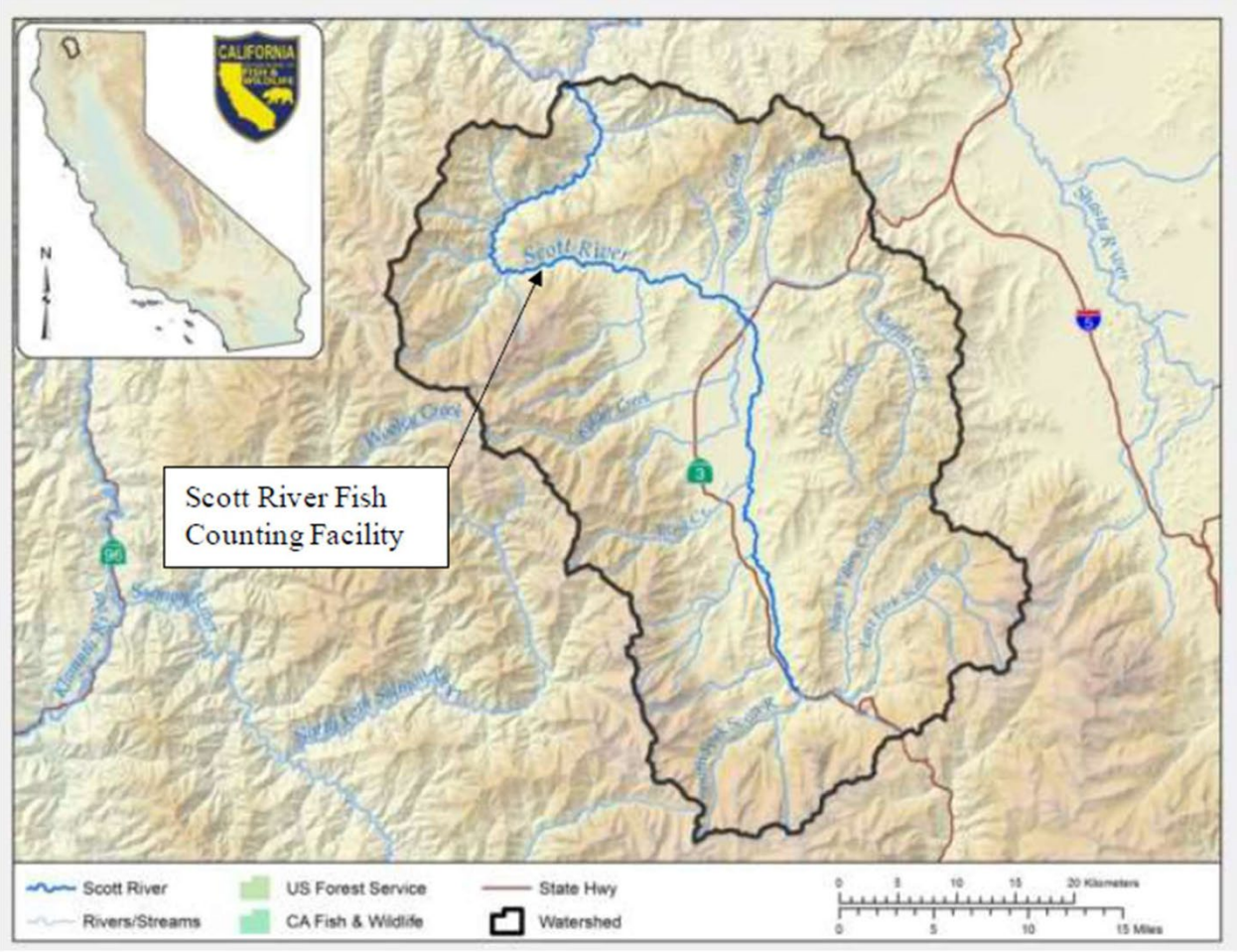


Figure 10. Location of the Scott River Fish Counting Facility. Source: CDFW (2023g)

The Scott River is TMDL listed for sediment and water temperature (NCRWQCB, 2005; Scott, 2023). Elevated, yet sublethal, water temperatures can have a myriad of detrimental impacts on the survival of salmon including stress, increased susceptibility to parasites and disease, altered metabolic rates, decreased growth rates, inhibition of smoltification, and altered competitive dominance. The stressful impacts of temperature on salmon are cumulative, and positively correlated to the duration and severity of exposure (NCRWQCB, 2005). Scott River temperature impairment is driven by

anthropogenically influenced factors including stream shade provided by riparian vegetation, streamflow affected by changes in groundwater accretion, streamflow affected by surface water diversions, and channel geometry. Groundwater accretions create temperature refugia and increase flow and thermal mass of the water body.

Increased thermal mass buffers the water body to changes in atmospheric temperature, solar radiation, and warm water inputs (i.e., warmer tributaries or tailwater return flows). Increased flow reduces travel time, thus reducing the time a unit of water is exposed to solar radiation. Increased flow also increases pool depths, providing enhanced temperature refugia. The impact of surface diversions on streamflow is especially important in smaller tributaries which tend to host summer juvenile salmonid rearing. In these water bodies, the total diversions can constitute a large proportion of the total streamflow, particularly in French Creek, Shackleford Creek, Kidder Creek, and the East Fork Scott River (Scott, 2023).

Timing of flow also has an important role in salmonid migration. Coho salmon respond almost instantaneously to fall flow increases in the Scott River, indicating that these fish are staging downstream of the SRFCF in the canyon reaches, waiting for a flow increase to migrate upstream. An annual average of 99.2 percent of coho salmon in the Scott River watershed spawn upstream of the SRFCF. However, if the increase in flow occurs too late in the spawning season, coho salmon are forced to spawn in the mainstem reaches of the Scott River. Mean daily flows more than 60 cfs were required to restore effective tributary access for coho salmon during the 2013-2014 season (CDFW, 2021a).

For example, in fall 2013 and winter 2014, average daily flows at the USGS Fort Jones Gage were less than 60 cfs for the entire coho salmon migration period (mid-September through January). As a result, 97 percent of coho salmon spawning occurred in the mainstem Scott River (CDFW, 2021a). In another example, in fall 2020, a lack of adequate flow in the Scott River during November and December prevented approximately 1,700 coho salmon from accessing spawning tributaries. CDFW hypothesizes that some of these coho salmon eventually managed to access a portion of available spawning habitat after a mid-December rain even and narrowly avoided complete spawning failure of the cohort for that year (CDFW, 2021a). It is worth noting that the 60 cfs threshold at the USGS Fort Jones gage does not necessarily result in migratory connection for all tributaries. The confluence at Shackleford Creek, one of the most productive coho tributaries on the Scott River, was found to be dry at 62.4 cfs in December 2022 and did not reconnect until a large storm event produced flows over 700 cfs (CDFW, 2024f). Isolated pools were observed at 62.6 cfs in October 2023, and while it did begin flowing at 70 cfs, adult fish passage was still not possible (CDFW, 2024f). On November 14, 2024, survey crews observed that adult coho fish passage was still not possible at 85 cfs (CDFW, 2024f).

Chinook salmon were also impeded or prevented from accessing spawning tributaries during the second half of October 2020 due to inadequate flows. During 2015 to 2020, the fall-run Chinook salmon run averaged 1,738 fish per year, which is a 65 percent reduction compared to the average of 4,977 fish per year during 1978 to 2020. The fall- run Chinook salmon run in the Scott watershed is declining at a faster rate than in the Klamath River watershed as a whole. From 2015 to 2020, the average Chinook fall-run migration in the Klamath Basin declined 43% from the historical average (CDFW, 2021a).

In July 2021, in response to severely limited habitat exacerbated by declining flows, NMFS conducted a fish relocation effort on Sugar Creek, a tributary to the Scott River (NMFS, 2021a). The Scott River Watershed Council assisted NOAA Fisheries in relocating young-of-the-year (YOY) juvenile coho salmon (*O. kisutch*) and steelhead trout (*O. mykiss*) from the Sugar Creek BDA Pond 1 to two habitats in Lower Sugar Creek during three efforts in July 2021. A total of 1,368 coho salmon were relocated from the drying Sugar BDA Pond 1 habitat to the adjacent Sugar OCP and natural beaver dam habitats (Scott River Watershed Council, 2021). The last time a large-scale fish rescue operation had been conducted in the Scott River watershed prior to 2021 was 2014, another significantly dry year.

In 2022, 1,505 coho salmon were again rescued from Sugar Creek and relocated to suitable habitat within the same tributary. In 2024, about 2,400 coho and 450 steelhead were rescued from Kidder Creek, and 15 coho and 85 steelhead were rescued from Shackleford Creek. The fish rescued from Shackleford Creek were relocated to suitable habitat within the same tributary. Fish from Kidder Creek were relocated to Patterson Creek, a neighboring tributary, due to wildfire evacuations and a lack of suitable habitat along Kidder Creek (NMFS, 2024).

In fall 2021, following the adoption of the 2021 Drought Emergency Regulation (SWRCB, 2021b) and the implementation of a large groundwater forbearance agreement in the Scott River watershed, 29% of Chinook salmon spawning occurred downstream of the SRFCF in the Scott River canyon and 71% occurred upstream in the Scott River valley, in more suitable spawning reaches (CDFW, 2022b). During fall 2021, 92% of the cumulative annual Chinook salmon migration occurred in a narrow 10-day period between October 21 and October 30 (CDFW 2022d). During this time there was one precipitation event that caused an increase in flows on the Scott River. On Oct 24, 2021, a storm caused flows to increase from 11 cfs to 717 cfs. The increase in flow resulted in stream reconnection and allowed for a majority of Chinook salmon to migrate upstream of SRFCF and into suitable spawning reaches.

Coho salmon migration peaked on three occasions in 2021. The pulses of coho salmon migration were observed from October 27, 2021, through November 5, 2021, December 7, 2021, through December 10, 2021, and from December 23, 2021, through December 25, 2021 (CDFW 2022d). Following the storm of October 24th, 2021, flows in the Scott

River continued to increase through December 7, 2021. Two of the three pulses of coho salmon migration were associated with increases in base flow (CDFW, 2022d).

In fall 2022, 92% of the fall-run Chinook spawned below the SRFCF due to insufficient flows to provide passage (Harris 2023a). The run peaked between October 26, 2022, and November 6, 2022, when 82.4% of the Chinook salmon migration was observed. During this period, flows were relatively low for this time of year, between 6 cfs and 11 cfs. The Emergency Regulation flow requirement was 40 cfs in October and 60 cfs in November. There were no storms during this period. Coho salmon migration peaked on two occasions during the 2022 season. These periods of migration were observed from December 13, 2022, through December 15, 2022, and from December 23, 2022, through December 26, 2022. During these seven days, 97.5% of the coho salmon, totaling 232 individuals, were observed. The counting station was removed during the day with the highest observed daily coho salmon migration. If the counting station was not removed additional coho salmon would have been counted (CDFW, 2023d). Both pulses of coho salmon migration were associated with increases in base flow from 6 cfs on November 15, 2022, to 56 cfs on Dec 15, 2022, and continually increasing to a peak flow of more than 3,000 cfs on December 31, 2022.

In fall 2023, the Chinook fall-run migration peaked at the SRFCF station between October 11, 2023, and October 22, 2023, when 58% of the migration was observed (CDFW, 2024e). During this period, flows were between 47 and 59 cfs. A seasonal total of 1,074 Chinook salmon was observed upstream of the counting station, while 832 were recorded downstream of the counting station. Coho salmon migration peaked on two occasions, with both pulses being related to an increase in base flow. The first pulse was from November 5, 2023, through November 7, 2023, when flows increased from 66 to 76 cfs. The second was from December 2, 2023, through December 5, 2023, when flows increased from 84 cfs to 232 cfs. During the 5 days of these pulses, 87% of the coho were observed. A season total of 914 coho was observed, with 936 above the counting station and 22 downstream.

The number of returning adult steelhead has been monitored at the SRFCF since 2007. From 2007 to 2023, the number of observed adult steelhead has ranged from a high of 917 to a low of 8, with an average of 235. The run size of adult steelhead prior to 2007 is unknown. Although recent adult run size data is sparse on the Scott River, monitoring of the juvenile emigration has taken place since 2003. A large fraction of the adult steelhead migration occurs outside the operational window of the SRFCF. Therefore, the number of observed steelhead should be considered a minimum number of returns and not basin estimates (CDFW, 2022ad; CDFW, 2024e). The Scott River rotary screw trap project has operated since 2000. In 2021, it was estimated that a total of 19,539 age 0+, 41,281 age 1+, 3,065 age 2+, and 5 age 3+ steelhead emigrated out of the Scott River watershed (CDFW, 2021e). In 2022, it was estimated that a total of 638,577 age 0+, 45,455 age 1+,

and 4,173 age 2+ emigrated out of the watershed, while no population estimate was available for age 3+ steelhead (CDFW, 2022e). In 2023, one rotary screw trap was operated on the Scott River from February 21 to July 14, 2023. In 2023, it was estimated that a total of 8,775 age 1+ steelhead emigrated out of the Scott River watershed (CDFW, 2024g). There was not a sufficient amount of data to calculate a population estimate for age 0+ or age 2+ steelhead. A population estimate was not available for age 3+ steelhead as well, as no live steelhead of that age was trapped during the 2023 season (CDFW, 2024e). Preliminary data for 2024 indicate a population estimate of 161,363 age 1+ steelhead, while not enough data had been collected to estimate the population for age 0+, 2+, and 3+ steelhead (CDFW, 2024f)

3.2.2 Shasta River Watershed Fishery Status

The periodicity of salmonids in the Shasta River watershed is summarized in Figure 11 and described here. CDFW does not perform adult and juvenile salmonid surveys year-round. Instead, CDFW tries to perform surveys during the period when a majority of the salmonids, for a particular life stage, have typically been observed in the watershed over the years. Therefore, the time-period when life stages of salmonids are shown in Figure 11 and described below, is when that life stage is typically observed. However, there is potential for a salmonid life stage to occur outside the time periods described below and shown in Figure 11.

In the Shasta River, SONCC coho salmon migration occurs from mid-October through January and spawning occurs from November to January. Coho salmon fry emerge from February to June and rear in the stream for approximately one year. The following February through mid-July juvenile coho salmon outmigrate to the ocean. Fall-run Chinook salmon migration occurs from September through mid-December and spawning occurs from mid-September through December. Fall-run Chinook salmon fry emergence and dispersal occurs from December through August. Juvenile Chinook salmon begin rearing in January and 0+ smolts outmigrate to the ocean from April to mid-July. Chinook salmon 1+ juveniles outmigrate to the ocean from January through April of the following year.

Obtaining migration and life history data for steelhead is challenging in the Shasta River because the objectives of the CDFW Klamath River project have traditionally focused on monitoring the escapement of Chinook salmon, and more recently coho salmon.

The weir at the Shasta video site is removed before steelhead migration is completed. In addition, individual steelhead are often observed moving repeatedly through the video flume in upstream and downstream directions (CDFW, 2022c). Adult winter-run steelhead typically enter the Klamath River from late August to February before spawning, which extends from January through April, peaking in February and March (NRC, 2004). Summer-run steelhead enter freshwater as immature fish from May to July, migrate upstream to the cool waters of larger tributaries, and hold in deep pools roughly until

December, when they spawn (NRC, 2004). Summer steelhead are potentially entering into the Shasta system but CDFW monitoring efforts are currently not focused on monitoring this population (CDFW 2023a). Juvenile steelhead typically rear in freshwater for one to three years, most commonly two years, before migrating (CDFW, 2017). In the Shasta, steelhead migration occurs from September through April, spawning occurs from mid-December through April, fry emergence occurs May through June, and out-migration occurs from February through July.

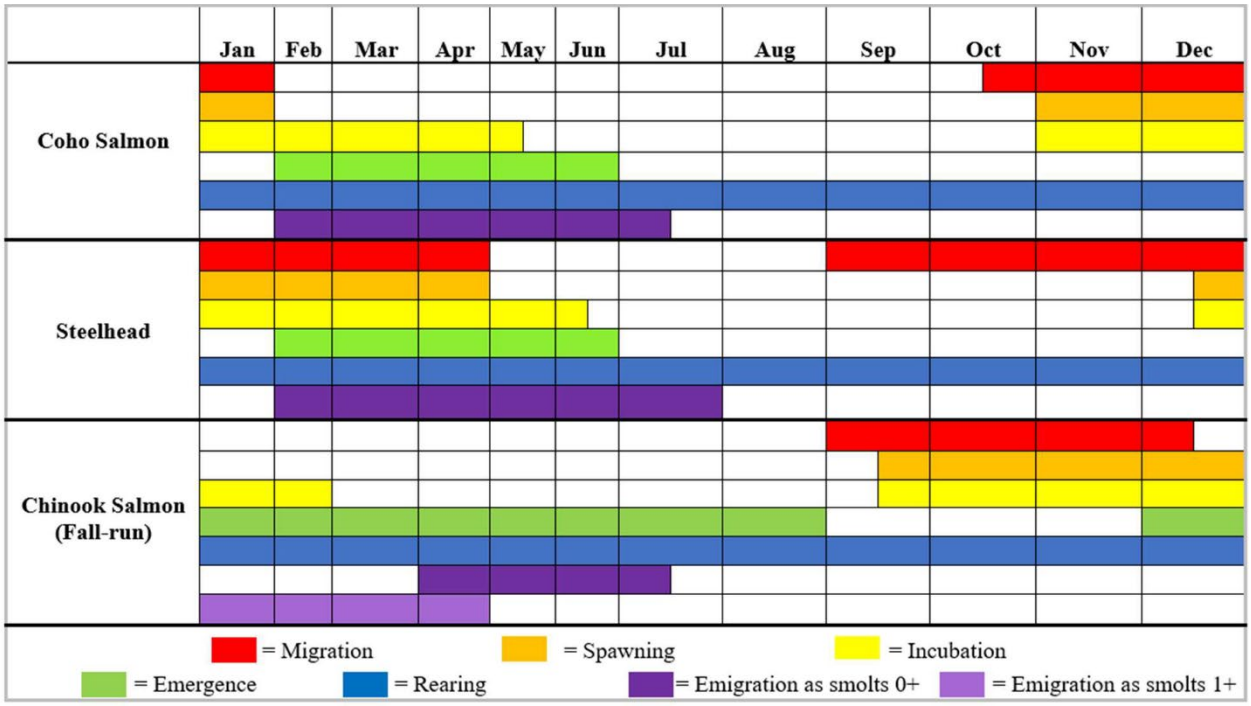


Figure 11. Salmonid periodicity in Shasta River watershed. Source: CDFW (2023a).

The Shasta River watershed has supported roughly 10 to 30 percent of the wild (non-hatchery origin) fall-run Chinook salmon population in the Klamath River watershed (including the Trinity River) over the last decade (CDFW, 2020a), and provides spawning and rearing habitat for Klamath Basin coho salmon. In the previous two years before implementation of the Drought Emergency Regulation (SWRCB, 2021b), outmigration conditions for fall-run Chinook and coho salmon in the Shasta River watershed were critically impaired. Daily average flows in May 2021 and July 2021 were as low as 5.8 cfs at the Shasta River near Montague gage, the lowest on record during 2001 to 2021 (USGS gage no. 11517000; USGS (2024b)) and 6.9 cfs at the Shasta River near Yreka gage, the third lowest on record during 1988-2021 (USGS gage no. 11517500; USGS, 2023c). According to the NMFS SONCC Coho Salmon Recovery Plan, coho salmon are at high risk of extirpation in the Shasta River watershed. The recovery criteria are 4,700 spawners and the depensation threshold is 144 (Abrams, 2023). The Shasta River coho salmon returns have averaged 43 adults since 2014 (Harris, 2023a). As of November 14,

2024, 9 adult coho salmon were observed to have returned to the Shasta River (CDFW, 2024d).

Construction of Dwinnell Dam in 1928 at river mile (RM) 40 has blocked access to high-quality habitat for steelhead, Chinook salmon, and coho salmon, historically abundant in the Shasta River. The dam, along with other downstream diversions, has altered the Shasta River hydrograph by eliminating peak flows, reducing streamflow, and contributing to increased summer water temperatures. These changes have not only restricted access to cold-water spawning and rearing habitats but have also degraded downstream habitat quality, leading to significant declines in these populations (Moyle et al., 2008).

The Shasta River rotary screw trap project has operated since 2000, sampling all age classes of emigrating Chinook salmon, coho salmon, and steelhead. In 2021, the rotary screw trap on the Shasta River was in operation from January 19 to May 29, to sample all age classes of emigrating salmonids. During this period, it was estimated that 3,810 age 0+ steelhead, 977 age 0+ steelhead, 20,316 age 2+ steelhead, and 3,638 age 3+ steelhead emigrated from the Shasta River. The estimated number of age 2+ steelhead produced from the Shasta River for 2021, represents only 38% of the 2019 estimate (CDFW, 2021f). In 2022, there were under 100 returning adult steelhead observed, the third lowest total since 2008. Adult steelhead from previous years could still be residing in the river upstream of the Shasta River Fish Counting Facility that would not be observed during the survey period (CDFW, 2023a). In 2023, the rotary screw trap was operated from January 30 to June 30. The population estimate for emigrating age 0+ steelhead in 2023 was 11,656, 1,695 for age 1+ steelhead, and 17,629 for age 2+ steelhead (CDFW, 2024h). For 2024, a preliminary update from CDFW (CDFW, 2024f) reported the rotary screw trap results from January 30 to June 13, with the screw trap being raised on June 6 due to high river temperatures. During this period, an estimated 1,540 age 0+ steelhead, 7,827 age 1+ steelhead, and 125,443 age 2+ steelhead out-migrated from the Shasta River. In 1933, the steelhead population estimate for the Shasta River was 8,400 adults (Harris, 2023a).

The Shasta River is TMDL-listed for dissolved oxygen and temperature (NCRWQCB, 2006). As shown in Figure 12, there is a high correlation of low flows in the Shasta watershed with temperatures that impair salmon, at both sublethal and lethal levels (CDFW, 2020c).

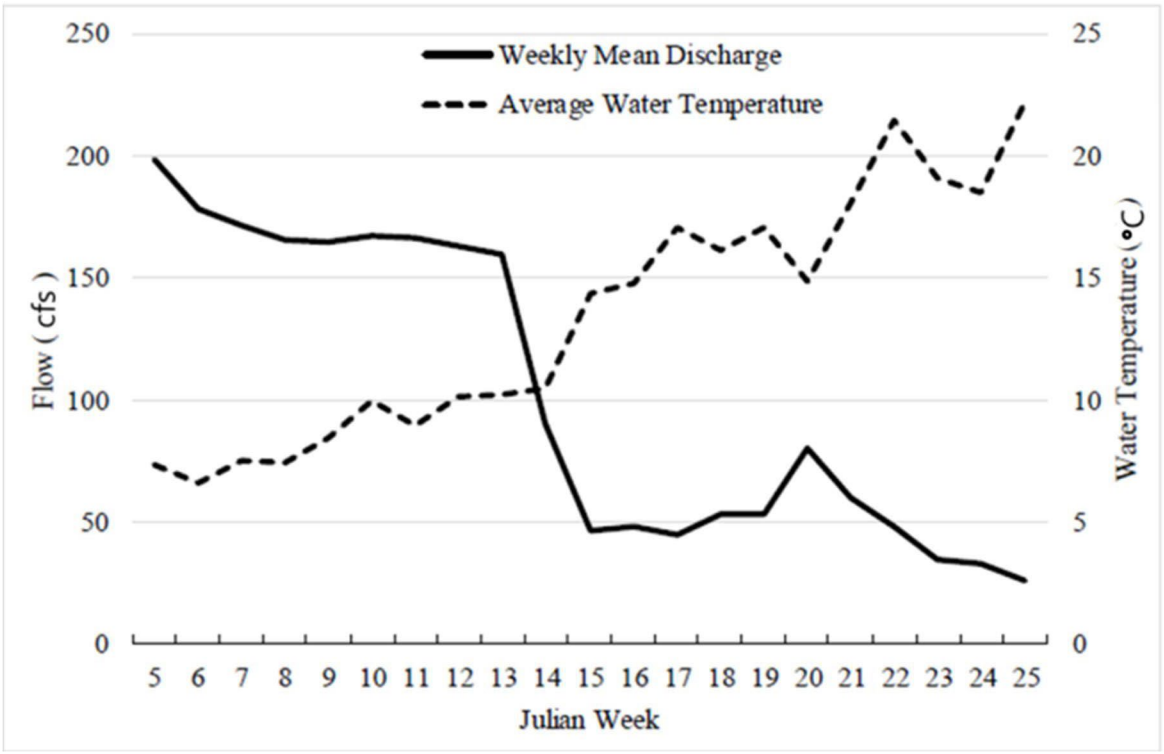


Figure 12. Average weekly flow in cfs and average water temperature in Cº on the Shasta River in 2020. Flow measurements are from the USGS Shasta River gage near Yreka (USGS gage no. 11517500) and temperatures recorded at the Shasta rotary screw trap, near confluence with Klamath River (CDFW, 2020c)

Anthropogenic drivers of temperature impairment include degradation of stream shade provided by riparian vegetation, tailwater return flows, Lake Shastina releases and minor channel impoundments, groundwater pumping which reduces groundwater accretion and spring inflows to streamflow, and streamflow affected by surface diversions. Important sources of cold water include Big Springs Creek and Little Springs Creek which contribute to a majority of the flow in the Shasta River during the summer. On June 16, 2022, these spring-fed streams were observed contributing about 80% of the total flow of the Shasta River. Smaller springs and accretions provide over- summering cold water refugia for salmonids in the Shasta River watershed (Scott, 2023).

Lethal temperatures are defined for Chinook and coho salmon in the Shasta River as occurring at 25°C, for a period of seven days. Elevated but sublethal water temperatures can have a myriad of detrimental impacts on the survival of salmon including stress, increased susceptibility to parasites and disease, altered metabolic rates, decreased growth rates, inhibition of smoltification, and altered competitive dominance. The stressful impacts of temperature on salmon are cumulative, and positively correlated to the duration and severity of exposure (NCRWQCB, 2006).

In Spring 2021, CDFW (2021f) recorded unprecedented temperatures at its rotary screw trap, which is located near the USGS Shasta River gage near Yreka (USGS gage no. 11517500; USGS, 2023c). As described in CDFW (2021h), CDFW operates the rotary screw trap when water temperatures are below 21 degrees Celsius (70 degrees Fahrenheit) to protect fish from additional stress. Shasta River water temperatures have allowed CDFW to operate the trap until the end of June in 14 of the last 20 years. In 2021, this temperature threshold was reached in mid-May 2021. In the 20-year record of operation, the previous earliest day this threshold was reached was June 17 (CDFW, 2021f).

CDFW (2022f) states that temperatures greater than 20.3 degrees Celsius can be detrimental to juvenile salmonid growth and survival. In the 2022 rotary screw-trapping season, this temperature was first reached on May 17. Between May 17, 2021, and the last day of operations on June 29, 2021, a total of 28 days were logged with temperatures above 20.3 degrees Celsius. For days when the 20.3 degrees Celsius water temperature threshold was reached, the average duration at that temperature was 12 hours (CDFW, 2022f).

During many years, fishery managers have been concerned with flow and temperature conditions in the Shasta River during the early weeks of the fall migration. For the past decade, resource agencies and local landowners coordinated a range of voluntary efforts to try and ensure adequate flows in the Shasta River for the fall migration of Chinook salmon during the critical month of September.

CDFW (2020a) estimated that the 2020 spawning season was the second consecutive year that the Shasta River fall-run Chinook salmon spawning migration population fell below the annual average population, 6,632 for the period of record, 1978 to 2020. For the 2021 spawning season, CDFW estimated 6,908 returning adults entered the Shasta River. (CDFW, 2021c) For the 2022 spawning season, CDFW estimated 4,509 fall run Chinook salmon entered the Shasta River (CDFW, 2023d). For the 2023 spawning season, as of December 4, 2023, CDFW observed 4,867 adult Chinook salmon enter the Shasta River (CDFW, 2023b). For the 2024 spawning season, as of November 15, 2024, CDFW observed 4,869 adult Chinook salmon enter the Shasta River (CDFW, 2024d). Chinook salmon numbers in the Shasta are nearing the 20-year median, but it is still too early to determine the population trend for this cohort in the watershed.

3.2.3 Fisheries Impacts on Tribal Nations

Tribal Nations in the Klamath River watershed depend upon fish for their physical and cultural survival (Belchik, 2023; Hockaday and Kane, 2023; Shaefer, 2023). The Yurok Tribe depends upon fall and spring Chinook salmon, coho salmon, steelhead, lamprey, and sturgeon for ceremonial, subsistence, and commercial purposes. The Yurok Tribe estimates that current salmon populations are, at a maximum, approximately 2 to 5 percent of historical estimates. The minimum number of adult natural origin Chinook

salmon spawners needed to maximize sustained yield in the Klamath River watershed (40,700) had not returned in seven of the past eight seasons by 2023 (Belchik, 2023). The 2023 Chinook fall-run was below the 1978-2023 average, making it the 13th lowest return for adult-migrating Chinook salmon since 1997 (CDFW, 2024a). Predictions for the 2024 Chinook fall-run are forecasted to be higher than 2023, but still below the average (CDFW, 2024b). The Yurok Tribe has not had a viable commercial fishery since 2015. In 2023, the Yurok Tribal Council cancelled the fall fishery for the first time ever, including subsistence fishing, food supply for elders, and take for ceremonies. The reduction in subsistence fishing has a negative impact on the tribal economies because subsistence fishing is a crucial part of tribal economies in the Klamath watershed (Belchik, 2023).

The Karuk Tribe currently has a poverty rate of 40% and an unemployment rate of 16%. In a study on the altered health of the Karuk Tribe, the elimination of traditional foods including multiple runs of salmon, Pacific lamprey, sturgeon, and other aquatic species, has had adverse health, social, economic, and spiritual effects on the Karuk people.

Historical fish consumption for the Karuk Tribe is estimated at 450 lbs per person per year. In contrast, estimates from 2004 indicate the rate has fallen to less than 5 lbs of salmon per person per year. The loss of the spring-run Chinook salmon in Scott and Shasta Rivers in the 1970s has caused the Karuk Tribe to experience one of the most dramatic diet shifts of any Native American tribe in the United States (Hockaday and Kane, 2023). The diet shift is directly linked to catastrophic increases in diabetes to the Karuk Tribe, Yurok Tribe, and Quartz Valley Indian Reservation. For example, diabetes rates in the Karuk Tribe are four times the national average. (Hockaday and Kane, 2023; Belchik, 2023; Schaefer, 2023).

The decline of fishery populations has negative impacts on tribal cultures. Low fish populations inhibit or prevent the Karuk Tribe, Yurok Tribe, and Quartz Valley Indian Reservations from performing the cultural and ceremonial practices they have practiced since time immemorial (Hockaday and Kane, 2023; Belchik, 2023; Schaefer, 2023).

4. Water Board’s Response: 2021, 2022 and 2024 Drought Emergency Regulation and Related Public Outreach Actions

On March 12, 2020, National Marine Fisheries Service (NMFS) staff contacted North Coast Regional Water Board staff out of concern for low flows in the Scott River watershed. Snowpack conditions at that time were poor (73% of average and 5% of average at the Middle Boulder and Scott Mountain snow gages, respectively) and indicative of drought conditions. In response to these conditions, North Coast Regional Water Board staff organized an ongoing bi-weekly drought response call that included NMFS, CDFW, and Division of Water Rights staff to coordinate agency actions around

voluntary instream flow efforts. These bi-weekly calls expanded to include additional interests in the watershed, including local and tribal government representatives, non-governmental organizations, the Scott Valley and Shasta Valley Watermaster District (Watermaster), and interested individuals. Despite these efforts, fall-run Chinook salmon and coho salmon were unable to reach spawning grounds in the Scott Watershed, forcing more spawning in the main channels and leaving the brood year at higher risk.

On March 22, 2021, the State Water Board sent 'Letters Regarding Ongoing Dry Conditions in Most California Watersheds' to all water right holders and claimants in the state regarding ongoing dry conditions in most California watersheds (SWRCB, 2021a). The letters encouraged water right holders and claimants to plan and prepare for potential water shortages later in the year. The letter also reminded water right holders and claimants that accurate and timely reporting of water use data will help to provide critical information needed to manage the state's water resources. On April 20, 2021, the Deputy Director and CDFW staff gave a presentation at the Siskiyou County Board of Supervisors regularly scheduled meeting addressing dry conditions in the Scott River watershed, fisheries and water management concerns, and funding opportunities to help address these challenges. On June 1, 2021, the State Water Board sent notices of water unavailability to 102 water right holders, accounting for 158 of the 803 water rights in the Scott River watershed, urging them to stop diverting amid worsening hydrologic conditions. The same day, State Water Board staff circulated a Press Release titled: Extremely Dry Conditions Prompt Restrictions for Some Water Right Holders in the Scott River. On July 1, 2021, State Water Board and CDFW staff hosted a public meeting on potential drought actions for the Scott River and Shasta River watersheds. Staff presented information on the drought conditions, potential drought response actions in the Scott and Shasta watersheds and solicited comments. A full recording of the July 1, 2021, meeting is available online here: https://youtu.be/fx3x4eB8LG8. Presentation slides from the July 1, 2021 meeting are available online here: https://www.waterboards.ca.gov/drought/scott_shasta_rivers/docs/scott_shasta_drought_presentation_070121.pdf. Additionally, on July 6, 2021, the State Water Board began distributing an informational flyer encouraging conservation throughout the Klamath watershed, with a focus on the Scott River and Shasta River watersheds.

4.1 Development of 2021, 2022 and 2024 Drought Emergency Regulation

On July 16, 2021, State Water Board staff issued a Notice of Public Meeting and Opportunity for Comment: Draft Drought Emergency Regulation for Scott River and Shasta River Watersheds that announced the release of draft 2021 Drought Emergency Regulation for public comment and advertising a July 20, 2021, public meeting. During the public meeting on July 20, 2021, the State Water Board and CDFW staff described the draft Drought Emergency Regulation, presented responses to past comments on the

CDFW flow recommendations, answered participants questions, and listened to comments. A full recording of the July 20, 2021, public meeting is available at: https://youtu.be/DgEs3GEJ-f0. Presentation slides from the meeting are available at: https://www.waterboards.ca.gov/drought/scott_shasta_rivers/docs/scott_shasta_e_reg_presentation_072021.pdf.

