FINDING OF EMERGENCY AND INFORMATIVE DIGEST

FINDING OF EMERGENCY

Executive Summary

California and most of western United States are facing a significant drought in the wake of one of the driest periods on record, driven by climate change and extreme hydrologic conditions over the past three years. Water supply in many parts of California, including the Klamath River watershed, is insufficient to meet a significant portion of water demands, including ecological needs. The water supply shortage is a particular concern in the Scott River and Shasta River watersheds (Scott and Shasta watersheds), which are tributaries to the Klamath River. Addressing the severe water shortage in the Scott and Shasta watersheds requires continued urgent action to ensure water supplies are and will remain available to meet minimum instream flows for fish, human health and safety needs, and minimum livestock watering needs.

The Scott and Shasta Rivers are crucial sources of water for 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 also home to fish that are listed as threatened under the state and federal Endangered Species Act (ESA), as well as fish that hold significant cultural importance to California tribes and that are vital to the commercial and recreational fishing economy. Maintaining minimum instream flows for fish requires immediate action. Ensuring water is available to meet minimum human health and safety and livestock needs, notwithstanding the shortage conditions, is also of the utmost importance. Additional efforts need to continue in this drought to ensure that water right holders and claimants in these watersheds without other means of accessing water supplies for basic health and safety and livestock watering needs can continue to divert water, even under critical drought conditions.

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 needs to continue 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) will need to continue to curtail water diversions when flows 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, and also to curtail diversions when water is not available under a diverter's priority of right. The proposed amendments to the drought emergency regulation as adopted in August 2021 also incorporate new information on fish flow requirements, allowing for increased diversions for other uses; adds consideration of impacts to steelhead; allows adaptation of groundwater local cooperative solutions to account for improved climate conditions; and extends the season defining as unreasonable inefficient livestock watering, while also allowing for greater flexibility for exceptions. The State Water Board also needs to continue to ensure that adequate water supplies remain available for minimum health and safety needs and minimum livestock watering use. Amendments hereby proposed would provide for streamlined minimum livestock water in hot summer months. Additional proposed amendments would streamline processes, clarify that actions taken under the August 2021 drought emergency regulation continue without the need for additional action, and make other minor improvements. Continuing the emergency regulation, with amendments, will enable the State Water Board to enforce the water right priority system with respect to all water right holders and claimants in a timely manner and to protect critical water supply needed for the protection of important fish species, minimum health and safety needs, and minimum livestock watering.

This document makes findings and provides evidence of the emergency, drought conditions in the Scott and Shasta watersheds, the State Water Board and North Coast Regional Water Quality Control Board's (North Coast Regional Water Board) response to the drought conditions in these watersheds last year and the and proposed updates to the regulation, outreach and interaction in the watersheds, and status of SONCC coho, steelhead, and fall-run Chinook salmon. It further makes findings and provides evidence regarding the need for the emergency regulation, which includes an overview of water rights legal framework, the need for emergency protective minimum fishery flows, a policy overview and discussion of the effect of the proposed changes to the regulation, descriptions of the watersheds, 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 and 875.4. The document concludes with a list of information relied on, statements on local mandates and 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).

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, 2021a), 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 within the Klamath River, Sacramento-San Joaquin Delta, and Tulare Lake watersheds (Newsom, 2021b). The May 2021 Proclamation directed the State Water Board to consider emergency regulations to curtail water diversions when water is not available at water right holders' priority of right or to protect releases of stored water in the Delta watershed. 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 fishes 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 flows. For purposes of approving these emergency regulations, the May 2021 Proclamation suspended the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) (CEQA) (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, 2021d). On October 21, 2021, Governor Newsom expanded the drought declaration statewide, and required additional drought emergency planning measures for local water supply agencies (Newsom, 2021e). On March 28, 2022, Governor Newsom affirmed the continued state of drought emergency for California, affirmed and 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 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) (SWRCB, 2021). The drought emergency regulation provides the State Water Board with curtailment authority to protect minimum instream flows, establishes exceptions for minimum health and safety, non-consumptive use, and livestock watering, and limits inefficient diversions for livestock during the September through January timeframe. On September 9 and 10, 2021, the State Water Board issued

curtailment orders in the Scott River[1] and Shasta River[2] watersheds to protect minimum instream flows. Since that time, curtailment of water rights has been managed adaptively to maintain minimum instream flows while maximizing water right diversions.

The current drought emergency regulation is set to expire in August 2022. However, due to ongoing drought conditions, State Water Board is proposing to amend and extend the emergency regulation one additional year. The proposed changes to the drought emergency regulation will be heard for consideration by the State Water Board at its June 21, 2022 meeting.

Emergency Defined

Water Code section 1058.5 grants the State Water Board the authority to adopt emergency regulations in certain drought years in order 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." Section 1058.5 applies to regulations "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, and the March 2022 Proclamation acknowledged the continued drought conditions throughout the state, and extended the authorities and directives of the 2021 proclamations.

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 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 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

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[1] URL: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/scott_addendums.html

[2] URL: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/shasta_addendums.html

of the proposed emergency to OAL, OAL must allow interested persons five calendar days to submit comments on the proposed emergency regulations as set forth in Government Code section 11349.6. The information contained within 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.

Evidence of Emergency

Water year 2021-2022 is the third very dry year in a row. Precipitation levels to date are approximately half of the normal levels across much of the Klamath Basin. As noted above in Governor Newsom's Drought Emergency Proclamations, Governor Newsom declared a drought emergency in the Klamath Basin on May 10, 2021 and acknowledged the continuation of the drought emergency on March 28, 2022. The Scott and Shasta watersheds are experiencing one of the most severe droughts on record.

The following discussion provides a detailed review of hydrologic conditions in the Scott and Shasta watersheds broken out as: Precipitation and Snowpack, and Instream Flows – Current and Projected.

Precipitation and Snowpack

The Scott and Shasta watersheds have had three consecutive years of below-average precipitation. Comparisons to the 35-year average for both the April 1st snow water equivalent values and annual precipitation for Water Year (WY) 2019-2020, WY 2020-2021, and WY 2021-2022 are summarized in Table 1 and Table 2, respectively, below. April 1 generally represents the best approximate date of annual maximum snowpack extent in California.

Table 1. Scott River: Percent of Average Snow Water Equivalent and Annual Precipitation

Scott River	Percent of Average April 1st Snow Water Equivalent		Percent of Average Annual Precipitation	
Water Year	Scott Mountain	Middle Boulder	Callahan	Fort Jones
2019-2020	7%	67%	52%	49%
2020-2021	62%	80%	54%	50%
2021-2022	0%	0%	76%	50%

Table 2. Shasta River: Percent of Average Snow Water Equivalent and Annual Precipitation

Shasta River	Percent of Average April 1st Snow Water Equivalent	Percent of Average Annual Precipitation
Water Year	Parks Creek Snow Course	Yreka Gage
2019-2020	45%	51%
2020-2021	81%	51%
2021-2022	28%	63%

Instream Flows

Scott River at Fort Jones Gage

Current Flow. The United States Geological Survey (USGS) Scott River near Fort Jones gage (USGS gage no. 11519500) is about 21 miles upstream of the outlet of the Scott River watershed and represents the observed (impaired) flow of the watershed. On average, 88 percent of the total flow in the WY occurs in October to May (Oct-May) based on the long term (1941-present) flow measurements at the Fort Jones gage.

As mentioned above, the current WY (2021-2022) represents one of the severest droughts on record for the Scott River watershed. The current WY Oct-May average monthly flow is 245 cubic feet per second (cfs), which includes the effects of the current drought emergency regulation. 245 cfs is about 31 percent of the long-term average Oct-May flow. It is also one of the seven driest years on record, with flows in the lowest nine percent of the historical record (Figure 1).

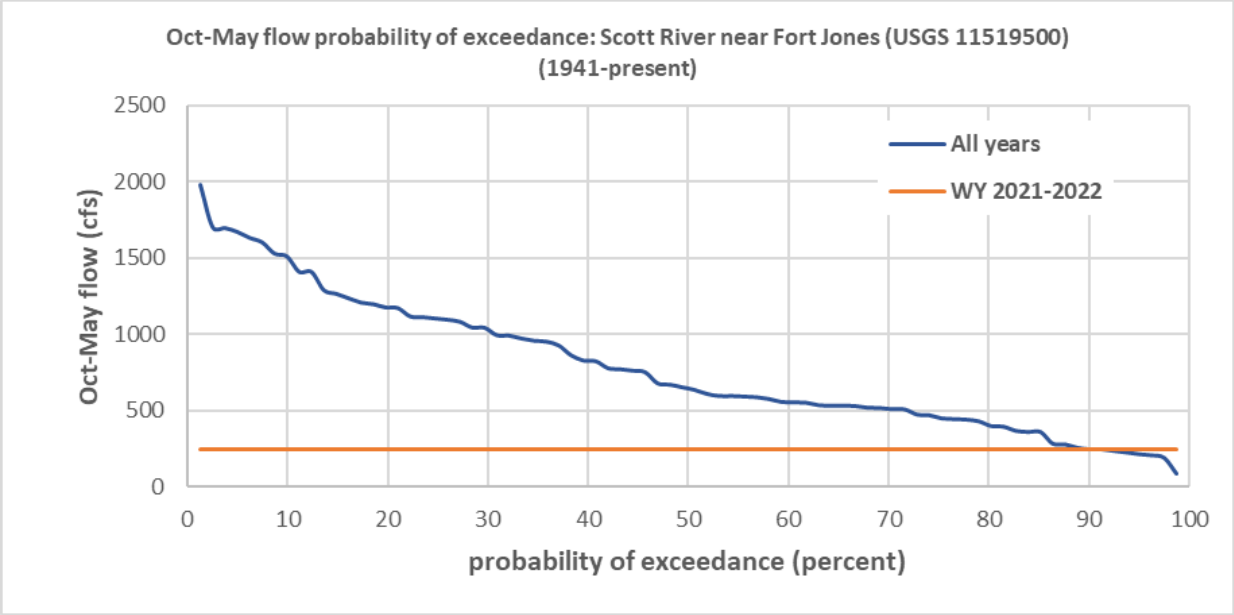

Figure 1. Probability of Exceedance of Oct-May Impaired Flow at Scott River Gage near Fort Jones (USGS Gage 11519500) and WY 2021-2022 Oct-May Flow.[3]

Forecasted Flows. Observed Fort Jones gage information from the recent dry WY 2020-2021 was used to create an impaired flow forecast for the period of July 2022 through July 2023. The water year used for the forecast represents a combination of hydrology and water use in the watershed during recent dry conditions. The State Water Board used WY 2020-2021 flows as a conservative scenario of what may occur during the July 2022 through July 2023 time period if conditions remain dry. That WY

[3] Raw data retrieved June 2, 2022 from: https://waterdata.usgs.gov/nwis/dv/?site_no=11519500&agency_cd=USGS&referred_module=sw

represents a combination of dry hydrology and water use in the watershed during recent drought events.

As shown in Figure 2, forecasted impaired (i.e., without curtailment of diversions) flows are not likely to meet the proposed drought emergency minimum flows until January 2023, if rainfall patterns this water year track those of 2020-2021. However, if rains arrive earlier in the fall, which has happened in other dry years, the flows could be met as early as October. Additionally, the timing of when flows increase in the Scott River during the fall is influenced by groundwater levels at the end of the irrigation season. In dry years, groundwater levels are lower, and it takes more fall precipitation to recharge groundwater in the basin and see sustained increases in flow in the Scott River and its tributaries. Decreased groundwater pumping (Harter, 2021a), as well as earlier precipitation, would provide for earlier reconnection of the stream system. Once the forecasted impaired flows exceed the proposed drought emergency minimum flows in January 2023, they are projected to stay above the minimum flows until June 2023. Accordingly, curtailment of diversions is needed to achieve the proposed drought emergency minimum flows from July 2022 through December 2022, and from June 2023 through July 2023.