The public comment period extended from July 16, 2021, to July 23, 2021, and the State Water Board received more than 100 written comments.

On August 17, 2021, the State Water Board adopted a Drought Emergency Regulation that went into effect on August 30, 2021, when it was approved by the Office of Administrative Law and filed with the Secretary of State (Cal. Code Regs., tit. 23, §§ 875–875.9). The Drought Emergency Regulation provided the State Water Board with curtailment authority to protect minimum instream flows, establishes minimum human health and safety and livestock watering exceptions, and limits inefficient diversions for livestock during the September through January timeframe. The Drought Emergency Regulation declared certain diversion practices unreasonable and declared that diversions are unreasonable when the drought emergency minimum instream flows are not met (SWRCB, 2021b).

On May 4, 2022, State Water Board and CDFW staff hosted a public meeting to provide information and solicit input on re-adoption of the regulation. Staff presented information on drought and fisheries conditions, potential changes to the Drought Emergency Regulation, and solicited comments. A full recording of the May 4, 2022, meeting is available online here: https://youtu.be/fx3x4eB8LG8. Presentation slides from the May 4, 2022 meeting are available online here: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/docs/2022/2022-may4-ereg-re-adopt.pdf.

On May 18, 2022, State Water Board staff issued a Notice of Public Meeting and Release of Preliminary Changes to Drought Emergency Regulation for Scott River and Shasta River Watersheds that announced the release of draft revised Drought Emergency Regulation for public comment and advertising a May 25, 2022, public meeting. On May 25, 2022, the State Water Board and CDFW staff hosted a public meeting to provide information on the revised regulation and solicit input on changes to the regulation. A full recording of the May 25, 2022, meeting is available online here: https://youtu.be/-ZhZOjufiYo. On May 26, 2022, a revised Notice was released that extended the comment period for the preliminary draft of proposed changes. The public comment period extended from May 18, 2022, to May 31, 2022. The State Water Board received approximately 17 written comment letters and emails.

On June 21, 2022, the State Water Board re-adopted the Drought Emergency Regulation, with minor modifications, and it went into effect on July 29, 2022, when it was approved

by the Office of Administrative Law and filed with the Secretary of State (Cal. Code Regs., tit. 23, §§ 875–875.9) (SWRCB, 2022b). The Drought Emergency Regulation expired on July 31, 2023.

On May 23, 2023, the Karuk Tribe of California, Environmental Law Foundation, Pacific Coast Federation of Fishermen's Associations, and Institute for Fisheries Resources submitted to the State Water Board a Petition for Rulemaking to Set Minimum Flows on the Scott River in Siskiyou County (Petition; Karuk Tribe et al., 2023). The petition requested that the State Water Board establish permanent stream flow requirements on the Scott River based on a CDFW 2017 report, Interim Flow Criteria for the Protection of Fishery Resources in the Scott River Watershed (CDFW, 2017). In response to the petition, the State Water Board held a hearing on August 15, 2023, to discuss potential actions on both the Scott and Shasta Rivers. At the hearing, the Board emphasized that urgent action was required to address grave fishery conditions and to be prepared for the risk of dry conditions in the upcoming irrigation season, and that it was necessary to maintain continuing baseline protection for fisheries even as more permanent longer-term recovery-focused efforts continued. The Board then adopted the Emergency Regulation on December 19, 2023, and it went into effect on February 1, 2024. The current Emergency Regulation will expire January 31, 2025.

On January 17, 2024, California Coastkeeper Alliance, Friends of the Shasta River, Mt. Shasta Bioregional Ecology Center, Water Climate Trust, Shasta Waterkeeper, Save California Salmon, and Environmental Protection Information Center submitted a petition for rulemaking to the State Water Board seeking a permanent regulation establishing minimum flows in the Shasta River across a host of hydrologic conditions. On February 16, 2024, the State Water Board denied the petition but reaffirmed the priorities established during the 2023 hearing and committed to holding a public meeting on flow efforts in the Shasta River watershed before the end of the year. A petition to reconsider the denial was received on April 15, 2024, which was again denied on May 15, 2024.

On October 16, 2024, the State Water Board adopted Resolution No. 2024-0036 regarding flow efforts in the Scott River and Shasta River watersheds. The resolution gives specific direction to the State Water Board staff regarding immediate-term actions and longer-term actions, acknowledging that a permanent effort will take. In the immediate term, the Board directed staff to solicit input on the readoption of the Emergency Regulation, proposed updates to the regulation if readopted, and potential alternatives to readopting the Emergency Regulation.

On October 21, 2024, a notice was posted for a public meeting that was to be held on November 12, 2024. The meeting summarized the current 2024 Emergency Regulations for the Scott and Shasta watersheds and solicited comments for potential updates to the Emergency Regulation and alternative proposals in lieu of readopting an emergency regulation. The public comment period ended November 20, 2024. Written and oral

comments concerned a range of topics, including instream flow requirements in summer, the need for multiple compliance points and tributary specific monitoring, implementation of curtailments, and groundwater management and data collection, recommended changes and feedback on the LCS program, and the desire to have or not have regulations in the short and long terms. The feedback and comments received were considered in developing the proposed Emergency Regulation. No formal alternative proposals were received, though the Siskiyou County Farm Bureau had previously shared concepts that have not yet been further developed or formally submitted.

The current Drought Emergency Regulation will expire on January 31, 2025, unless readopted. Staff will bring the proposed Emergency Regulation for consideration of the State Water Board at a board meeting scheduled on January 7, 2025. The proposed Emergency Regulation would make minor changes to the current Emergency Regulation based on implementation information and comments (See Section 8), and would continue to set minimum instream flow numbers, provide curtailment authority to the State Water Board to meet minimum instream flows, establish exceptions for minimum human health and safety, non-consumptive use, and livestock watering, and limit inefficient diversions for livestock during the September through March timeframe (SWRCB, 2021b, 2022b, 2023c).

4.2 Implementation of 2021, 2022 and 2024 Drought Emergency Regulation

The Drought Emergency Regulation was first in effect from August 30, 2021, through July 31, 2023, having been readopted once during that period. After the expiration of the 2022 Emergency Regulation, there was no regulation in effect between August 1, 2023, through January 31, 2024, for either watershed. The current Emergency Regulation went into effect on February 1, 2024.

The State Water Board issued curtailment and informational orders in the Scott River and Shasta River watersheds to protect minimum instream flows and gather information (SWRCB, 2021b, 2022b, 2024c). Curtailment of water rights was managed adaptively to maintain minimum instream flows while maximizing water right diversions.

Throughout implementation of the 2021, 2022, and 2024 Regulation, State Water Board staff engaged directly with various interested parties, including members of the agricultural community, local and county officials, state and federal agencies, tribal representatives, and other interested parties. These engagement activities included watershed tours with Board Members, Siskiyou County Supervisors, irrigators, and tribes to facilitate discussions on regulatory updates and implementation feedback. Staff also met extensively with coordinating entities and local diverters to help develop LCSs. The State Water Board organized webinars and in-person meetings to share funding opportunities for farmers and ranchers and provide technical assistance through

presentations on programs supporting local groundwater LCSs. Collaborative efforts further involved informational tours organized by Siskiyou County, with participation from agencies such as CDFW and the United States Bureau of Reclamation, fostering dialogue on emergency regulations and potential updates. These efforts informed presentations at Board meetings, which provided regular updates on hydrologic conditions, drought response, regulatory activities and other efforts supporting ongoing improvements in flow conditions. Additionally, to provide direct support to interested parties, staff established and managed a dedicated phone and email hotline. The hotline served as a reliable point of contact for inquiries related to LCSs, curtailments, and informational orders, with staff typically responding within one business day.

In 2024, State Water Board staff took a more active role in the Scott-Shasta Flow Subgroup Meeting hosted by the North Coast Regional Water Quality Control Board. This forum brings together a range of participants with diverse interests in the watersheds, including agricultural water users, tribal representatives, environmental groups, representatives of federal, state and local government agencies, and local water resource managers, to discuss flow and fisheries conditions as well as other relevant topics.

4.2.1 Groundwater Local Cooperative Solutions

To address the interconnected nature of groundwater and surface water in the Scott River and Shasta River watersheds, the Drought Emergency Regulation provides a pathway for LCSs that encourage reductions in high-priority overlying groundwater use while providing greater economic certainty to the agricultural community regarding water availability during curtailments (SWRCB, 2021b, 2022b, 2024c). The Scott Valley Integrated Hydrologic Model (SVIHM), developed by UC Davis, indicates that ceasing groundwater pumping for alfalfa irrigation by July or August in the Scott River groundwater basin during dry years improves instream flow conditions at the Fort Jones gage from October to December. During the dry season, when stream reaches become disconnected due to low groundwater levels, stream flows can only recover as groundwater levels rise through reduced pumping or significant rainfall. Groundwater pumping for irrigation during August to December constitutes approximately 30% of annual groundwater use, and spreading this reduction across the entire irrigation season could help prevent stream disconnection and minimize or delay curtailments.

Participants in the groundwater LCS program under the 2021 and 2022 Emergency Regulation agreed to modify their irrigation practices to reduce their groundwater pumping by a specified percentage throughout the irrigation season. In the Scott River watershed, the regulation required at least a 30% reduction in groundwater pumping over the irrigation season (April 1–October 31) and during the critical months of July, August, September, and October. In the Shasta River watershed, a 15% reduction was required over the irrigation season (March 1–November 1) and during the peak months of June, July, August, and September. Participants achieved the required reductions through

various strategies, such as fallowing fields, shortening irrigation run times, planting less water-intensive crops, or adopting more efficient irrigation methods.

Under the 2024 Emergency Regulation, participants could still select the Percent Reduction option, but the Regulation also introduced two additional groundwater LCS options: Best Management Practices and Graduated Cessation Schedule.

The Best Management Practices option is available to irrigators who adopt or have adopted the most water-efficient technologies. This LCS type incentivizes transitioning from traditional irrigation methods, such as wheel lines or flood irrigation, to more efficient systems found to have comparatively reduced evapotranspiration (ET), such as pivots equipped with Low Energy Precision Application (LEPA) technology and soil moisture sensors to optimize water application. These investments promote long-term conservation strategies, providing lasting benefits to both agricultural users and water resources. This LCS option also addresses concerns raised during earlier regulations that the 30 percent water use reduction was significantly harder for diverters who had already transitioned to more efficient irrigation systems and therefore had limited opportunities to further reduce water use, despite their pumping impact per acre already being significantly lower. To use this option, a LCS must have the following elements:

- Use of a low-energy precision application (LEPA) system on all irrigated acreage, including no irrigation of corners after June 15 and no use of end guns;
- Use of soil moisture sensors to inform irrigation timing, with records available for inspection; and
- In years with a snow pack of 80 percent or less of the Department of Water Resources' California Data Exchange Center's first May snow water equivalent station average (or the average of the first April measurement if May snow pack measurements are not gathered in the irrigation year) in the Scott River watershed, or with a water year determination of dry or very dry in the Shasta River watershed, as determined under Table 2 of the March 2021 Montague Water Conservation District water operation plan (MWCD, 2021), cessation of irrigation on 90 percent of irrigated acreage by August 31, with a maximum of two (2) inches of water/acre to be applied to the remaining 10 percent of irrigated acres for existing alfalfa fields and grain, or four (4) inches of water/acre for pasture or new alfalfa plantings, during the remainder of the irrigation season.

The Graduated Cessation Schedule option was introduced to provide flexibility for irrigators by allowing phased reductions in acres irrigated according to specified schedules. It enables irrigators to end water use on an increasing percentage of land throughout the irrigation season, following one of two schedules. This option recognizes the importance of offering alternatives that achieve water conservation goals while accommodating diverse irrigation practices and crop requirements. It is conceptually supported by the Scott Valley Groundwater Sustainability Plan (GSP) Management

Scenario Results and the UC Davis Scott Valley Drought Project findings, which highlight the ecological and flow benefits of a structured, gradual reduction strategy.

Some practices implemented through the groundwater LCS program are expected to provide lasting benefits as irrigators adopt more efficient equipment, such as LEPA systems, soil moisture sensors, and flow meters, to better inform irrigation decisions. Additional long-term benefits may result from switching to less water-intensive crops or maintaining practices like shorter irrigation run times or early cessation methods, contributing to ongoing groundwater conservation.

During implementation of the Emergency Regulations, overlying groundwater reduction LCSs were widely pursued in the Scott River watershed. While similar overlying groundwater reduction LCSs were available for landowners in the Shasta River watershed, no landowners chose to adopt them, perhaps since the potential for curtailments to reach these very senior rights was lower. Unlike the Scott River, which relies more heavily on groundwater, the Shasta River depends primarily on surface water, with only about 10% of its use coming from groundwater (Riverbend Sciences, 2023). As a result, minimum flow requirements in the Shasta River are typically met through surface water curtailments without the need to curtail overlying groundwater rights.

During the 2022 irrigation season, 47 landowners in the Scott River watershed operated under Percent Reduction LCS agreements. These irrigators encompassed roughly 17,268 acres, or 97% of the total groundwater-irrigated acreage in the Scott Valley.

In 2023, 14 landowners in the Scott River watershed submitted 30% water use reduction proposals to State Water Board staff. Upon expiration of the Drought Emergency Regulation on July 31, 2023, these landowners were no longer held to the terms of their LCSs. Three landowners chose to continue to keep their LCS active, encompassing 2,494 acres or 14% of the groundwater irrigated acreage in the Scott Valley.

In 2024, with the addition of two new options, irrigators could divide portions of their land under different LCS options to best suit their needs. As a result, there were 48 groundwater LCS proposals amongst 43 landowners, covering 15,244 acres or 86% of the total groundwater irrigated acres in the Scott Valley. From the three groundwater LCS options, the 30 percent water use reduction covered 7,030 acres or 46% of acreage under the LCS, the Best Management Practices covered 1,814 acres or 12%, and the Graduated Cessation Schedule covered 6,359 acres or 42%.

The State Water Board received comments questioning the effectiveness and need for the LCS program, particularly when flows in Scott River did not meet the minimum flow requirements in fall 2022. Hypothesized explanations for lower-than-expected mainstem Scott River streamflow in fall 2022 include pre-existing impacts from drought and water demand (e.g., low soil moisture and low groundwater levels), potential lack of compliance, inadequacies in the 30% baseline reduction target, and the potential that some

groundwater conservation actions, such as some types of irrigation efficiency improvements, may not immediately reduce net impacts on groundwater levels because they do not reduce evaporation or crop uptake of water.

To address concerns about the potential for inflated baseline values when determining percent reductions in water use under the groundwater LCS program, the 2024 Regulation capped the baseline annual water amounts for specific crops. These limits ensured fairness and consistency in calculating reductions while allowing irrigators to justify higher baselines in certain cases.

Riverbend Sciences compared the benefits of different groundwater reduction actions or irrigation efficiency improvements and found some irrigation efficiency practices reduce actual evapotranspiration (ETa), including crop switching (i.e. replacing alfalfa with grain), early cessation of irrigation, fallowing of fields, use of LEPA systems, and permanent water rights purchasing. Conversely, Riverbend Sciences found that some irrigation efficiency practices increase ETa, including decreasing the size of sprinkler nozzles to enhance wind drift losses, converting flood irrigation to inefficient sprinklers, and irrigating additional land, and recommended these practices not be pursued (Riverbend Sciences, 2023). The Best Management Practices and Graduated Cessation Schedule LCS's adopted in 2024 rely on practices found to effectively reduce ETa.

5. Benefits of the 2021, 2022, and 2024 Emergency Regulation

The Drought Emergency Regulation (SWRCB, 2021b, 2022b, 2024c) improved overall stream conditions and land management practices in both watersheds. The improved conditions, including higher flows, expanded wetted areas, better water quality in pools, earlier tributary connections, and sustained groundwater levels, result from multiple factors. These include regulatory actions like curtailments, limits on livestock watering, and widespread adoption of LCSs, along with efforts such as winter groundwater enhancement and restoration projects. Natural influences, like precipitation timing, amounts, and temperature, also played a role. While the specific contributions of each factor are still being evaluated, all are likely important in sustaining the river to maintain minimum conditions for fish survival. The Regulation also facilitated the collection of new data to better understand supply and demand in the watersheds.

5.1 Water Supply and Water Demand Data Collection

The implementation of the Emergency Regulations has increased the collection of water supply and demand information and provided a better understanding of water use in the Scott River and Shasta River watersheds. Both watersheds have seen increased reporting of water use on a more regular interval under the Emergency Regulations. Implementation of the Emergency Regulations has also facilitated increased coordination

among interested parties regarding hydrology, water supply and water demands, including state agencies, tribes, environmental organizations, the Watermaster, Montague Water Conservation District, Scott Valley Irrigation District, Siskiyou County and the Siskiyou County Groundwater Sustainability Agency, the Siskiyou County Farm Bureau, water users, and others. As part of these efforts, under the 2021 Drought Emergency Regulation, two information orders were issued to gain better insights into livestock-related water use and diversions on Willow, Julian and Yreka Creeks—tributaries to the Shasta River. These actions provided a more comprehensive understanding of agricultural water use and the overall water balance in the Scott River and Shasta River watersheds. This information enabled issuance of more tailored curtailment addenda, which improved compliance in meeting the minimum flow requirements and allowed for additional diversions.

In addition to collecting more information regarding diversions, the State Water Board, CDFW, the Watermaster, and the North Coast Regional Water Board collaborated on the location and maintenance of four temporary flow gages in the Shasta watershed and two temporary flow gages in the Scott watershed. The additional data collection allowed State Water Board staff to better understand the impacts of management decisions in real time, including information related to interconnectivity of groundwater and surface water in critical tributaries to the Shasta River, such as Big Springs Creek. These gages include temperature loggers, allowing staff to better understand the relationship between water quality and water quantity in both watersheds. Building on these efforts, in 2024, the State Water Board, after consultation with CDFW, the Watermaster, and the North Coast Regional Water Quality Control Board, identified locations for two permanent gages in the Scott River and two additional permanent gages in the Shasta River, to be installed and operated by USGS to enhance long-term monitoring and data availability. Staff continue to coordinate and work on gaging efforts in the watersheds to obtain more efficient real-time data.

These advancements in the State Water Board's data collection have significantly improved the understanding of water demand and supply across both the Scott and Shasta River watersheds. However, sustained collaboration and continued efforts are necessary to support ongoing decision-making.

5.2 Groundwater Irrigation Metering Data

The 2024 Drought Emergency Regulation required LCS participants to meter their groundwater extractions by installing flow meters on wells, providing significant benefits to water management through increased data collection and a better understanding of water usage. Metering provides an objective measure for assessing compliance with LCSs and addresses past criticisms regarding uncertainty in baseline and applied water use estimates during the implementation of the 2022 groundwater LCS program and for other purposes. Participants were required to document water use daily via meter readings,

unless justified as infeasible, and report usage monthly to their Coordinating Entity. Many participants were unable to order and install meters before the start of the irrigation season and were subsequently unable to install them once irrigation had begun. In such cases, applicants were required to demonstrate their efforts to procure meter(s), provide a proposed timeline for installation, and agree to submit metering data from the time of installation through the end of the 2025 irrigation season. Many applicants sought funding for meters from the Natural Resources Conservation Service (NRCS), although funding awards are not expected until 2025 or 2026. The State Water Board also offered funding for meters, contingent upon participants agreeing to provide irrigation data for five years from the time of installation, a condition that deterred many from seeking this funding source.

For the 2024 irrigation season, 58 meters were installed on wells or pivots covering 5,543 acres, which represents 36% of the groundwater irrigated acreage included in the LCS program. An additional 62 meters were scheduled for installation after the 2024 irrigation season, expanding coverage by 5,671 acres, or 37% of the total groundwater LCS acreage. These meter installations collectively account for 63% of the total groundwater irrigated acreage in the Scott Valley, demonstrating significant progress in implementing metering and improving water management in the region.

5.3 Improved Groundwater Levels in the Scott River Watershed

Groundwater monitoring in Scott Valley showed improvements while the Emergency Regulation was in effect. These improvements reflect a combination of regulatory actions, increased LCS participation, groundwater restoration efforts, and natural factors such as precipitation timing and major storm events.

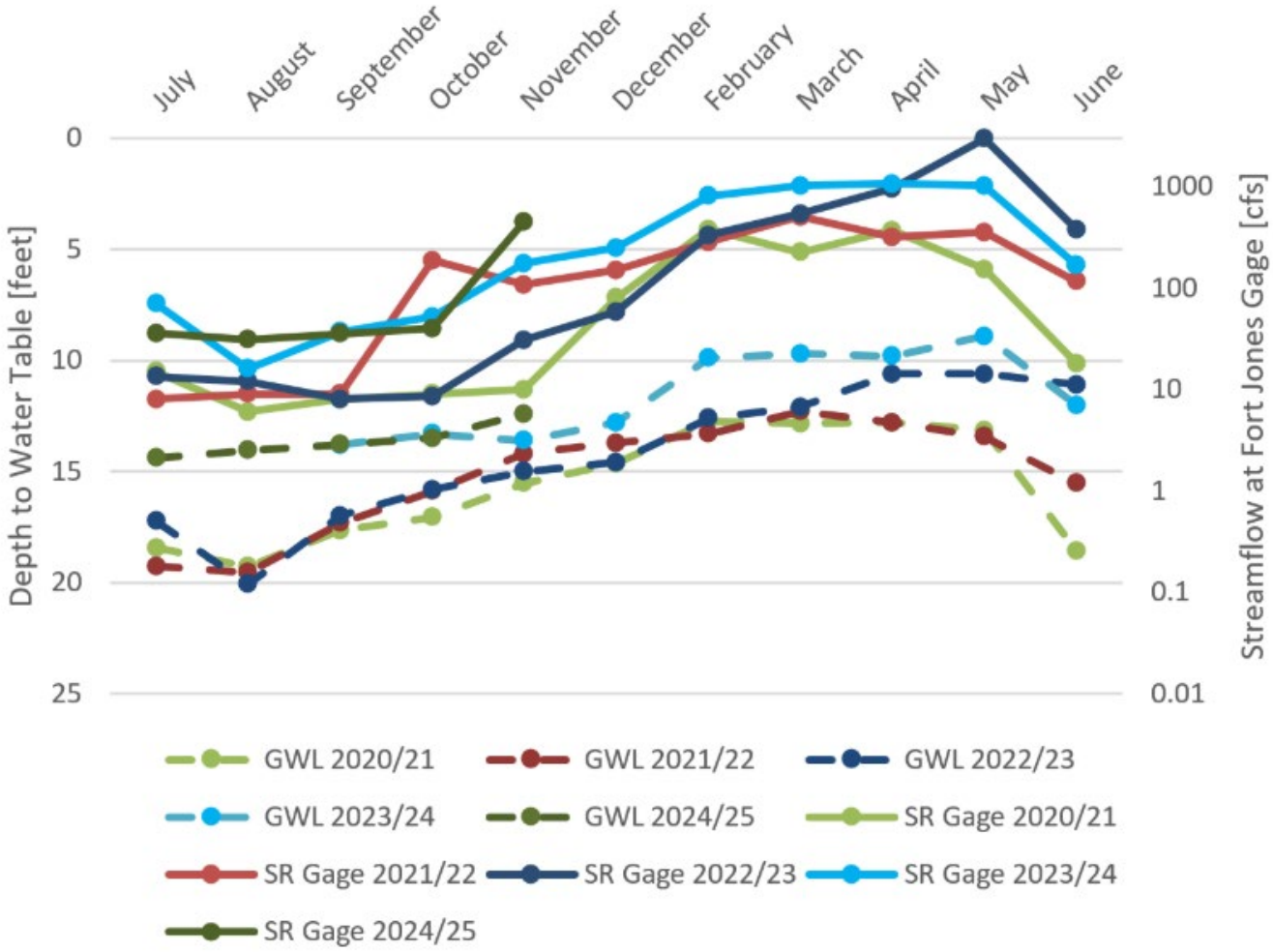


Figure 13. Streamflow at Scott River gage near Fort Jones (USGS gage no. 111519500) and average depth to groundwater level for Scott watershed "Valley Floor" wells. Dashed lines show monthly average depth to groundwater (ft) from July of one year to June of the subsequent year for 2020-2021 (green), 2021-2022 (red), 2022-2023 (dark blue), 2023-2024 (light blue), 2024-2025 (dark green) for "Valley Floor" wells of the Scott Valley Monitoring Network (UC Davis, 2024). Solid lines show streamflow at the USGS Scott River gage near Fort Jones (USGS gage no. 11519500) for the same months in 2020-2021 (green), 2021-2022 (red), 2022-2023 (dark blue), 2023-2024 (light blue), and 2004-2025 (dark green) on the day the groundwater level was measured. Note: Average May 2023 streamflow was 1,990 cfs (the scale of the graph is limited to 1,000 cfs). Figure copied from UC Davis (2024). Streamflow data source: USGS (2024a).

Figure 13 shows the increasing trend in monthly groundwater levels in Scott Valley since UC Davis began monitoring in July 2020, one year prior to the implementation of the

Drought Emergency Regulations. This overall increase in monthly groundwater levels has been observed each year since monitoring began, even between WY 2022-2023 and WY 2023-2024, which experienced similar snowpack, hydrology and precipitation. In November 2024, groundwater levels for 2023-2024 reached their highest point in the period of record compared to the previous five years. In summer 2024, groundwater levels were comparable to those observed in summer 2023, despite the May 1st, 2024, snowpack being lower than that of 2023. These improvements are the result of a combination of factors, including regulatory actions such as curtailments, reductions in livestock watering diversions, and a significant increase in the number of LCS participants in 2024 compared to 2023. Other efforts, such as winter groundwater enhancement and restoration projects that improve natural groundwater infiltration, also contributed. Additionally, natural factors like temperature, precipitation timing, and precipitation amounts played a role, with a significant storm event in November 2024 further supporting these gains and groundwater levels surpassing those recorded in November 2023.

In addition to measured increases in groundwater levels during implementation of the Drought Emergency Regulation, comparison of NCRWQCB field observations from 2021, 2022, and 2024 demonstrated improved streamflow and water quality conditions in the Scott River watershed. In 2022, high groundwater LCS participation, along with surface and groundwater curtailments, and fall limits on inefficient livestock watering, contributed to significant expansion of wetted area available as habitat to aquatic organisms. This is likely due to elevated groundwater levels in 2022 as compared to 2021. These improvements occurred despite hydrologic conditions in 2022 being drier than 2021, with comparable precipitation as rain in both years and April 1 snowpack measurements indicating 78% and 20% of average in 2021 and 2022, respectively.

During implementation of the 2024 Drought Emergency Regulation, improved groundwater levels continued to enhance base flows and water quality conditions. In the Scott River watershed, NCRWQCB field observations noted increased groundwater accretion downstream of the Eller Lane Bridge, where summertime base flows are generally low or non-existent. These conditions included cooler water temperatures, prolonged flow, and decreased algal growth and abundance. Additionally, summertime base flows in the Scott River began increasing around August 20, 2024, potentially due to increased groundwater inputs resulting from reduced pumping triggered by LCSs.

5.4 Improved Hydrologic Conditions

The Drought Emergency Regulation has significantly improved hydrologic conditions in the Scott River and Shasta River watersheds. By maintaining minimum instream flow requirements through curtailments of surface water and groundwater diversions, the regulations have ensured that more water remains within the system. The improved conditions include higher flows than under recent similar water years; increased wetted

area and improved water quality conditions in isolated pools; improved and earlier tributary connections to the mainstem; improved groundwater levels; and improved surface flows despite less precipitation. This impact is clearly illustrated in Figures 14A and 14B, which compare the Scott River below Youngs Dam on August 11, 2021, with no regulation in place, to the same location on August 17, 2022, when the regulation was active. The comparison demonstrates significantly improved flow and hydrologic conditions under the Regulation.

Directly following the expiration of the 2023 Drought Emergency Regulation on July 31, 2023, flows in the Scott River receded below the expired drought minimum flow requirements until early September when rainfall temporarily improved conditions. Figures 14C and 14D illustrate the impact of the Regulation's expiration, showing the Scott River below Youngs Dam on August 8, 2023, after the Regulation expired compared to conditions around the same time of year on July 31, 2024, when the Regulation was in effect. The comparison highlights that more water remains in the system when the Regulation was active.

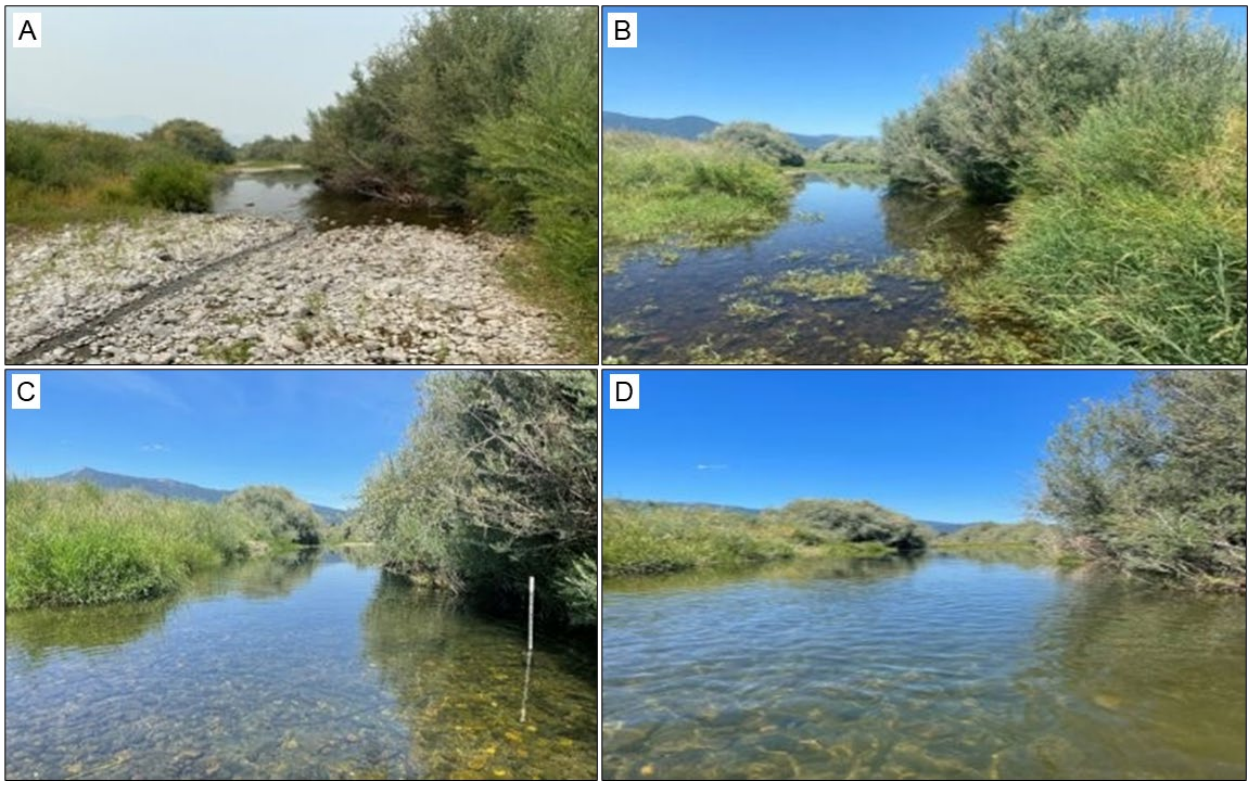


Figure 14. Comparison of the Scott River below Youngs Dam under regulatory conditions in effect and not in effect: (A) August 11, 2021, with no regulation in effect; (B) August 17, 2022, during the active Regulation period; (C) August 8, 2023, after the Regulation had expired; and (D) July 31, 2024, when the Regulation was in effect.

Additionally, flows dropped significantly after the Regulation expired on July 31, 2023, falling to less than half of the emergency flow requirement and requiring more than twenty days to recover. Despite coordination among major diverters to improve flows, these efforts only intermittently met the minimum instream flow targets. This is illustrated in Figure 6C, which presents a time series of daily flow and precipitation near Yreka in the Shasta River watershed alongside emergency minimum flow requirements for the period from October 2017 through September 2024.

5.5 Scott River Flow Response to Fall Rainfall

While analysis remains ongoing, data analyzed so far indicate that implementation of the Emergency Regulation has improved groundwater levels and overall surface water levels, allowing for improved flows during the critical adult salmonid migration period, even with smaller amounts of rainfall (see Figure 16).

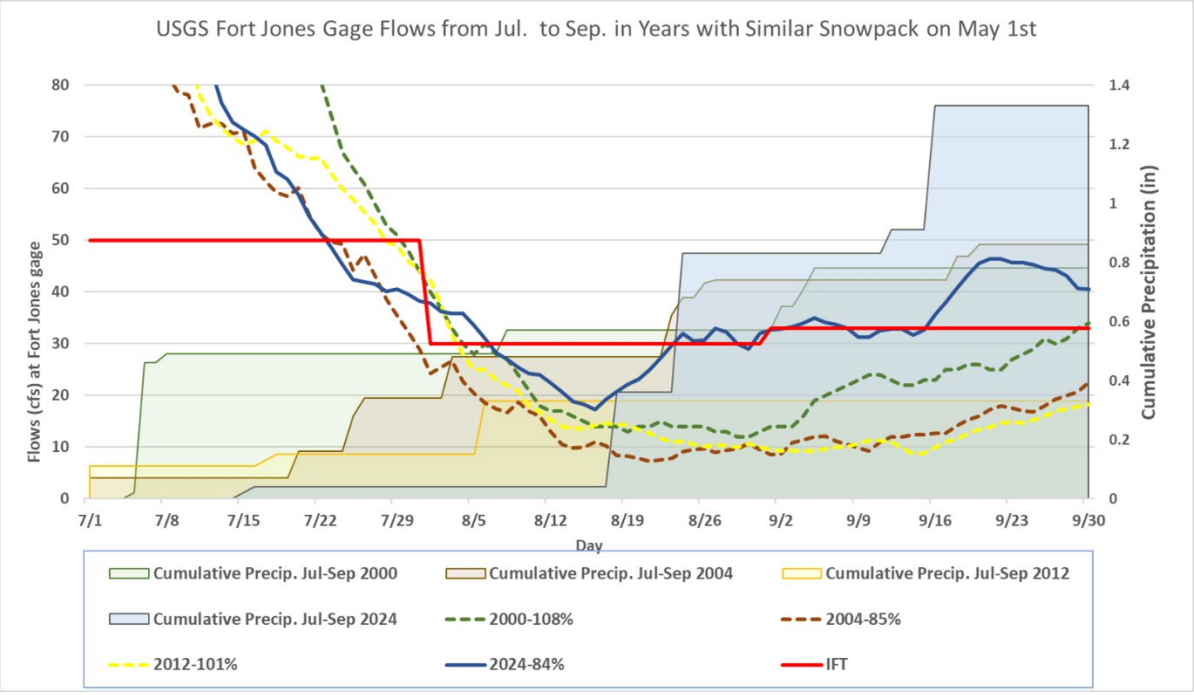


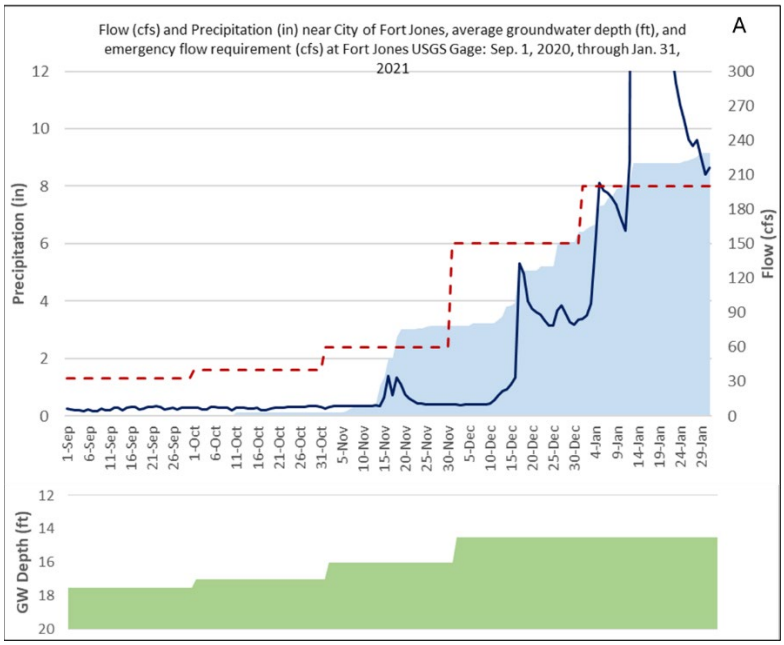
Figure 16. USGS Fort Jones gage flows from July to September of WY 2024 when the Emergency Regulation was in effect and WYs 2000, 2004, and 2012 when the Emergency Regulation was not in effect, with similar May 1st snowpack levels. Snowpack shown as Year-% of Long-Term Average (1946–Present). Left: Daily Flows; Right: Daily Cumulative Precipitation starting July 1.

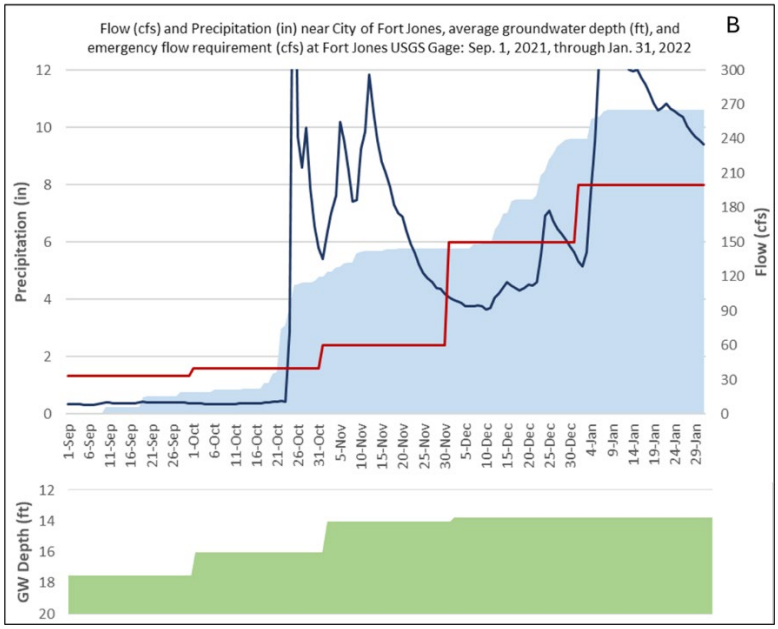
Figure 16 compares USGS Fort Jones gage flows from July to September 2024, when the Emergency Regulation was in effect, to the flows of the same time period in 2000, 2004, and 2012; these years had comparable May 1st snowpack levels compared to 2024 but did not have the Emergency Regulation in place. In 2024, despite receiving less than one inch of rainfall between August 18 through 24, flows at the USGS Fort Jones gage immediately increased to meet and sustain the minimum flow requirement. In contrast, flows in the summer of 2004 and 2000, which received approximately the same cumulative rainfall (0.86 inches in 2004 and 0.74 inches in 2000), remained below the minimum flow requirement. This is likely due to higher groundwater levels in the Scott Valley in 2024 compared to the previously mentioned years. The higher groundwater levels supported surface water flows, enabling a more immediate response to minimal rainfall.

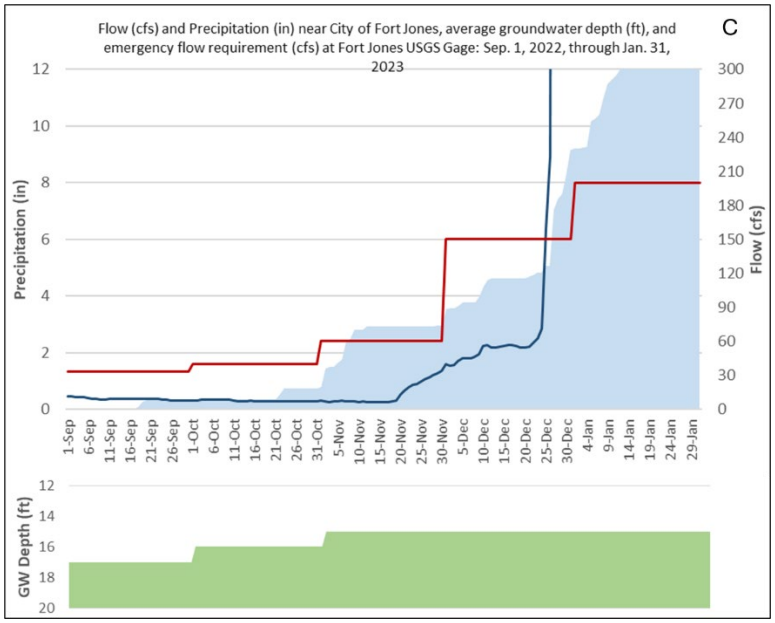
Historically, Reach 9 of the Scott River, a critical reach for Chinook salmon migration, was a “gaining” reach, where groundwater contributions increased surface flows. However, in recent decades, this reach became “losing,” meaning surface flows began sinking into the groundwater table, causing the reach to disconnect (SWRCB, 1974). This disconnection has hindered Chinook salmon movement to their spawning grounds. In 2021, prior to implementation of the Emergency Regulation (which started on August 17, 2021), three groundwater-irrigated alfalfa growers partnered with CDFW to forbear their irrigation and cease pumping from the aquifer underlying Reach 9. This early forbearance effort began in early August with the goal of supporting streamflow reconnection in Reach 9 in time for Chinook salmon migration. Simulation results from the SVHIM model, which analyzed all water year types (dry, moderate, wet) over the period of WY 1990-1991 to WY 2017-2018, indicated that reducing groundwater usage by August 15 contributes to earlier streamflow reconnection. On September 1, 2021, the prohibition on inefficient livestock watering went into effect. On September 10, 2021, full curtailment of surface and groundwater diversions—except for health and safety and livestock watering—was required under Orders WR 2021-0083-DWR and WR 2021-0084-DWR. These actions appear to have resulted in an increase in groundwater elevation in Reach 9 prior to the first major rainfall of the season on October 18, and to have improved the response of the watershed to the rainfall event.

The curtailments and participation in groundwater LCSs have reduced groundwater usage, contributing to higher groundwater elevation and improved overall surface water flows and response rates. For example, on December 7, 2023, flows at the USGS Fort Jones gage reached over 250 cfs after cumulative precipitation of 4.56 inches (PRISM Climate Group, 2024). Similarly, in fall 2024, flows exceeded the 60 cfs minimum requirement in November with less than 2 inches of cumulative rainfall (Figure 17). This is a notable improvement compared to 2022, when similar rainfall yielded significantly lower flows. As of November 2024, fall groundwater levels are the highest recorded in the past five years (Figure 17). These elevated groundwater levels—to which regulation

implementation contributed—have contributed to the Scott River's improved runoff response to precipitation events (Figure 17).






C
Flow (cfs) and Precipitation (in) near City of Fort Jones, average groundwater depth (ft), and emergency flow requirement (cfs) at Fort Jones USGS Gage: Sep. 1, 2022, through Jan. 31, 2023
Precipitation (in)
Flow (cfs)
GW Depth (ft)
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270
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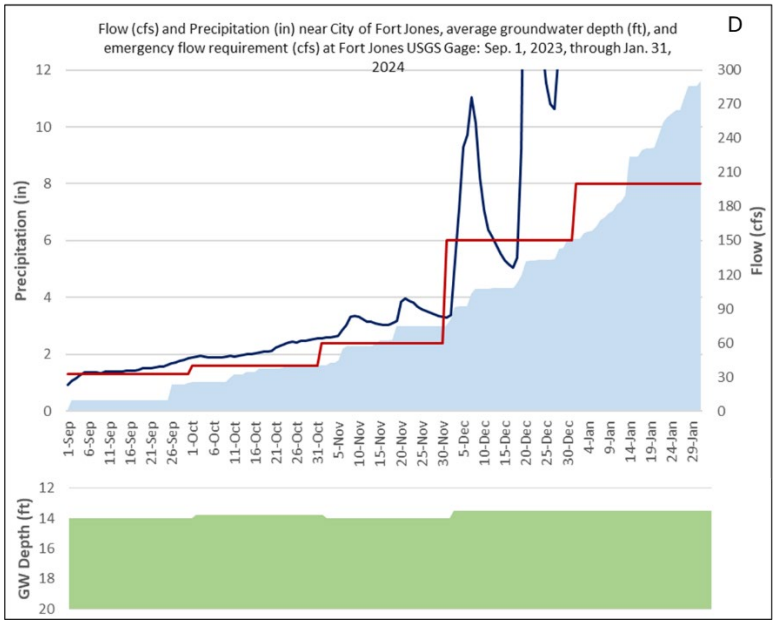
D
Flow (cfs) and Precipitation (in) near City of Fort Jones, average groundwater depth (ft), and emergency flow requirement (cfs) at Fort Jones USGS Gage: Sep. 1, 2023, through Jan. 31, 2024
Precipitation (in)
Flow (cfs)
GW Depth (ft)
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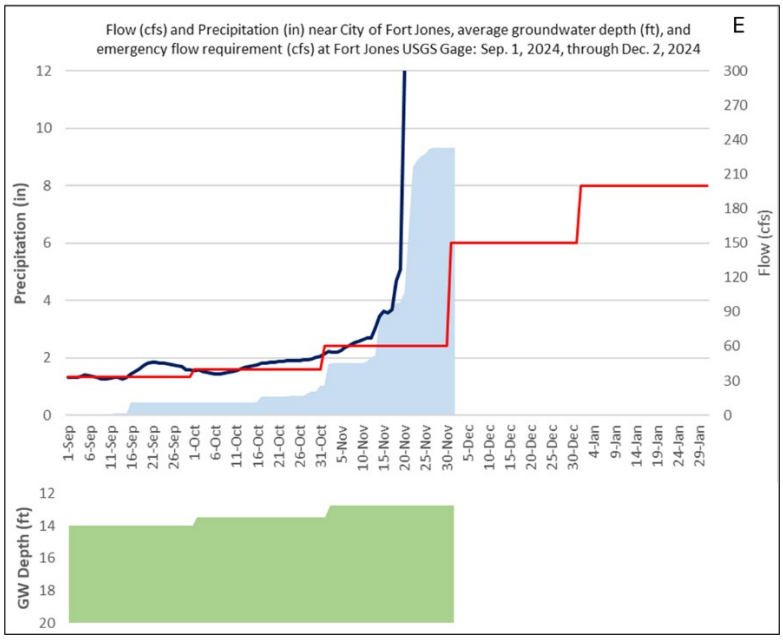

Figure 17. Daily average flow (cfs), cumulative daily precipitation (in) at USGS Scott River near Fort Jones gage, drought emergency minimum flows, and average groundwater level in the Scott Valley in the period of September through January of WY's 2020-2021 (A), 2021-2022 (B), 2022-2023 (C), 2023-2024 (D), and 2024-2025 (E) (as of December 12, 2024). Streamflow data source: USGS Scott River gage near Fort Jones (USGS gage no. 11519500). Precipitation data source: PRISM Climate Group (2024). Precipitation is estimated at the location of USGS gage with the assumption that it represents the rainfall pattern of the Scott River watershed. Average groundwater level source: UC Davis (2024)

5.6 Moderated Drop in Shasta River Flows Following the Onset of Irrigation Season

A direct benefit of the Drought Emergency Regulation in the Shasta River was a reduction in the magnitude of difference between pre-irrigation flows and flows following the onset of irrigation season. For example, between March 15, 2021, and May 1, 2021, flows ranged from 160 cfs to 19 cfs, with regular fluctuations of more than 20 cfs in a 24-hour period (Figure 18). The large and rapid fluctuations in flow likely increased stranding of juvenile salmonids, or their redds, resulting in an increase of fish stress and fish mortality and reduction of viable redds. The fluctuations generally result from un-coordinated diversions and large diversions that do not graduate their change in diversion rates when turning on or off. Between March 15, 2022, and May 2, 2022, during implementation of the Drought Emergency Regulation, flows ranged from 129 cfs to 42.9 cfs, with less than a 5 cfs drop in a 24-hour period. (Figure 19) Similarly, between March 15, 2024, and May 1, 2024, flows were in the range of 321 cfs to 98.1 cfs (Figure 20), with less than a 5 cfs

drop in a 24-hour period, closely mirroring the long-term median flow trend. The reduced variation in flow likely reduced fish stress and mortality resulting from large variations in flow. The reduced variation in flow was a result of coordination between the State Water Board, the Watermaster, and water diverters in response to the Drought Emergency Regulation.

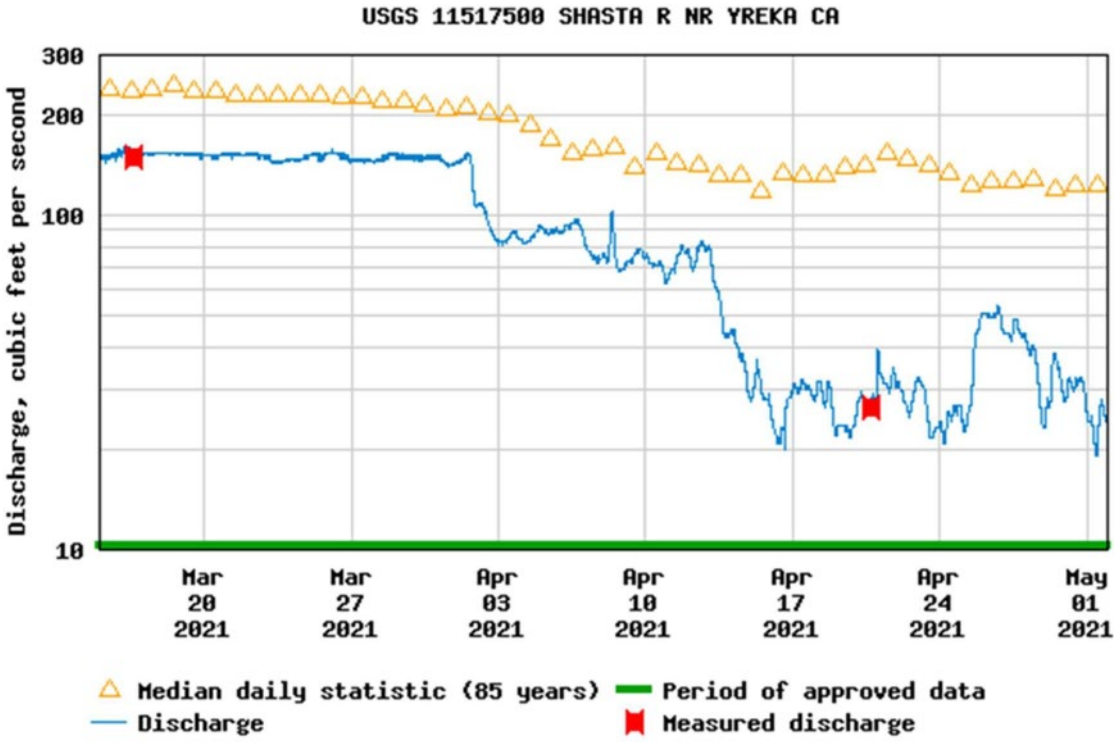

Figure 18. Shasta River flow at the USGS Gage near Yreka (USGS gage no. 11517500) between 3/15/2021 and 5/1/2021. Source: USGS (2023c).

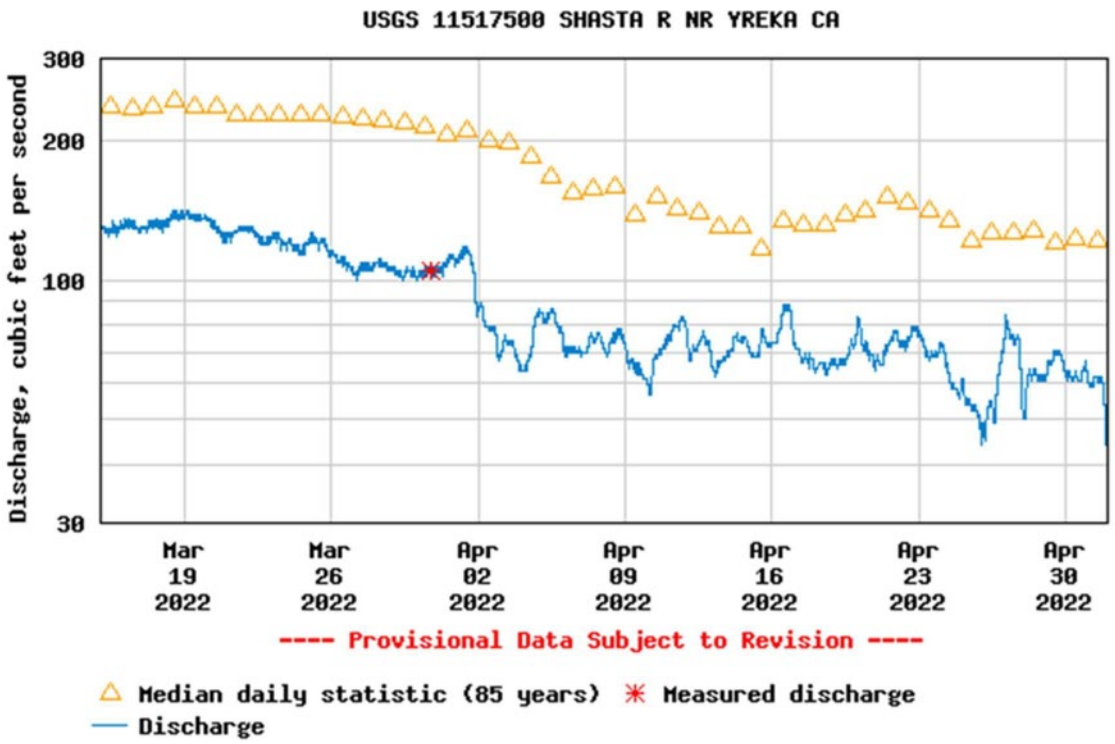

Figure 19. Shasta River flow at the USGS Gage in Yreka between between 3/15/2022 and 5/1/2022. Source: USGS Shasta River gage near Yreka (USGS gage no. 11517500).

Discharge, cubic feet per second

Most recent instantaneous value: 185 12-05-2024 16:00 PST

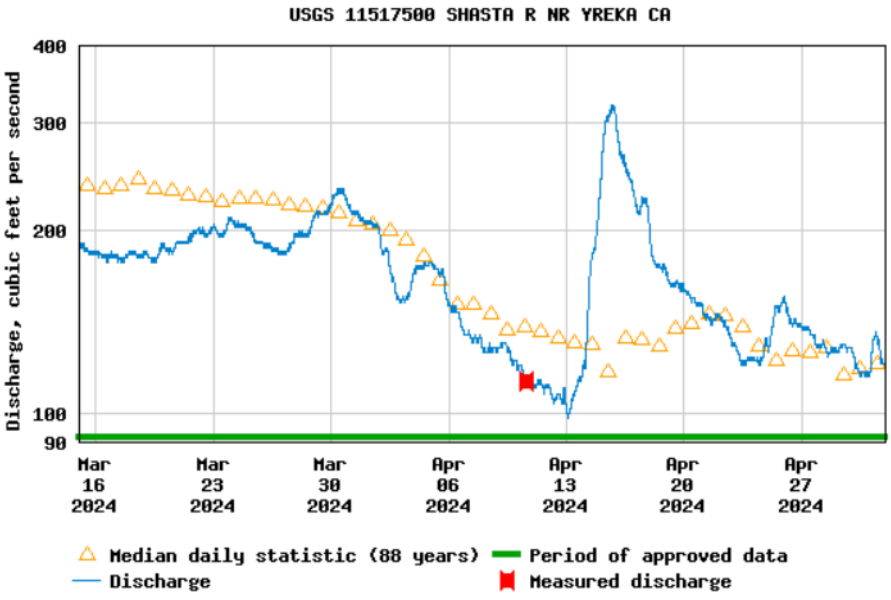

Figure 20. Shasta River flow at the USGS Gage in Yreka between 3/15/2024 and 5/1/2024. Source: USGS Shasta River gage near Yreka (USGS gage no. 11517500).

5.7 Benefits to Coho and Chinook Salmon Populations

Prior to the implementation of the Drought Emergency Regulations, critically low flows in the Scott River and Shasta River watersheds created water quality conditions lethal to salmonids, severely limiting their ability to migrate, spawn, and rear. These conditions also disrupted the abundance, timing, and community structure of benthic macroinvertebrates (BMI), a critical food source for salmonids during key growth stages, further contributing to fish population declines. Maintaining minimum instream flow requirements in the Shasta River watershed and significantly improving instream flows in the Scott River watershed has since stabilized habitat conditions, contributing to a reduction in the risk of catastrophic population collapses, preservation of genetic diversity, and ensuring salmonids have access to vital spawning and rearing habitats.

During the implementation of the 2022, 2023, and 2024 Drought Emergency Regulations, measurable improvements in instream habitat conditions have been observed, supporting key life history stages for salmonid species. These include the maintenance and stability of surface flows, increased groundwater elevations, and sustained streamflow connectivity in reaches where disconnection would have otherwise occurred. The stabilization of surface flows in the Scott River and Shasta River watersheds has reduced the risk of fish stranding, contributed to improving and maintaining suitable water temperatures and conditions for fish passage, and increased access to habitats that would otherwise be inaccessible. These improvements further reinforce ongoing habitat restoration projects within the watersheds that support salmonid recovery efforts.

CDFW reported that since the implementation of the regulations, improved connectivity through the Scott River tailings has enabled juvenile coho salmon and Chinook salmon that may have over-summered in the South Fork and East Fork of the Scott River to move out of those sub-watersheds and successfully outmigrate to the Klamath River. CDFW staff have also observed temperature stratification occurring in deep pools within the Shasta River canyon, with salmonids actively utilizing these microhabitats as cold-water refugia during the summer months when water temperatures are elevated. Additionally, CDFW found that increased groundwater elevations have contributed to earlier surface water reconnection and greater cold-water discharge into the Scott River, which supported healthy riparian habitat and improved surface flows and connectivity—conditions critical for coho salmon, Chinook salmon, and steelhead migration (Harris 2023b). For example, in 2022, despite continued drought conditions, improved west-side tributary habitat for coho salmon juveniles was observed compared to the previous year (Harris 2023b).

Voluntary flow transactions and collaborative efforts by agencies, tribes, and watershed groups have also been critical contributing factors to these improvements. In WY 2020-

2021, prior to the adoption of the Drought Emergency Regulation (SWRCB, 2021b), significant efforts were undertaken by a collaborative group of resource agencies, tribes, and watershed groups to address the impacts of low precipitation and critically dry conditions on salmonid species. Without a groundwater forbearance agreement or any emergency regulation in place, the available toolset was limited. An estimated 1,766 adult coho salmon from the 2020 brood year passed the SRFCF, located downstream of the USGS Scott River gage near Fort Jones (USGS gage no. 11519500). Efforts in the spring of 2021 were focused on ensuring coho salmon redds deposited in spawning gravels in French and Miner's Creeks—key west-side spawning tributaries to the Scott River—were kept wetted through a combination of voluntary instream dedications and flow transactions. These tools were also utilized to support redistribution of smolts higher up in the watershed where both flow and temperature would reliably support juvenile rearing through critically dry conditions.

Analysis is ongoing regarding the effect of the emergency regulation and other factors on salmon population resilience in the Scott River and Shasta River watersheds. The below data on outmigrant cohorts is one type of information being considered.

5.7.1 2022 Coho and Chinook Salmon Outmigrant Cohorts

In 2022, outmigrant data from CDFW's rotary screw trap on the Scott River indicated 68,616 age 1+ coho salmon out-migrated from the Scott watershed (CDFW, 2022d). In the Scott River, coho salmon juveniles typically rear in the stream system for a year before out-migrating to the ocean the following spring and summer. Therefore, these outmigrants are from the 2020 brood year (1,766 adults) that benefitted from both limited voluntary transactions on French Creek, Miner's Creek and upper tributaries for spawning and rearing, and from emergency regulations for rearing and outmigration.

It is estimated that 493,084 age 0+ Chinook salmon outmigrated from the Scott River (CDFW, 2022d). These are juveniles from the 2021 brood year (1,961 adults). The promising outmigration of 0+ Chinook salmon benefitted from the emergency regulations and are positive results during an extreme drought.

For the Shasta River, rotary screw trap data indicated an outmigrating population estimate of 1,950 age 1+ coho salmon, resulting from the 2020 brood year of 37 adults (CDFW, 2022a). The population estimate for age 0+ coho salmon was 722. An estimated 120 age 1+ Chinook salmon and 1,458,375 age 0+ outmigrated from the Shasta River in 2022 (CDFW, 2022a).

5.7.2 2023 Coho and Chinook Salmon Outmigrant Cohorts

Outmigrant data from CDFW's rotary screw trap on the Scott River indicate that an estimated 6,565 age 1+ coho salmon have out-migrated from the Scott River to the Klamath River resulting from the 2021 brood year of 852 adults. This cohort was spawned, incubated, reared and out-migrated under the Emergency Regulation, and

benefitted from significantly wetter conditions than previous years. It is estimated that 106,912 age 0+ Chinook salmon have out-migrated to the Klamath River resulting from the 944 adult Chinook salmon that entered the Scott River in the 2022 season.

There is a large decline in the estimated 0+ Chinook salmon outmigrant populations from 493,084 in 2022 to 106,912 in 2023. While the benefits to 2023 Scott River Chinook salmon outmigrants from the 2021 and 2022 Emergency Regulations may not have resulted in an increase in fish from the previous years, the outmigrant population numbers may have been much lower without the improvements in hydrologic conditions resulting from curtailments and groundwater conservation in 2022. Improved groundwater levels enabled stream connectivity to occur earlier in the season, improving adult returns and therefore preventing further collapse in 2023 0+ outmigration. Improved rearing habitat likewise should have improved 2023 1+ outmigration relative to what may have occurred in the absence of curtailments and groundwater conservation.

For the Shasta River, rotary screw trap data indicated an outmigrating population estimate of 1,029 age 1+ coho salmon, resulting from the 2021 brood year of 53 adults. There was not a sufficient amount of data to calculate a population estimate for age 0+ coho and for age 1+ Chinook salmon outmigrating from the watershed in 2023. The population estimate for outmigrating age 0+ Chinook salmon was 1,298,012 (CDFW, 2024h).

5.7.3 2024 Coho and Chinook Salmon Outmigrant Cohorts

Preliminary data from CDFW's rotary screw trap estimate that 10,703 age 1+ coho Salmon outmigrated from the Scott River as of June 4, 2024, resulting from the 2022 brood year number of 238 adults. This is an increase from the 6,565 age 1+ from 2023, while also a significant decrease from the 68,616 from 2022. There is not a current estimate of the season-to-date population number for outmigrating age 0+ coho salmon. Comparisons to previous years cannot be fully made until CDFW releases the 2024 Outmigrant Annual Report. There was a preliminary estimate of 983 age 1+ Chinook salmon that outmigrated from the Scott River as of June 4, 2024. The preliminary population estimate of age 0+ Chinook salmon was 314,334, which is an increase from the 2023 outmigrant population of 106,912.

Preliminary data from the rotary screw trap for the Shasta River estimate that 811 age 1+ coho salmon outmigrated as of June 4, 2024, resulting from the 2022 brood year of 47 adults. The preliminary estimate for age 0+ coho salmon was 1,621. For Chinook salmon, the preliminary age 1+ estimate was 274, while the age 0+ was 4,864,442 (CDFW, 2024d). This preliminary estimate was a large increase from the 2023 age 0+ outmigrating Chinook salmon.

6. Policy Overview, Need, and Effect of Proposed Emergency Regulation

The Proposed Emergency Regulation, like the 2021, 2022 and 2024 Drought Emergency Regulation, would establish emergency minimum flow requirements for salmonid protection in the Scott River and Shasta River watersheds, consistent with flow recommendations from CDFW. Similar to the current Drought Emergency Regulation, the State Water Board will have authority to curtail diverters in these watersheds in the order of priority as necessary to maintain a reasonable assurance of meeting the minimally protective flows. The Proposed Emergency Regulation would also continue important exceptions to priority-based curtailments to protect human health and safety, minimum livestock watering needs, and non-consumptive uses. In light of competing needs, the Proposed Emergency Regulation will continue to limit certain low-efficiency diversions for livestock outside the irrigation season, as was done similarly in 2021, 2022 and 2024.

This Proposed Emergency Regulation provides the State Water Board the tools it needs to:

1. Establish emergency drought minimum flow requirements to protect the threatened SONCC coho salmon, the culturally and commercially significant fall-run Chinook Salmon, and the culturally significant steelhead;
2. Ensure that adequate water is available to meet baseline minimum instream flow requirements for the protection of SONCC Coho, fall-run Chinook Salmon, and steelhead;
3. Implement the water rights priority system (including in systems with closely interconnected surface and groundwater), as necessary to protect such instream flows;
4. Provide a path for LCSs to allow for improved agricultural planning while supporting flow and fishery needs, with the additional benefits of incentivizing investment in long-term efficiency to provide resilience in future water shortages, and improving groundwater information to inform immediate and longer-term management actions;
5. Ensure continued access to water supplies for minimum human health and safety needs;
6. Ensure continued access to minimum water supplies for livestock watering;
7. Generally prohibit inefficient conveyance of water for livestock watering needs outside the primary irrigation season, with exceptions to limit the prohibition when reasonable under specified conditions, in light of fishery needs and the potential for winter groundwater storage;
8. Provide allowances for non-consumptive uses;
9. Require curtailment order reporting; and

10. Authorize information gathering related to implementing the regulation for the above purposes.

This section provides an overview of California's water rights framework, the specific emergency minimum flow needs in the Scott River and Shasta River watersheds, watershed descriptions, and additional detail regarding the effect of the Proposed Emergency Regulation and changes from the expired Drought Emergency Regulation.

6.1 Water Rights Framework

A very generalized overview of water rights is provided here to help understand the need for the Proposed Emergency Regulation and how it will be applied.

Two main types of surface water rights constitute the vast majority of surface water diversions in California: riparian rights and appropriative rights. A riparian water right (riparian right) generally provides a right to use the natural flow of a water body to which the land is riparian. Broadly speaking, riparian land is land that touches a lake, river, stream, or creek. Water can only be diverted under a riparian right when that water is used on the riparian parcel on land that drains back to the lake, river, stream, or creek from which the water was taken. Riparian rights remain with the property when it changes hands, although parcels severed from the adjacent water source generally lose their right to the water. Only the natural flow of water can be diverted under a riparian right. Water that is imported into a watershed from another river, stream, or creek cannot be used under a riparian right. Water cannot be stored during a wet time for use during a drier time under a riparian right. Neither can water released from an upstream storage reservoir be used by a downstream user under a riparian right. Riparian rights generally have a senior (higher relative priority) right to natural flows as against appropriative rights, and water must be available to fulfill the needs of all riparian rights before an appropriator may divert. This is not always the case, however, depending on whether an appropriation that predates the patent date of riparian lands was initiated on public or private land, and whether the appropriative diversion was upstream or downstream of the relevant riparian parcel. The priorities of riparian right holders are correlative vis-à-vis each other; during a drought all share the shortage among themselves. Because a riparian right only allows the use of natural flow, it is possible to have water available under a riparian right during wetter years or months and not during drier years or months when natural flows are no longer available, including cases where stream flow is being supported by releases of previously stored water. This is particularly the case in dry years.