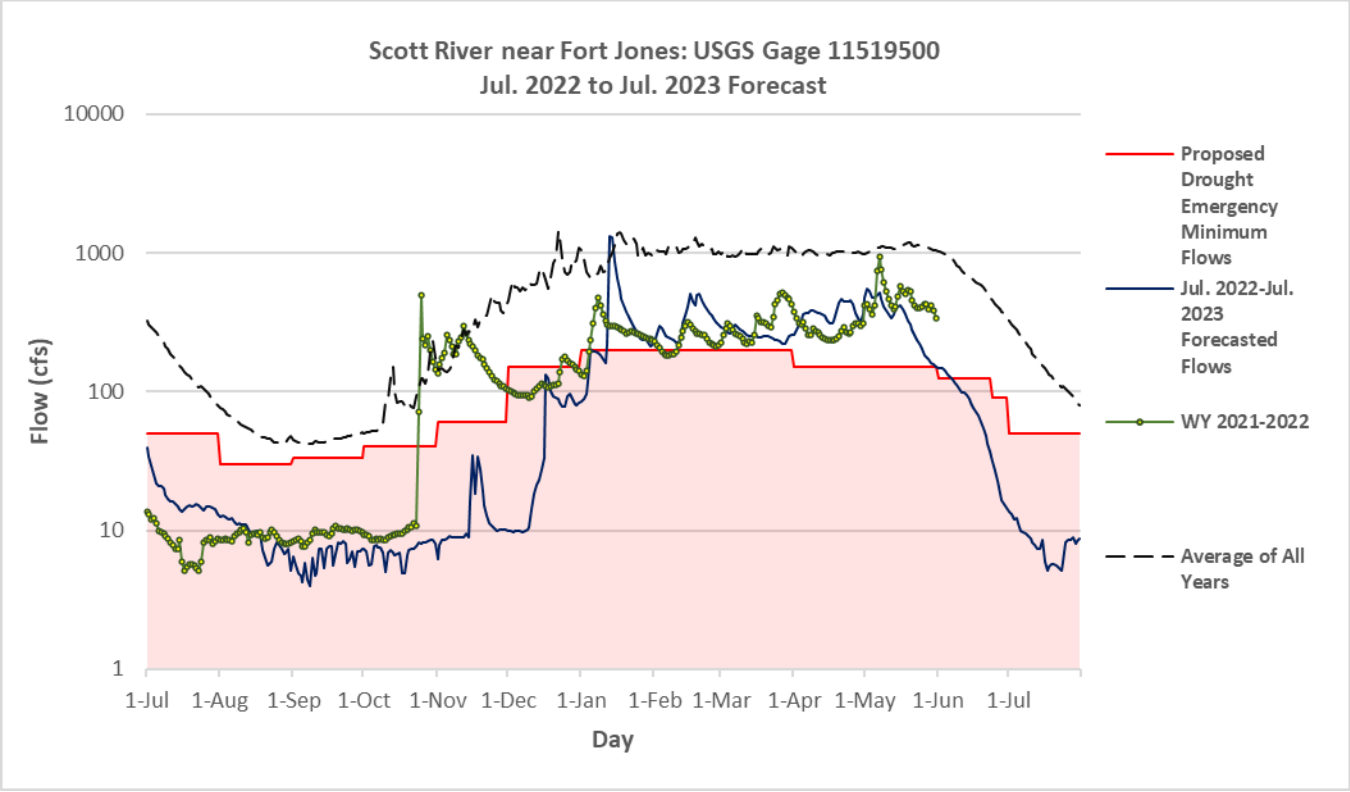

Figure 2. Scott River Average Daily Impaired Flow at Fort Jones Gage for Recent Dry Water Year (2020-2021). Note: Water Year 2020-2021 used to forecast potential impaired flow during July 2022 through July 2023. Flows in Water Year 2021-2022 as shown with a green line with circles is influenced by curtailment orders that were mailed to water right holders starting September 9, 2021, in the Scott River watershed. The vertical scale (y-axis) is logarithmic.

Shasta River at Yreka Gage

Current Flow. The USGS Shasta River gage near Yreka (USGS gage no. 11517500) is at the outlet of the Shasta River watershed and represents the impaired flow of the entire watershed. On average, 89 percent of the total flow in the WY occurs in October to May (Oct-May) based on long-term (1933-present) flow measurements at the Yreka gage. The recent WY (2021-2022) represents one of the severest droughts on record for the Shasta River watershed. The current WY Oct-May average monthly flow is 125 cfs, which includes the effects of the current drought emergency regulation. 125 cfs is 53 percent of the long-term average Oct-May flow. It is also one of the five driest years on record, with flows in the lowest six percent of the historical record (Figure 3).

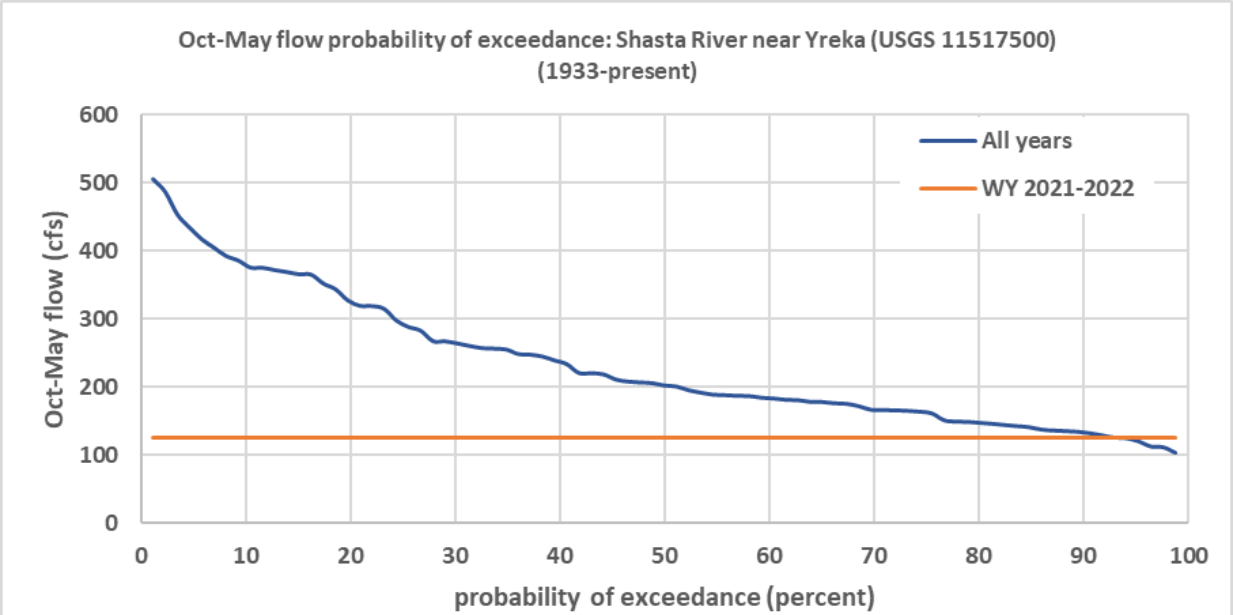

Figure 3. Probability of Exceedance of Oct-Jul Impaired Flow at Shasta River Gage near Yreka (USGS Gage no. 11517500) and WY 2020-21 Oct-May Flow.[4]

Forecasted Flows. Historical flow data from past years (which includes depletions from diversions) were used to create flow projections for the remainder of calendar year 2022 through July 2023. The recent dry WY 2020-2021 was used to create impaired flow forecasts at the Yreka gage for July 2022 through July 2023. That WY represents a combination of hydrology and water use in the watershed during recent drought events. The Shasta River is fed by large spring sources and is less dependent on heavy rains to increase flows in the fall season as compared to the Scott River. Typically, when the

[4] Raw data retrieved June 2, 2022 from: https://waterdata.usgs.gov/nwis/uv?cb_00060=on&cb_00065=on&format=gif_stats&period=30&site_no=11517500

irrigation diversions end around October, the flows at the Yreka gage of the Shasta River increase in a pattern not dependent on rainfall timing.

As shown in Figure 4, forecasted impaired flows (WY 2020-2021) are not likely to meet the CDFW drought minimum flows until mid-December 2022. Forecasted impaired flows are also not likely to meet the proposed drought emergency minimum flows after mid-April 2023. Accordingly, curtailment of flows is needed to achieve the proposed drought emergency minimum flows.

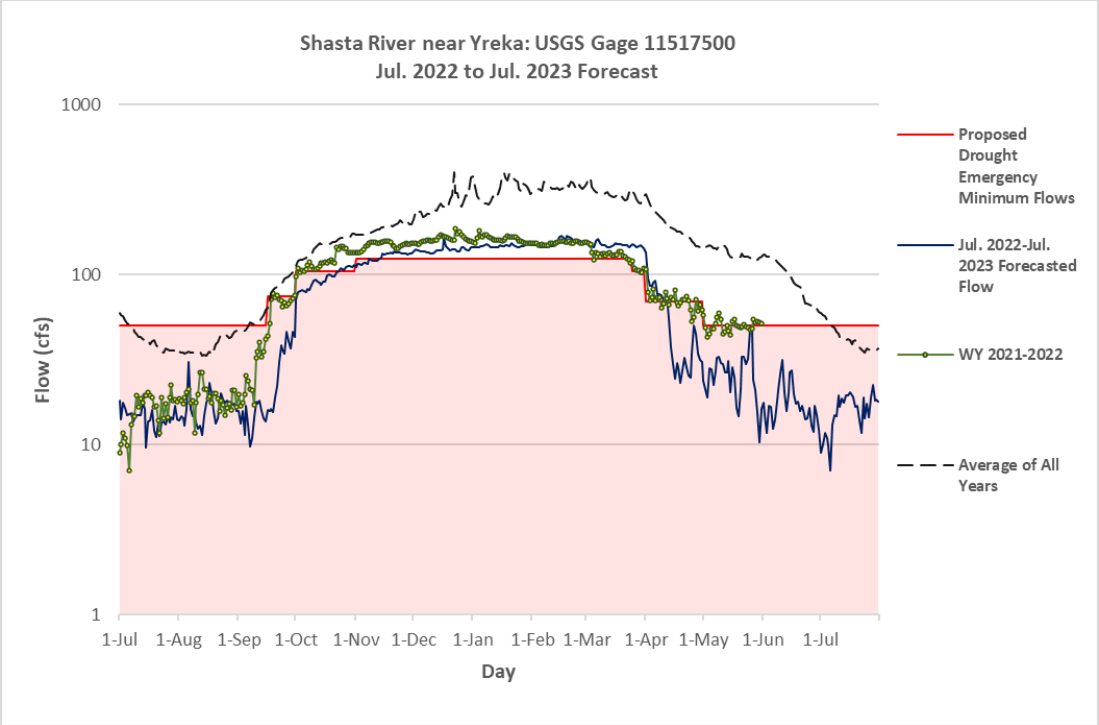

Figure 4. Shasta River Average Daily Impaired Flow at Yreka Gage for Forecast for July 2022 to July 2023. Note: Water Year 2020-2021 used to forecast potential impaired flow during July 2022 through July 2023. Flows in Water Year 2021-2022 as shown with a green line with circles is influenced by curtailment orders that were mailed to water right holders starting September 10, 2021, in the Shasta River watershed. The vertical scale (y-axis) is logarithmic.