On the other hand, an appropriative water right is generally needed for water that is diverted for use on non-riparian land or to store water for use when it would not be available under natural conditions. An appropriative water right holder can use natural flow, and non-natural flows like imported water from other watersheds, or irrigation return flows. Prior to 1914, appropriative water rights were acquired by putting water to beneficial use. The exact priority date of a pre-1914 appropriation can vary depending on

the circumstances but depends on either posting notice under the then-applicable procedures of the Civil Code or otherwise clearly initiating the means necessary to divert or actually diverting. An appropriative water right that was acquired before 1914 is called a pre-1914 appropriative water right and is not subject to the permitting authority of the State Water Board. Appropriative water rights obtained after 1914 require a water right permit and subsequently a license issued by the State Water Board or its predecessors. Similar to pre-1914 water rights, the seniority of post-1914 water rights is based on a first-in-time concept with the date of seniority typically established by the date of the application for the permit. A water right permit confers the State Water Board's (or its predecessor's) authorization to develop a water diversion and use project. The right to use water is obtained through actual beneficial use of water within the limits described in the permit. A water right license is issued once full beneficial use of water has been made and other conditions of a water right permit are met and constitutes the confirmation by the State Water Board (or its predecessor) of the water right. As between appropriators, junior water right holders may only divert where there is sufficient water to completely fulfill the needs of more senior appropriators.

When the amount of water available in a surface water source is not sufficient to support the needs of existing water right holders, junior appropriators must cease diversion in favor of more senior rights. However, it is not always clear to a junior diverter whether there is sufficient flow in the system to support their diversion and senior water uses downstream. It can also be difficult to determine whether releases of stored water are abandoned flows that may be diverted or whether those flows are not available for diversion because they are being released for downstream purposes.

Similarly, it can be difficult for a riparian to know if water is natural flow or if it is stored or imported water and whether, when and to what extent correlative reductions in water use are needed due to the need to share limited supplies amongst riparian rights. As part of administrating water rights, the State Water Board may adopt regulations to curtail water diversions under any water right type to protect more senior rights.

For groundwater diversions, case law recognizes overlying and appropriative rights to groundwater, analogous to riparian and appropriative rights to surface water. (*City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224, 1240; see also *Katz v. Walkinshaw* (1903) 141 Cal. 116, 135-136.) An overlying groundwater right is analogous to a riparian right to surface water. (*City of Pasadena v. City of Alhambra*, 33 Cal.2d 908, 925.) An overlying right attaches to land overlying a groundwater basin and is correlative to the rights of other overlying users to the safe yield of the groundwater basin. A water right permit from the State Water Board is not required to exercise an overlying right to groundwater, and like a riparian right, an overlying right to groundwater is not lost for non-use. The rights of overlying groundwater users are correlative, consisting of an equitable share of the available supply.

Like appropriative rights to surface water, appropriative rights to groundwater are governed by the principle of first in time, first in right, and allow use of water outside of the groundwater basin. The State Water Board does not have permitting jurisdiction over most groundwater, so an appropriative groundwater right can be obtained simply by extraction and beneficial use and does not require a permit from the state. Water may be appropriated for beneficial uses subject to the rights of those who have a lawful priority. Any water not needed for the reasonable beneficial uses of those having prior rights is excess or surplus water. Surplus water can be appropriated for non-overlying uses such as sale, public use or exportation beyond the groundwater basin or watershed. (*City of Pasadena v. City of Alhambra, supra*, 33 Cal.2d, 925-926; *Leavitt v. Lassen Irrigation Co.* (1909) 157 Cal. 82.)

Where groundwater and surface waters are interconnected, such as in the Scott and Shasta watersheds, the "common source" doctrine applies, integrating the water rights and applying priorities without regard to whether the diversion is from surface water or groundwater. (*Hudson v. Dailey* (1909) 156 Cal. 617, 627–628.) "[I]t has been recognized by California decisions that a percolating groundwater supply, although not part of the flow of a stream, may nevertheless be hydrologically connected with it, with the result that the extraction of water from either source diminishes the amount of water in the other. In such a situation, the percolating groundwater and the stream are regarded as one common water supply …." (*United States v. Fallbrook* (S.D.Cal. 1958) 165 F.Supp. 806, 847 [internal citations omitted].) "Because these basins are interconnected, some of the surface inflow to one basin is outflow from another. The groundwater and surface water within the entire Mojave River Basin constitute a single interrelated source." (*City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224, 1234.)

Article X, section 2 of the California Constitution requires that all water in the state be used reasonably and not wasted, and that it be put to beneficial uses to the fullest extent possible, in light of the importance of water to the state. It further provides that rights to the use of water are limited to such water as is reasonably required for the beneficial use served, and does not extend to the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of the water. The State Water Board has continuing authority under Water Code sections 100 and 275 to enforce the requirements of the California Constitution, Article X, section 2.

The reasonable use doctrine applies to the diversion and use of both surface water and groundwater, and it applies irrespective of the type of water right held by the diverter or user. (*Peabody v. Vallejo* (1935) 2 Cal.2d 351, 366-367.) What constitutes a reasonable use, method of use, or method of diversion depends on the facts and circumstances of each case. (*People ex rel. State Water Resources Control Board v. Forni* (1976) 54 Cal.App.3d 743, 750.) Under the reasonable use doctrine, water right holders may be required to endure some inconvenience or to incur reasonable expenses. (Id. at pp. 751-

752.) In applying the reasonable use doctrine, the Board must consider the demands of both instream uses (such as fisheries habitat, navigation, and recreation) and off-stream uses (such as irrigation, domestic use, and commercial use). (*National Audubon Society v. Superior Court* (1983), 22. Cal.3d 419, 443-444.) The State Water Board may determine particular uses not to be reasonable by regulation, including by exercising the emergency authority under Water Code section 1058.5 to adopt minimum drought emergency flows to protect critical fisheries, and to establish that diversions for most uses that interfere with meeting such flows are unreasonable. (*Stanford Vina Ranch Irrigation. Co v. State of California* (2020) 50 Cal.App.5th 976)

7. Need for Proposed Emergency Regulation

Although the watersheds received above average precipitation in WY 2022-2023 and WY 2023-2024, the Scott and Shasta watershed and fisheries present in and returning to the watersheds are still suffering from the long-term impacts of severe recurring drought. The Klamath River watershed, which includes the Scott River and Shasta River watersheds, remains under a drought emergency proclamation (Newsom, 2023, 2024b) and the region faces an uncertain hydrologic future, particularly in light of the ongoing long-term drought. To continue minimum levels of protection of the anadromous fisheries and to effectively manage the available water, immediate action is needed to readopt the proposed Emergency Regulation with minimum fisheries flow requirements in the Scott River and Shasta River watersheds. Immediate adoption of the proposed Emergency Regulation is additionally needed to continue effectively and efficiently administer and enforce the State's water rights system to meet those flows in light of severely limited water availability in the watersheds during the current drought. Immediate action is also needed to ensure continued reasonable use of water in light of limited water availability and fluctuating drought conditions. In the absence of the Drought Emergency Regulation (SWRCB, 2021b, 2022b, 2024c), there are no other regulations that provide for bare minimum fisheries flows in the Scott River and Shasta River watersheds, and the watersheds have not consistently met these minimum flows absent regulation. For example, after the 2022 Emergency Regulation and its associated curtailment orders expired on July 31, 2023, flows in the Shasta River watershed dropped to half of the minimum flow requirement, taking 20 days to return to the minimum flow level. The State Water Board may need to restrict water diversions when it determines flows are likely to be reduced below the proposed drought emergency minimum flows so that water is available for minimum flows for migration, rearing, and spawning of fall-run Chinook and SONCC coho salmon in the Shasta River and Scott River watersheds. The Emergency Regulation is also needed to provide for minimum health and safety needs and minimum livestock watering needs.

To implement the water rights priority system more effectively in the Scott River and Shasta River watersheds under water limitations and in uncertain hydrologic conditions,

the State Water Board may need access to better and more current information regarding water rights, water use, water needs, and procedures that allow the State Water Board to obtain and use the best available information quickly. Similar to the current Emergency Regulation, the Proposed Emergency Regulation has metering and data collection requirements. The State Water Board needs to continue to collect information related to surface water and groundwater diversions and uses of water in the watersheds to inform water demand estimates and the curtailment process. Additional information may also be needed regarding the basis of right and priority date for some water rights and claims to inform curtailment decisions.

The State Water Board is continuing to move forward with developing models for peer review, data, implementation alternatives, and economic analysis that will inform a long-term solution. This information development is anticipated to require several years. Should part of that ultimate solution be a permanent regulation, the State Water Board will need to undertake analysis under the California Environmental Quality Act, which is anticipated to take several years. Therefore, development and implementation of a long-term regulation is not possible on the timeframe necessary to address the ongoing emergency.

7.1 Need for Emergency Minimum Instream Flows for Fall-Run Chinook Salmon, Steelhead, and SONCC Coho Salmon in Scott River and Shasta River Watersheds

In these watersheds, application of the reasonable use doctrine requires consideration of the benefits of continued diversions of water from the identified waterbodies for current uses and the potential for harm to SONCC coho salmon, steelhead, and fall-run Chinook Salmon from such diversions under the current drought conditions.

The purpose of the Proposed Emergency Regulation is to protect commercially significant and culturally important fall-run Chinook Salmon (See Trihey & Associates, 1996; SWRCB, 2020), the culturally important steelhead (SWRCB, 2020) and the ESA- listed SONCC coho salmon affected by the drought in the Scott and Shasta watersheds by maintaining minimum streamflow for adult salmon migration, rearing, spawning, and out-migrating juvenile fish.

On November 12, 2024, the State Water Board staff held a public meeting to solicit comments and feedback on the possible readoption of the Emergency Regulation. At the meeting CDFW provided comments supporting the continuation of the existing Emergency Regulations to provide a minimum flow and stability for both watersheds that have been impacted by drought. On November 20, 2024, CDFW sent the State Water Board a letter stating their belief that the emergency regulation needs to be readopted to protect fish species including State and Federally threated Coho Salmon, Steelhead,

Chinook salmon and native endemic fish in the Shasta and Scott Rivers, and all critical tribal trust species.

7.1.1 Scott River Watershed Need for Emergency Minimum Flows

In an October 16, 2024, letter to the State Water Board, CDFW (2024d) recommended the State Water Board re-adopt the following minimum flow recommendations, shown in Table 3, as interim flows to improve conditions in the Scott and Shasta watersheds to support key populations of coho salmon, Chinook Salmon, and steelhead. The minimum flow recommendations are the same as CDFW (2022b) recommended the State Water Board adopt for, and were adopted in, the 2022 and 2024 Drought Emergency Regulation (SWRCB, 2022b, 2024c).

Table 3. Scott River emergency daily minimum flow recommendations.

River Gage	Daily Minimum Emergency Flow Recommendation (cfs)												
	Jan	Feb	Mar	Apr	May	Jun 1-23	Jun 24 - 30	Jul	Aug	Sep	Oct	Nov	Dec
Scott River at Fort Jones (USGS gage no. 11519500)	200	200	200	150	150	125	90	50	30	33	40	60	150

In a June 15, 2021, letter to the State Water Board, CDFW provided emergency drought minimum flow recommendations for the Scott River to support salmon survival through the current drought emergency (CDFW, 2021b). These flow requirements were adopted in the 2021 Drought Emergency Regulation (SWRCB, 2021b). On April 20, 2022, letter to the State Water Board, CDFW recommended continuing the previous emergency drought minimum flow recommendations, with the update of ramp-down flows in June to avoid stranding (CDFW, 2022b). These modified flow requirements were adopted in the 2022 and 2024 Drought Emergency Regulation (SWRCB, 2022b, 2024c) and are proposed for re-adoption in the proposed Emergency Regulation.

The flow recommendations were developed in consultation with NMFS, and pertain specifically to hydrologic conditions in the Klamath River basin that triggered the May 10, 2021, drought declaration, and provide minimum flows to support all life stages of fall-run Chinook and SONCC coho salmon during the current drought emergency.

CDFW notes the flow recommendations are not intended to set the stage for long-term management considerations, nor are they to be construed to provide adequate protections for salmon over extended periods of time. They only provide drought emergency minimum flow recommendations for all life stages of salmon during the current drought emergency. The proposed emergency minimum flow requirements are intended to enable salmon in the Scott and Shasta Rivers to survive. The minimum flows are also informed by the experiences of fall 2020 salmon runs where, as mentioned previously, the entire year's cohort of migrating coho salmon nearly failed to reach key spawning areas in the Scott River watershed (CDFW 2021b, 2022b).

The flow recommendations that CDFW (2022b) recommended for drought emergency are significantly lower than the recommended flow regime that CDFW (2017) developed for the Scott River. CDFW (2017) developed a flow regime using an estimated fish passage flow needs equation, Q_{fp} (R2 and Stetson, 2008), and Hatfield and Bruce (2000)'s instream flow incremental methodology and component microhabitat model, physical habitat simulation (PHABSIM) for spawning and rearing. CDFW (2017) then used Tessman's adaptation of the Tennant Method (Tessman, 1980) to ensure the flow regime is consistent with Scott River watershed hydrology. CDFW (2017) integrated the flow numbers with salmonid life stage periodicity and selected the highest semi-monthly flow.

Though the drought emergency flows are much lower than the CDFW (2017) recommendations, concerns have been raised regarding the burden the drought emergency flow requirements have on local water users, including the suggestion that the flows are excessive. Photographs taken in connectivity surveys conducted by CDFW across the watershed provide a visual demonstration of how modest these flows are, and a representative example is provided here.

When fall-run Chinook salmon begin migrating in September, the flow requirement is 30 cfs as measured at the USGS Fort Jones gage. Figure 21 is a photo of Scott River at Quartz Valley Road (Meamber Bridge) taken when flows at the USGS Fort Jones Gage were 34 cfs. There is typically 10-15 cfs being contributed downstream of this location before reaching the Fort Jones gage. Above this site is a majority of the best salmon habitat and many of the migrating fish will need to pass. So, although the flow requirements to some may seem high, the upstream flows in the mainstem Scott River and tributaries may be much lower. These low flows can cause migration impediments and potential risk for redd dewatering in the mainstem Scott River. The flow requirement increases to 40 cfs in October, when the peak of migration typically occurs and at this site may not have much more flow than we see in this photo.

Figure 21: Observed flows in the Scott River taken at Quartz Valley Road (Meamber Bridge) when flows at the downstream USGS Fort Jones gage was 34 cfs. Source: CDFW Scott River Connectivity Survey 2024.

The Scott River Adjudication assigned first priority instream flow rights to the United States Forest Service that are intended to provide bare minimum protections for fish during dry years in the mainstem's Klamath National Forest (KNF) reach, as measured at the USGS Scott River gage near Fort Jones (USGS gage no. 11519500; Siskiyou County Superior Court, 1980). CDFW's Scott River minimum flow recommendations are strongly influenced by the KNF first priority adjudicated right, with minor amendments that take migration observations from more recent dry years into account (e.g., CDFW 2021a, 2021d, 2021e, 2021f). The Scott River Adjudication (Siskiyou County Superior Court, 1980) deemed the first priority KNF flow amounts necessary:

> *to provide minimum subsistence-level fishery conditions including spawning, egg incubation, rearing, downstream migration, and summer survival of anadromous fish and can be experienced only in critically dry years without resulting in depletion of fisheries resources*.

CDFW (2021b) noted that implementation of these minimum flows might be adjusted if CDFW and NMFS subject matter experts agree that the reference drought emergency minimum flows are more than may be necessary to benefit relevant life stages (e.g., migration ends early). This option was exercised during implementation of the 2021, 2022 and 2024 Drought Emergency Regulations (e.g. CDFW, 2022b). This flexibility was adopted into the previous Drought Emergency Regulations (SWRCB, 2021b, 2022b, 2024c) and is included in the proposed Emergency Regulation.

CDFW or NMFS may notify the Deputy Director that the pertinent life stage(s) of the pertinent species the flows are crafted to protect is not yet, or is no longer present at the time anticipated, or may notify the Deputy Director that lower, alternative flows at the

USGS Scott River gage at Fort Jones (USGS gage no. 11519500), or alternative flows at a different point or points in the watershed, provide equal or better protection for the pertinent species' relevant life stages.

On May 23, 2023, the State Water Board received a Petition (Karuk Tribe et al., 2023) to establish permanent stream flow requirements on the Scott River based on a CDFW 2017 report (CDFW, 2017). The Petitioners state that the decades-long decline in fish populations, and the infrequency that minimum flows are met regardless of water year type, require that Emergency Regulations be implemented even after the revocation of the drought Executive Order. The minimum flow requirements recommended in the 2017 report (CDFW 2017) are significantly higher than those deemed appropriate for a drought emergency and included in the proposed Emergency Regulation.

On July 20, 2023, CDFW submitted a comment letter regarding the Petition for permanent streamflow requirements on the Scott River. In the letter, CDFW indicated that during the fall of 2022, 93% of the adult Chinook run spawned in the Scott River canyon downstream of the CDFW video counting weir due to instream flows insufficient to provide passage to the Scott River Valley. Following this, there was a considerable amount of snow accumulation during the winter, and spring runoff flows were high. CDFW rotary screw trap crews had been trapping an unusually high amount of Chinook sac fry in the spring of 2023, indicating redd scour had occurred, presumably from the Scott River canyon. This underscores the importance of maintaining sufficient late summer/fall flows to allow adult Chinook Salmon to pass through and upstream of the Scott River canyon into the Scott River Valley for spawning, thereby protecting redds from potential high winter/spring runoff (CDFW 2023f). The letter additionally supported setting interim backstop flows for the Scott River. The anticipated benefits of establishing interim flows for the Scott River included increased west side tributary habitat for coho salmon juveniles, increased groundwater elevation, and increased surface flows and stream connectivity during adult Chinook, coho, and steelhead migration (CDFW, 2023f).

On August 15, 2023, the Board held a hearing in response to the Petition. The hearing was expanded to include the Shasta River watershed. At the hearing, in light of the petition and comments thereon, the State Water Board directed Division of Water Rights staff to further engage with experts and community members on the basis for and implementation of prior emergency regulations to inform a proposed Emergency Regulation for the Scott River and Shasta River watersheds for Board consideration.

The Board emphasized that urgent action was required to address grave fishery conditions and to be prepared for the risk of dry conditions in the upcoming irrigation season, and that it was necessary to maintain continuing baseline protection for fisheries even as more permanent longer-term recovery-focused efforts continued. The State Water Board also directed the Division of Water Rights staff to identify and initiate the

scientific work needed to pursue long-term flows in both the Scott and Shasta watersheds.

On October 6, 2023, waterboard staff held a public workshop regarding emergency regulation efforts in the Scott River and Shasta River watersheds. The workshop focused on technical items related to the recently expired Emergency Regulation for the Scott River and Shasta River watersheds: minimum flow requirements, the state of the fisheries, data, and LCSs. Staff invited parties to present, answer specific staff questions, and engage in further discussion to deepen the information and discourse. During the workshop, staff were informed on the low fish numbers and dire state of the fisheries, the cultural and economic impacts to the tribes and commercial fishing, the need for minimum instream flows to protect the populations from extinction, in depth description of watershed hydrology and geomorphology, feedback on LCS and ways to improve the process and assessment.

On October 16, 2024, the State Water Board directed staff to solicit input regarding whether to readopt Establishment of Minimum Instream Flow Requirements, Curtailment Authority, and Information Order Authority in the Scott River and Shasta River Watersheds and determine if changes to the regulation would be appropriate. On November 12, 2024, SWRCB staff held a public meeting on the potential readoption of the emergency regulation establishing minimum instream flow requirements for the Scott River and Shasta River watersheds and proposals for viable alternatives to the emergency regulation. At the meeting, CDFW provided comments supporting the continuation of the existing emergency regulations to provide a minimum flow and stability for both watersheds that have been impacted by drought.

In a November 20, 2024, comment letter, CDFW emphasized the need for readopting the emergency regulations and conditions seen during the regulation and highlighted that the emergency baseline flow requirements are intended solely to provide emergency protection for salmonids, not to establish a foundation for long-term management considerations.

CDFW has been conducting weekly flow connectivity surveys in the Scott River watershed to better understand flow relationships between the discharge at the USGS Fort Jones gaging station and connection of Scott River tributaries with the mainstem. Sufficient flow is required to provide unimpeded migration of adult salmonids to reach spawning grounds as well as to facilitate the redistribution and outmigration of juveniles.

During the 2024 Emergency Regulation, CDFW reported increased surface flows in both watersheds during key periods, including adult Chinook salmon, coho salmon and steelhead migration, as well as juvenile rearing and outmigration. In the Scott River, drought flows also improved groundwater elevation, which led to earlier surface water

reconnection and increased cold-water discharge into the river, supporting healthy riparian habitat during baseflow conditions (CDFW, 2024d).

7.1.2 Shasta River Watershed Need for Emergency Minimum Flows

In an October 16, 2024, letter to the State Water Board, CDFW (2024d) recommended the State Water Board re-adopt the following minimum flow recommendations, shown in Table 4, as interim flows to improve conditions in the Scott and Shasta watersheds to support key populations of coho salmon, Chinook Salmon, and steelhead. The minimum flow recommendations are the same as CDFW (2022b) recommended the State Water Board adopt for, and were adopted in, the 2022 Drought Emergency Regulation (SWRCB, 2022b).

CDFW (2021b) noted that implementation of these minimum flows might be adjusted if CDFW and NMFS subject matter experts agree that the reference drought emergency minimum flows are more than may be necessary to benefit relevant life stages (e.g., migration ends early). This option was exercised during implementation of the 2021, 2022 Drought Emergency Regulations (e.g. CDFW, 2022b).

Table 4. Shasta River emergency daily minimum flow recommendations.

River Gage	Daily Minimum Emergency Flow Recommendation (cfs)													
	Jan	Feb	Mar 1-24	Mar 25-31	Apr	May	Jun	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov	Dec
Shasta River near Yreka (USGS gage no. 11517500)	125	125	125	105	70	50	50	50	50	50	75	105	125	125

In a June 15, 2021, letter to the State Water Board, CDFW (2021d) provided minimum flow recommendations for the Shasta River to support salmon survival through drought emergency and were adopted in the 2021 Drought Emergency Regulation (SWRCB, 2021b). The flow recommendations were developed in consultation with NMFS, pertain specifically to hydrologic conditions in the Klamath River basin that triggered the May 10, 2021, drought declaration (Newsom, 2021b), and provide minimum flows to support all life stages of fall-run Chinook and SONCC salmon during the current emergency. In light of additional evidence, CDFW submitted a letter to the State Water Board which recommended reduced winter flows for the Shasta River and ramping flows to reduce stranding potential (CDFW, 2022b). The reduced winter flows were deemed sufficient to provide survival-level habitat for salmon and steelhead and minimize superimposition of redds (redds placed on top of redds) (CDFW, 2022b), while making more water available for storage. These modified flow requirements were adopted in the 2022 Drought

Emergency Regulation (SWRCB, 2022b) and are proposed for re-adoption in the proposed Emergency Regulation.

CDFW's June 15, 2021, letter notes the flow recommendations are not intended to set the stage for long-term management considerations, nor should they be construed to provide adequate protections for salmon over extended periods of time. They only provide drought emergency minimum flow recommendations for all life stages of specific salmonids during drought emergency. The flow recommendations were intended to enable salmon in the Scott River and Shasta River watersheds to survive drought conditions (CDFW, 2021b).

The waterboards staff have reviewed comments that the Shasta flow numbers in the canyon reach are incorrect, being either too high or low. The Shasta River flow recommendations are informed by recommended flows for dry conditions from McBain and Trush Shasta River Canyon Instream Flow Needs Assessment (2014), and CDFW's understanding of available base flows and historical water use. The study model and analyses took into consideration the temperature thresholds CDFW defined for salmon suitability, but the model did not thoroughly cover all the aspects for streamflow-water temperature relationship and quotes "analyses does not address many facets of the streamflow-water temperature relationship" (McBain and Trush, 2014). This includes the addition of cold-water springs into the canyon reach that may help it maintain cooler temperatures. The study acknowledges this in their findings and states it's a conservative approach to identifying instream flows needs. The recommendations deviate from referenced values only when CDFW considered other factors such as the current emergency drought conditions, field notes, and the professional judgment of CDFW and NMFS subject matter experts. Because of this conservative approach the recommended flows for Shasta River are equal to or lower than the flows recommended for dry conditions in McBain and Trush (2014).

Flow-habitat results from the three sites in the McBain and Trush Shasta River Canyon Instream Flow Needs Assessment (2014) were composited to calculate spawning habitat availability during a critically dry water year winter-flow scenario on the Shasta River. Based on this modeled scenario, 105 cfs represents approximately 83% of the maximum habitat value available in a critically dry water year. For this reason, 105 cfs provides an appropriate amount of early season spawning habitat for Chinook salmon in this drought emergency (October). The overall flow-habitat relationships display a relative peak of spawning habitat at 125 cfs in a critically dry water year. The increase from 105 cfs in October to 125 cfs in subsequent months should minimize superimposition of redds.

Redd dewatering is influenced by redd and tail spill depth. The minimum depth of a redd is typically 0.5 foot, and the tailspill depth is typically 0.3 foot less than the redd depth. Accordingly, a drop or rise of more than 0.2 foot in water surface elevation would be expected to change tailspill depths and available spawning habitat. Rating curves in

McBain and Trush (2014) demonstrate that fluctuations between 105 and 125 cfs would result in approximately a 0.18-foot change in water surface elevation. Assuming two (2) months from spawning to fry emergence, flows could be dropped to 105 cfs in late March without causing redd dewatering.

While adequate flows are necessary to support fish, another vital and related component of the aquatic habitat necessary to protect salmonids is cold water. It is important to note the correlation of low flows with lethal water temperatures for salmon. In the spring of 2021, CDFW recorded unprecedented high temperatures at its rotary screw trap, which is located near the USGS Shasta River gage near Yreka (USGS gage no. 11517500). In order to ensure fish are not harmed, CDFW only operates the rotary screw trap when water temperatures are below 21 degrees Celsius (70 degrees Fahrenheit). In 14 years of the 20-year rotary screw trap record, Shasta River water temperatures have allowed CDFW to operate the screw trap until the end of June. In 2021, the temperature threshold was reached in mid-May, approximately a month earlier than ever before. In the 20 years of records prior to 2021, the earliest day the temperature threshold was met was June 17. The 2022 juvenile salmonid outmigrant study for the Shasta River states that temperatures greater than 20.3 degrees Celsius can be detrimental to juvenile salmonid growth and survival. In the 2022 screw-trapping season, this temperature was first reached on May 17 and 28 days were logged with temperatures above that threshold between then and the last day of operations on June 29. For those days when the 20-degree water temperature threshold was reached, the average duration at that temperature was 12 hours.

The outmigrant rotary screw trap in the Shasta River canyon was still catching salmonids on June 30, 2023. Nonetheless, the rotary screw trapping operation ended on this date due to water temperatures exceeding safe levels for the salmonids. Snorkel surveys continued, however, and Chinook Salmon were observed almost through the end of July. Subsequently, and with the end of the drought regulation, no juvenile Chinook Salmon were observed in the canyon (Harris, 2023a).

On June 16, 2022, a memo prepared by Michael Podlech was submitted to the State Board presenting an interpretation of temperature modeling contained in McBain and Trush (2014), and arguing that the summertime flow target of 50 cfs would result in adverse instream temperatures not supportive of juvenile salmonid survival. The memo included an alternative flow target of 30 cfs between June 1 and September 15, followed by a ramped increase in flow from 30 cfs to 50 cfs by September 16, followed by another ramped increase in flow to 75 cfs by September 30. The recommendation was based on the information contained in McBain and Trush (2014) but did not fully assess the differences between the modelling parameters used in that report and the implementation of curtailment in the Shasta River by order of priority. Importantly, McBain and Trush (2014) modeled the change in temperature under different flow regimes by increasing the

volume of water in stream, assuming a uniform temperature based on data collected in the Shasta River canyon. This approach does not take into account the temperature of the source water flowing into the Shasta River canyon caused by changes in water management that may result in increased flow from cold water springs. Big Springs Irrigation District is one of the lower priority water rights holders in the Shasta River, being an appropriative groundwater right holder, and diverts water from the Big Springs Complex, a geologic feature that supplies significant cold-water springs and the important cold water tributaries Big Springs Creek and Little Springs Creek. Big Springs Irrigation District was curtailed for much of the time the curtailments were in effect, resulting in a measurable increase in cold water flow from the Big Springs Complex into Big Springs Creek, Little Springs Creek, and eventually into the Shasta River.

Analysis conducted by North Coast Regional Water Board staff showed that this increased flow of cold water from the Big Springs Complex into the Shasta River, as occurred through curtailment in order of water right priority under the Drought Emergency Regulation, reduced temperatures by nearly 2°C during early July 2022 when compared to early July 2021. The Regional Water Board also assessed instream temperatures in early July 2018 where flows were close to 30 cfs. Instream temperatures during this period were warmer than July 2022, despite comparable atmospheric temperature, providing evidence that flows of 50 cfs, when cold water spring flows were increased from curtailment of appropriative groundwater users consistent with water right priority, provide better water quality conditions than flows of 30 cfs in the Shasta River canyon. Subsequent juvenile surveys in the Shasta River canyon conducted by CDFW in July 2022 and in July 2023 showed the presence of salmonids in the canyon, utilizing habitat. A subsequent juvenile survey conducted after the Emergency Regulation ceased on July 30, 2023, showed most of the juvenile salmonids had vacated the canyon as flows decreased. These field observations provide additional evidence of the efficacy of 50 cfs minimum flows supporting juvenile habitat utilization and survival in the Shasta River canyon, when the source water supporting these flows is of sufficient quality.

In addition, fishery managers have been concerned with flow and temperature conditions in the Shasta River during the early weeks of the fall migration during many prior years. As a result, over the past decade, resource agencies and local landowners have tried to coordinate to provide adequate flows in the Shasta River during the critical month of September to support fall-run Chinook Salmon migration.

On January 17, 2024, California Coastkeeper Alliance, Friends of the Shasta River, Mt. Shasta Bioregional Ecology Center, Water Climate Trust, Shasta Waterkeeper, Save California Salmon, and Environmental Protection Information Center submitted a petition for rulemaking to the State Water Board seeking a permanent regulation establishing minimum flows in the Shasta River across a host of hydrologic conditions. On February 16, 2024, the State Water Board denied the petition but reaffirmed the priorities

established during the 2023 hearing and committed to holding a public meeting on flow efforts in the Shasta River watershed before the end of the year. A petition to reconsider the denial was received on April 15, 2024, which was again denied on May 15, 2024.

8. Changes in Proposed Emergency Regulation Compared to Current Emergency Regulation

The following changes to the Proposed Emergency Regulation compared to the current Emergency Regulation represent staff's recommendations to address feedback and insights gained during the implementation of the previous emergency regulations.

8.1 Local Cooperative Solutions

The Proposed Emergency Regulation has been revised to include several clarifications and minor changes to LCSs.

The metering requirement included in the Proposed Regulation clarifies that metering may occur at the points of "application" (e.g. pivots) as well as at points of "extraction" (i.e., wells), since the two locations provide equivalent water use data. The updated language clarifies that pivot metering is acceptable in light of concerns raised by many irrigators that the current regulation would require retrofitting their current irrigation systems to install meters on the wells themselves, which in many instances would require significant and costly overhauls, including the need for custom metal fabrication to extend pipes to accommodate the meters. During the 2024 LCS program, many irrigators predominantly installed meters on pivots instead of wells for these reasons, and this update serves as a clarification that such a practice is acceptable. Additionally, meters installed at the point of application can provide more precise monitoring of water application for certain fields or crop types.

Under the current emergency regulation, overlying groundwater LCS participants were required to maintain a log of daily meter readings and submit it monthly to the coordinating entity of the State Water Board. The reporting requirement has now been revised from daily to weekly in response to participant feedback that daily readings are not feasible or are unduly burdensome. Many irrigators are not on the property daily, and physically collecting measurements from meters, especially for larger operations, is time-consuming and burdensome. Weekly readings are sufficient to ensure compliance with the LCS while reducing the burden on participants.

The Proposed Emergency Regulation also clarifies and revises the deadline requirements for groundwater LCSs. The updated language clarifies that the Deputy Director has discretion to accept submittals after April 15, where the applicant provides justification and staff resources are available. This change reflects staff experiences during the 2024 implementation, where many late applications were received. It furthered the goals of

early groundwater use reduction and increased agricultural certainty to accept applications with justifiable reasoning (e.g. misunderstanding deadline or options, but still having the ability to meet groundwater pumping reductions) to the extent staff resources permitted.

Based on comments from Siskiyou County, the Regulation has been updated to allow for development and implementation of LCSs that last more than one year. In addition to allowing for longer term planning, the update will improve efficiency and streamline processing of LCSs, while also simplifying the development process for applicants by reducing the need for frequent renewals or renegotiations. Any multi-year proposals will comply with the existing regulation in place at the time.

Several clarifications have been made in the Regulation to ensure consistency with the provisions and methods used to evaluate LCSs during previous terms of the regulation. These include greater clarification on what participants can expect regarding that LCS compliance inspections–that these may be scheduled by email or telephone and can include a range of documentation methods. Additionally, the regulation now includes language clarifying that the CDFW's assessment of whether a LCS is 'Equal or Better' may consider multi-year benefits of restoration projects and access to information that would not otherwise be available, explicitly naming two types of projects with considerable potential in the watershed for which there was confusion as to how such benefits could be considered under the regulation.

Further, the regulation specifies that the ultimate responsibility for providing information regarding the benefits, implementation, potential injury to other legal users, expected flow impact, and other necessary information lies with the petitioner(s). While the State Water Board and CDFW can assist in evaluating and developing LCSs, the responsibility for supporting an LCS rests with the petitioner. Lastly, the regulation clarifies that for LCSs proposing flow or other benefits on a watershed-wide or tributary basis, petitioners must provide substantiation that they control sufficient flow in the system to allow the agreed-upon terms to be met and provide the anticipated benefits proposed.

8.2 Alternative Flows in the Shasta River Watershed

In response to a request from the Siskiyou County Farm Bureau, the regulation has been revised to include a pathway for testing alternative flow scenarios at the Yreka gage in the Shasta River to evaluate whether such alternative flows could improve fishery conditions. For example, lower flows with cooler water temperatures during certain times of the year could increase the availability of cold-water habitat and potentially yield the same or greater benefits than higher flows with warmer water temperatures (McBain & Trush, 2014). Conversely, higher flows may provide access to cold-water refugia that remains inaccessible to salmonids under lower flows. CDFW, in coordination with the National Marine Fisheries Service (NMFS), may propose that the Deputy Director implement these alternative flows for a limited period. A period of 10-14 days is anticipated to be sufficient

to detect a representative change in the 7-day moving average of water quality metrics, such as Maximum Weekly Maximum Temperature (Carter, 2008) and habitat availability, but the final duration will depend on study structure. If such alternative flows are higher than the flows described in subsection (c)(2)(A), the proposal requires agreement from affected water right holders, as it may result in reduced water availability or curtailments for these users. This modification allows for temporary experimental measures to collect data that may inform future flow efforts.