Water Boards Planning and Response to Drought, Emergency Regulation, and Related Public Outreach

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, NMFS, CDFW, and Division of Water Rights staff organized an ongoing bi-weekly drought response call 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-profit organizations, the Scott River and Shasta River Watermaster District (watermaster), and interested individuals. Despite these efforts, fall-run Chinook salmon were unable to reach spawning grounds in the Scott watershed and coho salmon nearly suffered the same fate in 2020.

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. This information letter encouraged water right holders and claimants to plan and prepare for potential water shortages later this 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 representatives presented at the Siskiyou County Board of Supervisors regularly scheduled meeting regarding current dry conditions in the Scott River watershed, fisheries and water management concerns, and funding opportunities to help address these challenges. 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 and Shasta watersheds.

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.

On July 14, 2021, State Water Board staff met with representatives from local environmental organizations to discuss the emergency drought 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 an Shasta River Watersheds that announced the release of draft drought emergency regulations for public comment and advertising a July 20, 2021 public meeting. During the public meeting on July 20, 2021, State Water Board and CDFW staff described the draft drought emergency regulations, presented responses to past comments on the CDFW flow recommendations, answered audience 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 existing drought emergency regulation provides 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 emergency regulation declares certain diversion practices unreasonable, and declares that diversions are unreasonable when the drought emergency minimum instream flows are not met. On September 9 and 10, 2021, the State Water Board issued curtailment orders in the Scott River and Shasta River watersheds to protect minimum instream flows. Since that time, curtailment of water rights has been managed adaptively to maintain minimum instream flows while maximizing water right diversions

To assist compliance with curtailments and informational orders, Water Boards staff setup and managed a phone and email hotline. Water Boards staff responded to over 360 inquiries, usually within 1-business day. Staff developed online video tutorials for compliance, and held a workshop on compliance on September 23, 2021. On October 21, 2021, State Water Board staff issued a letter to water users clarifying the regulation's rules regarding stockwater diversions in both watersheds. On December 10, 2021, State Water Board and CDFW staff hosted an in-person compliance assistance day in Yreka, CA.

Since adoption of the emergency regulation on August 17, 2021, Water Boards staff met frequently with community members, members and staff from the Siskiyou County Board of Supervisors regarding implementation, local cooperative solutions, and potential regulatory changes. On June 1, 2022, Water Boards staff and Board Members toured the watersheds with members of the agricultural community and Siskiyou County Board of Supervisors and discussed the aforementioned topics.

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 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, 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. 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/2022/2022-05-25-meeting-ssd.pdf.

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. State Water Board received approximately 17 written comments.

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 Southern Oregon/Northern California Coast (SONCC) Coho Salmon ESU, culturally and commercially significant Upper Klamath Trinity fall-run Chinook Salmon ESU, and the culturally significant KMP steelhead Distinct Population Segment (DPS). 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 species spawns, hatches, and rears in tributaries to the Klamath River, including the Scott River and Shasta River, and then travels to the ocean. The fish then typically return to the same tributary, three years after hatching. 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).

Summer-run steelhead within this 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).

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, 2021a). Dry conditions have led to extreme events that threaten the 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 on the mainstem Scott River, resulting in significant migration delays and potentially[5] a loss of that year's run of salmon (also known as a brood year). CDFW notes that cohort failure represents loss of a significant component of the population, increases the potential for extirpation, and greatly impedes natural recovery. The May 3 CDFW letter 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 proposed drought emergency minimum flows for the Scott and Shasta River watersheds urging the State Water Board to adopt flows in the current drought emergency (CDFW, 2021c). 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, 2022a).

The following discussion provides a detailed review of fisheries conditions in the Scott River and Shasta River watersheds.

Scott River Watershed

The periodicity of salmonids in the Scott River watershed is summarized in Figure 5 and described here. In the Scott River, fall-run Chinook salmon migration and spawning typically occurs from late-September through December. SONCC coho salmon migration and spawning typically occurs from mid-October to early January (CDFW, 2020a). Fall-run Chinook salmon fry emergence occurs during the winter and spring, and a majority of the juveniles out-migrate from April through June. SONCC coho salmon fry emerge from February to June and rear in the stream for approximately one year. The following spring and early summer juvenile coho salmon out-migrate to the ocean. Tributary-specific migration data for steelhead in the Scott River is less well

[5] Juvenile coho outmigration numbers gathered in 2022 indicate that cohort loss of coho salmon was avoided in the Scott River in 2020, despite the significant migration delays (CDFW, 2022d).

captured than for coho and fall-run Chinook because a large fraction of the adult steelhead migration occurs outside the operational window of the Scott River Fish Counting Facility (SRFCF) (CDFW 2022b). 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, most commonly two years, before migrating downstream toward the ocean in spring, primarily during the months of March through May. Summer steelhead runs are only occasionally present in the Scott River watershed (NCRWQCB, 2005).

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. The 2019 return of brood year 1 increased to an estimated 365 fish, an improvement that remains far below the population prior to the 2013 drought (CDFW, 2021b).

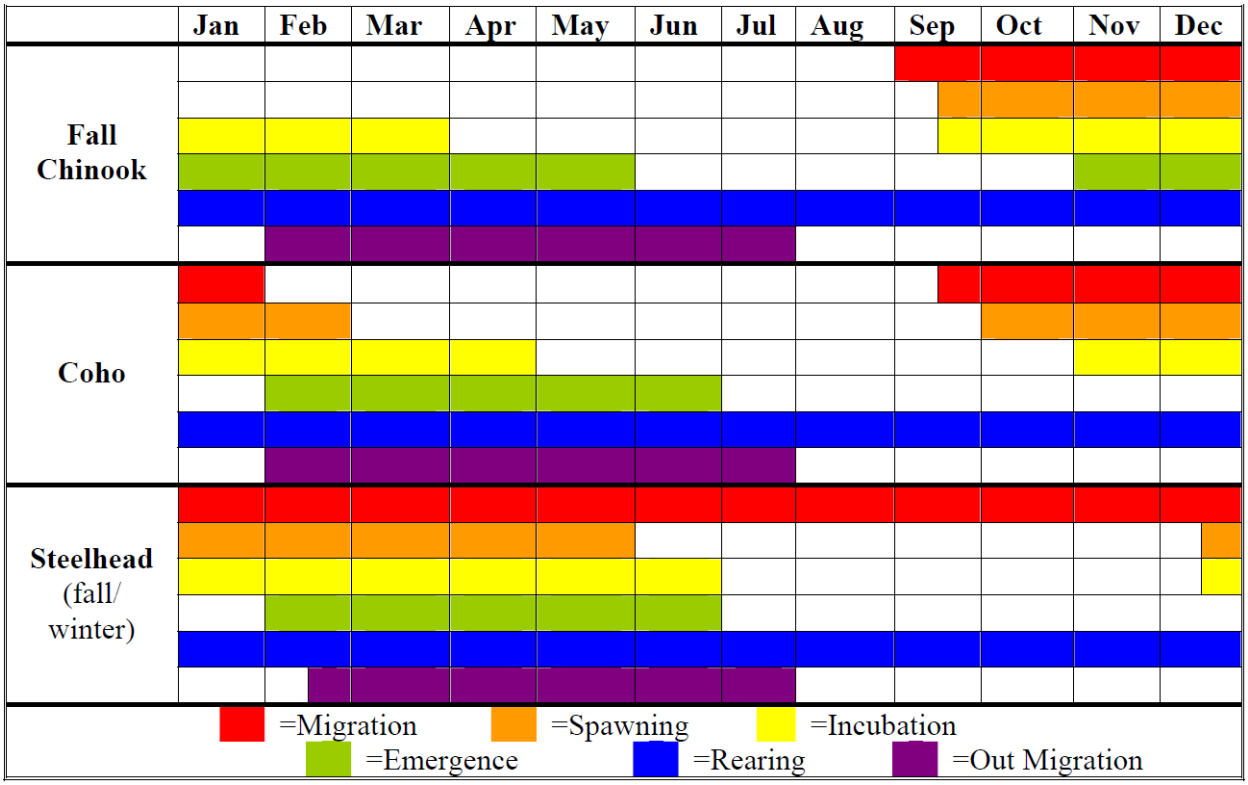

Figure 5. Salmonid Periodicity in Scott River Watershed (NCRWQCB, 2005)

The spatial distribution of annual spawning in the Scott River 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 (i.e., eggs are deposited in the tributaries rather than the mainstem). The tributaries and upstream floodplain provide refuge, cover, and feeding opportunities for juvenile salmonids that is not available in the downstream canyons. In other words, access to more rearing habitat increases potential production, which can in turn increase adult returns. Since 2008, an average of 65 percent of the Chinook salmon have spawned *upstream* of the SRFCF (location in the watershed is indicated in Figure 6). However, in three of the last five years prior to adoption of the Emergency Regulation (2015, 2018, and 2020) 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, 2021b). However, in the Fall of 2021, following the adoption of the Emergency Regulations and the implementation of a large groundwater forbearance agreement in the Scott, 29% of Chinook Salmon Spawning occurred downstream of the SRFCF and 71% occurred upstream, in more suitable spawning reaches (CDFW, 2022b).

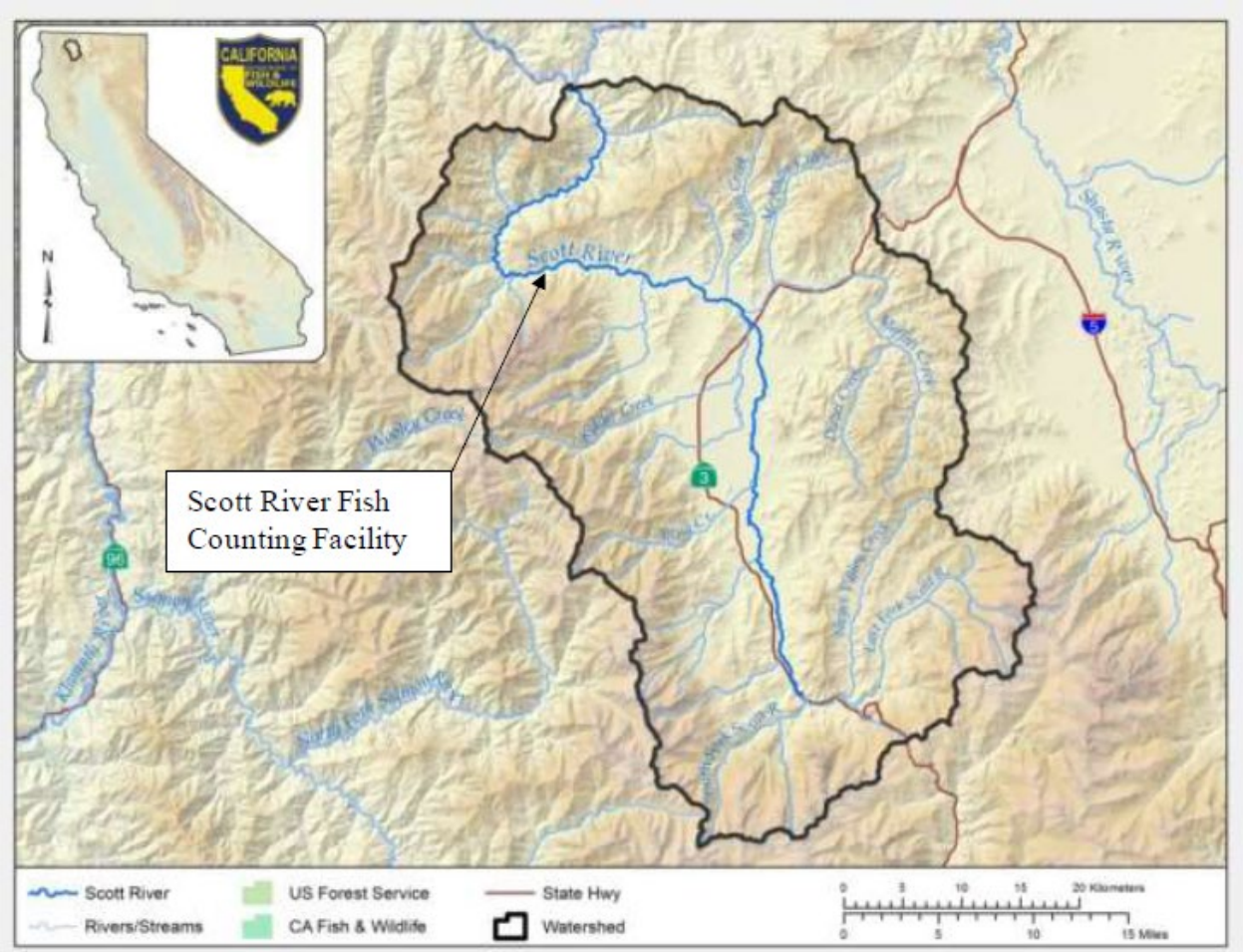

Figure 6. Location of the Scott River Fish Counting Facility

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. This occurred in the fall and winter of 2013/2014, when daily mean flows at the Fort Jones gage were less than 60 cfs (flow needed to reconnect the mainstem Scott River to the key spawning tributaries) for the entire coho salmon migration period (mid-September through January), and 97 percent of coho salmon spawning occurred in the mainstem (CDFW, 2021b).

Additionally, in the fall of 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 believes that some of these coho eventually managed to access a portion of available spawning habitat after a mid-December rain event, and narrowly avoided complete spawning failure of the cohort for that year. In the Scott River, coho salmon juveniles typically rear in freshwater for a year before out-migrating

to the ocean the following spring and summer. As of June 2022, monitoring of the juvenile coho salmon outmigration population from the fall 2020 adult cohort is ongoing. While preliminary juvenile outmigration population estimates are positive, the success of the 2020 spawning will not be fully understood until data collection and population estimates are finalized. Chinook salmon were also impeded or prevented from accessing spawning tributaries during the second half of October 2020 due to inadequate flows. This is very concerning to CDFW because there has been a 65 percent reduction in the Scott River fall-run Chinook salmon run from 2015 to 2020 compared to the period of record from 1978 to 2020 (from an average of 4,977 fish per year, to 1,738 per year) and the fall-run Chinook salmon run in the Scott watershed is declining at a faster rate than the Klamath River watershed as a whole (a population decline of 43% as compared to the period of record from 1978 to 2020) (CDFW, 2021b).

In July 2021, the National Marine Fisheries Service (NMFS) conducted a fish relocation effort on Sugar Creek, a tributary to the Scott River, in response to severely limited habitat exacerbated by declining flows (NMFS, 2021a). Fish were relocated to an adjacent off-channel pond with reliable cold-water inputs from groundwater sources. A total of 473 juvenile coho salmon were relocated. Due to fish health risks associated with relocation efforts, they are only attempted in the Scott River watershed when a significant number of juvenile fish are threatened by decreasing flows and have no natural path to refugial waters. The last time a large-scale fish rescue operation was conducted in the Scott River was in 2014, another significantly dry year. Coho salmon smolts ratios (as compared to the number of returning adult females) in the year of the rescue were quite low, suggesting that the survivability of the smolts was severely reduced despite these efforts (CDFW, 2020a).

The number of returning adult steelhead has been monitored at the SRFCF since 2007. From 2007 to 2021, the number of observed adult steelhead has ranged from a high of 917 to a low of 8 with an average of 250. 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, 2022b). The Scott River rotary screw trap project has been in operation since 2000. In 2021, one rotary screw trap was operated on the Scott River from January 26 to June 22, 2021 to sample all age classes of emigrating salmonids. In 2021, it is estimated that a total of 19,539 young-of-the-year (zero-plus years old) steelhead, 41,281 one-plus year-old steelhead, 3,065 two-plus year-old steelhead; and 5 three-plus year-old steelhead emigrated out of the Scott River. Estimates of the number of two-plus year-old steelhead produced from the Scott River for 2021 were compared with the data from the previous 20 years of sampling. The estimate of 3,062 two-plus year-old steelhead is 15% of the seasonal average population estimate (CDFW, 2021f).

Shasta River Watershed

The periodicity of salmonids in the Shasta River watershed is summarized in Figure 7 and described here. In the Shasta River, fall-run Chinook salmon migration and spawning typically occurs from September through December. SONCC coho salmon migration and spawning occurs from mid-October to early January. Fall-run Chinook salmon fry emergence occurs during the winter and spring, and juveniles out-migrate to the ocean from April to June. Coho salmon fry emerge from February to May and rear in the stream for approximately one year. The following spring and early summer juvenile coho salmon out-migrate to the ocean. Obtaining migration and life history data for Steelhead is challenging in the Shasta River because the objectives of the 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). Juvenile steelhead typically rear in freshwater for one to three years, most commonly two years, before migrating (CDFW, 2017).

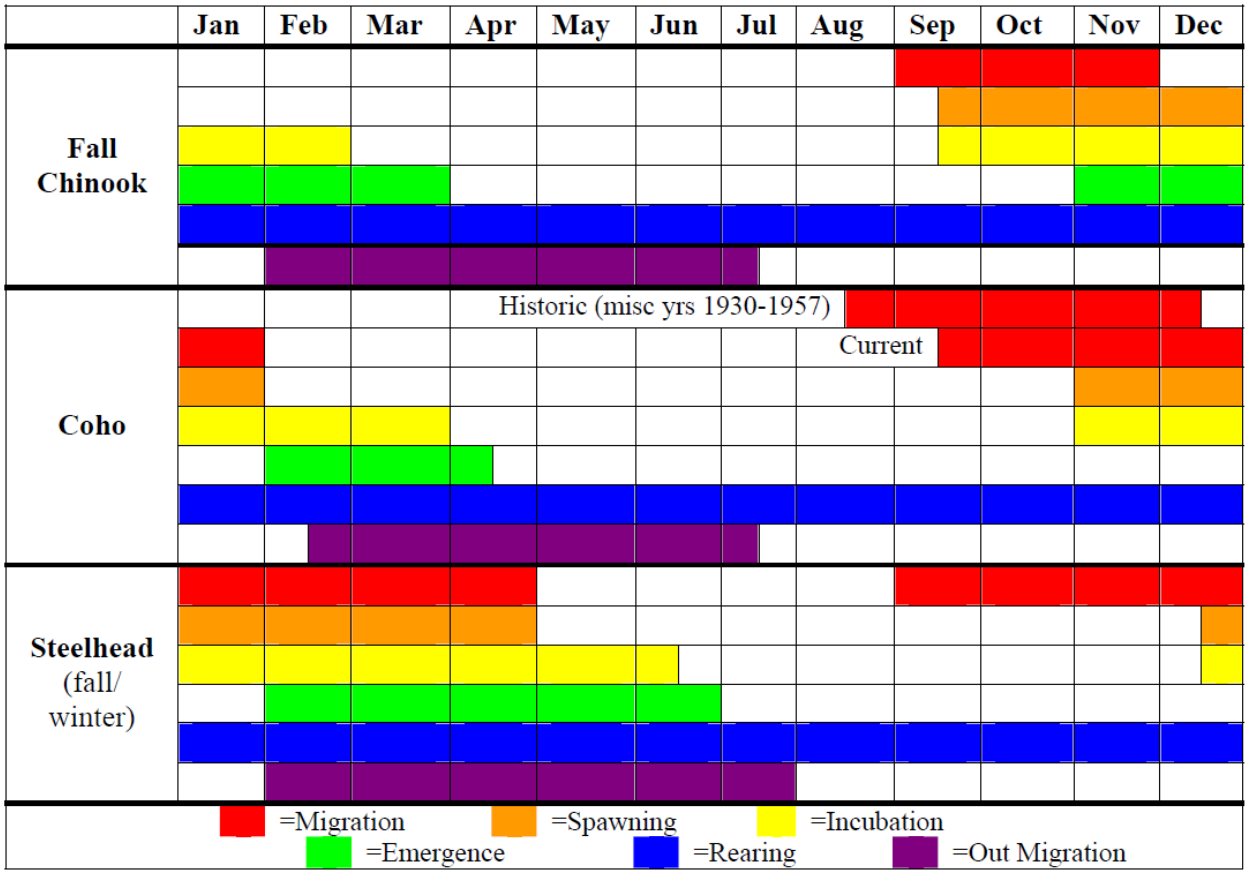

Figure 7. Salmonid Periodicity in Shasta River Watershed (NCRWQCB, 2006)

The Shasta River watershed, including the Big Springs Complex, mainstem Shasta River, and other key tributaries, has supported roughly 10 to 30 percent of the natural Klamath River watershed (including the Trinity River) fall-run Chinook salmon population over the last decade (CDFW, 2020c). The Shasta River watershed is also key to supporting spawning and rearing habitat for Klamath Basin coho salmon. In the previous two years before implementation of the Emergency Regulation, out-migration conditions for fall-run Chinook and coho salmon in the Shasta River watershed have been critically impaired. May 2021 and July 2021 flows were as low as 5.8 cfs at the Montague gage (lowest record of 2001-2021) and 6.9 cfs at the Yreka gage (third lowest record of 1988-2021).

Construction of Dwinnell Dam in 1928 at River Mile 40 has blocked access to over 18 miles of high-quality steelhead habitat. The dam, along with other downstream diversions, has changed the Shasta River hydrograph and has contributed to an increase in summer water temperatures, limiting the availability of high-quality habitat for steelhead (Moyle et al., 2008).

The Shasta River rotary screw trap project has been in operation 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, 2021 to sample all age classes of emigrating salmonids. During this period, it was

estimated that 3,810 young-of-the-year (zero+ years old) steelhead, 977 one-plus year old steelhead, 20,316 two-plus year old steelhead, and 3,638 three-plus year-old steelhead emigrated from the Shasta River. The estimated number of two-plus year-old steelhead produced from the Shasta River for 2021 was 20,316, representing only 38% of the 2019 estimate (CDFW, 2021g).

It is important to note the high correlation of low flows in the Shasta watershed with temperatures that impair salmon, at both sublethal and lethal levels (Figure 8).