8.3 Inefficient Livestock Watering

The Proposed Emergency Regulation's prohibition on inefficient diversions for livestock watering has been updated compared to the 2024 Emergency Regulation to include a new requirement. The 2024 Emergency Regulation sets forth the terms under which inefficient livestock-watering may occur, including a requirement that such diversions from tributaries are allowed only if the tributary remains connected to the mainstem (with certain exceptions). The Proposed Emergency Regulation adds an additional provision to this requirement for in the event that CDFW determines that this connection is insufficient to support adult salmon migration. This update supports salmon migration into tributaries by addressing situations in which tributary-stream connection alone does not ensure sufficient flow for fish passage into and out of these vital spawning and rearing areas, as was observed in 2023 and 2024 at Shackleford Creek (CDFW, 2024d).

8.4 Continuation of Existing Curtailment Orders, Certifications, Petitions and Approvals

The Proposed Emergency Regulation has been revised to allow for the continuation of existing curtailment orders, as well as petitions, certifications, or approvals of exceptions granted under sections 875.1, 875.2, and 875.3, ensuring they remain effective without additional action on the part of either the State Water Board or the large number of affected water users. The updated language is closely aligned with that used during the Regulation's readoption in 2022, providing continuity that reduces administrative workload, conserves staff resources, and minimizes confusion for recipients. These changes streamline processes while maintaining regulatory clarity and consistency.

8.5 Penalties

The Proposed Emergency Regulation has been updated to remove references to specific, outdated penalty amounts following the passage of Assembly Bill 460, which revised penalty structures to allow for higher fines for noncompliance with water rights laws or curtailments.

9. Description and Effect of Proposed Emergency Regulation

The following section provides a detailed explanation of the Proposed Emergency Regulation and the anticipated effects.

9.1 Proposed Emergency Regulation Section 875

The State Water Board has determined that the flows that CDFW recommended in 2022 after consultation with NMFS, and that the Board subsequently adopted in 2022 are the appropriate, scientifically supported drought emergency minimum flows to support a minimum level of protection for salmonids in the Scott and Shasta watersheds. Section 875, subdivision (c) adopts the recommended drought emergency minimum flows for fall-run Chinook salmon, steelhead, and SONCC coho salmon species protection in the Scott River and Shasta River watersheds. The description and rationale for the flows is detailed above in the section titled Need for Emergency Minimum Instream Flows for Fall-Run Chinook Salmon, Steelhead and SONCC Coho Salmon in Scott River and Shasta Watersheds. The proposed emergency minimum flows are intended to enable salmonids in the Scott and Shasta watersheds to successfully survive periods of extreme water scarcity, but do not represent optimal flows for salmon.

Recognizing the dynamic, and at times, localized and context-specific nature of information development and the variation in fish behavior and population over different years, Section 875, subdivisions (c)(1)(B); (c)(2)(B); and (c)(2)(C) provide for CDFW, in coordination with NMFS, to provide the Deputy Director with information regarding fish presence and/or alternative flow needs, based on new scientific information. The Deputy Director can then use that information in issuing or lifting curtailment orders, as occurred under the 2021 and 2022 Drought Emergency Regulation. The proposed regulation further allows the Deputy Director to approve alternative flow proposals from CDFW at the Yreka gage for a limited time, to gather information to evaluate whether such alternative flows can provide equal or better fishery protection. (Section 875, subdivision (c)(2)(D)).

Section 875, subdivision (b) provides for the Deputy Director to issue enforceable curtailment orders, in order of water right priority, to ensure that these emergency minimum flows are met. In order to allow for rapid communication and the ability to act dynamically as conditions change, changes to curtailment orders after the initial order will be noticed electronically (Section 875, subdivision (d)(2)). This section was updated to allow the continuation of existing curtailment orders, petitions, certifications, or approvals from the current Emergency Regulation.

Section 875, subdivision (f) also provides for alternative methods of compliance with the Proposed Emergency Regulation through LCSs that provide benefits to fisheries resources or develop alternative methods to contribute to fishery flows. The next few

paragraphs describe the modified LCS framework in the Proposed Emergency Regulation, its reasoning, and its anticipated effect.

Significant efforts in prior years have established that voluntary efforts on an individual or group level in the watershed can result in benefits to the fishery through more flexible means than straightforward implementation of the water rights priority system, although they have not yet proven sufficient on a watershed-wide scale.

The Scott River and Shasta River watersheds have a long history of voluntary efforts aimed at improving fisheries conditions. Voluntary actions in the Scott River watershed prior to adoption of the Drought Emergency Regulation (SWRCB, 2021b) included temporary and long-term water leasing through CalTrout and the Scott River Water Trust, safe harbor agreements, and coordination with private landowners, the Watermaster, CDFW, and NMFS to provide targeted flows to protect redds and juvenile fish in critical spawning and rearing watersheds. Some of these efforts resulted in, or are in the process of becoming, dedicated instream flows pursuant to Water Code 1707. Note that instream flow dedications are often specifically intended to contribute flows in addition to any required flows, at the discretion of the petitioner. A water diverter may also elect to have 1707 flows contribute to a required flow.

Pre-regulation voluntary efforts have produced some measurable success but have also been thwarted to some extent due to a lack of comprehensive management of water diversions in these watersheds. Often, flows increased in one reach have simply been diverted farther downstream, limiting the effectiveness of flow efforts to a small, localized area. Water use in the Shasta River is particularly difficult to manage due to the number of riparian diversions and groundwater pumping that are not accurately represented in the outdated Shasta River Adjudication (Siskiyou County Superior Court, 1932). The Proposed Emergency Regulation provides a more comprehensive framework for managing water transactions and incentivizing more participation in voluntary efforts. Section 875, subdivision (f) provides the regulation’s framework to build on existing efforts.

The Proposed Emergency Regulation allows for alternative compliance methods at the watershed, tributary, and individual level that establish binding, enforceable approaches to meeting the minimum flow requirements, or to other fishery protection goals that provide equivalent or greater fishery benefits. Such measures have the potential to increase certainty for planting, hiring, and other resource determinations for farmers, and have the potential to generate voluntary efforts that will improve community resilience and response to drought in this and future dry years.

Section 875, subdivision (f) provides that local cooperative solutions by individuals or groups may be proposed by petition to the Deputy Director as an alternative means of reducing water use to meet or preserve drought emergency minimum flows, or to provide

other fishery benefits (such as cold-water refugia, localized fish passage, or redd protection), in lieu of curtailment. The Deputy Director may approve a petition to implement cooperative solutions for: (A) a watershed-wide cooperative solution that will provide sufficient assurance that the flows in subdivision (c)(1) or (c)(2) are achieved; (B) tributary-wide cooperative solutions in two situations – first, if sufficient information allows the Deputy Director to identify the appropriate contribution of the tributary to the flows identified in subdivision (c)(1) or (c)(2), and the Executive Director makes a finding that a local cooperative solution is sufficient to provide the pro-rata flow for that tributary or second, if the trustee fisheries agencies find that the cooperative solution provides benefits to anadromous fish are equal to or greater than the protections provided by their contribution to flow; (C) individual cooperative solutions for any type of diversion in two situations – first, if there is binding agreement under which water users have agreed to cease diversions in a specific timeframe or second, if fisheries agencies recommend an exemption to curtailment based on an assessment that the benefits to anadromous fish are equal to or greater than the protections provided by their contribution to flow; (D) overlying groundwater diversions for irrigated agriculture that results in a net reduction of 30 percent in the Scott River watershed and 15 percent in the Shasta River watershed; that commits to graduated overlying groundwater diversion cessation schedule; or that commits to best management practices for efficient irrigation, combined with early cutoff of corner irrigation and of all irrigation in the driest years; and (E) comparable reduction in use of a users' more senior right in favor of continuing diversion under her more junior right otherwise subject to curtailment under certain circumstances.

Petitions to implement watershed-wide, tributary, individual, and comparable reduction local cooperative solutions may be submitted to the Deputy Director at any time. As described in Section 875(f)(4)(D), petitions for overlying or adjudicated groundwater local cooperative solutions are due by April 15 of the irrigation season and must be implemented for the duration of the irrigation season. Updated language now allows the proposal of multi-year local cooperative solutions and the ability for the Deputy Director to waive the deadline on demonstration of good cause and evidence of implementation during the entirety of the irrigation season.

Under the Proposed Emergency Regulation, after approval of a petition for a local cooperative solution, the Deputy Director will not issue curtailment orders or shall suspend, rescind or modify, as applicable, such orders already issued, affecting those rights relevant to the proposed cooperative solution, so long as the Deputy Director finds that any continued diversions under the local cooperative solution are reasonable and do not result in unreasonable harm to other legal users of water. Approval of a petition may be subject to appropriate conditions, including monitoring and reporting requirements, and approval may be rescinded if monitoring or other reliable information indicates that parties are not meeting their obligations under the cooperative solution, if the agreement is not providing the benefits to anadromous fish outlined in the cooperative solution, or based

on an objection filed under (f)(2). Section 875, subdivision (f)(4)(D), has well metering and reporting requirements for local cooperative solutions. Language has been updated addressing inspection procedures and data collection, clarifying reporting requirements and expand metering at the place of use (e.g. pivot).

Under Section 875, subdivision (f)(4)(B), in the Scott River watershed, information to determine a tributary's pro-rata tributary contribution could include but is not limited to instream flow measurement information, Foglia et al. (2013a), Foglia et al. (2013b), Foglia et al. (2018), The Nature Conservancy California Natural Flow Database (CEFWG, 2021), information developed for the Sustainable Groundwater Management Act (SGMA) process, and available hydrologic models. In the Shasta River watershed, information to determine a tributary's pro-rata tributary contribution could include but is not limited to instream flow measurement information, Watercourse Engineering (2007), The Nature Conservancy California Natural Flow Database (CEFWG, 2021), information developed for the SGMA process, and available hydrologic models.

The proposed Emergency Regulation supports continued development and implementation of binding local cooperative solutions among water right holders and claimants in the Scott River and Shasta River watersheds.

Under Section 875(f)(4)(D)(v), a percent reduction local cooperative solution allows overlying or adjudicated groundwater diverters to reduce water use by 30 percent in the Scott River watershed and 15 percent in the Shasta River watershed. The percent reduction volumes were determined to be reasonable for this voluntary option based on the information described below.

The SVIHM developed by UC Davis (Foglia et al., 2018; Harter, 2021ab) indicates that ceasing groundwater pumping for alfalfa irrigation by July or August within the Scott River groundwater basin in dry years would result in improved instream flow conditions at the USGS Scott River gage near Fort Jones (USGS gage no. 11519500) during October through December. As shown in the SVIHM, during the dry season when stream reaches are dry due to low groundwater levels, stream flows cannot recover until groundwater levels rise due to reduced groundwater pumping or significant rain. In evaluating forecasted shortfalls, State Water Board determined that there may be a need to curtail all priorities of surface water diversions and some or all water pumped by groundwater users in order to achieve the proposed drought emergency minimum flows. As shown in the demand analysis of Fiscal Impact Statement, groundwater pumping for irrigation during August through December is approximately 30 percent of the annual groundwater pumping for irrigation. For the voluntary pathways in the regulation described above, the volume of the 30 percent reduction of groundwater pumping may be allowed to be spread over the entire irrigation season instead of full pumping curtailment during August through December, with that percent required in the late summer and fall when flows are generally lowest in the Scott River watershed. This is a plausible scenario based on previous years,

and actions under the expired Drought Emergency Regulation indicate that such a reduction is feasible (if difficult) for water users.

For the Shasta River, projected curtailments do not indicate the same level of curtailment impact to overlying groundwater pumping primarily because the lower priority demands are typically large enough to cover the projected curtailments. Even in the record-setting dry period from 2020-2022, it was not necessary to curtail overlying groundwater users to meet instream flows. However, curtailments may need to be higher than what can be estimated from available supply and demand information because of uncertainty in the Shasta River watershed related to reported and unreported water demand, actual inflows to Dwinnell Reservoir, streamflow depletion losses, and potential dry stream segments in some parts of the watershed and wet stream segments in other parts of the watershed. It is anticipated that overlying groundwater curtailments needed to meet the drought emergency minimal flows would be much lower in the Shasta River watershed compared to the Scott River watershed, if needed at all. However, overlying groundwater users may still wish to have certainty that curtailment will not be imposed, or may wish to be part of a broader solution in the Shasta River watershed. Governor Newsom's July 2021 Executive Order N-10-21 called on Californians to voluntarily reduce their water use by 15 percent. Therefore, for the groundwater voluntary pathways in the Shasta River watershed the water use reduction target is 15 percent if overlying groundwater users decide to pursue this voluntary pathway.

Section 875, subdivision (f)(4)(D)(vi) allows for a graduated cut-off local cooperative solution in which overlying or adjudicated groundwater diverters reduce water use by ceasing groundwater diversions on one of two schedules if the petitioner demonstrates that irrigation during the current irrigation season will be meaningfully decreased compared to standard practices. Option 1 requires that irrigation cease on 15 percent of acres by July 15, 50 percent of acres by August 15, and 90 percent of acres by August 31. For the remainder of the irrigation season, a maximum of 8 inches of water may be applied on the remaining 10 percent of irrigated acreage. Option 2 requires that irrigation cease on 20 percent of acres by July 20, 50 percent of acres by August 20, and 95 percent of acres by September 5. For the remainder of the irrigation season, a maximum of 6 inches of water may be applied on the remaining 5 percent of irrigated acreage.

Section 875, subdivision (f)(4)(D)(vii) allows for a best management practices local cooperative solution in which overlying or adjudicated groundwater diverters may continue to irrigate if the petitioner does all of the following: (a) uses a low-energy precision application (LEPA) system on all irrigated acreage; (b) does not irrigate corners after June 15, and does not use end guns; and (c) uses soil moisture sensors to inform irrigation timing and keeps records available for inspection. Additionally, in drier years, the petitioner agrees to cease irrigation on 90 percent of irrigated acreage by August 31 with

limits on the amount of water that may be applied to the remaining 10 percent of irrigated acreage.

Section 875, subdivision (f)(1)(G) defines coordinating entities as those with the expertise and accountability mechanism to serve such a role and includes requirements to avoid conflicts of interest and require reporting to the State Water Board.

9.2 Proposed Emergency Regulation Section 875.1

Section 875.1 provides an exception to curtailment in order of priority for non-consumptive diversions. Because such uses do not decrease downstream flows, curtailing such diversions would not help achieve minimum flows or provide additional water for senior rights. In order to provide sufficient information on the diversions to demonstrate that they are truly non-consumptive and can continue without harming other diverters of equal or more senior priority, diverters must provide the Deputy Director with evidence that the diversion and use would not decrease downstream flows. The regulation specifically identifies certain types of non-consumptive uses to provide clarity for diverters who may qualify.

9.3 Proposed Emergency Regulation Section 875.2

Section 875.2 provides that diversions for minimum human health and safety needs may be authorized to continue after receipt of a curtailment order. This provision recognizes that certain water diversions provide directly for individual human health needs, such as those typically provided through indoor domestic water use. It also recognizes that water plays a more indirect, but still vital, role in providing for human health and safety, such as uses for fire protection and recovery, air quality protection, and electrical grid reliability. When providing water for any of these purposes is not feasible with an alternate supply, and when the water is not being used for non-health and safety needs, continued use under a water right that has received a curtailment order is permitted. This is a narrow exception to the order of priority that protects human health and safety and furthers the human right to water expressed in Water Code section 106.3 and adopted as a core value in State Water Board Resolution No. 2016-0010. Updated language adds additional clarity that water diversions for firefighting can continue under a human health and safety exemption.

The section includes the process for certification of up to 55 gallons per person per day of human health and safety water use, and also provides for a petition process for health and human safety uses requiring more than 55 gallons per person per day or that cannot be measured in gallons per person per day. The section allows for a governmental or non-profit organization to submit the necessary certifications or petitions in certain circumstances.

9.4 Proposed Emergency Regulation Section 875.3

Section 875.3 allows for limited diversions to occur for minimal livestock watering, after receipt of a curtailment order. This limited exception to the order of priority is established in light of several factors: the limited amount of water required for livestock watering; the inability of livestock to withstand long periods without drinking water; state law requirements regarding humane treatment of animals; and the important role that livestock—particularly cow-calf operations—play in the economy of the Scott and Shasta Valleys specifically and the larger Klamath region as a whole. Necessary minimum diversions that meet the reasonable livestock-watering amounts described in California Code of Regulations, title 23, section 697, may continue under self- certification to the Deputy Director. In recognition of livestock's increased water needs during heat waves, limited diversions may be increased up to twice the amount in section 697 to support minimum livestock water needs. The trigger for the use of such a change to exceedance of 90 degrees is based on the increased water needs of livestock at temperatures above 90 degrees (Stull et al., 2012) (Meehan et al., 2021). To avoid barriers to providing sufficient water to livestock, there is no specific certification process for these additional diversions. The purpose of setting reasonable livestock watering amounts is not to limit the amount of water that livestock drink, but to require that water diverted is delivered and used efficiently, and that an allowance for continued diversion when others are curtailed is limited. For situations in which livestock require more water than the amounts described in section 697, the current regulation allows for diverters to file a petition supporting the increased need. A proposed minor amendment to Section 875, subdivision (d) allows for the Deputy Director to approve a petition for efficient conveyance systems with minimal amounts of seepage. The Deputy Director may deny certificates or petitions that fail to demonstrate that they meet the requirements of certification or the requirements for increased water use.

9.5 Proposed Emergency Regulation Section 875.5

Section 875.5 subdivisions (a) and (b) set forth categories of water right holders in order of priority for curtailments in the Scott and Shasta watersheds. Curtailment orders, as required to meet drought emergency minimum fisheries flows, would be issued in groupings, according to water right priority, from lowest to highest priority, including both groundwater and surface water.

For the Scott River, the priority groupings are based primarily on those set forth in the Scott River Adjudication (Siskiyou County Superior Court, 1980). The Scott Adjudication itself incorporates the French Creek and Shackleford Adjudications (Siskiyou County Superior Court, 1950, 1958), placing their priorities along those of other tributaries to the Scott River. Most water rights in the Scott River Adjudication are placed into five separate schedules. Water rights within Schedule A, B, C, and D water rights are considered independent of water rights in other schedules, with the exception of "surplus class

rights." Water rights in Schedule E, on the other hand, are integrated (Siskiyou County Superior Court, 1980).

In order to meet the drought emergency minimum flows at the downstream end of the Scott River, all the water right schedules must be integrated because all users in the system are required to contribute to the drought emergency minimum flows. In determining how to integrate these schedules, the State Water Board reviewed files from the Scott Adjudication proceedings. A State Water Board staff memorandum, "Principles for the Scott Adjudication" assessed the evidence presented in light of water rights law and set forth several principles relevant here. The memorandum describes that (1) tributary rights are superior to rights on the mainstem, due to prescription; (2) the priority of the five mainstem schedules decreases from upstream to downstream reaches, due to prescription and (3) interconnected groundwater rights are superior to all surface water rights, due to reasonableness (SWRCB, 1976, ¶s 1, 4, 5). This memo is the best available interpretive tool for integrating the various schedules in the adjudication, and the Board adopts its principles for the limited purpose of establishing the priorities in section 875.5 (a) (1) (A) for enabling implementation of drought emergency minimum fisheries flows. This interpretation does not limit the State Water Board in future proceedings, such as any adoption and implementation of long-term flow requirements or if the Scott River Adjudication is reopened and referred to the Board for additional recommendations.

Applying the general water law principles of appropriative and overlying use, section 875.5 also recognizes the junior status of appropriative surface water and groundwater rights developed after the Scott River Adjudication, and for overlying groundwater rights developed outside the adjudicated zone or after completion of the Scott River Adjudication (Siskiyou County Superior Court, 1980).

In the Shasta River watershed, curtailment orders would be issued first for appropriative diversions initiated after the Shasta Adjudication (inclusive of surface water and groundwater appropriations), then for post-1914 and pre-1914 appropriative water rights in accordance with the priority set forth in the Shasta Adjudication or based on appropriative groundwater use date, then last for riparian and overlying groundwater diversions (Siskiyou County Superior Court, 1932).

Section 875.5 subdivision (c) clarifies that de minimis groundwater users are a group that may be excluded from curtailment. There are numerous small groundwater diversions in the Scott River and Shasta River watersheds, that are primarily used for domestic uses, firefighting ponds, and other uses closely related to human health and safety and minimum livestock watering needs. The Deputy Director may determine not to curtail such diversions of less than two acre-feet per annum in light of their de minimis impact on flows and the considerable effort required on the part of diverters and of State Water Board staff to issue and respond to curtailment orders, and to file, review, and act on appropriate minimum use petitions.

9.6 Proposed Emergency Regulation Section 875.6

Section 875.6 establishes the reporting requirements for water users or water right holders that are issued a curtailment order. This provision requires water users or water rights holders to provide information that will allow the State Water Board to understand who has curtailed water use and who continues to use water under an exception provided for in the regulation or under a different water right. This information will help the State Water Board prioritize its efforts to oversee implementation of the regulation and better understand where and how much water is being used outside of water rights priority. This includes minimum water needs allowed for in the regulation, including minimum amounts of water for human health and safety and livestock. Subdivision (a) requires that all water users or water right holders who are issued a curtailment order are required, within seven (7) calendar days, to submit a certification of the actions they are taking in response to the curtailment order.

Subdivision (b) describes that water users and water right holders who are issued a curtailment order and continue to divert out of order of priority established in section 875.5, as authorized in sections 875.2, 878.1, or 875.3, must submit information to the State Water Board on a schedule established by the Deputy Director as a condition of certification or petition approval. Examples of information that may be required include but are not limited to: water right information, well information, how the diverter complies with any conditions of continued diversion, planned conservation and efficiency efforts, efforts to obtain alternate water sources, diversion amounts and other related information. Subdivision (c) provides the Deputy Director with authority to request additional information that is reasonably necessary to assess compliance. Any person receiving an order under subdivision (c) must provide the requested information within the time specified by the Deputy Director, which shall not be less than five (5) days. This provides recipients with a minimum timeframe for compliance but allows for additional time to provide information that is less time-sensitive or more difficult to provide.

9.7 Proposed Emergency Regulation Section 875.7

Subdivision (a) of Section 875.7 defines inefficient livestock watering as the diversion of more than 10 times the amount of water the livestock need to drink, with reference to the reasonable water quantities set forth in California Code of Regulations, Article 5, section 697. Subdivision (b) of Section 875.7 broadly prohibits inefficient livestock watering during September through March, unless certain conditions listed in subdivision (b)(1) through (b)(6) are met. Absent these conditions, the competing water needs for fisheries and the availability of alternatives make this inefficient method of diversion generally unreasonable. September to March is a critical period when fall-run Chinook and coho salmon must migrate from the mainstem Klamath River into the Scott and Shasta River watersheds to find safe places to spawn, with adequate flows also necessary to support successful egg incubation and juvenile rearing. Most of this period coincides with reduced

irrigation requirements, but flow remains a limiting factor in dry years and is anticipated to continue be so in this ongoing drought emergency.

Subdivision (b)(1) through (b)(6) of Section 875.7 describe the conditions under which inefficient diversion for livestock are not generally barred in the September through March period. First, drought emergency minimum flows must be met without any active curtailment orders in the relevant watershed. Second, the diversions may not occur in the fall until after there has been sufficient flow to stimulate fall-run Chinook salmon migration. Third, for diversions that occur after November 1, a similar flow sufficient to stimulate coho salmon migration, including in an applicable tributary, must occur.

CDFW makes the determinations for the second and third requirements. Fourth, for tributary diversions, the relevant tributary must be connected to the mainstem and passable for migrating salmonids and remain so. The Proposed Emergency Regulation introduces an additional provision to those in the Current Emergency Regulation, allowing CDFW to inform the State Water Board that the connection is insufficient to support adult salmon migration. Requirement four does not apply in Moffett Creek in the Scott River Watershed, as this creek does not generally maintain connectivity except in the wettest conditions. Fifth and Sixth, any diversion must bypass 90% of flow (or 80% of flow in defined high flow conditions), or bypass greater amounts to avoid disturbing redds. As described in Subdivision (d) of Section 875.7, requirements four through six do not apply upstream of Dwinell Dam in the Shasta watershed, as Dwinell Dam is the limit of anadromy.

Subdivision (c) of Section 875.7 provides that diverters must e-mail notification to the Board of the intent to divert under the conditions in subdivision (b), including a description of the anticipated point and amount of diversion and how compliance with the conditions in subdivision (b) will occur. It further requires diverters to maintain records of those diversions and provide them to the Board upon request.

As described in the Supporting Technical and Cost Information Related to Limitation on Inefficient Livestock Watering section, there are several alternatives to inefficient livestock watering that are commonly employed in the Scott and Shasta watersheds, including use of groundwater and pipes, as well as the potential to haul water on a temporary basis. Cessation or significant reduction of highly inefficient livestock watering has the potential to significantly address the anticipated shortfalls in the fall migration season of this drought emergency, including on both a tributary and watershed-wide basis. As such, during September through March, use of surface water for extremely inefficient livestock watering is not reasonable in light of available alternatives and fishery needs, unless the conditions of subdivision 9b) are met.

Subdivision (e) of Section 875.7 clarifies that otherwise-prohibited inefficient livestock diversions may continue if approved under a local cooperative solution, and it provides

specific findings for the basis of a local cooperative solution that focuses on connectivity, migration, rearing and redd dewatering.

Subdivision (f) of Section 875.7 provides for the Deputy Director to suspend the prohibition for a particular user in the event of failure of an alternative watering system.

9.8 Proposed Emergency Regulation Section 875.8

Section 875.8 establishes the methodology and requirements for information orders. In order to more effectively implement curtailments through the water rights priority system in the Scott and Shasta watersheds under current drought conditions, the State Water Board needs access to better and more current information regarding water rights, water use, water needs, and procedures that allow the State Water Board to obtain and use the best available information quickly. The State Water Board needs an enforceable mechanism to collect information related to surface water and groundwater diversions and uses of water in the Scott and Shasta watersheds to inform water demand estimates and the curtailment process. Additional information is also needed regarding the basis of right and priority date for some water rights and claims to inform curtailment decisions.

In more detail, subdivision (a) of the proposed section establishes that the Deputy Director may issue information orders to some or all landowners, diverters, or other water right holders in the Scott and Shasta watersheds, requiring them to provide additional information related to water use. The subdivision describes that information orders will be prioritized by size or impact, and efforts will be taken to reduce duplicative collection of information. The subdivision establishes the types of information that may be requested. Subdivision (b) establishes that any party receiving an information order will have at least five (5) days to respond, and requests for additional time will be considered. Subdivision (c) defines new diversions for purposes of their applicability to the proposed section.

9.9 Proposed Emergency Regulation Section 875.9

Section 875.9 describes the potential consequences of failure to comply with a curtailment order issued under this regulation. It is important that the public understand that the State Water Board has enforcement authority to ensure the Emergency Regulation is implemented in accordance with its provisions and can take appropriate enforcement actions for failure to comply with the regulation. It is also important for diverters with multiple rights to understand how to comply with receipt of multiple curtailment orders.

Subdivision (a) addresses a situation in which a diverter receives more than one curtailment order and is subject to more than one set of requirements either under separate curtailment orders or under multiple conditions for approval of petitions for continued diversion. This subdivision clarifies that the diverter is to comply with the most stringent requirements, to the extent of any conflict. Subdivision (b) describes the enforcement mechanisms. Subdivision (c) clarifies that subdivision (b) is explanatory,

rather than limiting. Language in subdivision (b) was updated in light of changes in the penalty amounts associated with curtailment violations, effective January 1, 2025.

10. Watershed Descriptions

10.1 Scott River Watershed Description

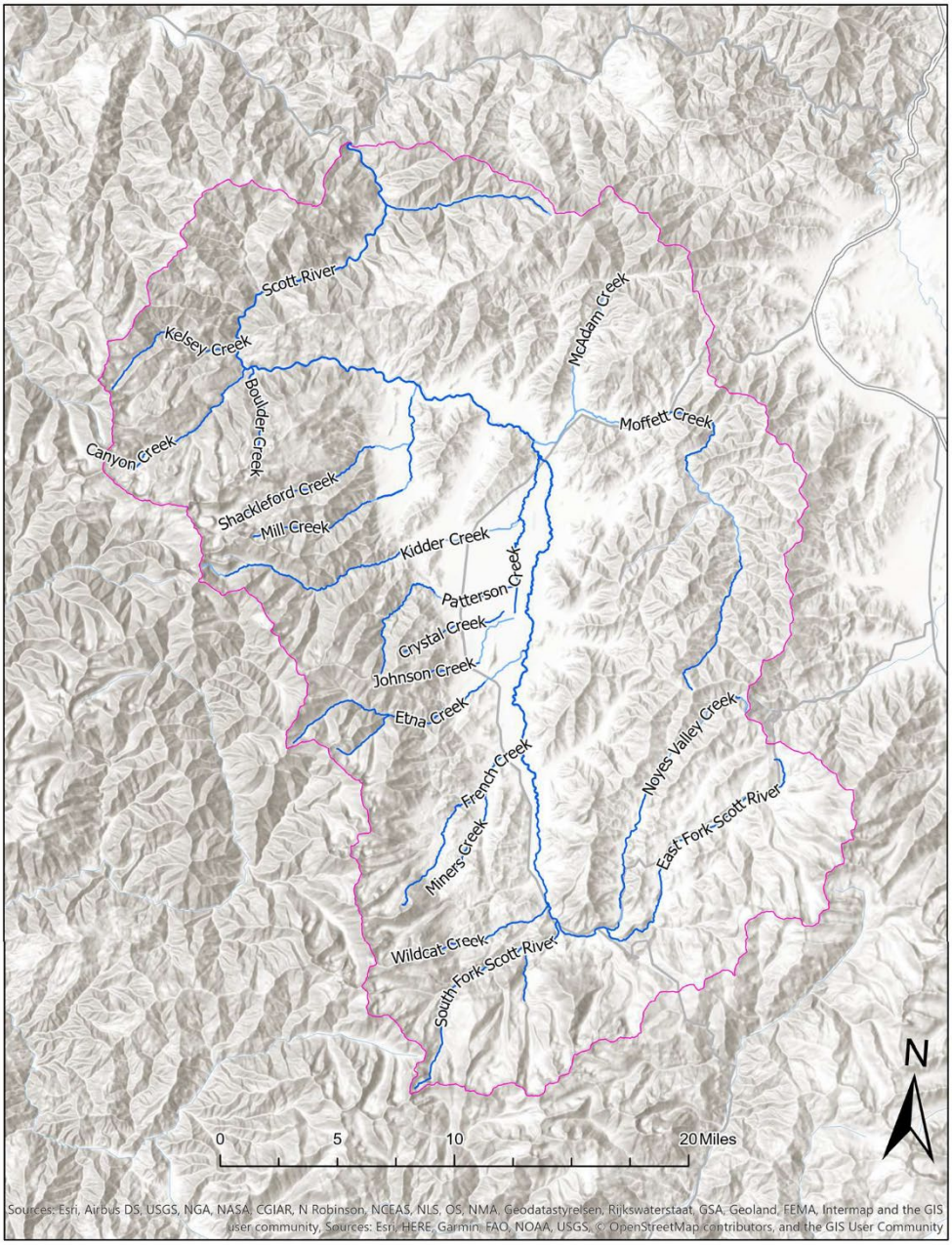

Figure 22. Scott River watershed.

The Scott River watershed (Figure 22) is approximately 813 square miles. The mainstem Scott River can be divided into two major reaches. The Canyon Reach stretches from the confluence of the Scott River and the Klamath River at RM 0 to RM 21 and flows mostly on bedrock, confined in a steep-sided, rocky canyon with a gradient that ranges from 45-55 feet/mile (ft/mi). The Valley Reach stretches from RM 21 to about RM 50 and flows through the relatively flat, open, agricultural valley floor of Scott Valley with a river gradient ranging from 4-8 ft/mi. The upstream end of the Valley Reach is dominated by remnant tailings from past placer gold mining operations, where flow seasonally disconnects in most years. Upstream of the Valley Reach, the East Fork of the Scott River and the South Fork of the Scott River flow from the Scott Mountains and join to form the mainstem Scott River just upstream of the tailings, near the town of Callahan. Elevations in the Scott Valley range from 8,532 feet above mean sea level (msl) at China Mountain at the south end of the Scott Valley down to 2,500 to 3,000 feet above msl at the floor of the Scott Valley. Downstream of Scott Valley, the Scott River joins the Klamath River at 1,600 feet above msl (NCRWQCB, 2005).

Scott Valley hydrology depends largely on precipitation stored as snow at higher elevations in the mountains to the south and west of Scott Valley, where annual total precipitation, including rain fall and snow water equivalent depth, ranges from 60-80 inches (NCRWQCB, 2005). Streams leaving the mountains from the west enter the valley and recharge the high-capacity aquifer of sand and gravel that underlies the valley at a thickness of up to 400 feet. These west-side tributaries (including Shackleford Creek, Kidder Creek, Patterson Creek, French Creek, Miner's Creek, Crystal Creek, Sugar Creek), as well as the East Fork Scott River and the South Fork Scott River provide critical cold-water habitat that facilitates rearing of juvenile salmonids. The Scott River populations of SONCC coho and fall-run Chinook salmon in the Klamath Basin rely on spawning grounds in the Scott River and its tributaries – including French Creek, Miner's Creek, Shackleford Creek, Crystal Creek, Sugar Creek, the South Fork Scott River, and the East Fork Scott River (NMFS, 2014). In particular, Scott River population of coho salmon is considered a core, functionally independent population by NMFS and is important to the overall survival of the species (NMFS, 2014). Functionally independent populations are those with a high likelihood to persist in isolation over a 100-year time scale and are not substantially altered by exchanges of individuals with other populations.