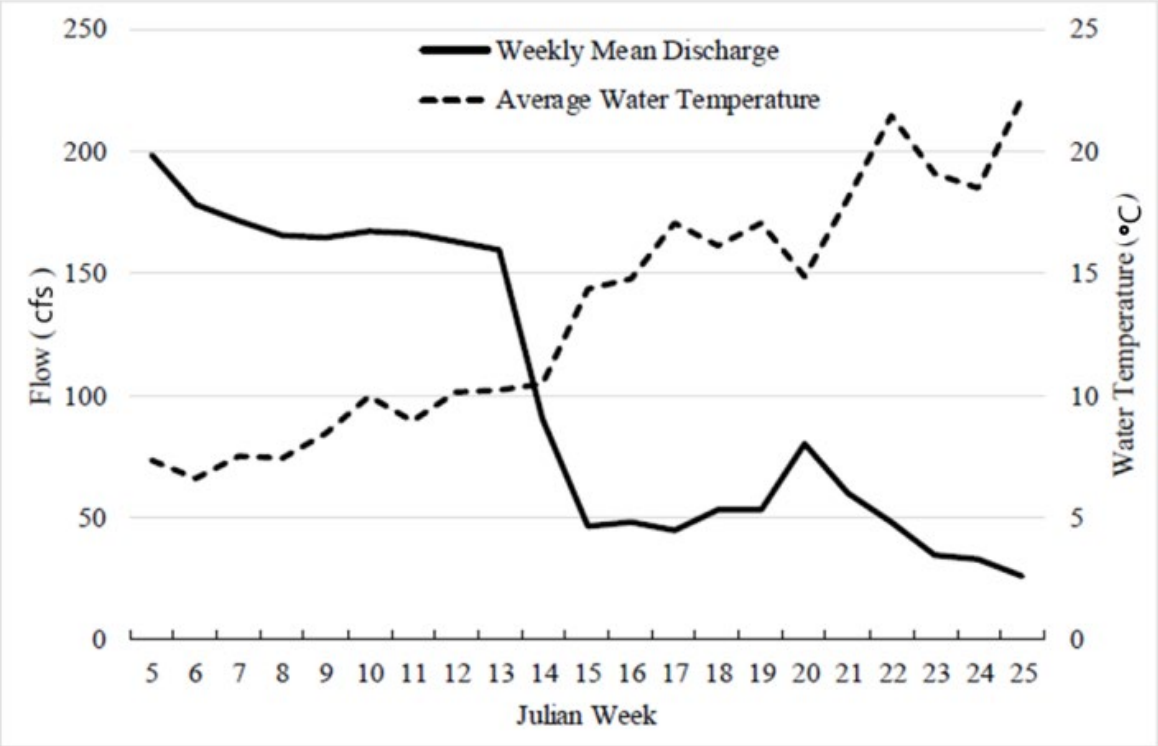

Figure 8. Average weekly flow in cfs and average water temperature in Cº on the Shasta River in 2020. Flow measurements are from the Yreka gage and temperatures recorded at the Shasta rotary screw trap, near confluence with Klamath River (CDFW, 2020b)

Lethal temperatures are defined for Chinook and coho salmon in the Shasta River as occurring at 25°C, for a period of 7 days. Elevated but sublethal water temperatures can have myriad 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 recorded unprecedented temperatures at its rotary screw trap, which is located near the Yreka gage. CDFW only operates the rotary screw trap when water temperatures are below 21 degrees Celsius (70 degrees Fahrenheit) in order to protect fish from additional stress. In 14 years of the 20 year-rotary screw trap record, Shasta River water temperatures have allowed CDFW to operate the trap until the end

of June. In 2021, this temperature threshold was reached in mid-May. As of June 8, 2022, this temperature threshold has not been reached during the juvenile outmigrant period in the Shasta River for the 2021-2022 water year. In the 20-year record of operation, the previous earliest day this threshold was reached was June 17.

Fishery managers have been concerned with flow and temperature conditions in the Shasta River during the early weeks of the fall migration during many years. As a result, resource agencies and local landowners have been coordinating a range of voluntary efforts for the last decade to try and ensure adequate flows in the Shasta River for the fall migration of Chinook salmon during the critical month of September. Data from 2020 represents the second consecutive year that the Shasta River fall-run Chinook salmon spawning migration population has fallen below the average population (6,632) for the period of record (1978-2020) (CDFW, 2020c). Preliminary data from 2021 indicates 6,908 returning adults in the Shasta River (CDFW, 2021e).

BENEFIT OF THE 2021 REGULATION

Since adoption, the Scott and Shasta River Emergency Drought regulation has resulted in multiple benefits, including to groundwater conservation and timing of reconnection of the Scott River in Fall 2021, and reduced instream flow impacts caused by the onset of surface water diversion in the Shasta River, which benefit the 2022 coho and Chinook salmon juvenile outmigrants. The regulation has also benefited water supply and water demand data collection.

Groundwater Conservation

Groundwater use in both watersheds was a focus of the drought emergency regulation, acknowledging the interconnected nature of groundwater and surface water in the Scott and Shasta watersheds. A pathway for local cooperative solutions (LCS) was built into the drought emergency regulation to encourage reductions in groundwater use while also allowing for greater economic certainty to the agricultural community around water availability during curtailments. To date, 57% of the acres identified as being irrigated with groundwater in the Scott watershed are operating under an approved 30% water use reduction plan. An additional 32% of the total groundwater-irrigated acreage have groundwater use reduction plans officially pending approval or under development or review. Opportunities exist in the Shasta watershed for similar groundwater reduction LCS to be formed.

Prior to the adoption of the drought emergency regulation, several landowners entered into a forbearance agreement with CDFW to cease groundwater pumping in August 2021. This forbearance agreement resulted in an early and significant rise in groundwater elevation, showing the result of groundwater conservation on groundwater elevation.

Model results from the Scott Valley Integrated Hydrologic Model (SVIHM) indicate a 20% improvement in irrigation efficiency would result in an increase in streamflow for November and December during a dry year.

Considering the response observed to the groundwater forbearance agreement and the modeled results for a 20% increase in irrigation efficiency, the State Water Board expects to see an increase in surface flow from these 30% groundwater conservation LCS agreements.

Scott River Reconnection Response to Rainfall

In the Scott watershed, full curtailment occurred pursuant to Order WR 2021-0083-DWR on September 10, 2021, following the adoption of the drought emergency regulation. Prior to this, three landowners representing over 4,000 acres of groundwater-irrigated alfalfa approached CDFW with a plan to forbear their irrigation and cease pumping from the aquifer that underlays a critical reach of the Scott River that must be connected to allow Chinook to move from the Scott River canyon to their spawning grounds (Reach 9). CDFW funded forbearance, and it was initiated in early August (during the drafting and preparation for adoption of the drought emergency regulations) with the understanding that reductions in groundwater use no later than August 15 would be needed to facilitate reconnection of the Scott River in time for Chinook migration per the SVIHM results. As discussed elsewhere in this document, these forbearance agreements resulted in an increase in groundwater elevation in Reach 9 prior to the first major rainfall of the season.

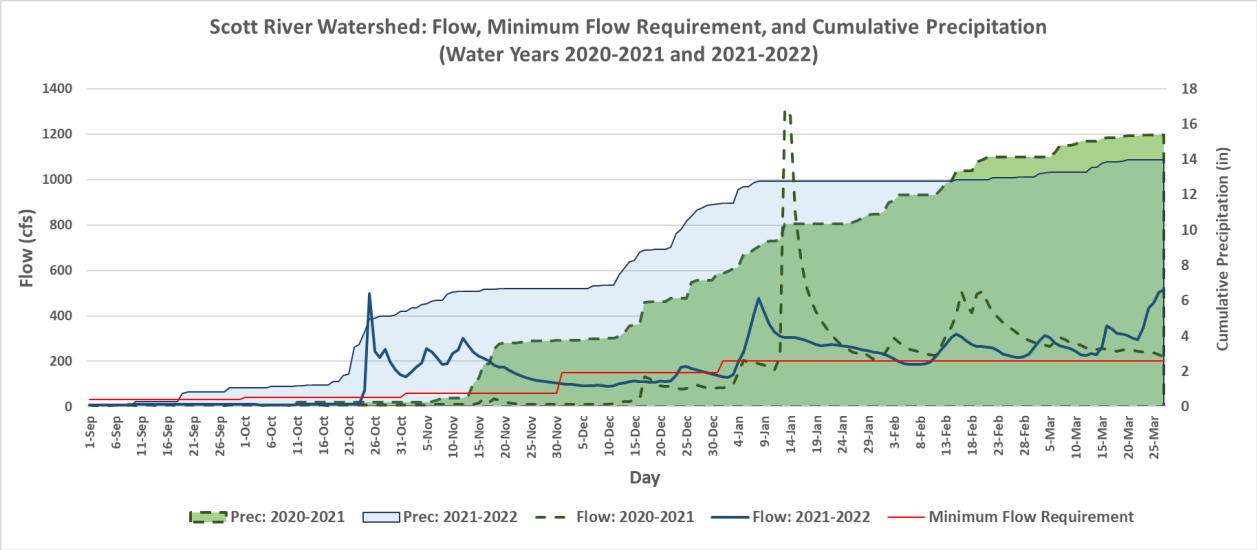

Figure 9. Rainfall and Flow in the Scott River. Cumulative Precipitation (in) and flow (cfs) at USGS Scott River near Fort Jones gage in the period of September through March of water years 2020-2021, and 2021-2022. Streamflow data source: USGS Scott River near Fort Jones gage (USGS gage no. 11519500). Precipitation data source: (PRISM Climate Group, 2015). Precipitation is estimated at the location of USGS gage (with the assumption that it represents the average rainfall of the Scott River watershed). CHA = Callahan rain gage; CLB = Collins Baldy rain gage; QTZ = Quartz Mountain rain gage.

Beginning on October 5, 2021, the first recordable rainfall for the 2021-2022 water year began at the Collins Baldy rain gage (CLB) at the northern end of the Scott River watershed near the divide with the Mid-Klamath River watershed (Figure 9). On October 25, 2021 at 2 am, the first peak flow for the 2021-2022 water year was recorded at USGS Scott River near Fort Jones gage (USGS gage no. 11519500), measuring 720 cfs. At this time, cumulative rainfall in the Scott River watershed ranged from 4.09 inches at the Callahan rain gage (CHA) to 1.89 inches at the Quartz Mountain rain gage (QTZ). This precipitation had fallen predominantly between October 18 and October 25 and was able to connect the Scott River and allow Chinook Salmon to migrate to their spawning grounds. It is likely that the elevated groundwater levels, resulting from the combined effect of the forbearance agreements and the curtailments, contributed to the Scott River connecting with the relatively moderate amount of rainfall spread out over a period of 7 days. Following this connection event, the river remained connected with subsequent precipitation events, allowing an estimated 1,324 Chinook salmon and 829 Coho salmon to pass the CDFW counting station located in the Scott River watershed for spawning.

Benefit to the 2022 Coho and Chinook Salmon Outmigrant Cohorts

In water year 2020-2021 prior to the adoption of the Emergency Regulations, significant efforts were underway by a collaborative group of agencies, tribes, and watershed groups to address the impacts of low rainfall and critically dry conditions on salmonid species, including Coho salmon. Without a groundwater forbearance agreement or any emergency regulations in place, a limited toolset was available. For the 2020 brood year, a total of 1,766 adult Coho salmon were estimated to have passed the SRFCF, downstream of the USGS Scott River near Fort Jones gage. Efforts in the spring of 2021 were focused on ensuring Coho redds deposited in spawning gravels in French and Miner's Creeks, 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. As of June 10, 2022, the Scott River tailings remain connected with no interruption in flows, allowing juveniles that may have over-summered in the South Fork of the Scott River and East Fork of the Scott River to move out of those sub-watersheds and out-migrate to the Klamath River. As of June 10, 2022, a preliminary estimate of outmigrant data from CDFW's rotary screw trap on the Scott River indicated 81,303 age 1+ Coho salmon have out-migrated from the Scott watershed resulting from the 2020 brood year, indicating high rearing and outmigration success despite the dry conditions, that is likely attributable to the combination of voluntary and regulatory efforts. Additionally, early data from juvenile outmigration monitoring show that Chinook salmon juvenile outmigration numbers from both the Scott River and Shasta River watersheds are approximately average or better than average this year as compared to previous years which is a very positive result during an extreme drought.

Water Supply and Water Demand Data Collection

Both watersheds have seen increased reporting of water use on a more regular interval than in past drought years. This includes increased coordination with the watermaster, Montague Water Conservation District, and Scott Valley Irrigation District, among others. Individual landowners diverting more than 1 cfs have been required to report daily average diversion information in the Scott, beginning with Addendum 11 to Order for Reported Water Rights in the Scott River Watershed issued September 9, 2021. Additionally, two information orders have been issued to better understand water use related to livestock diversion and better understand diversions on Willow, Julian and Yreka Creeks, tributaries to the Shasta River. These actions have developed a more thorough understanding of agricultural water use and the overall water balance in the Scott and Shasta watersheds, and have allowed issuance of more tailored curtailment addenda that have both improved meeting drought emergency regulation flows and allowed additional diversion. In addition to better information regarding diversions, the State Water Board, CDFW, the watermaster, and the North Coast Regional Water Board have collaborated on the location and maintenance of four new flow gages in the Shasta watershed and two new flow gages in the Scott watershed. This additional data collection has allowed staff to better understand the impacts of management decisions in real time, including information related to groundwater-surface water connectivity in critical tributaries to the Shasta River like Big Springs Creek. These gages include temperature loggers, allowing staff to also better understand the relationship between water quality and water quantity in both watersheds. Additionally, information submitted by petitioners in the curtailment process has enabled a re-assessment of flow requirements, resulting in the changes to winter drought emergency flow requirements on the Shasta River, under both implementation of the current drought regulation, and for adoption in the proposed regulation.

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

A direct benefit of the drought emergency regulation in the Shasta River is 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 10). These large fluctuations likely result in the stranding of juvenile salmonids or their redds, resulting in fish stress or mortality and a reduction of viable redds. Following the adoption of the drought emergency regulation, between March 15, 2022 and May 2, 2022, flows ranged from 129 cfs to 42.9 cfs, with less variation in flow (Figure 11). This has likely minimized fish stress and mortality resulting from large variations in flow and is a direct result of coordination between the State Water Board, the watermaster, and surface water diverters in response to the emergency regulation.

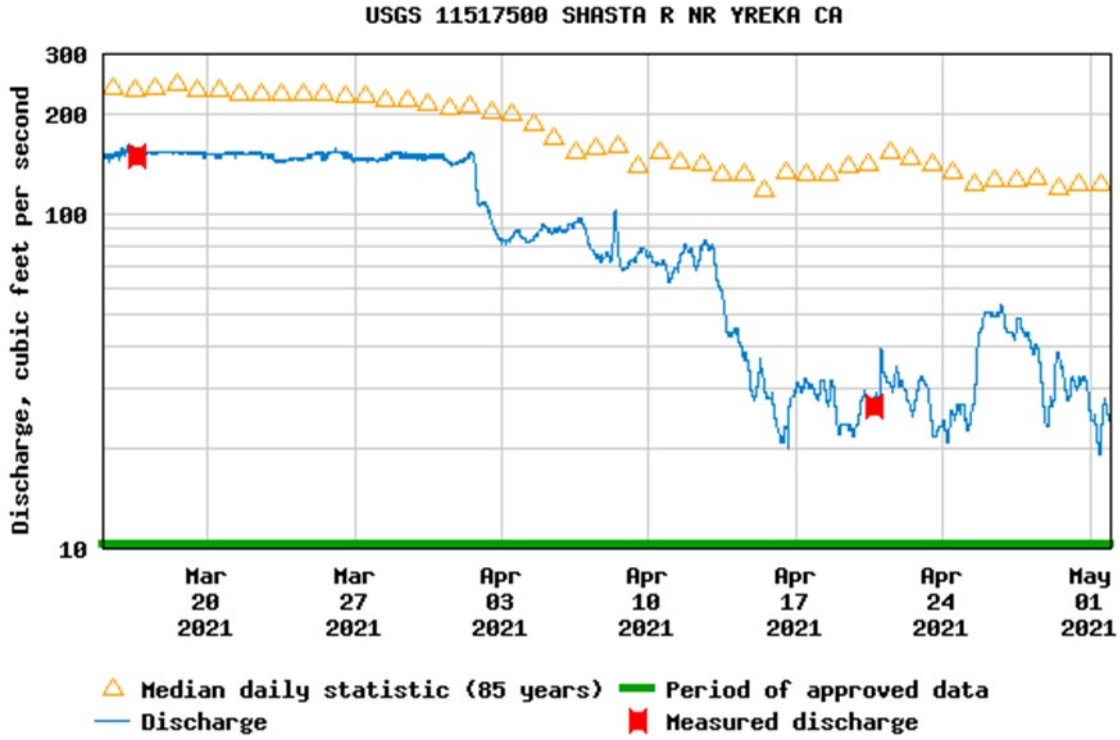

Figure 10. Shasta River flows at the USGS Gage in Yreka between 3/15/2021 and 5/1/2021

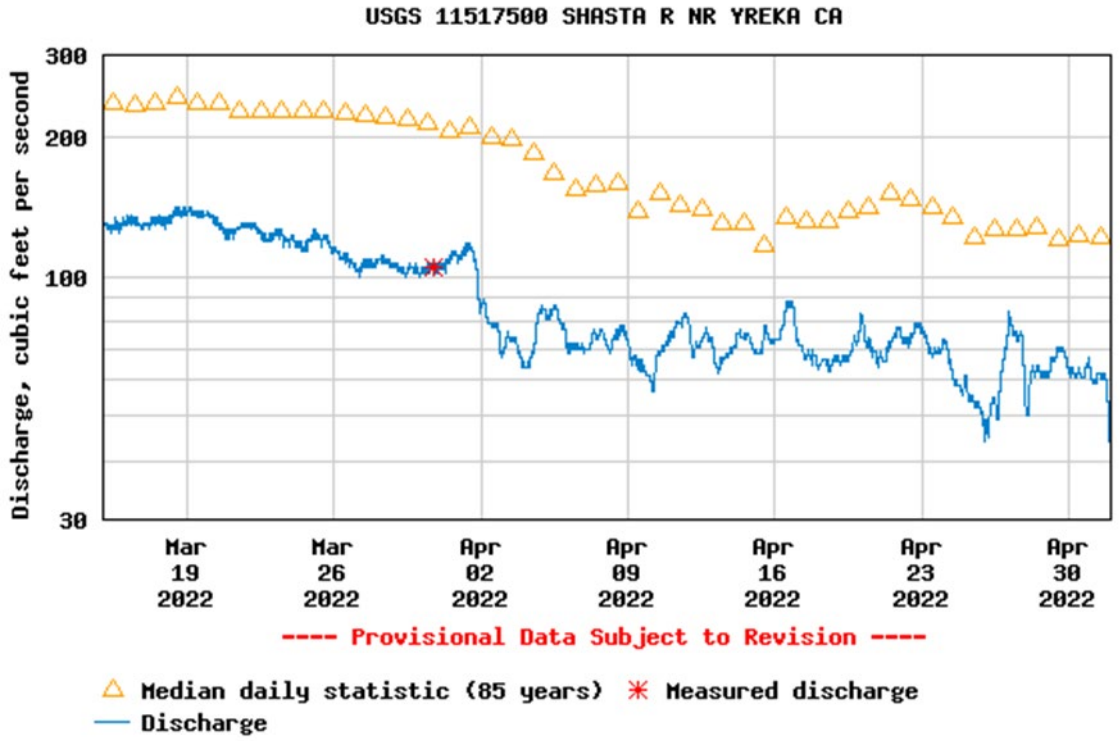

Figure 11 – Shasta River flows at the USGS Gage in Yreka between 3/15/2022 and 5/1/2022

NEED FOR CONTINUED EMERGENCY REGULATION AND UPDATES

Immediate action is needed to extend the duration of and amend the drought emergency minimum fisheries flow requirements in the Scott River and Shasta River watersheds, and 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 during the drought. In the absence of the drought emergency regulation, there are no other regulations that provide for bare minimum fisheries flows in the Scott River and Shasta River watersheds. The State Water Board will need to continue to curtail 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. Additionally, the State Water Board will need to continue to curtail water diversions for which water is not available at their water right priority to protect senior diversions and instream flows and stored water in the Klamath River basin. 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 current drought 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. The State Water Board needs to extend an enforceable mechanism 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.

POLICY OVERVIEW AND EFFECT OF PROPOSED REGULATION

The proposed emergency regulation extends and makes amendments to drought emergency minimum flows for salmonid protection in the Scott River and Shasta River watersheds, consistent with the revised flow recommendations from CDFW. The State Water Board would continue to curtail diverters in these watersheds in the order of priority as necessary to maintain a reasonable assurance of meeting the minimally protective flows and senior water rights. The regulation also continues important exceptions to priority-based curtailments to protect public health and safety, minimum livestock watering needs, and non-consumptive use. In light of competing needs, the regulation also continues and amends the regulation of certain low-efficiency diversions for livestock outside the irrigation season, both extending the season of regulation and adding increased flexibility.

This regulation provides the State Water Board the tools it needs to:

1. Maintain emergency drought minimum flow requirements (including amendments thereto in light of data developed over the past year) 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 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);
4. Provide a path for local cooperative solutions to more effectively support flow and fishery needs;
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. Prohibit unreasonably inefficient conveyance of water for livestock watering needs, with amendments to extend the term of this provision while also providing additional flexibility in its implementation;
8. Provide allowances for non-consumptive uses;
9. Require continued 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 emergency regulation and proposed updates.

Water Rights Framework

A very generalized overview of water rights is provided here to help understand the need for the 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 such as the current drought.

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 curtail water diversions based on California's water rights priority system.

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 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*)*

Need for Emergency Flows 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 extending the emergency drought 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, as threatened, SONCC coho salmon during this drought in the Scott and Shasta watersheds by maintaining minimum streamflow for adult salmon migration, rearing, spawning, and out-migrating juvenile fish.

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

On April 20, 2022, in response to continued emergency drought conditions persisting throughout the Scott River and Shasta River watersheds (tributaries to the Klamath River) and insufficient water supply to meet the needs of all water uses, CDFW sent a letter requesting that the State Water Board consider readoption of the drought emergency regulation to protect coho and Chinook salmon and steelhead (CDFW, 2022a). In its request, CDFW provided updated drought emergency minimum flow recommendations (described in more detail below) for the Scott River and Shasta River watersheds during this drought emergency, based on the best available science. CDFW (2022a) also notes that in providing updated flows to the Deputy Director during the past year, CDFW and the Board staff have applied the Board's direction in Item No. 6 of State Water Board **Resolution No. 2021-0029**, which states, in pertinent part: "The State Water Board directs staff to continue to work with CDFW to evaluate and refine the drought minimum instream flows adopted in this regulation if new scientifically-defensible information becomes available…".

The CDFW request notes that "Since adoption, the SWB [State Water Board] and CDFW have implemented Resolution 6 from the regulation as a good faith effort to evaluate and refine the drought emergency minimum flows. CDFW is grateful to have been able to exercise this resolution. It is critical that Resolution 6 continue to be available."

Need for Scott River Watershed Salmon Flows

In its April 20, 2022 letter, CDFW recommended continuing the previous emergency drought minimum flow recommendations with the addition of ramp-down flows in June to avoid stranding. These updated drought emergency minimum flow recommendations are shown below in Table 3 (CDFW, 2022a).

Table 3. Updated Scott River Drought Emergency Daily Minimum Flow Recommendations. *Note: The **bold italicized** numbers represent from the proposed change from the current drought emergency flows.*

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
Fort Jones USGS 11519500	200	200	200	150	150	125	***90***	50	30	33	40	60	150

In CDFW's June 15, 2021 letter, CDFW had provided emergency drought minimum flow recommendations for the Scott River to support salmon survival through the current drought emergency. These were the flows adopted for the currently effective drought emergency regulation, and, except for the inclusion of a ramping flow noted above, are proposed for re-adoption. 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, 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 drought emergency minimum flows are intended to enable salmon in the Scott and Shasta Rivers to survive this dire situation. 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.

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 at Fort Jones gage. 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. (See CDFW 2021b, CDFW 2021c, CDFW 2021d.) The Scott River Adjudication 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*".

In its June 15, 2021 letter recommending drought minimum flows, CDFW notes that implementation of these bare minimum flows may be adjusted if CDFW and NMFS subject matter experts agree that the reference minimum drought emergency flows are

more than may be necessary to benefit relevant life stages (e.g., migration ends early). 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 at Fort Jones gage, or alternative flows at a different point or points in the watershed, provide equal or better protection for the pertinent species' relevant life stages. This flexibility was adopted into the existing emergency regulation, and is proposed to continue.