Predominant land use in the Scott Valley includes cow-calf production, alfalfa production, grain production, timber, and forest resources (NCRWQCB, 2005). Surface water is diverted from the Scott River and its tributaries primarily to support agricultural and municipal uses. Groundwater is extracted primarily for domestic and agricultural uses. Surface water rights in the Scott River watershed were adjudicated in three separate adjudications: Shackleford Creek Adjudication (Siskiyou County Superior Court, 1950), French Creek Adjudication (Siskiyou County Superior Court, 1958), and the Scott River Adjudication (Siskiyou County Superior Court, 1980). In addition to surface water rights,

the Scott River Adjudication also included some groundwater rights that are within a geographic boundary defined in the Scott River Adjudication. Water rights in the Scott River Adjudication are divided into 48 sub-schedules, and the Scott River Adjudication lists the relative priorities of the surface water rights in each schedule. Currently, only water rights in French Creek and Wildcat Creek are under Watermaster service. Oro Fino Creek, Sniktaw Creek, and Shackleford Creek were previously under Watermaster service but are no longer watermastered. The rest of the Scott River watershed (including the mainstem Scott River) has never been watermastered. Thirty-seven percent of the watershed is owned by federal resource management agencies (NMFS, 2014).

Surface water and groundwater diversion can result in insufficient flows for adult salmon migration to suitable spawning habitat, particularly during drought years (NMFS, 2014). Insufficient flows can also affect the ability for salmon juveniles to emerge and redistribute into refugial streams that can support their development. Enhancing instream flows and limiting diversions are both identified by NMFS in its recovery strategy as being among the highest priority recovery actions for the Scott River watershed (NMFS, 2014). Various other actions are described in the recovery plan to support increases in instream flow, including but not limited to securing additional Water Code section 1707 instream flow dedications, improving irrigation efficiency, lining and piping ditches, increasing water-mastering service to better manage surface water diversion, studying instream flow needs and establishing instream flow targets, and developing and implementing groundwater recharge plans focused on increasing summer base flow and connectivity. Adequate streamflow during salmon migration periods will support the survival of adult coho and fall-run Chinook salmon by increasing critical passage riffle depth and reducing water temperatures in the Scott River.

10.1.1. Scott River Temperature and Sediment TMDLs Summary

The Scott River watershed has been listed as impaired with relation to sediment since 1992, and impaired with relation to temperature since 1998, pursuant to Section 303(d) of the Clean Water Act (NCRWQCB, 2005). On December 7, 2005, the North Coast Regional Water Board adopted the Action Plan for the Scott River Sediment and Temperature Total Maximum Daily Loads (TMDLs), which were subsequently approved by the United States Environmental Protection Agency (USEPA) on September 8, 2006 (NCRWQCB, 2018). The TMDLs identify the following sensitive beneficial uses impacted by excessive sediment loads and elevated temperatures:

- Cold freshwater habitat;
- Rare, threatened, and endangered species;
- Migration of aquatic organisms; and
- Spawning, reproduction, and/or early development of fish.

In the TMDL for temperature, five factors were identified that have affected or have the potential to affect stream temperatures. These factors include:

1. Stream shade,
2. Stream flow via changes in groundwater accretion,
3. Stream flow via changes in diversion,
4. Channel geometry, and
5. Microclimate.

According to the TMDL, groundwater accretion affects temperature by both directly supplying cold water instream and by changing flow volume and transit time. Extraction of groundwater can reduce these accretions by lowering the water table relative to stream bed elevation and reducing the amount of surface water gained instream through groundwater-surface water interactions. Similarly, surface diversions of tributary stream flow can lead to adverse temperature conditions that impact beneficial uses when the diverted volume is large relative to total tributary stream flow. Many of these smaller tributaries with surface diversions host high densities of spawning coho and Chinook Salmon (NMFS, 2014). The remaining factors relate to physical, non-flow processes that impact temperature conditions.

10.1.2. Interconnected Groundwater and Surface Water

In the Scott River watershed, surface water and groundwater are strongly connected. As noted above, closely connected surface and groundwater are managed under the "common source" doctrine. The Scott Valley Groundwater Sustainability Plan (GSP) simplifies the watershed's geology into two major geologic components, alluvial deposits in the valley that comprise the aquifer and the underlying impermeable or semipermeable bedrock. The aquifer is recharged by infiltration from the Scott River and its tributaries, snowmelt, precipitation, and water used for irrigation. Recharge affects the groundwater levels, which determine if sections of the Scott River and its tributaries are gaining or losing streams (Siskiyou County, 2022a). The Scott Valley GSP (Siskiyou County, 2022a) acknowledges the watershed's interconnectedness of surface water and groundwater, stating:

> *because the water table in many parts of Scott Valley can be relatively shallow, the Scott River surface water network contains many miles of stream channel that are connected to groundwater. The direction of flow exchange (i.e., gaining vs losing stream reaches) varies over both space and time, and simulated rates of stream leakage or groundwater accretion to tributaries and the Scott River can vary by orders of magnitude …*
>
> *The Scott River and its major tributaries…are therefore all considered part of a single interconnected surface water system in the basin. The interconnected surface water system supports significant fish habitat and riparian vegetation.*

The interconnectedness of surface water and groundwater in the Scott River watershed has also been legally recognized. For example, Water Code section 2500.5, subdivision (b), which defines groundwater as part of the Scott River stream system:

> *The Legislature finds and declares that by reasons of the geology and hydrology of the Scott River, it is necessary to include interconnected ground waters in any determination of the rights to the water of the Scott River as a foundation for a fair and effective judgment of such rights, and that it is necessary that the provisions of this section apply to the Scott River.*

Other reports that indicate interconnectedness of surface water and groundwater in the Scott River watershed include but are not limited to: Foglia et al. (2013a), Foglia et al. (2013b), Foglia et al. (2018), Harter (2021a), Kouba (2021), and Tolley et al. (2019).

10.2 Shasta River Watershed Description

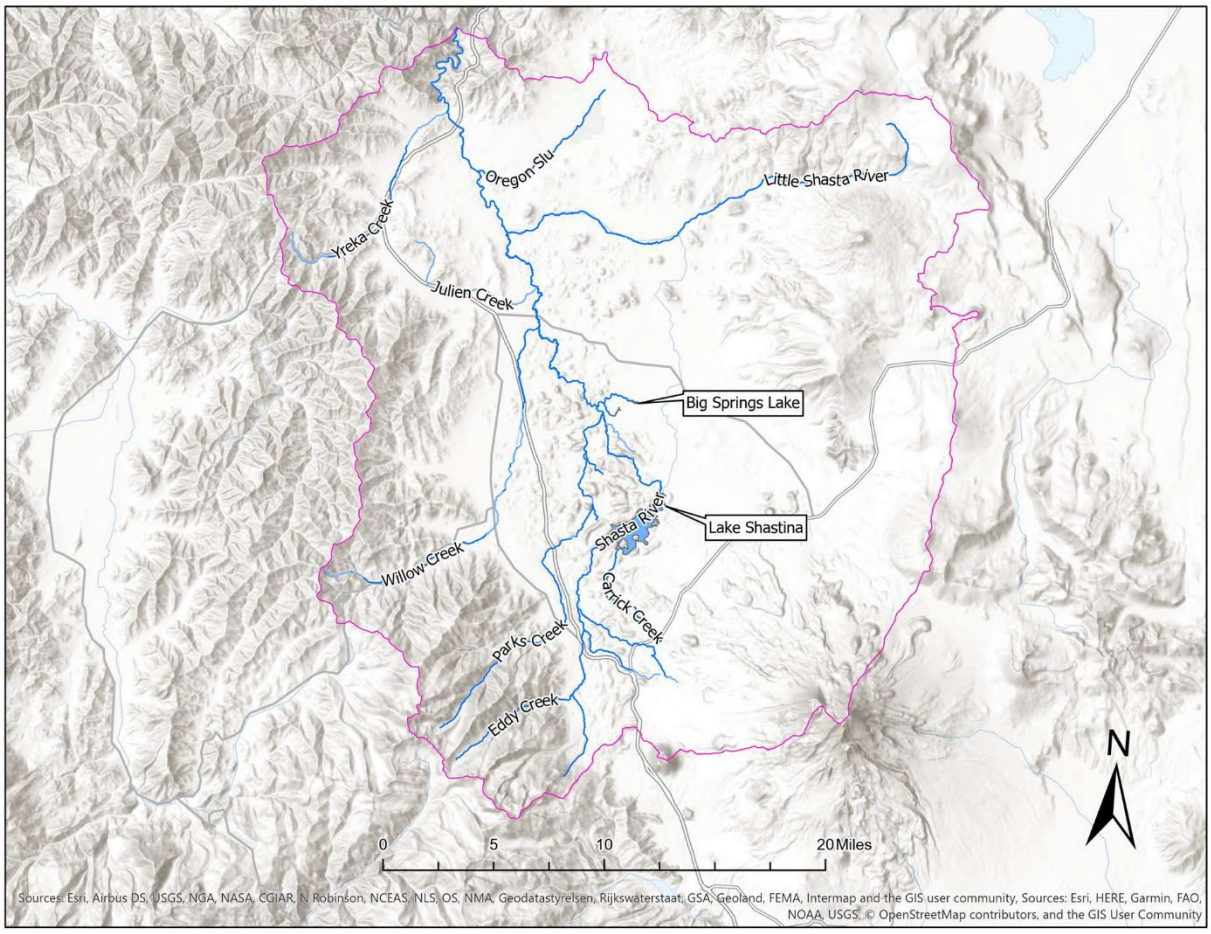

Figure 23. Shasta River watershed.

The Shasta River watershed (Figure 23) spans approximately 795 square miles. The Shasta River begins on the north slope of Mt. Eddy in the southwestern part of the watershed and flows mostly northward until meeting the Klamath River. The Shasta River has a canyon reach that ends at the confluence of the Shasta River and Klamath River. The canyon reach extends seven miles upstream from the confluence, with an average gradient around 52 ft/mi. Legacy impacts from historic mining operations in the canyon reach continue to negatively impact habitat quality in the canyon reach (NMFS, 2014). Upstream of the canyon reach, the Shasta River flows northward for 33 miles through the low-gradient Shasta Valley, a groundwater basin comprised of alluvial and volcanic aquifers (NCRWQCB, 2006; Siskiyou County, 2022b). At RM 40.6, Dwinnell Dam impounds the Shasta River, forming Lake Shastina. The lower Shasta River is an approximately 40-mile reach of the river that begins below Dwinnell Dam and ends at the confluence with the Klamath River. Major tributaries to the Shasta River are Parks Creek (RM 35), Big Springs Creek (RM 34), Willow Creek (RM 26), Little Shasta River (RM 16), and Yreka Creek (RM 8) (USFWS, 2013; SWRCB, 2018). The Shasta Valley contains hillocks that were deposited during a massive avalanche and debris flow over 300,000 years ago (NCRWQCB, 2006). Mountains surround the Shasta Valley on four sides, with the Klamath Range on the west, the Siskiyou Range to the north, the Cascade Range to the east, and Mt. Shasta and Mt. Eddy to the south. Elevations in the Shasta River watershed vary from 14,200 feet above msl at the summit of Mt. Shasta to 2,020 feet above msl at the confluence of the Shasta River with the Klamath River (NCRWQCB, 2006).

The Shasta River watershed is predominantly a low rainfall, high desert environment characterized by cool winters and hot dry summers (SWRCB, 2018). The Shasta Valley is in the rain shadow of the Klamath Mountains and receives little precipitation, about 12-18 inches per year (NMFS, 2014). Shasta Valley hydrology depends on surface flow from precipitation-driven streams in the southwest, south, and east areas of the watershed and significant cold-water springs in the central Shasta Valley (NCRWQCB, 2006; SWRCB, 2018). Annual mean precipitation in the watershed ranges widely from 8 to 125 inches, though average precipitation in the mountains can range from 45 or 85 inches to 125 inches (NCRWQCB, 2006; PRISM Climate Group, 2024; SWRCB, 2018). Precipitation falling below 5,000 feet is usually rain, while snow usually accumulates above this elevation. Most precipitation falls between October and March, providing rainfall runoff or snowmelt to streams in the western and southwestern headwater tributaries to the Shasta River. Due to the watershed's volcanic geology, precipitation that falls in the watershed's volcanic uplands infiltrates and enters the Shasta Valley's volcanic aquifers (SWRCB, 2018). In the southern and eastern watershed, groundwater springs emanating from volcanic aquifers provide continuous discharge to the Shasta River and its tributaries (NMFS, 2014).

Development of water resources in the Shasta River watershed has led to changes in the hydrologic behavior of the river (Jeffres et al., 2010), and to reductions in the quantity and quality of cold-water habitats available to rearing coho salmon throughout the Shasta River watershed (Willis et al., 2013; Stenhouse et al., 2012; SWRCB, 2018). In its recovery plan for coho salmon, NMFS ranks impaired water quality and altered hydrologic function as 'very high' key limiting stresses to juvenile coho salmon and ranks agricultural practices and dams/diversions as 'very high' key limiting threats (NMFS, 2014; SWRCB, 2018). Excess tailwater from flood irrigation can discharge hot water into the Shasta River and tributaries (NCRWQCB, 2006; Aqua Terra Consulting, 2011; SWRCB, 2018).

Surface water diversions in the Shasta watershed are subject to a statutory adjudication that resulted in a judgment and decree approved by the Superior Court of the State of California in Siskiyou County in 1932 (*In the Matter of the Determination of the Relative Rights Based on Prior Appropriation, of the Various Claimants to the Use of the Water of the Shasta River and its Tributaries in Siskiyou County, California*, Case No. 7035) (Siskiyou County Superior Court, 1932). The court recognized that the water supply of the stream system is inadequate for all agricultural needs throughout the irrigation system. When the watershed was adjudicated, there were approximately 40,000 acres of irrigated agriculture. Today, there are over 50,000 acres of irrigated agriculture, presumably from additional diversions under riparian rights and groundwater pumping, which are not subject to the Shasta River Adjudication. The Shasta River Adjudication contains no requirements for the protection of instream beneficial uses (Siskiyou County Superior Court, 1932; SWRCB, 2018).

The Shasta River watershed includes numerous dams, wells, and diversions from the Shasta River and its major tributaries. Water use in the watershed consists principally of agricultural supply for crop irrigation and livestock watering, but municipal, industrial, fish and wildlife also play substantial roles in the overall water resources development and use (Willis 2013; SWRCB, 2018). Agricultural water demands are met with direct diversion of surface water from the Shasta River and its tributaries, diversion of surface water stored in Lake Shastina and other reservoirs, pumping from groundwater, and re-use of applied irrigation water (Willis et al., 2013). Four irrigation districts make up the primary water rights holders in the watershed, with approximate irrigation season diversions totaling 227 cfs (USFWS, 2013; SWRCB, 2018). Primary municipal water users in the watershed include the communities of Yreka, Montague, and Weed, along with several small hamlets with populations of less than 100 (SWRCB, 2018).

The Shasta Valley is a 217,980-acre groundwater basin comprised of alluvial deposits and volcanic rock aquifers. The Shasta Valley's aquifers are the watershed's primary source of groundwater. The volcanic aquifers are comprised of lava flows from the High Cascades and Western Cascades volcanic series. The lava flows exhibit an internal complexity originating from how the lava flows erupted, flowed, and solidified. Some

groundwater wells tap productive lava tubes, underground voids that once insulated and channelized flowing lava and now feature flowing water. Other groundwater wells tap pockets of water and sediment that fill cracks or crevices in the lava rock (Mack, 1960; Siskiyou County, 2022b). In the southeastern Shasta Valley, near Big Springs, groundwater pumping from the Pluto's Cave basalt, a volcanic formation in the High Cascades volcanic series, produces water for irrigation, stock, and domestic uses. In the eastern Shasta Valley, groundwater pumping from lava flows of the Western Cascades volcanic series, supply water for irrigation, livestock, and domestic uses (Mack, 1960; Siskiyou County, 2022b).

In the southern and central parts of the Shasta Valley, numerous productive groundwater springs emerge from the highly permeable basalt flows of the High Cascades volcanic series, especially the Pluto's Cave basalt. In the spring, once snowmelt and rainfall precipitation end for the season, groundwater springs become the primary source of baseflow to the Shasta River and its tributaries for the remainder of the spring, summer, and fall (Nichols, 2008; Nichols et al., 2010; Jeffres et al., 2008).

During dry seasons, groundwater springs in the Big Springs Complex provide an estimated 95 percent of baseflow to the lower Shasta River via the Big Springs Creek tributary (Nichols et al., 2010). Jeffres et al. (2009) reported that during the irrigation season, irrigation diversions and groundwater pumping reduce baseflows in Big Springs Creek by 35 percent. Following the end of the irrigation season, baseflows in Big Springs Creek rapidly rebound (Nichols et al., 2010). Another study found that during April 1 to April 12, 2008, streamflow at the Shasta River gage near Montague (USGS gage no. 1151700) decreased by approximately 70 percent, from 143 cfs to 43 cfs. The authors concluded that the onset of surface water diversions and groundwater pumping for irrigation caused the swift and significant reduction of groundwater-fed baseflows throughout the Shasta River basin (Nichols et al., 2010).

10.2.1 Shasta River Temperature TMDL Summary

Elevated water temperatures and low dissolved oxygen levels in the Shasta River watershed have impaired designated beneficial uses of water and the non-attainment of water quality objectives, primarily associated with cold-water fish. Impaired beneficial uses include the migration, spawning, and early development of cold-water fish such as coho salmon, coho salmon and Chinook Salmon (O. tshawytscha). The Shasta River watershed was listed as impaired with relation to organic enrichment and low dissolved oxygen in 1992 and temperature in 1994, pursuant to Section 303(d) of the Clean Water Act (NCRWQCB, 2006). In 2005, the North Coast Regional Water Board adopted the Action Plan for the Shasta River Dissolved Oxygen and Temperature TMDL, which was subsequently approved by USEPA in 2006. Water quality modeling conducted during development of the Shasta River TMDL found depletion of streamflow to be a primary cause of high summer water temperatures in the Shasta River and its tributaries

(NCRWQCB, 2006). NCRWQCB (2006) relied on the Tennessee Valley Authority's River Modeling System (RMS) as its primary analytical tool to develop the temperature TMDL. The RMS depicts inflows from Big Springs Creek, Parks Creek, and Yreka Creek to the Shasta River as discrete inputs. The compliance scenario modeled by the RMS relied on modifying the boundary conditions associated with inputs from Parks Creek and Big Springs Creek to account for reductions in stream temperature that could occur based on increased shade. In addition to shade, the RMS was used to analyze six different flow scenarios by systematically increasing flow by 50 percent at six locations in the Shasta River: Dwinnell Dam, downstream of Big Springs Creek, Grenada Irrigation District, Highway A12, Montague-Grenada Road, and Anderson Grade Road. The temperature assigned to the increased flow was equal to the baseline temperatures at the corresponding river location. These flow increases were modeled using observed atmospheric conditions between August 29, 2002, and September 4, 2002. Compliance points were set at three locations in the Shasta River where juvenile salmon rearing was known to occur: Highway A-12 (RM 24.1), Montague-Grenada Road (RM 15.5), and an area known as Salmon Heaven in the Shasta River Canyon (RM 5.6). The modelling effort resulted in the following conclusions:

- Maximum stream temperatures are reduced from baseline condition at all locations downstream of where the flow increases were applied for all six modelled scenarios.
- The largest reduction in maximum stream temperature is associated with a 50 percent flow increase downstream of the Big Springs Creek confluence.
- The temperature of water (e.g. warm tailwater compared to cold spring water) associated with the 50 percent flow increase greatly influences the stream temperature results.
- The Big Springs Creek 50 percent flow increase simulation resulted in maximum stream temperature reductions of approximately 1°C to 2°C, with the largest reduction of 2.2°C at Yreka Agar Road (RM 10.9). At RM 5.6, an important location for summer rearing, the maximum stream temperature is reduced by approximately 1.8°C from baseline. The Big Springs Creek 50 percent flow increase simulation resulted in minimum stream temperature increases of approximately 0.2°C to 2°C. The 50 percent flow increase downstream of the Big Springs Creek confluence is attributed to a 45 cfs increase in flow from the Big Springs Creek Complex, resulting in a total flow of 112 cfs from Big Springs Creek. This total flow is within estimates of pre- diversion flow from the Big Springs complex. As such, the temperature TMDL recommends an additional 45 cfs of cool water to improve water temperature conditions (NCRWQCB, 2006; SWRCB, 2018).

In total, the water quality compliance scenario in the temperature TMDL includes the following:

- Increased riparian shade according to modeled site potential riparian conditions.
- Modified temperature regime of irrigation tailwater return flows such that the return flows do not cause heating of the receiving waters.
- Big Springs Creek temperatures reduced by 4°C from baseline.
- Parks Creek temperatures reduced by 2°C from baseline.
- 50 percent increase in Shasta River flows downstream of the Big Springs Creek confluence, which is an increase of 45 cfs of cold water and provides for a total flow of approximately 112 cfs from Big Springs Creek.

10.2.2 Interconnected Groundwater and Surface Water

In the Shasta River watershed, surface water and groundwater are strongly connected. As noted above, closely connected surface and groundwater are managed under the "common source" doctrine.

The Shasta Valley aquifer is a hydro-geologically complex system of alluvial and volcanic formations. Volcanic aquifer formations include lava tubes, porous volcanic deposits, and sediment-filled pockets within the volcanic deposits. The juxtaposition of these differing aquifer formations creates preferential pathways for groundwater discharge. In Shasta Valley, the Pluto Cave Basalt formation occupies the eastern part of the Shasta Valley from Dwinnell reservoir to Rabbit Hill (Montague Irrigation District, 1963). Springs occur where groundwater discharges to the surface rather than into less- conductive aquifer materials or where head levels are close to or exceed the ground level (Siskiyou County, 2022b).

In the southern and central parts of the Shasta Valley, numerous productive groundwater springs emerge from the highly permeable basalt flows of the High Cascades volcanic series, especially the Pluto's Cave basalt. The most notable of these is Big Springs Complex (Montague Irrigation District, 1963). Multiple studies have shown that in the spring, once snowmelt and rainfall precipitation end for the season, groundwater springs become the primary source of baseflow to the Shasta River and its tributaries for the remainder of the spring, summer, and fall (e.g., Nichols, 2008; Nichols et al., 2010; Jeffres et al., 2008).

The Shasta Valley GSP acknowledges interconnectedness of surface and groundwater in the watershed (Siskiyou County, 2022b), stating:

> *The link between surface water and groundwater is based on historic reports (Mack 1960) as well as continued summer baseflow within the Shasta River. Because the water table in many parts of the basin can be relatively shallow, the Shasta River contains many miles of stream channel that are connected to groundwater. The Shasta River and its major tributaries are all considered part of the [interconnected surface water] system in the Basin…*

> *With respect to the functional flows of the Shasta River, depletion of surface water due to groundwater pumping affects the timing of the late spring recess, the amount of summer baseflow, and the onset of the fall flush flow.*

The historic report referred to in the Shasta Valley GSP (Siskiyou County, 2022a) is the USGS Water-Supply Paper 1484 (Mack, 1960). Mack (1960) concluded groundwater discharge in Shasta Valley occurs principally by seepage into streams, including discharge from springs, stating:

> *Little Shasta River and other streams along the east side of Shasta Valley derive most of their flow from springs and seeps issuing from the volcanic rocks of the high Cascades…From about Weed northward the [groundwater level] contours intersect the channels of the major streams, indicating that ground-water discharge supplements the surface-water flow in the Shasta River system…In Little Shasta Valley the water table locally intersects the land surface and ponds and meadows occupy the depressions.*

Mack (1960) estimated groundwater discharge into streams within the from Shasta Valley for WY 1953. Included in these estimates were 70,000 acre-feet discharged into the Shasta River plus 30,000 acre-feet discharged from Big Springs.

Multiple recent analyses based on geologic conceptual interpretation, scientific literature, modeling studies, and data analysis exist on the hydrologic connectivity between groundwater and surface water in the Big Springs area of Shasta Valley (e.g., Bedekar, 2022a; Bedekar, 2022b; Scott, 2022a; Scott, 2022b; Worth, 2022a; Worth, 2022b; Worth 2022c).

Since groundwater is interconnected with surface water, groundwater pumping impacts the quality and quantity of surface water. For example, Scott (2022) demonstrated a strong correlation between the cessation of groundwater pumping in the Big Springs area and water quality at Big Springs Lake, including increase in depth measured at the monitoring station Big Springs West (BSW), decrease in temperature measured at the monitoring station Big Springs East (BSE), and the decrease in pH reading measured at BSW. Figure 24 shows the Big Springs West (BSW) stage height and the number of Big Springs Irrigation District (BSID) pumps actively pumping. Figure 25 demonstrates a similar correlation between Big Springs Creek flow and BSID pump status.

Other reports that indicate interconnectedness of surface water and groundwater in the Shasta Watershed include but are not limited to Buck (2013), SWRCB (2018), Watercourse Engineering (2007), and Willis et al. (2013).

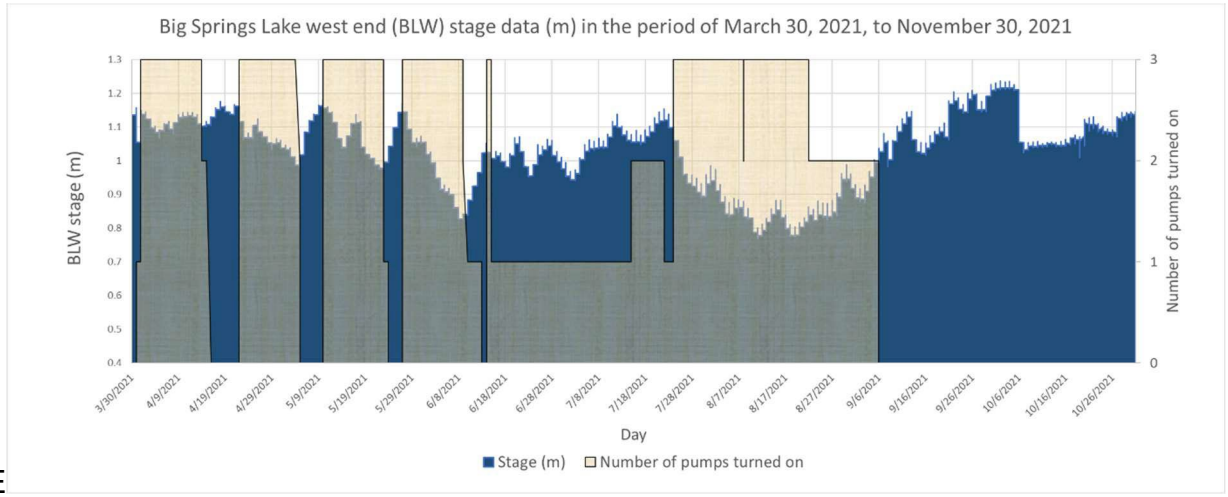

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Figure 24. Big Springs Lake west with Big Springs Irrigation District pumping information for 2021. Big Springs Lake west end = BLW. Source: Scott (2022b).

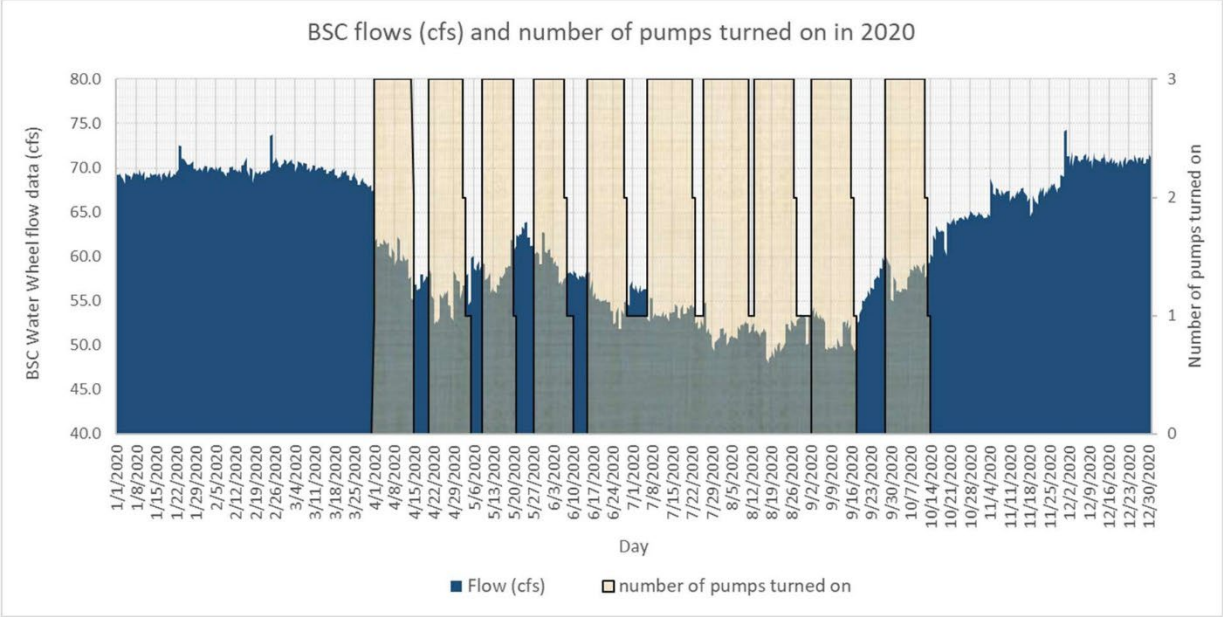

Figure 25: Big Springs Creek flow with Big Springs Irrigation District pumping information for 2020. Big Springs Lake west end = BLW. Source: Worth (2022b).

11. Supporting Technical and Cost Information Related to Limitation on Inefficient Livestock Watering

What follows is a brief description of livestock watering, ditch losses, and factors that cause ranchers to divert much more water than livestock can drink. Irrigation generally ceases in the Scott and Shasta watersheds by October, although specific dates vary

depending on weather, water source, crop type, water right, and business practices. When irrigation ceases for the growing season, some ranchers continue to divert surface water to provide water for livestock. When the surface water is conveyed using gravity-fed earthen ditches, ranchers divert much more water than their livestock can drink due to seepage, freezing (more water in the ditch helps prevent the water from freezing), and to ensure hydraulic function of the ditch. State Water Board staff estimates that at ranches with the largest livestock diversions, less than one percent of the water diverted is ultimately consumed by livestock, as described below. In the Scott River and Shasta River watershed, livestock watering is the largest source of surface water demand during the winter months as the irrigation season and practices are not active. State Water Board staff analyzed the Reports of Water Diversion and Use of the eight largest November 2020 diversions in the Scott River watershed. It is assumed that these November diversions are solely for the purpose of livestock watering, as they occur outside the irrigation season. These eight diversions reported that approximately 758 acre-feet of water was diverted for livestock watering for 3,100 to 4,100 cows. Using a 15 gallon per day per cow estimate[5], cows drank approximately 5.7 acre-feet of the 758 acre-feet of water diverted in November 2020. This equates to 0.75% of the water diverted being consumed by livestock. These diversions occurred when water was not broadly available in the Scott River and when coho salmon were unable to access spawning grounds due to insufficient flow. Based on diversion data received from the major surface water diverters in the Scott River, along with a margin for unreported diversions, and combined with information from the Scott River and Shasta River Watermaster regarding the monthly diversions for French Creek, Wildcat Creek, and Miners Creek (which report to the Watermaster and not the State Water Board), livestock water diversion in the Scott River watershed is estimated to peak at up to 45 cfs when water is available to meet the demand. Monthly average surface-water demands in the September through March period of dry years with no emergency regulation, which are assumed to be primarily for stockwatering in the Scott River watershed, range from 12 to 44 cfs. (See Table B of Attachment 1.) Less data is available on livestock watering diversions in the Shasta Watershed because most large diversions in the Shasta River watershed are under Watermaster service and are reported less frequently than diversions outside Watermaster jurisdiction. However, since the implementation of the emergency regulations, State Water Board staff have regularly coordinated with the Watermaster to monitor flows in real-time and ensure that minimum flow requirements are met. The conveyance systems and livestock watering practices in the Shasta Watershed

[5] The 15 gallons per day estimate is the amount of diversion that is considered reasonable for a head of beef cattle per Title 23, Article 5, section 697 of the California Code of Regulations. This is largely consistent with recommended watering amounts by UC Davis School of Veterinary Medicine (Stull et al., 2012) and North Dakota State University Extension livestock and veterinary specialists (Meehan et al., 2021).

are similar to the practices in the Scott Watershed, so it is expected that losses due to inefficient livestock watering are similar.

A 1975 Division of Water Rights study measured irrigation ditch losses in 66 different ditches in the Scott Valley. Losses varied from 6 percent to 97 percent (generally smaller ditches had the largest percentage of losses), while the median and mean ditch losses were 52 percent and 50 percent. Figure 26 shows the distribution of these losses (SWRCB, 1974).

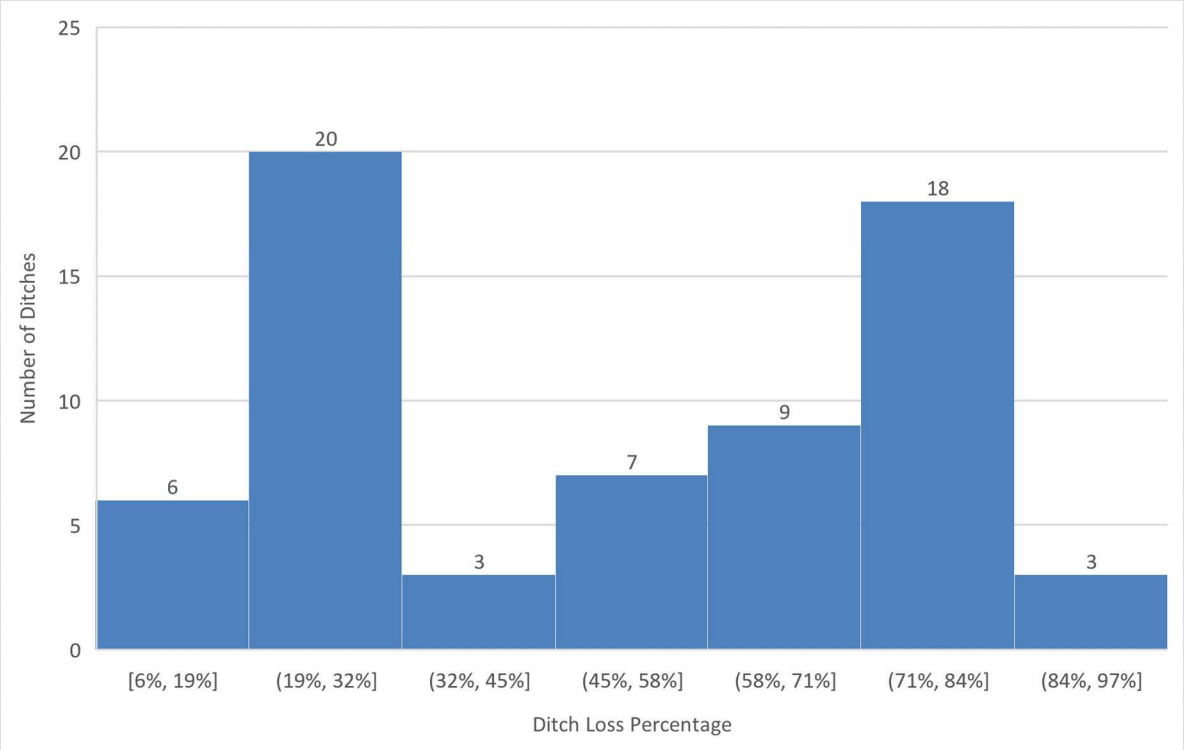

Figure 26. Scott River watershed ditch losses.

While ditch losses can be immense, some ranchers choose to divert surface water because it avoids energy costs required to pump the water from a well, the water is always available to the livestock, and flowing water typically does not freeze.

For properties issued curtailments or when the operation of an inefficient ditch is prohibited under the Proposed Emergency Regulation, there are several alternatives available. Permanent troughs can be installed that are connected to small solar powered wells that continuously maintain water levels in the trough. These types of solutions can cost $20,000 to $40,000 (NMFS, 2021b).

For properties that do not have or do not wish to install permanent troughs, aluminum or plastic troughs can be purchased for $400-$600 (Tractor Supply Company, 2024). If a property has a well on site, then the well can be used to source water to fill the troughs.

Additional costs may occur due to purchasing conduits to convey water from the well to the troughs or portable tanks that can help transport the water to the troughs. With this type of setup, the rancher would need to check on the troughs at least daily to fill and or ensure that the troughs have water in them and that the water surface is not frozen. When ice forms, the rancher would need to break up the ice or install a heating element. If a property has multiple pastures with cattle on them, each pasture would need access to troughs.

There are a large number of wells in the area, and reliance on groundwater for some water uses is common. For properties that do not have access to wells or cannot divert from surface water in reasonable quantities, water may need to be purchased and delivered. Water hauling costs are estimated to be $200 per delivery (ABC 30 Action News, 2014) (CNBC, 2015). A delivery could be between 3500-5000 gallons of water (CNBC, 2015). The frequency, number, and duration of deliveries required depends on the number of livestock that must be watered. A property with 100 cattle may require 34 deliveries (assuming a 4,000-gallon capacity water truck) over a three-month period. The cost of these deliveries could amount to $6,750.

The Proposed Emergency Regulation finds that it is unreasonable to divert water for livestock at loss rates of greater than 10 times the amount needed for livestock unless the fish-related conditions discussed in Section 9.7 are met. Diversions of greater than an order of magnitude more than the presumptively reasonable amount set forth in California Code of Regulations, title 23, section 697 are unreasonable because: the fishery need for the additional flow is high in this drought emergency; and more efficient alternatives are available and commonly used in the area. The availability of grant funding provides additional support for the unreasonableness finding of the Proposed Emergency Regulation and associated limitation on inefficient livestock watering practices.

The Proposed Emergency Regulation includes California Code of Regulations, title 23, section 875.7, which generally provides that, in the months of September through March, diversions in the Scott River and Shasta River watersheds for livestock watering must meet a threshold of efficiency for reasonable uses under Article X, Section 2 of the California Constitution.

12. Informative Digest

This section provides additional information required under Government Code, section 11346.5, subdivision (a)(3). For the policy statement normally included in this section, please see the above section **Policy Overview and Effect of Proposed Emergency Regulation.**

12.1 Summary of Existing Laws and Regulations

A general description of the following is set forth above, in Water Rights Framework: existing law governing water rights, the water right priority system, and the constitutional prohibition against the waste, unreasonable diversion, unreasonable method of diversion, or unreasonable use of water. More specifically regarding water rights in the Scott and Shasta River watersheds, both of these watersheds are adjudicated, meaning that a court has issued a far-reaching decree establishing the rights of various claimants to water in the watershed. These adjudications are the: Shasta River Adjudication[6], Shackleford Adjudication[7], French Creek Adjudication[8], and the Scott River Adjudication.[9] These adjudications form the backbone of understanding the water rights in each watershed—including information on the priorities, uses, points of diversions, seasons of diversion, places of use, and water rights holders.

However, none of the adjudications address all water use in the Scott and Shasta watersheds. The Shasta Adjudication does not address riparian diverters or groundwater use (Siskiyou County Superior Court, 1932). The Shackleford and French Creek Adjudications do not address groundwater, and the Scott River Adjudication addresses groundwater diversions only in part (Siskiyou County Superior Court, 1950, 1952, 1980). None of these adjudications set forth the reasonable flow minimums necessary to protect the critical needs of SONCC coho, KMP steelhead, and fall-run Chinook salmon in a drought emergency or establishes the mechanism to curtail diversions when such flows are not being met. The Shasta, Shackleford and French Creek adjudications do not assign any instream flow determinations. The Scott River Adjudication does determine that the United States Forest Service holds certain instream flow rights for fisheries protection purposes, including flows in the mainstem reach near the USGS Scott River gage near Fort Jones (USGS gage no. 11519500) that are very close to the emergency instream flows set forth in the Emergency Regulation. However, the Scott River

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[6] The Judgement and Decree entered on December 29, 1932 in Siskiyou County Superior Court Case No. 7035, *In the Matter of the Determination of the Relative Rights, Based Upon Prior Appropriation, of the Various Claimants to the Waters of Shasta River and its Tributaries in Siskiyou County, California*, and all supplements thereto (Siskiyou County Superior Court, 1932).

[7] The Decree entered on April 3, 1950 in Siskiyou County Superior Court Case No. 13775. *In the Matter of the Determination of the Rights of the Various Claimants to the Waters of Shackleford Creek and its Tributaries in Siskiyou County, California, and all supplements thereto*. Shackleford Creek is a tributary to the Scott River (Siskiyou County Superior Court, 1950).

[8] The Judgement entered on July 1, 1959 in Siskiyou County Superior Court Case No. 14478, *Mason v. Bemrod*, and all supplements thereto. French Creek is a tributary to the Scott River (Siskiyou County Superior Court, 1959).

[9] The Decree entered on January 30, 1980 in Siskiyou County Superior Court Case No. 30662, *In the Matter of Determination of the Rights of the Various Claimants to the Waters of Scott River Stream System, Except Rights to Water of Shackleford Creek, French Creek, and all Streams Tributary to Scott River Downstream from the U.S. Geological Survey Gaging Station, in Siskiyou County, California*, and all supplements thereto (Siskiyou County Superior Court, 1980).

Adjudication specifically notes that it does not make reasonable determinations regarding the instream flows or other allocations.

Further, because it sets forth tributary, upstream mainstem and groundwater diversion schedules as generally as independent from lower mainstem flows, the Scott River Adjudication does not establish a legal mechanism from which to address diversions that unreasonably interfere with these lower mainstem minimum flows. While adjudicated water users in the Shasta River watershed and French Creek and Wildcat Creek have enrolled in Watermaster services, many adjudicated areas elected to not engage in Watermaster services. Also, Watermaster services are not available for unadjudicated areas. Thus, there is not an existing entity with the authority to effectively manage all diversions in this extreme drought in the Scott and Shasta watersheds.

Under existing law, the State Water Board has several types of enforcement authority. However, absent the drought emergency regulation, none are both sufficiently efficient and sufficiently serious enough to deter diversions that would interfere with fish flows. The State Water Board may take enforcement action to prevent unauthorized diversions of water under Water Code section 1052. Diverting water when it is unavailable under a water right holder's priority of right constitutes an unauthorized diversion and a trespass against the state. Violations are subject to an Administrative Civil Liability (ACL) under the Water Code. (Wat. Code, § 1052.) An ACL order for an unauthorized diversion may impose liability of up to $1,000 a day, plus $2,500 per acre foot of water that is illegally diverted for violations during specified drought periods. (Water Code, § 1052.)

The State Water Board may also issue fines of up to $1,000/day for violations of the terms and conditions of water right permits, licenses, certificates and registrations. (Water Code, § 1846.)

Under existing law, administrative cease and desist orders and court injunctions may also be issued to require that diversions stop. (Wat. Code, § 1831.) For the State Water Board to require cessation of diversions of water when it is unavailable under a water right holder's priority of right, each diversion may be investigated and charged, generally on the basis of a complaint, and water right holders may request a full evidentiary hearing on issues that include availability of water under the water right holder's priority. Violations of a cease and desist order have much higher penalties in specified drought years (up to $10,000/day). However, this process is not well suited to drought management, as it does not afford interim relief, and an enforcement hearing would extend past any single irrigation season.

On the other hand, violation of a curtailment order issued under the drought emergency regulations allows for direct enforcement penalties of up to $10,000/day plus $2,500/acre-foot of water, allowing for more timely enforcement and providing a clearer compliance incentive. (Water Code, § 1846, subd. (b).) Violation of a drought regulation is

additionally directly subject to an additional $500/day fine. (Water Code, § 1058.5, subd. (d).)

Under existing law, the State Water Board also may initiate adjudicative proceedings to prevent the waste or unreasonable use of water. (Wat. Code, § 275.) The State Water Board lacks authority, however, to take efficient adjudicative enforcement action against the waste or unreasonable use of water. The State Water Board must first determine whether a given diversion or use is unreasonable, either in a State Water Board order or decision, and direct the diverter or user to cease the unreasonable diversion or use. The State Water Board may then issue a cease and desist order to enforce the order or decision. (Wat. Code, § 1831, subd. (d)(3).) If the cease and desist order is violated, the State Water Board may impose an ACL. (Wat. Code, § 1845, subd. (b)(1).) This process is also not well suited to drought management, as it does not afford interim relief, and an enforcement hearing would extend past any single irrigation season. In the event that the State Water Board has adopted a regulation defining the unreasonable use, the State Water Board may issue a cease and desist order and/or simultaneously impose an ACL in response to violations of the regulation. (Wat. Code, §§ 1831, sub. (d)(4); 1846, subd. (a)(2).) There is no such permanent regulation addressing reasonable use in these watersheds, and only emergency regulatory action would be timely enough to address the current irrigation year.

Current law provides for measurement and periodic reporting, as well as the ability for the Deputy Director to require increased reporting when there is as risk of shortage. However, with limited exceptions not applicable in the Scott and Shasta watersheds, these requirements are for surface water diversions, which are insufficient in these watersheds in which groundwater and surface water are closely interconnected. Additionally, watermastered diversions, which constitute a significant percent of water use in these watersheds, are largely exempt from the measurement and reporting requirements.

Water Code section 106.3, establishes a human right to sufficient, affordable water to meet basic needs for human consumption and sanitation. Penal Code, section 597 establishes a requirement for livestock owners to provide sufficient water for their animals. Neither of these statutes articulates a specific amount of water for meeting these needs. However, California Code of Regulations, section 697, sets forth general reasonable quantities for a range of water uses in the state, for the purposes of assisting the public in determining how much water is reasonable to seek in a water right application. The uses described include for various domestic uses, and livestock watering.

12.1.1 Comparable Federal Statutes and Regulations

There is no comparable federal statute or regulation. The proposed Emergency Regulation is not inconsistent or incompatible with existing state regulations.

12.2 Data and Methodology for Issuing, Suspending and Rescinding Curtailments

The following subsections describe the data that may be used to support the issuance of curtailment orders pursuant to sections 875 of the regulation and for the suspension, reinstatement, or rescission of curtailment orders.

12.2.1 Summary of Water Supply Information

The proposed Emergency Regulation establishes the proposed emergency minimum flows as requirements at the USGS Scott River gage near Fort Jones (USGS gage no. 11519500) and the USGS Shasta River gage near Yreka (USGS gage no. 11517500). These gages will be used to determine compliance with the proposed emergency minimum flows except as otherwise specified in the proposed Emergency Regulation.

When issuing curtailments, other water supply information may be considered. Knowing whether or not water is physically available for specific diversions helps inform how deep in the water rights priority system curtailments must be made to achieve the proposed drought emergency minimum flows at the gages. Understanding when and where there is water available, or not, for specific diversions can be informed by using multiple sources of available information as listed below. Uncertainty regarding supply, demand, and groundwater losses may also support issuing and rescinding curtailments as an iterative process. For example, curtailments can be issued to diverters in a more junior grouping of water right priorities, and if the proposed drought emergency minimum flows are still not achieved at the compliance gage, then additional curtailments would be required for the next, more senior priority grouping of water right holders. Water supply information used to inform curtailments may include but is not limited to:

- Forecast estimates of precipitation and streamflow;
- Historical information from periods of comparable flow conditions and hydrology;
- Historic reported water use during similar dry years;
- Streamflow gage data;
- Information in Division of Water Rights records on the extent to which flows are protected under Water Code section 1707;
- Groundwater levels;
- Reservoir levels;
- Hydrologic models;
- Visual observations of stream reaches being dry versus wet; and
- Other sources of water supply data

12.2.2 Summary of Water Demand and Water Right Priority Information

Implementing curtailments requires information on water rights priorities and projected water demands.

12.2.2.1 Water Rights Priority

The water rights priority groups in the Scott and Shasta River watersheds are outlined in section 875.5 of the proposed Emergency Regulation. Within each water rights priority group there can be relative priorities that are based on the priority date of each specific water right or other determination methods for priorities set forth in an adjudication. The information used to develop relative priorities for unadjudicated surface water comes from the State Water Board's Division of Water Rights records.

In California, groundwater rights have right categories similar to surface water rights. Overlying groundwater rights have a priority and characteristics equivalent to surface water riparian rights. Groundwater appropriations have a priority date from when the well was constructed and/or water first used for appropriative use, and have characteristics analogous to surface appropriative rights. An appropriative groundwater right is distinguished from an overlying groundwater right when the diverter: 1) does not own land overlying the basin; 2) owns overlying land but uses the water on non- overlying land; or 3) sells or distributes the water to another party. Some groundwater users may exercise both overlying and appropriative rights, and depending on the depth of curtailment, may only need to curtail the appropriative right. Some groundwater rights in the Scott watershed have been adjudicated, and these rights have priorities as set forth in the Scott River Adjudication (Siskiyou County Superior Court, 1980). For other groundwater diversions in the Scott and Shasta watersheds, information on when wells were first constructed and water first used for groundwater appropriations is typically obtained from the California Department of Water Resources (CDWR) or Siskiyou County. Siskiyou County reviews, permits, and inspects agricultural, domestic, and monitoring groundwater wells, and exploratory borings, to maintain a safe water supply. Siskiyou County maintains a record of well permits and well completion reports that were issued in the county since 1991. The CDWR Northern Region office maintains records for well permits issued before 1991 and maintains well information that Siskiyou County transmits to CDWR for post-1991 records.

12.2.2.2 Water Rights Demand

Water demand factors into the process of issuing curtailments. For example, knowing if the most junior water rights priority grouping in the watershed is diverting 1 cfs, 10 cfs, or 100 cfs factors in to how many water right priority groupings need to be curtailed if there is a flow shortfall of 23 cfs at the gage, for example. There are different sources of demand data. For example, permitted, licensed or adjudicated water rights generally have a maximum volume or rate of water that is allowed to be diverted, which is referred to as the face value of the water right. Additionally, water users with all types of surface water diversions are generally required to report their monthly water use to the Division of Water Rights on an annual basis. However, not all water right holders provide their annual water use data, and the data are often incorrect (e.g., incorrect units, etc.). When reported water use data is available, it is often more useful than the maximum allowable diversion (face

value) for determining how much water that right holder could be expected to divert during a similar dry year. A potentially better source of demand information can be gathered from the information orders described in the proposed Emergency Regulation. Using information provided through responses to information orders, the State Water Board can better understand projected water use for individual water users, which can be useful to determine with more precision how deep curtailments need to go into the water rights priority system to achieve the minimum flow requirement under different water supply conditions. The use of such information over has been helpful in more carefully tailoring curtailment orders as flows have approached the drought emergency minimum flow requirements, during recent years. What can create challenges for curtailment purposes, is that in some cases a water right holder may report accurate data, and in other cases a different water right holder may report less accurate and unreliable data. Therefore, multiple sources of data are useful as no single source of information may be considered the most reliable source.

For purposes of the Proposed Emergency Regulation, the State Water Board uses the following sources of water demand information, if available, for surface water rights.

They are listed in order of what is typically most useful.

- Surface Water Right Demand Data:
  - Information Order reported water use or projected water use;
  - Annual water use reporting by water right holders to the State Water Board's eWRIMS database (SWRCB, 2023b), to the Watermaster (e.g. Watermaster 2014, 2016, 2017ab, 2021a), and to the State Water Board's eAR database (SWRCB, 2023a); and
  - Adjudication and other legal records establishing the face value of individual water rights (Siskiyou County Superior Court, 1932, 1950, 1952, 1980).

Other sources of information like remote sensing of crop water use can be used to validate demand information related to water rights records and water use reporting.

Additionally, for watermastered areas, more real-time demand information can be extremely useful. The State Water Board has contracted with the Watermaster to support such coordination.

Groundwater rights are not licensed and permitted by the State Water Board the same way that surface water rights are, and this leads to different types of groundwater right records. For groundwater rights in the Scott and Shasta watersheds, the information that is available is listed below in order of what is typically most useful.

- Groundwater Rights Demand Data:
  - Water supplier information reported to the State Water Board's eAR database (SWRCB, 2023a);

- County and CDWR records of wells;
- Studies that delineate which fields are irrigated by groundwater and related remote sensing data that estimates how much water those fields use; and
- Metering data reported to the State Water Board for groundwater LCSs.

Each of the available data sources contain uncertainty and/or is incomplete. Therefore, no single source of data can be used for every situation. When issuing curtailments, the State Water Board will use the priority groups as described in the proposed Emergency Regulation, as well as available records as described above. The State Water Board will also use the best available demand information to inform how many water rights need to be curtailed to achieve the minimum flow requirements.

12.2.2.3 Streamflow Gains and Losses

Stream systems are dynamic and contain losing and gaining reaches. Gaining stream reaches gain water from inflow of groundwater through the streambed. Losing stream reaches lose water to groundwater through the streambed. The losing or gaining nature of a stream reach can be influenced by geology, groundwater levels, evaporation, and evapotranspiration. These potential gains and losses affect the ability to curtail exactly the right amount of water to achieve the minimum flow requirements. For this reason, the issuance, suspension, reinstatement, or rescission of curtailment orders may be an iterative process. Additionally, it is important to consider that curtailing 10 cfs of water may not translate to exactly 10 cfs of flow at the gage. In some cases, more water will need to be curtailed than what is needed at the compliance gage to achieve the minimum flow requirements.

Because of uncertainty related to reported and unreported surface water demand, natural streamflow losses, streamflow losses due to groundwater diversions, and potential dry stream segments in some parts of the watershed and wet stream segments in other parts of the watershed, curtailments may need to be higher than what can be estimated from available supply and demand information.

12.3 Suspension of California Environmental Quality Act

Paragraph 9 of Executive Order N-5-20 and Paragraph 12 of Governor Newsom's "Proclamation of a State of Emergency, issued on July 8, 2021, suspend the California Environmental Quality Act (CEQA) as applied to the State Water Board's adoption of an emergency regulation to ensure critical instream flows for species protection through emergency minimum drought instream flow regulations.

12.4 Mandate on Local Agencies or School Districts

The proposed Emergency Regulation does not impose a mandate on local agencies or school districts because it does not mandate a new program or a higher level of service of an existing program. The regulation is generally applicable to public and private entities

and is not unique to local government. No state reimbursement is required by part 7 (commencing with section 17500) of Division 4 of the Government Code.

12.5 Fiscal Cost Estimate

The fiscal effects incurred by state and local government agencies as a result of the proposed Emergency Regulation include the following: (1) revenue losses for municipal water supply agencies; (2) revenue losses for non-municipal water supply agencies (water for agriculture); (3) state and county tax revenue losses; (4) reporting costs to complete and submit initial compliance certification forms and ongoing diversion reporting in response to a curtailment order; and (5) reporting costs to complete and submit the information required by an information order, including supporting documentation.

In light of the uncertainty regarding the depth of curtailment required to maintain drought emergency minimum flows in the upcoming year, the State Water Board estimated fiscal impacts under three different water year scenarios: an expected-range scenario, an extreme-drought scenario, and above-average precipitation scenario.

The State Water Board estimates the total cost to all state and local agencies (including city, county, schools, and publicly owned water suppliers) due to the proposed Emergency Regulation as $1,563,353 for the expected-range scenario, $2,303,933 for the extreme-drought scenario, and $374,812 for the above-average scenario. The total revenue loss for municipal water supply agencies is estimated to be $765,752 for the expected-range scenario, $972,668 for the extreme-drought scenario, and $286,750 for the above-average scenario. Total revenue loss for non-municipal water supply agencies is estimated to be $ 263,445 for the expected-range scenario, $485,550 for the extreme-drought scenario, and $6,630 for the above-average scenario. Total county and state agricultural tax revenue losses are estimated to be $464,535 for the expected-range scenario, $776,094 for the extreme-drought scenario, and $11,811 for the above-average scenario. The total reporting costs for all state and local agencies to complete and submit initial compliance certification forms, ongoing diversion reporting for the curtailment order, and complete and submit the information required by an informational order is estimated to be $69,621, the same amount for each of the three scenarios.

12.6 Funding Resources

The following opportunities provide funding for habitat restoration, water efficiency, ditch lining, instream flow dedications, fish passage, and other project types. Project types that could support local cooperative solutions (referenced in multiple sub-sections of section 875) or improve the efficiency of livestock water conveyances (referenced in section 875.7) may be eligible for some of the funding sources listed below.

- **CDFW: Fisheries Restoration Grant Program (FRGP)**

    - Example project types: fish passage, instream habitat or upslope watershed restoration, bank stabilization, fish screens for diversions, water conservation, flow monitoring, water diversion measuring devices, project design, etc.
    - Webpage: https://wildlife.ca.gov/Grants/FRGP
- **CDFW: Natural Community Conservation Planning, Habitat Conservation Plans, and Local Assistance Grants**
    - Example project types:
        - Land acquisition, planning, and management
        - Design and implementation of biological monitoring
        - Development and implementation of management plans
    - Webpage: https://wildlife.ca.gov/Conservation/Planning/NCCP/Grants
- **CDFW: Proposition 1 Restoration Grant Program**
    - Example project types:
        - Modernizing stream crossings, culverts, and bridges
        - Installing or improving fish screens
        - Fish passage improvement
        - Acquisitions from willing sellers
    - Webpage: https://wildlife.ca.gov/conservation/Watersheds/Prop-1
- **CDFW: Proposition 68 Grant Program**
    - Example project types:
        - Habitat enhancement or restoration
        - Water conservation, temporary water transfers, water acquisition
        - Rotational fallowing, ditch lining, etc.
    - Webpage: https://wildlife.ca.gov/Conservation/Watersheds/Prop-68
- **Natural Resources Conservation District**
    - Example project types:
        - Water use efficiency improvements
        - Efficient watering systems, piping, troughs, and fencing
    - Webpage: Drought Assistance | Natural Resources Conservation Service
- **United States Bureau of Reclamation: WaterSMART Program**
    - Example project types:
        - Canal lining/piping,
        - Water use efficiency improvements
    - Webpage: www.grants.gov
- **U.S. Fish and Wildlife Service: Endangered Species Recovery Land Acquisition Grant Program (Non-traditional Section 6)**
    - Example project types:
        - Land acquisition
        - A CDFW grant lead is required
    - Webpage: Endangered Species Conservation and Recovery Grant Program
- **Wildlife Conservation Board: Proposition 1 Funding**

- Example project types:
  - Water transactions: instream flow dedications, forbearance agreements, conservation easements, purchase or long-term transfer of water
  - Water conservation projects: off-channel water storage, changes in timing or rate of diversion, livestock watering systems, agricultural tailwater management systems
  - Other project types: changing points of diversion, groundwater storage and conjunctive use, habitat restoration to enhance stream flow, streamflow gaging, scientific studies, etc.
- Webpage: https://wcb.ca.gov/Programs/Stream-flow-Enhancement

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ATTACHMENT 1. FISCAL IMPACT STATEMENT

Fiscal Effect on Local and State Government

The fiscal effects resulting from the proposed Emergency Regulation are the costs that would be incurred by state and local government agencies to respond to any requirements therein, pursuant to Government Code section 11346.5, subsection (a)(6). This Fiscal Impact Statement has been prepared in accordance with State Administrative Manual 6600-6616.

The fiscal effects incurred by state and local government agencies as a result of the proposed Emergency Regulation include the following: (1) revenue losses for municipal water supply agencies, (2) revenue losses for non-municipal water supply agencies (water for agriculture), (3) state and county tax revenue losses, (4) reporting costs to complete and submit initial compliance certification forms and ongoing diversion reporting in response to a curtailment order, and (5) reporting costs to complete and submit the information required by an information order, including supporting documentation.

In light of the uncertainty regarding the depth of curtailment required to maintain emergency minimum flows in the upcoming year, fiscal effects were estimated for three different flow forecast scenarios for 2024: the expected-range scenario, extreme-drought scenario, and above-average scenario. These flows forecast scenarios are discussed in the next section, “Water Demand and Supply Data for Fiscal Impact Analysis.”

The State Water Board estimates the total cost to all state and local agencies (including city, county, schools, and publicly owned water suppliers) due to the proposed Emergency Regulation as $1,563,353 for the expected-range scenario, $2,303,933 for the extreme-drought scenario, and $374,812 for the above-average scenario.

The total revenue loss for municipal water supply agencies is estimated to be $765,752 for the expected-range scenario, $972,668 for the extreme-drought scenario, and $286,750 for the above-average scenario. Total revenue losses for non-municipal water supply agencies are estimated to be $263,445 for the expected-range scenario, $485,550 for the extreme-drought scenario, and $6,630 for the above-average scenario. Total county and state agricultural tax revenue losses are estimated to be $464,535 for the expected-range scenario, $776,094 for the extreme-drought scenario, and $11,811 for the above-average scenario[1]. The total reporting costs for all state and local agencies to complete and submit initial compliance certification forms, ongoing diversion reporting for the curtailment order, and the required informational order

[1] Total revenue loss for agricultural crop sales is not a component of the fiscal analysis, but it was calculated in order to develop state and local tax revenue losses and was conservatively estimated to be $5,994,000 for the expected-range scenario, $10,014,122 for the extreme-drought scenario, and $152,393 for the above-average scenario. Please refer to the section below titled Siskiyou County and State Estimated Tax Revenue Loss for more information on how the revenue loss for agricultural crop sales was calculated.

submissions is conservatively estimated to be $69,621, the same amount for each of the three scenarios.

Analysis of Water Demand and Supply Data for Fiscal Impact

The State Water Board used the best available water supply and demand data to inform the fiscal impact statement as described below for the Scott River and Shasta River watersheds.

Scott River Watershed

The Scott River gage near Fort Jones (USGS gage no. 11519500) located approximately 21 miles upstream from Scott River watershed outlet, records the observed (impaired) flow of the watershed. Figure A shows the forecasted impaired streamflow (i.e., with diversions) for 2025 under expected-range, extreme-drought, and above-average scenarios, along with the proposed emergency minimum flow requirements. Curtailment of diversions and LCSs are forecasted as needed to achieve the proposed emergency minimum flow requirements during several months of 2025.

The National Weather Service (NWS, 2024) forecasts equal chances of above or below-average precipitation for most of the WY 2024-2025. Under these conditions, an alternative for representing the expected flows of WY 2024-2025 is to use historical flows. Two filters have been applied to select the historical years used for forecasting: (1) Only historical years after WY 1999-2000 are considered. Data from WYs prior to WY 1999-2000 are excluded as they are presumed not to reflect current average flows accurately, due to changes in land use and climate; (2) To account for the effect of Fall baseflows on the annual hydrograph, only years with October flows comparable to the current October flow (based on the latest baseflow data before the storm of November 2024) are selected. Years with significantly higher or lower October flows than those of 2024 are excluded.

In the seven selected WYs, the monthly average streamflow during October was approximately 43 cfs, which aligns with the average flow observed in October 2024. Daily average streamflow for all months in each of the seven selected WYs are plotted in Figure A for the expected-range scenario, with all WY lines shown in the same color, with the range between them shaded in light blue. Under the expected-range scenario, daily average streamflow is forecasted to fall below the minimum flow requirements during August 2025 to mid-November 2025 for most of these seven selected WYs.

In the extreme-drought scenario, daily average streamflow from WY 2020-2021 is assumed to occur again in WY 2024-2025. WY 2020-2021 was an extremely dry WY. Under this scenario, daily average streamflow is forecasted to fall below the minimum flow requirements during June 2025 to October 2025, and in December 2025.

The above-average scenario in this document represents a year with above-average precipitation, which does not necessarily result in above-average runoff. Therefore, the recent WY 2022-2023, which had above average May 1st snowpack, is considered as an alternative for the above-average scenario. In the above-average scenario, daily

average streamflow from WY 2022-2023 is assumed to occur again in WY 2024-2025. Under this scenario, daily average streamflow is forecasted to exceed the minimum flow requirements, except during August 2025.

Table A shows the Scott River forecasted range of daily impaired flows over each month for each scenario, the proposed drought emergency minimum flows, and the monthly average shortfall compared to the proposed drought emergency minimum flows for the period from February 2025 to January 2026, based on the assumptions outlined above. The daily shortfall is determined by calculating the difference between the proposed drought emergency minimum flows and daily forecasted flows. Once the daily shortfall is calculated for each hydrograph in the expected range scenario, the expected range daily forecasted shortfall is determined by averaging the daily shortfall for the selected WYs. The daily shortfall values for each scenario are then averaged for the monthly average shortfall. Where daily flows are above minimum flow requirements, the daily shortfall is recorded as zero.

Table B compares the forecasted monthly average shortfall for the Scott River with reported monthly water demand. Surface water demand estimates were calculated using data from the electronic Water Rights Information Management System (eWRIMS) database (SWRCB, 2024b) and the Scott River Adjudication (Siskiyou County Superior Court, 1980). Records deemed ineligible (e.g., cancelled, inactive, pending, rejected, revoked, and state filing) were removed from the eWRIMS dataset, which was then reviewed for duplicates, unit errors, and unrealistically high diversion values. The surface water demand is based on the average reported use from WYs 2017-2018 and 2019-2020, the two most recent dry WYs without emergency regulations in place and with available water use data.

The irrigation demand estimate for dry years may result in an overestimation of demands under the above-average and the expected-range scenarios. However, due to insufficient data on annual demand variability within the watersheds, the demand data is assumed to remain constant across all scenarios.

Groundwater demand is derived from land use estimates from the SVIHM model developed by UC Davis (Foglia et al., 2018; Harter, 2021ab).

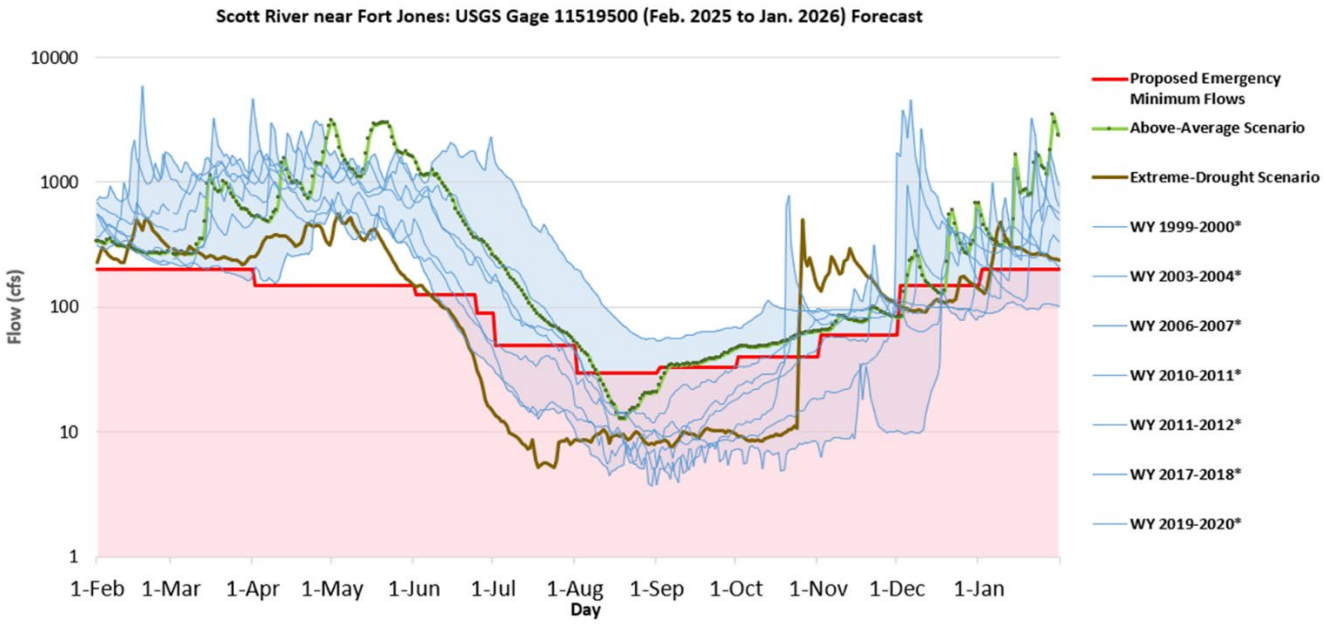

Figure A. Forecasted daily average flow for Scott River gage near Fort Jones (USGS gage no. 11519500). *Graph starts in February of listed WY and ends January of the following WY (for example, the line of WY 1999-2000 shows flows from February 2000 to January 2021). Streamflow data source: USGS (2024a)

Table A. Average daily forecasted flow range, proposed emergency minimum flows, and expected shortfall compared to the proposed emergency minimum flows for the period of February 2025 to January 2026 at USGS Scott River gage near Fort Jones (USGS gage no. 11519500). Forecasted shortfalls are calculated daily and then averaged for the month, while the forecasted flow is shown as the range of daily flows for the month.