Need for Shasta River Watershed Salmon Flows

In its April 20, 2022 letter, CDFW recommend reduced winter flows at the Yreka gage as compared to those adopted by emergency regulation in August 2021, and also recommended including ramping flows to reduce stranding potential. Reduced winter flows will continue to provide survival habitat for salmon and steelhead and minimize superimposition of redds (redds placed on top of redds) (CDFW, 2022a). 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. The overall flow-habitat relationships display a relative peak of spawning habitat at 125 cfs in a critically dry water year. The increase in subsequent months from 105 cfs to 125 cfs should minimize superimposition of redds.

Redd dewatering is influenced by redd and tailspill 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.

CDFW's June 15, 2021 letter had also provided minimum flow recommendations for the Shasta River to support salmon survival through the current drought emergency, and the flows were adopted in an emergency drought regulation (CDFW, 2021c). 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, and provide minimum flows to support all life stages of fall-run Chinook and SONCC salmon during the current emergency. Except for the changes noted above, the flows adopted in 2021 are proposed for re-adoption. CDFW 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 the current drought emergency. The flow recommendations are intended to enable salmon in the Scott River and Shasta River watersheds to survive the ongoing dire situation.

The Shasta River flow recommendations are informed by recommended flow for dry conditions from McBain and Trush (2014), and CDFW's understanding of available base flows and historical water use. 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. The recommended flows for Shasta River are equal to or lower than the flows recommended for dry conditions in McBain and Trush (2014).

While adequate flows are necessary to support fish, another vital 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 Yreka gage. 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 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. 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. Data from 2020 represented the second consecutive year that the Shasta River Chinook salmon spawning migration population has fallen below the average population for the period of record.

In the June 15, 2021 letter recommending drought emergency minimum flows, CDFW notes that implementation of these bare minimum flows may 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) (CDFW, 2021c). This option was exercised during implementation to make changes similar to, but of smaller magnitude than, the changes currently being proposed.

Table 4. Shasta River Drought Emergency Daily Minimum Flow Recommendations. *Note: cfs = cubic feet per second. The **bold italicized** numbers represent deviations from the current drought emergency flows when subject matter experts considered other environmental variables.*

	Daily Minimum Emergency Flow Recommendation (cfs)													
River Gage	Jan	Feb	Mar 1-24	Mar 25-31	Apr	May	Jun	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov	Dec
Yreka USGS 11517500	***125***	***125***	***125***	***105***	70	50	50	50	50	50	***75***	***105***	***125***	***125***

Description and Effect of Emergency Regulation and Proposed Updates

Emergency Regulation Section 875

The State Water Board has determined that the drought emergency minimum flows recommended by CDFW on April 20, 2022 in consultation with NMFS are the bare minimum flows supported with a scientific basis that are necessary to provide a

minimum level of protection for salmon in the Scott and Shasta watersheds during this drought emergency. 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. Proposed amendments to the emergency regulation as compared to the current regulation include updated proposed drought emergency minimum flows as recommended by CDFW. The description and rationale for the flows as detailed above in the section titled Emergency Minimum Instream Flows for Fall-Run Chinook Salmon, Steelhead and SONCC Coho Salmon in Scott River and Shasta watersheds. The proposed drought emergency minimum flows are intended to enable salmonids in the Scott and Shasta watersheds to successfully survive this dire situation, 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, subdivision (c)(1)(B) and (c)(2)(B) provides 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 has occurred over the past year. No substantive changes are proposed from the current emergency regulation.

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)). A proposed minor update includes Section 875, subdivision (d)(3) to ensure existing curtailment orders remain in effect such that these orders do not need to be reissued with readoption of the regulation.

Section 875, subdivision (f) also provides for alternative methods of compliance with the emergency regulation through local cooperative solutions that provide benefits to fisheries resources or develop alternative methods to contribute to fishery flows. The next few paragraphs describe the local cooperative solution framework in the current drought emergency regulation, its reasoning and effect. It then goes on to describe the proposed amendments to the current process.

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 current emergency regulation have 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 have 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 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. The 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 current regulation is developed to allow for alternative compliance methods at the watershed, tributary, and individual level that establish binding, enforceable alternative methods 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.

The current 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. Petitions to implement local cooperative solutions may be submitted to the Deputy Director at any time. 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) binding agreements for 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; 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.

Under the current and the proposed regulations, 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).

Under Section 875(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.

Under Section 875(f)(4)(D), a cooperative solution that 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 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 Fort Jones gage 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 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 Watershed.

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. 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, 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. Governor Newsom's July 2021 Executive Order N-10-21 calls 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 water overlaying groundwater users decide to pursue the voluntary pathway.

Proposed amendments to the regulation support continued development and implementation of binding local cooperative solutions among water right holders and claimants in the Scott River and Shasta River watersheds.

Minor amendments to the groundwater local cooperative solution Section 875, subdivision (f)(4)(D) include: an update to the reference for baseline years as provided for in the current regulation so parties are not held to further reductions in coming year; an update to the 400-acre requirement to watershed-wide rather than individual requirement, based on feedback that the 400-acre requirement presented hurdles for smaller farms and more certainty that sufficient acreage would be enrolled in these agreements to positively affect groundwater withdrawals, and the experience that it would be possible to process many smaller certifications with available resources; an addition of flexibility to the monthly reductions in water use in late summer and fall months, where a week of flexibility allows the water user or diverter to take advantage of cooler weather or late rains that would change the timing of actions proposed in the local cooperative solution; and other minor clarifications and clean ups. When approved, such agreements are expected to achieve the overall objectives that would otherwise be served by curtailment.

In addition, a provision was added to Section 875, subdivision (f)(4)(B) that allows for a tributary-wide local cooperative solution for livestock diversions that would otherwise be prohibited under Section 875.7. This local cooperative solution may be approved if CDFW finds that the proposal will adequately protect fishery resources (e.g., sufficient water to provide for a natural hydrologic flow regime in the watershed including pulse flows; redds are not dewatered; flows do not inhibit juvenile and adult salmon migration, incubation, and rearing; and no material decrease in available tributary habitat) and the Deputy Director finds there is sufficient water available under the proposal for competing uses (e.g., storage for human health and safety and environmental needs; would not result in additional curtailments; and flows in subdivision (c)(1) or (c)(2) will be met). This type of proposal results in benefits that make the less efficient diversion

reasonable, such as providing for such diversion during high flow events with assurances that such diversion will not result in curtailments or inhibit adult or juvenile salmonid migration, incubation, or rearing. The solution must include monitoring for and protection of redds and verification of flows approved as part of the local cooperative solution, as appropriate.

There are also a number of more minor amendments proposed to the local cooperative solution framework. A minor amendment to Section 875, subdivision (f)(3) expands the entities that may install gages or request gaging to support local co-operative solutions. Additional local agencies were added to the list of entities that may serve as "cooperating entities" for developing and complying with local cooperative solutions, based on these entities providing that role in the past year, and there is proposed clarification that an entity other than those listed must be public, rather than individual or private, for-profit entities, in order to provide a mechanism for greater accountability. A proposed minor update includes Section 875, subdivision (f)(7)(5) to ensure existing approvals of local cooperative solutions remain in effect such that these approvals do not need to be reissued with readoption of the regulation.

Emergency Regulation Section 875.1

The current 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. No substantive changes are 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.

The section adopts the process for certification and petitions for health and human safety uses provided in Article 24, section 878.1.

Proposed amendments include minor clarifications to the description of minimum health and safety needs, based on consistency with other drought emergency regulations and needs identified for clarification as petitions and certifications were evaluated.

Emergency Regulation Section 875.3

The current 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 proposed amendments change the trigger for such a change to exceedance of 90 degrees, rather than a declaration of an extreme heat event, based on the increased water needs of livestock at temperatures above 90 degrees (Stull et al., 2012) (Meehan et al., 2021). The proposed amendments further eliminate the need for a specific certification process, to avoid barriers to providing sufficient water to livestock.

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.

Emergency Regulation Section 875.4

The current section 875.4 provides the authority for curtailments of diversions to occur in any California portion of the Klamath River watershed if there are insufficient flows to support diversions under that right, in light of the watershed-wide drought emergency. Such curtailment could occur based on the water availability and demand analysis on the level of individual tributaries to the Klamath River, or based on the needs of the mainstem Klamath River. The curtailment orders could be issued based on the need to protect more senior rights, based on lack of natural flows for riparian rights, or based on the need to protect instream flows dedicated under Water Code section 1707. The

procedures for and exceptions to these curtailments are the same as those established in Sections 875, 875.1, 875.2 and 875.3.

The regulation establishes certain information as reliable sources that the Deputy Director shall consider in evaluating water right demand, water supply, water rights priority and water availability projections, and also provides for consideration of additional information that provides the best available information for the particular determination at issue. Several models are under development that will ultimately assist in determining water demand and availability projections, but at this point, they have not been completed. The regulation indicates that these models may be used to supplement the existing information, if the models constitute the best available information. The availability of information to inform curtailment decisions is inconsistent throughout the watershed, with some areas being data-rich with gages and consistent reporting, and others being less so. In this context it is helpful to clarify what sources the Deputy Director shall consider, while leaving open the potential to consider additional information where available. This provision allows for more expedited curtailment of diversions than the existing cease and desist order process, in light of the drought emergency. No substantive changes are proposed to this section.

Emergency Regulation Section 875.5

Current section 875.5 subdivisions (a) and (b), in text not proposed for amendment, 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 groundwater.

For the Scott River, the priority groupings are based primarily on those set forth in the Scott River Adjudication. The Scott Adjudication itself incorporates the French Creek and Shackleford Adjudications, 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.

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.

For curtailment orders based on lack of availability as set forth under Section 875.4 (rather than the drought emergency minimum fishery flow as set forth under Section 875 as discussed in the preceeding paragraph), curtailment priorities in the regulation follow the French Creek Adjudication, Shackleford Creek Adjudication and Scott Adjudication priorities independently, rather than integrating them.

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.

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.

The sole proposed amendment to this section is the addition of a new Section 875.5, subdivision (c), which clarifies that de minimis groundwater users as 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 Board staff to issue and respond to curtailment orders, and to file, review, and act on appropriate minimum use petitions.

Emergency Regulation Section 875.6

The current 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 the water rights priority system. 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, under penalty of perjury, 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, under penalty of perjury, 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.

No substantive changes are proposed. Minor clarifying amendments are proposed clarifying the continued need to comply with information requests related to curtailment during periods in which a curtailment order is suspended.

Emergency Regulation Section 875.7

The current section 875.7, subdivision (a) prohibits inefficient livestock watering during the fall migration season for fall-run Chinook and SONCC coho salmon, when the competing water needs for migration and the availability of alternatives make this inefficient method of diversion unreasonable. September to January 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 and rear. 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.

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 of highly inefficient livestock watering has the potential to significantly address the anticipated shortfalls in the fall migration season of this drought emergency. As such, during September through January, use of surface water for extremely inefficient livestock watering is not reasonable in light of available alternatives and fishery needs. For purposes of this regulation, inefficient surface water diversions for livestock watering are those that divert, as measured at the point of diversion, more than 10 times the amount of water needed to support the number of livestock, as established by the reasonable water quantities set forth in California Code of Regulations, Article 5, section 697.

Subdivision (b) of Section 875.7 authorizes the Deputy Director to suspend the limitations in this section upon a finding that suspending the provision will not result in a decrease in flows that would either require curtailment of diversions or inhibit salmon migration. This allows the regulation to be lifted if and when it becomes clear that the immediate competing needs for the water that provide the reason for the declaration that the inefficiency is unreasonable no longer present a conflict with the use.