Month		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Drought Emergency Minimum Flow (cfs)		200	200	150	150	125, 90[1]	50	30	33	40	60	150	200
Daily Forecasted Flow Range (cfs)	Expected-Range Scenario	[219, 5850]	[164, 4650]	[157, 3230]	[249, 1780]	[32, 2310]	[10, 1410]	[4, 199]	[4, 69.2]	[5, 778]	[6, 1710]	[10, 4520]	[85, 3280]
	Extreme-Drought Scenario	[227, 508]	[221, 305]	[255, 467]	[150, 554]	[14, 149]	[5, 13.5]	[8, 10.4]	[8, 10.8]	[8, 501]	[105, 296]	[91, 177]	[129, 477]
	Above-Average Scenario	[264, 346]	[262, 1130]	[477, 3130]	[1100, 3000]	[258, 1420]	[53, 247]	[13, 51]	[23, 46.6]	[47, 64.1]	[64, 99.5]	[82, 675]	[305, 3500]
Average Daily Forecasted Shortfall (cfs)	Expected-Range Value	0.0	1.1	0.0	0.0	8.9	11.4	15.4	18.0	13.3	10.8	35.4	23.3
	Extreme-Drought Scenario	7.1	0.0	0.0	0.0	41.2	41.7	21.0	23.5	22.7	0.0	34.2	6.6
	Above-Average Scenario	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.7	0.0	0.0	7.8	0.0

[1] The drought minimum emergency flow is 125 cfs for the period of June 1-23, and it is 90 cfs for the period of June 24-31.

Table B. Scott River watershed demand compared to forecasted shortfall for February 2025 to January 2026 flows at USGS Scott River gage near Fort Jones (USGS gage no. 11519500). cfs = cubic feet per second.

Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Average Daily Forecasted Shortfall (cfs): Expected-Range Value	0.0	1.1	0.0	0.0	8.9	11.4	15.4	18.0	13.3	10.8	35.4	23.3
Average Daily Forecasted Shortfall (cfs): Extreme-Drought Scenario	7.1	0.0	0.0	0.0	41.2	41.7	21.0	23.5	22.7	0.0	34.2	6.6
Average Daily Forecasted Shortfall (cfs): Above-average Scenario	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.7	0.0	0.0	7.8	0.0
Average Daily Surface Demand[1] (cfs)	28	37	139	160	140	80	55	44	24	12	20	24
Average Daily Irrigation Groundwater Demand[2] (cfs)	0.0	5	51	114	185	197	170	32	8	0.0	0.0	0.0
Average Daily Total Demand[3] (cfs)	28	42	190	274	325	277	225	76	32	12	20	24

[1] Total surface demand = average 2017-2018 and 2019-2020 reported water use from eWRIMS (SWRCB, 2024b) and Watermaster (2017b, 2021a) (does not account for unreported surface water use);
[2] Land use-based irrigation groundwater demand from SVIHM;
[3] Total of surface and groundwater demands.

Curtailments may need to exceed estimates based on the available supply and demand information due to uncertainties related to reported and unreported surface water demand, streamflow depletion losses, and presence of dry stream segments in some areas of the watershed and wet stream segments in others. From approximately July through October in the Scott River watershed, curtailments may extend to adjudicated and overlying groundwater users. During this period, groundwater demand is high and water supply is limited by low groundwater levels, and the Scott River may become disconnected. When surface flows become disconnected, precipitation events are needed to reconnect with the river, meet the proposed minimum instream flow requirements, and eventually provide the flow thresholds necessary to support salmonids. Surface water flows may go subsurface during the dry season when groundwater levels are low, potentially necessitating curtailment of all priorities of surface water rights and some or all groundwater rights to meet the proposed emergency minimum flows. Based on prior experience implementing the emergency regulations, full curtailment of surface water and groundwater diversions is typically needed when there is a shortfall in meeting emergency minimum flows in the Scott River watershed.

Shasta River Watershed

The USGS Shasta River gage near Yreka (USGS gage no. 11517500), located at the outlet of the Shasta River watershed, and records the impaired flow of the entire watershed. Figure B shows the forecasted impaired streamflow (i.e., with diversions) for 2025 under the expected-range, extreme-drought, and above-average scenarios, along with the proposed emergency minimum flow requirements. Curtailment of diversions and LCSs are forecast as needed to meet the proposed emergency minimum flow requirements during several months of 2025.

The National Weather Service (NWS, 2024) forecasts equal chances of above or below-average precipitation for most of the WY 2024-2025. Due to the strong correlation between hydrologic conditions of Scott River and Shasta River watersheds, the same years are used for the expected-range, extreme-drought and above-average scenarios.

Under the extreme-drought scenario (i.e., based on WY 2020-2021), daily average streamflow is forecasted to fall below the minimum flow requirements during April 2025 to end of September 2025.

The above-average scenario in this document represents a year with above-average precipitation, which does not necessarily provide an above-average runoff. Therefore, the recent water year 2022-2023, which experienced above average precipitation, is used as an alternative for the above-average scenario. Under the above-average scenario, it is assumed that daily average streamflow from WY 2022-2023 will occur again in WY 2024-2025. In this scenario, daily average streamflow is forecasted to fall below the minimum flow requirements during July 2025 to September 2025.

Table C shows the Shasta River forecasted range of daily impaired flows over each month for each scenario, the proposed drought emergency minimum flows, and the monthly average shortfall compared to the proposed drought emergency minimum flows

for the period from February 2025 to January 2026, based on the assumptions outlined above. The daily shortfall is determined by calculating the difference between the proposed drought emergency minimum flows and daily forecasted flows. Once the daily shortfall is calculated for each hydrograph in the expected range scenario, the expected range daily forecasted shortfall is determined by averaging the daily shortfall for the selected WYs. The daily shortfall values for each scenario are then averaged for the monthly average shortfall. Where daily flows are above minimum flow requirements, the daily shortfall is recorded as zero.

Table D compares the forecasted monthly average shortfall for the Shasta River with reported water demand. Surface water demand was calculated using data from the eWRIMS database (SWRCB, 2024b), the Shasta River Adjudication (Siskiyou County Superior Court, 1932), and the Watermaster (2017b, 2021a). As with the Scott River analysis, ineligible water right records were removed from the dataset. The data were further reviewed for duplicates, unit errors, and unrealistically high diversion values. The surface water demand represents the average reported water use of WY 2017-2018 and WY 2019-2020, the two most recent dry WYs with available water use data and without drought emergency regulations in place.

The adjudication data are from the annual Watermaster statements for the following eight streams under Watermaster service: Beaughan, Boles, Carrick, Parks, Jackson creeks, Little Shasta, Lower Shasta, and the Upper Shasta rivers (Watermaster, 2017b, 2021a). The water demand for Willow, Yreka, and Julian creeks and other miscellaneous springs, which do not have Watermaster service, was estimated based on the Shasta River Adjudication (Siskiyou County Superior Court, 1932). The estimated water demand for the streams under Watermaster service was adjusted to reflect actual water use instead of the full face-value of the decreed water rights, which are not representative of actual water use. As part of the Shasta Valley GSP development (Siskiyou County, 2022b), Larry Walker Associates and Davids Engineering modified the CDWR 2010 Land Use Maps (CDWR, 2024b) to reflect existing conditions and developed remote sensing-based estimates of crop evapotranspiration and applied water for fields in the Shasta River basin for 1989 to 2018 (Davids Engineering, 2020). Data from Davids Engineering (2020) were used to estimate groundwater demands.

Curtailments may need to exceed estimates based on available supply and demand information due to uncertainties related to reported and unreported surface water demand, streamflow depletion losses, and the occurrence of dry stream segments in some areas of the watershed and wet stream segments in others.

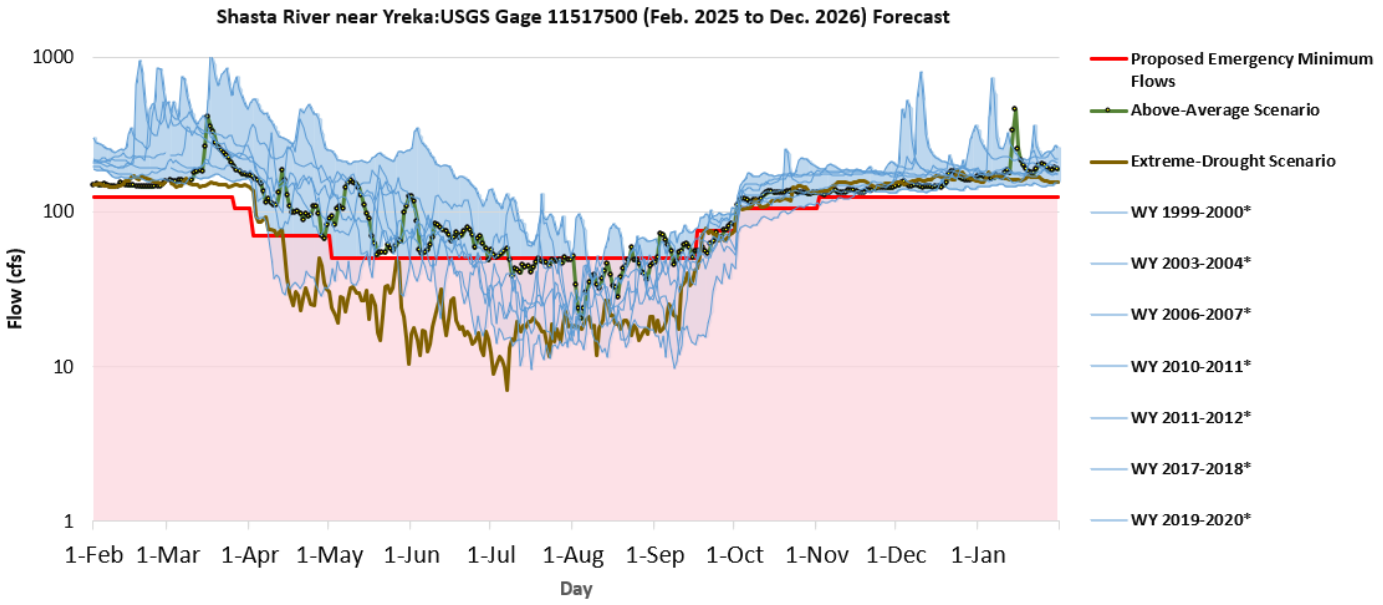

Figure B. Shasta River average daily impaired streamflow at Yreka gage (USGS gage no. 11517500) for forecast for February 2025 to January 2026. Maximum Daily flow in March 2011 was 1110 cfs which is beyond the y-axis scale of this graph. *Graph starts in February of listed WY and ends January of the following WY (for example, the line of WY 1999-2000 shows flows from February 2000 to January 2021). Streamflow data source: USGS (2024c).

Table C. Average daily forecasted flow range, proposed emergency minimum flows, and expected shortfall compared to proposed emergency minimum flows for period of February 2025 to January 2026 at USGS Shasta River gage near Yreka (USGS gage no. 11517500). Forecasted shortfalls are calculated daily and then averaged for the month, while the forecasted flow is shown as the range of daily flows for the month.

Month		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Drought Emergency Minimum Flow (cfs)		125	125, 105[1]	70	50	50	50	50	50, 75[2]	105	125	125	125
Daily Forecasted Flow Range (cfs)	Expected-Range Scenario	[156, 944]	[150, 1110]	28, 534]	29, 258]	[16, 345]	[10, 131]	[11, 96]	[10, 107]	[72, 253]	[111, 209]	[133, 797]	[145, 736]
	Extreme-Drought Scenario	[145, 169]	[144, 163]	[23, 136]	[10, 48]	[12, 31.5]	[7, 22.6]	[12, 26.6]	[17, 78.3]	[97, 148]	[135, 159]	[151, 188]	[153, 181]
	Above-Average Scenario	[145, 156]	[156, 414]	[67, 184]	[52, 159]	[48, 116]	[38, 58]	[20, 58]	[46, 84]	[111, 137]	[128, 146]	[143, 182]	[164, 456]
Average Daily Forecaste	Expected-Range Value	0.0	0.0	3.9	1.0	4.6	17.5	18.0	13.3	1.8	0.4	0.0	0.0

d Shortfall (cfs)	Extreme-Drought Scenario	0.0	0.0	22.2	23.7	32.3	34.1	31.1	15.2	0.3	0.0	0.0	0.0
	Above-Average Scenario	0.0	0.0	0.1	0.0	0.1	3.2	11.6	4.7	0.0	0.0	0.0	0.0

[1] The drought minimum emergency flow is 125 cfs for the period of Mar 1-24, and it is 105 cfs for the period of Mar 25-31.

[2] The drought minimum emergency flow is 50 cfs for the period of Sept 1-15, and it is 75 cfs for the period of Sept 16-30.

Table D. Shasta River watershed demand compared to forecast shortfall for February 2025 to January 2026 at USGS Shasta River gage near Yreka (USGS gage no. 11517500).

Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Average Daily Forecasted Shortfall[1] (cfs): Expected-Range Value	0.0	0.0	3.9	1.0	4.6	17.5	18.0	13.3	1.8	0.4	0.0	0.0
Average Daily Forecasted Shortfall[1] (cfs): Extreme-Drought Scenario	0.0	0.0	22.2	23.7	32.3	34.1	31.1	15.2	0.3	0.0	0.0	0.0

Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Average Daily Forecasted Shortfall[1] (cfs): Above-Average Scenario	0.0	0.0	0.1	0.0	0.1	3.2	11.6	4.7	0.0	0.0	0.0	0.0
Average Daily Surface Demand (cfs)[1]	98	248	364	354	307	232	200	207	114	88	112	100
Average Daily Ground- water Demand (cfs)[2]	11	9	21	62	98	109	102	98	65	36	4	4
Average Daily Total Demand [3] (cfs)	109	257	385	416	405	341	302	305	179	124	116	104

[1] Total surface demand = averaged 2017-2018 and 2019-2020 reported water use from eWRIMS (SWRCB, 2024b) and Watermaster (Watermaster 2017b, 2021a).

[2] Land use-based groundwater demand from Shasta Valley GSP development (Siskiyou County, 2022b).

[3] Total surface and groundwater demands.

Methodology for Estimating Projected Curtailments to Water Supply Agencies

Forecasted shortfall data were used as described above to estimate total potential curtailments volumes. To apportion the total forecasted curtailment volumes to specific water supply agencies, additional information was needed about the water rights priority system, including how the water suppliers fit into the priority system relative to other water rights and their water demands.

To estimate projected curtailments to specific water suppliers resulting from the proposed Emergency Regulation in the Scott and Shasta watersheds, the State Water Board also used CDWR groundwater well completion reports, Watermaster yearly narrative reports (2014-2017; e.g. Watermaster, 2014, 2016, 2017a) and the State Water Board's electronic Annual Report database (eAR) (SWRCB, 2024a).

Potential curtailments were estimated based on the forecasted water supply shortfall to meet the emergency minimum flows, and water rights priorities and related demand. For water right priority dates, the State Water Board used water right priority dates in the eWRIMS database (SWRCB, 2024b) and priority dates in the Watermaster Field Schedules notes for the Shasta Adjudication water rights (Siskiyou County Superior Court, 1932). For water rights in eWRIMS, the average of WY 2017-2018 and WY 2019-2020 reported water use was used to represent the forecasted demand, instead of face-values (SWRCB, 2024b). For Shasta Adjudication water rights without detailed reported water use, potential curtailments were estimated based on past curtailments as indicated in the Watermaster annual narrative reports (Watermaster, 2017b, 2021a).

Groundwater appropriations have a priority date from when the well was constructed or when water was first appropriated. For agencies that use groundwater and have more than one well, the latest well construction date was used as a priority date for the agency's groundwater appropriative water right. For example, if a public water supply agency has two wells with priority dates of May 15, 1985, and January 31, 1967, the later date of May 15, 1985 would be used as the priority date for the water supply agency's groundwater appropriative right to conservatively estimate potential curtailments for the fiscal analysis. For public municipal water suppliers, the monthly estimated water supply reductions are limited to maintaining the minimum human health and safety allowance of 55 gallons per capita per day (gpcd).

Revenue Losses for Agencies that provide Municipal Water Supplies

In addition to the water demand and supply data described above, the State Water Board also used data from the State Water Board's eAR database for information on the number of individuals served, amount of water supplied, and the water rate charged to customers (SWRCB, 2024a). Fifteen agencies supply drinking water in the Scott and Shasta watersheds. This section only analyzes suppliers whose primary function is as a municipal drinking water supplier that charge fees to customers for water use. The municipal water supply agencies that were analyzed are listed in Table E, below. A fiscal analysis was not performed on the agencies listed in Table F because they do not sell municipal drinking water to customers. Based on individuals served and the indoor residential use standard of 55 gpcd, the State Water Board estimates municipal suppliers'

minimum water demand for human health and safety in the Scott and Shasta watersheds to be 1,188 acre-feet. Based on the proposed Emergency Regulation, and accounting for minimum human health and safety needs, it is estimated that potential curtailments in the Scott and Shasta watersheds could reduce available water supply to municipal water suppliers by a total of 470 acre-feet in the expected-range scenario, 597 acre-feet in the extreme-drought scenario, and 176 acre-feet in the above-average scenario. See Table G below for shortages for individual municipal water suppliers.

The State Water Board used a conservative water rate estimate of $5.00 per 1000 gallons of water. According to the State Water Board's eAR database, this was the water rate for the City of Montague in 2024 and was the highest rate that a public water supply agency charged to residential customers in the Scott and Shasta watersheds (SWRCB, 2024a). The water rate was converted to $1629.26 per acre-feet of water to develop a cost estimate.

Municipal water systems included in this fiscal impact analysis serve a population of 19,109 individuals in the two watersheds. The public water systems not included in this analysis serve a population of 2,178 individuals. The estimated loss in revenue (income before expenses are subtracted) to municipal water suppliers from the proposed Emergency Regulation is estimated to be $765,752 ($1629.26 per acre-feet of water multiplied by 470 acre-feet) for the expected-range scenario, $972,668 ($1629.26 per acre-feet of water multiplied by 597 acre-feet) for the extreme-drought scenario, and $286,750 ($1629.26 per acre-feet of water multiplied by 176 acre-feet) for the above-average scenario.

Table E. Public drinking water systems in Scott and Shasta watersheds included in fiscal impact analysis. Information provided from State Water Board's Division of Drinking Water electronic Annual Report database (SWRCB, 2024a).

Watershed	Public Water System ID	Public Water System Name	*2022 or 2023 Number of Service Connections	*2022 or 2023 Population	Water Source
Shasta	CA4710011	City of Yreka	3,383	7,746	Surface water
Shasta	CA4710007	City of Montague	536	1,495	Surface water
Shasta	CA4710009	City of Weed	*1,111	*5,324	Surface water and groundwater
Shasta	CA4710013	Lake Shastina CSD	1,293	2,790	Groundwater
Shasta	CA4700523	Grenada Sanitary District	103	289	Groundwater
Scott	CA4710004	City of Etna	*413	*720	Surface water
Scott	CA4700503	Callahan Water District	31	70	Recycled water and surface water
Scott	CA4710003	Town of Fort Jones	347	675	Surface water and groundwater

Table F. Public drinking water systems not included in fiscal impact analysis in Scott and Shasta watersheds. Information provided from State Water Board's Division of Drinking Water electronic Annual Report database (SWRCB, 2024a). AF = acre-feet; gpcd = gallons per capita per day.

Watershed	Public Water System ID	Public Water System Name	*2022 or 2023 Number of Service Connections	*2022 or 2023 Population	Water Source
Shasta	CA4700591	Delphic Elementary School	1	50	No record
Shasta	CA4700577	Big Springs Union Elementary School	*1	*95	No record
Shasta	CA4700521	Siskiyou County Service Area #5/Carrick	*58	*143	No record
Shasta	CA4700582	Gazelle School	1	60	No record
Shasta	CA4700559	Butteville Union School	1	165	No record
Shasta	CA4700557	California Department of Transportation: Weed Rest Stop	2	1,000	Groundwater
Shasta	CA4700558	California Department of Transportation: Grass Rest Stop	1	600	Groundwater
Scott	CA4710800	California Department of Forestry and Fire Protection: Deadwood Conservation Camp	13	65	Groundwater

Table G. Public drinking water systems in Scott and Shasta watersheds included in the fiscal impact analysis. Information provided from State Water Board's Division of Drinking Water electronic Annual Report database (SWRCB, 2024a). AF = acre-feet; gpcd = gallons per capita per day.

Public Water System Name	Population	Water Source	Annual Total Demand (AF)	Annual Health and Safety Demand(AF)	Estimated Water Supply Reduction (AF) - Expected-Range Value	Estimated Water Supply Reduction (AF) – Extreme-Drought Scenario	Estimated Water Supply Reduction (AF) – Above-Average Scenario
City of Etna	720	SW	213	44	72	116	0
Callahan Water District	70	SW	77	4	16	16	2
Town of Fort Jones	675	SW	184	42	82	82	37
City of Yreka	7,746	SW	2,182	482	0	48	0
City of Montague	1,495	SW	274	93	0	0	0
City of Weed	5,324	GW	232	331	19	19	10
Lake Shastina Community Services District	2,790	GW	717	174	267	278	122
Grenada Sanitary District	2829	GW	66	18	14	38	5

[1] Annual (2020) total demand is used.

[2] Minimum human health and safety demand of 55 gpcd is used.

Minimum Revenue Losses for Agencies that provide Non-Municipal Water Supplies (primarily for agriculture)

Eight agencies provide water for agriculture or irrigation in the Scott and Shasta watersheds. Of these eight agencies, two agencies were not included in this fiscal impact analysis because they are not an irrigation supplier that charges fees to customers for water use. The agencies included in this fiscal impact analysis are listed in Table H. Agencies that were not included are listed in Table I.

The proposed Emergency Regulation would result in an unmet demand to non-municipal water suppliers from February 1, 2025, to January 31, 2026. The estimated unmet demand is as follows: 4,053 acre-feet for the expected-range scenario, 7,470 acre-feet for the extreme-drought scenario, and 102 acre-feet for the above-average scenario. A water sales price of $65 per acre-feet was used to calculate losses in water sales in the Scott and Shasta watersheds. State Water Board staff obtained this water sales price from Montague Water Conservation District (MWCD) staff. MWCD is an irrigation district located in the Shasta River watershed. MWCD staff provided two water sales prices, $49 per acre-feet for Quota Water (the permitted amount of the landowner's water right) and $65 per acre-feet for the Siskiyou County Farm Bureau for landowners participating in the CDFW grant program that was awarded to the Siskiyou County Farm Bureau (Siskiyou County Farm Bureau works with CDFW to identify willing landowners to conserve water, resulting in improved habitat conditions in key fisheries/streamflow areas by fallowing agricultural fields along with the associated reduction in irrigation water use). The higher rate was used to calculate a conservative cost estimate. The estimated loss in water sales revenue for non-municipal water suppliers from the proposed Emergency Regulation is estimated to be $263,445 ($65 per acre-feet multiplied by 4,053 acre-feet) for the expected-range scenario, $485,550 ($65 per acre-feet multiplied by 7,470 acre-feet) for the extreme-drought scenario, and $6,630 ($65 per acre-foot multiplied by 102 acre-feet) for the above-average scenario. See Table J (Public Irrigation Systems in Scott and Shasta Watersheds Included in the Fiscal Impact Analysis) below for shortages for individual non-municipal water suppliers.

Table H. Public irrigation districts in Scott and Shasta watersheds evaluated in the fiscal impact analysis. For Diverters with multiple water rights of the same type and beneficial use group, the Face Values and Most Recent Reported Annual Diversions are summed.

Watershed	Public Water System Name	Beneficial Use (Permit Status)	Face Value or Adjudication	2020 Reported Annual Diversion (AF)	Water Source
Scott	Callahan Water District	Irrigation (License)	12.90 (AF)	0.42 (AF)	Surface Water
Scott	Scott Valley Irrigation District	Irrigation (License)	31,131 (AF)	7,844 (AF)	Surface Water
Shasta	Big Springs Irrigation District	Irrigation	30 cfs (summer)	N/A	Ground-water
Shasta	Greenhorn Water District	Irrigation (License)	15.00 (AF)	3.93 (AF)	Surface Water
Shasta	Greenhorn Water District	Irrigation (Claim)	N/A	0.00 (AF)	Surface Water
Shasta	Grenada Irrigation District	Irrigation (Adjudication/ License)	14,599 (AF)	3,252	Surface Water
Shasta	Montague Water Conservation District	Irrigation (Adjudication/ Permit)	49,000 (AF)	22,683 (AF)	Surface Water

Watershed	Public Water System Name	Beneficial Use (Permit Status)	Face Value or Adjudication	2020 Reported Annual Diversion (AF)	Water Source
Shasta	Montague Water Conservation District	Domestic (Permit)	1,665 (AF)	247 (AF)	Surface Water
Shasta	Montague Water Conservation District	Irrigation (Claim)	N/A	246 (AF)	Surface Water

Table I. Public irrigation systems in the Scott and Shasta watersheds that were not evaluated in the fiscal impact analysis.

Watershed	Public Water System Name	Beneficial Use (Permit Status)	Face Value or Adjudication (AF)	2020 Reported Annual Diversion (AF)	Water Source
Scott	California Department of Forestry and Fire Protection	Irrigation (License)	14.00	13.32	Surface Water
Scott	California Department of Forestry and Fire Protection: Deadwood Camp	Irrigation (License)	26.10	1.16	Surface Water
Shasta	California Department of Fish and Wildlife	Irrigation (License)	14,887	2,538	Surface Water
Shasta	California Department of Fish and Wildlife	Irrigation (Adjudication)	8,104	0	Surface Water

Table J. Public irrigation systems in Scott and Shasta watersheds included in the fiscal impact analysis.

Watershed	Public Water System Name	Estimated Water Supply Reduction (AF)-Expected-Range Value	Estimated Water Supply Reduction (AF)-Extreme- Drought Scenario	Estimated Water Supply Reduction (AF)-Above-Average Scenario
Scott	Callahan Water District	18	48	0
Scott	Scott Valley Irrigation District	2,952	2,952	0
Shasta	Montague Water Conservation District	92	92	92
Shasta	Grenada Irrigation District	10	10	10
Shasta	Greenhorn Water District	1	3	0
Shasta	Big Springs Irrigation District	980	4,365	0

Siskiyou County and State Estimated Tax Revenue Loss

Potential Siskiyou County and state tax losses are based on the loss in sales taxes associated with a reduction in crop sales due to the proposed Emergency Regulation. The State Water Board used information from the following sources to calculate tax loss estimates: water rights data from the State Water Board's eWRIMS database (SWRCB, 2024b), Annual Statements of Diversion and Water Use for 2019 and 2020 from the Watermaster (Watermaster 2021a), CDWR groundwater well completion reports, the State Water Board's eAR database (SWRCB, 2024a), DWR Agricultural Water Use Data 2019-2021 (CDWR, 2024a), CDWR 2010 Land Use Maps (CDWR, 2024b), a land use and water use analysis conducted by Davids Engineering (David's Engineering, 2020), SVIHM (Foglia et al., 2018; Harter, 2021ab), Siskiyou County's 2022 Annual Crop and Livestock Report (Siskiyou County, 2024), and the tax rate for the cities of Yreka and Dunsmuir, which have the highest tax rates in Siskiyou County) (CDTFA, 2024).

Potential sales tax losses were based on State Water Board calculations of the estimated annual reduction in water supply for agriculture, the estimated amount of crop acreage and yield affected by the reduction in water supply due to the proposed Emergency Regulation, the estimated crop value per acre, the resulting revenue loss from the affected crop acreage, and a 7.75% tax (0.5% local tax and 7.25% state tax) on the revenue loss from the affected crop acreage and yield. Table K (Siskiyou County and State Estimated Tax Revenue Loss) provides an overview of the calculations discussed below. The estimated reduction in agricultural irrigation supply due to proposed Emergency Regulation is 42,325 acre-feet of water for the expected-range scenario, 70,709 acre-feet for the extreme-drought scenario, and 1,076 acre-feet for the above-average scenario. These reductions represent a percent reduction in the agricultural water supply as follows: a 17.26 percent reduction in the expected-range scenario, a 28.84 percent reduction in the extreme-drought scenario, and a 0.44 percent reduction in the above-average scenario. The percentage reduction in water supply was multiplied by the total amount of acres of irrigated agriculture (81,574.00 acres) in the two watersheds to estimate the affected acreage and reduction in crop yield. The estimated reductions in crop yield acreage in 2024 due to the proposed Emergency Regulation is therefore estimated to be 14,081 acres for the expected-range scenario, 23,525 acres for the extreme-drought scenario, and 358 acres for the above-average scenario. The crop categories of Field Crops, Seed Crops, Fruit and Vegetable Crops, Nursery Crops, and Organic Crops were used to calculate the total crop revenue in Siskiyou County ($316,125,604) and total crop acreage in Siskiyou County (742,630 acres) (Siskiyou County, 2024). Based on this information the average crop value per acre used in this analysis was calculated as $425.68. The loss in crop sales revenue in 2024 in the Scott and Shasta River watersheds is estimated to be $5,994,000 for the expected-range scenario, $10,014,122 for the extreme-drought scenario, and $152,393 for the above-average scenario. This results in the following estimated losses in tax revenue for Siskiyou County: $29,970 for the expected-range scenario, $50,071 for the extreme-drought scenario, and $762 for the above-average scenario. The estimated losses in state tax revenue would be: $434,565 for the expected-range scenario, $726,023 for the extreme-drought scenario, and $11,049 for the above-average scenario.

Table K. Siskiyou County and state estimated tax revenue loss due to the proposed Emergency Regulation. AF = acre-feet

Estimates	February 2025 through January 2026 Expected-Range scenario	February 2025 through January 2026 Extreme-Drought Scenario	February 2025 through January 2026 Above-Average Scenario
Estimated Agricultural Irrigation Demand	245,192 AF	245,192 AF	245,192 AF
Estimated Reduction in Agricultural Irrigation Supply due to proposed Emergency Regulation	42,325 AF	70,709 AF	1,076 AF
Estimated amount of crop acreage affected by reduction in water supply due to proposed Emergency Regulation	14,081 acres	23,525 acres	358 acres
Estimated crop value per acre	$425.68	$425.68	$425.68
Estimated revenue loss from the affected crop acreage	$5,994,000	$10,014,122	$152,393
Tax Losses to Siskiyou County and the State 7.75% tax rate.	$464,535	$776,094	$11,811

4.1.1.7 Fiscal Costs of Reporting Requirements for State and Local Agencies

The State Water Board expects there will be fiscal impacts on public agencies due to the costs of reporting and self-certification requirements, under the proposed Emergency Regulation. There are three potential reporting costs to local agencies: (1) the costs associated with submittal of the initial compliance certification, which all public agency right holders in the Scott and Shasta watersheds must complete upon being issued a curtailment order per proposed section 875.6, (2) the costs for public right holders to complete required reporting when continuing to divert for non-consumptive uses (proposed section 875.1), minimum health and safety needs (proposed section 875.2), and livestock needs (proposed section 875.3), and (3) the costs associated with completion and submittal of the information required by an information order issued pursuant to proposed section 875.8, including supporting documentation.

For the proposed Emergency Regulation, the State Water Board identified three (3) state agencies, fifteen (15) local agencies, and five (5) schools in the Scott and Shasta watersheds that may be required to submit reports. In this analysis, the fiscal impacts are estimated on reporting for these agencies and schools.

To conservatively estimate the cost of the proposed Emergency Regulation, the State Water Board multiplied the total number of local and state government agencies and schools in the two watersheds by the total average time to complete all three reporting tasks, and then multiplied by an estimated staff cost per hour. The estimated amount of time required to complete the forms will depend on whether each entity already has documentation regarding its diversion and use, or if the entity will need to obtain such information. The State Water Board estimates that completion of its initial compliance curtailment certification would take one hour. It is estimated that the total time for each state agency, local agency, or school to complete the regular reporting would be 1.5 hours per report and the reporting frequency is monthly for 12 months for a total of 18 hours per agency. The State Water Board estimates that the total time to complete and submit information required by an information order will be 6 to 25 hours (between 5 to 24 hours to collect the requested documentation plus one hour to fill out the form and submit the data). Inasmuch as agencies are required to exercise due diligence prior to using public funds to purchase property, it is estimated that at least half of the agencies will have partial or complete records. The remaining agencies will likely have incomplete records. Thus, the average time is expected to be 15.5 hours to gather and submit the information for the information order. The State Water Board has used a conservative estimate of $79 per hour (hourly rate includes wages plus retirement and health care benefits) for local agency and school staff time, representing a Deputy Director position in Siskiyou County. A conservative estimate of $146 per hour (hourly rate includes wages plus retirement and health care benefits) was used for state government staff time, representing an Environmental Program Manager I position. The hourly rate information for these estimates was based on 2023 records from the California State Controller's Government Compensation in California database for local and state agencies.

Using the values above, the estimated cost to state agencies is $15,111, local agencies is $40,833, and schools is $13,628. The estimated costs are calculated as follows: the total number of state agencies (3), local agencies (15), or schools (5) affected by the emergency drought regulation multiplied by the amount of time to complete the reporting tasks of 34.5 hours (1 hour for initial compliance certification, 18 hours for monthly reporting for any exceptions claimed for human health and safety, livestock, or non-consumptive uses, and 15.5 hours to gather and submit the information for the information order) multiplied by the staff pay rate. This results in a total cost to local and state agencies of $69,621 due to the proposed Emergency Regulation. The cost is the same for all three scenarios.

References contained in the Fiscal Impact Statement are listed within the Information Relied Upon section of the Finding of Emergency and Informative Digest.