Proposed amendments to Section 875.7 extend the period to March 31, and also provide flexibility for continued use of inefficient stockwater deliveries where the circumstances allow such diversions to be made reasonably. It was observed that following the expiration of the inefficient livestock prohibition in 2021, flows precipitously dropped, increasing the risk of redd dewatering while salmon eggs are incubating and hatching. Extending the period to maintain the inefficient livestock watering prohibition affords protection for these sensitive life stages. The proposed amendments to the regulation would allow for the Deputy Director to lift the prohibition as to a particular tributary or mainstem reach after the adult SONCC coho and fall-run Chinook salmon season, upon findings that, under the particular circumstances, the above-discussed fishery needs will be met.

An additional proposed amendment also clarifies that the prohibition may be lifted as to a particular user in the event of failure of an alternative watering system. Finally, the reasoning for the prohibition was expanded from solely fishery needs to include other uses. This change was made because over the past drought year, storage to Dwinnell Reservoir on the Shasta River fell to extremely low levels, putting into question the ability of the reservoir to meet its minimum obligations for human health and safety, prior rights, and environmental water over the course of another drought year. The text has been changed to recognize that interference with the ability to store water for basic needs may also be balanced against the reasonableness of an inefficient diversion.

In addition, Section 875.7, subdivision (d) is added that allows the Deputy Director to suspend operation of this provision as to the participants of an approved mainstem-reach or tributary-wide local cooperative solution based on the findings required for approval in Section 875, subdivision (f)(4)(B)(iii).

Emergency Regulation Section 875.8

Section 875.8 is proposed for re-adoption with no amendments. Section 875.8 establishes the methodology and requirements for information orders. In order to more effectively implement 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, 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.

Emergency Regulation Section 875.9

Section 875.9 describes the penalties for 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 and associated potential penalties. Subdivision (c) clarifies that subdivision (b) is explanatory, rather than limiting.

No changes are proposed to this section.

Watershed Descriptions

Scott River

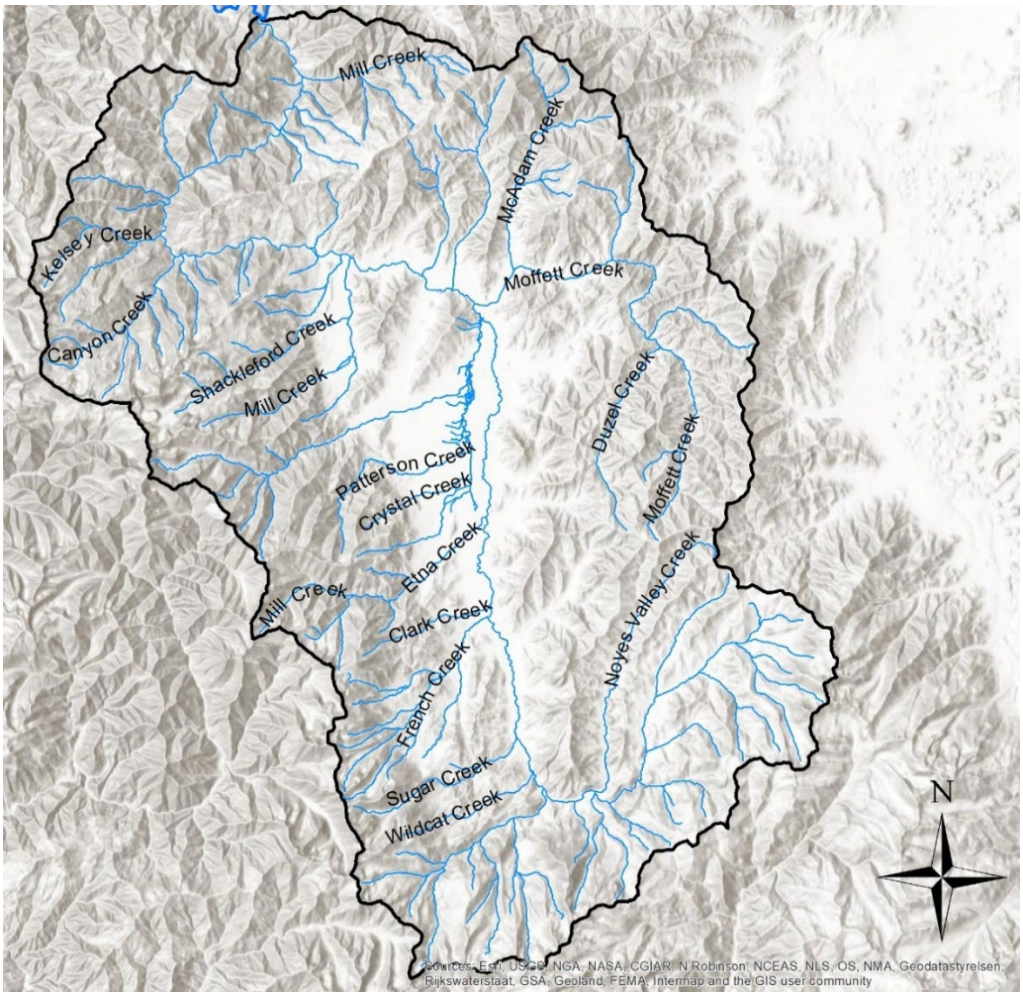

Figure 12. Scott River Watershed

The Scott River watershed (Figure 12) is approximately 813 square miles (NCRWQCB, 2005). 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 river mile (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 relies 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.

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 was 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.

Shasta River

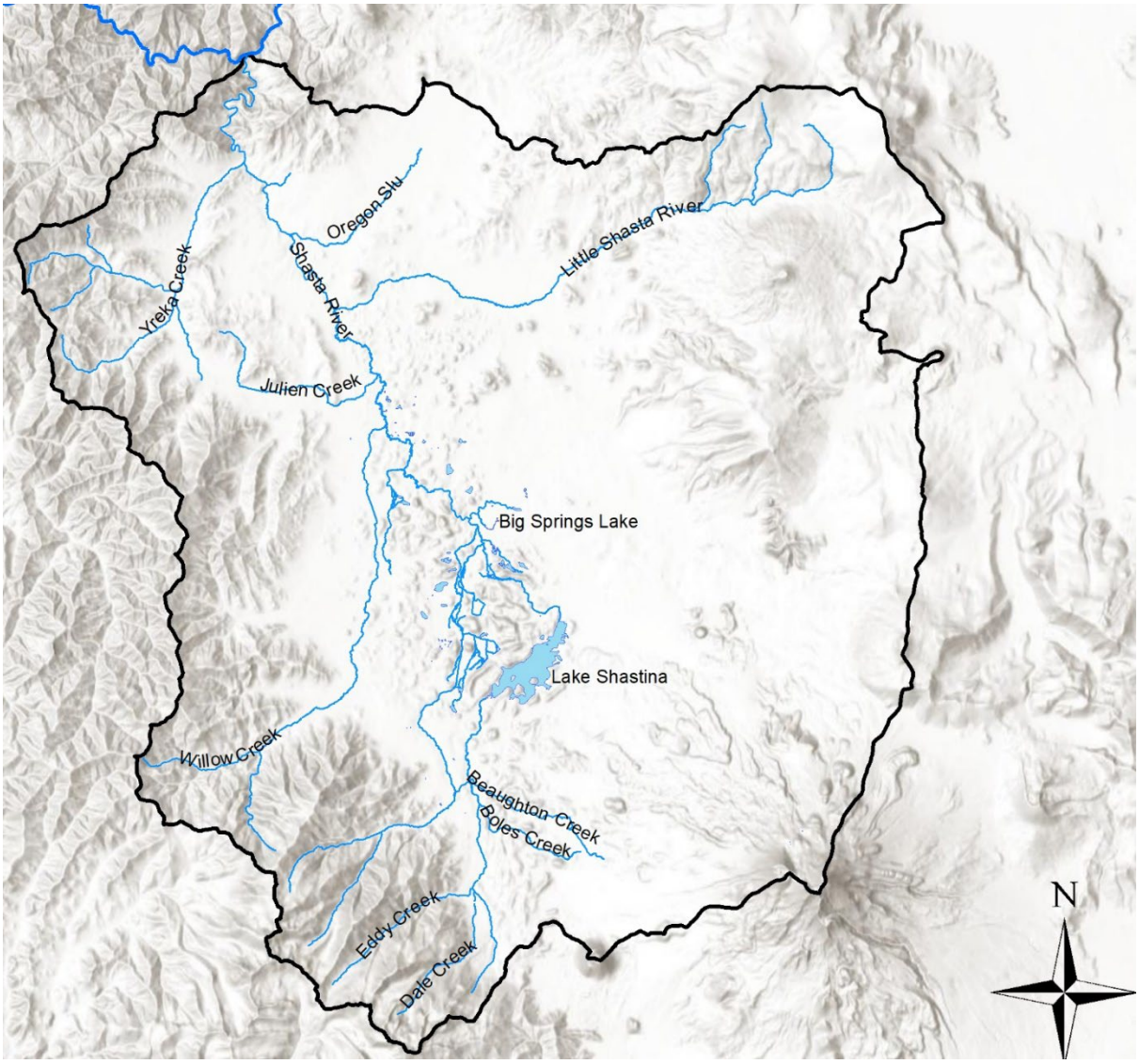

Figure 13. Shasta River Watershed

The Shasta River watershed (Figure 13) 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 (NCRWQCB, 2006). 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, 2021a). 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, 2015; 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 were 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 at that time that the water supply of the stream system is inadequate for all agricultural needs

throughout the irrigation system. At the time the watershed was adjudicated, there were approximately 40,000 acres of irrigated agriculture. Today, there are over 50,000 acres of agriculture under irrigation, 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 (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 deposit 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, 2021a). 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, 2021a).

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 Montague gage 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).

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 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.

The North Coast Regional Water Board 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.

Interconnectedness of Surface Water and Groundwater

Surface water and groundwater have varying degrees of connection. As noted above in the "Water Rights Framework" section, closely connected surface and groundwater are managed under the "common source" doctrine. As further discussed below, the surface water and groundwater in the Scott and Shasta watersheds is strongly connected.

Scott River

Scott Valley has two major geologic components, the alluvial deposits in the valley that comprise the aquifer, and the underlying impermeable or semipermeable bedrock. The aquifer is recharged by infiltration from Scott River and its tributaries, snowmelt, precipitation, and water used for irrigation. Recharge affects the groundwater levels and determines if sections of the Scott River are gaining or losing streams (Siskiyou County, 2021b). The draft Scott River Groundwater Sustainability Plan (GSP) (Siskiyou County, 2021b) acknowledges this interconnectedness of surface water and groundwater, stating that:

> *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 discharge can vary by orders of magnitude …*

Summer baseflow levels are, in part, related to groundwater levels and storage which determine the net groundwater contributions to streamflow.

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 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).

Shasta River

The Shasta Valley aquifer is a hydrogeologically 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, 2021b).

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 (Nichols, 2008; Nichols et al., 2010; Jeffres et al., 2008).

The Shasta Valley GSP acknowledges interconnectedness of surface and groundwater in the Shasta River basin (Siskiyou County, 2021b):

Interconnected surface water has [been] largely assumed based on historic reports (Mack, 1960) as well as continued summer baseflow within the Shasta River. Spring discharge has been observed in the Shasta Valley and is used to determine locations of interconnected surface water.

The historic report referred to in the Shasta Valley GSP (Siskiyou County, 2021a) 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.

> *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 the 1953 water year. 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 (Bedekar, 2022a; Bedekar, 2022b; Scott, 2022a; Scott, 2022b; Worth, 2022a; Worth, 2022b; Worth 2022c).

Because 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 14 shows the Big Springs West (BSW) stage height and the number of Big Springs Irrigation District (BSID) pumps actively pumping. Figure 15 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).

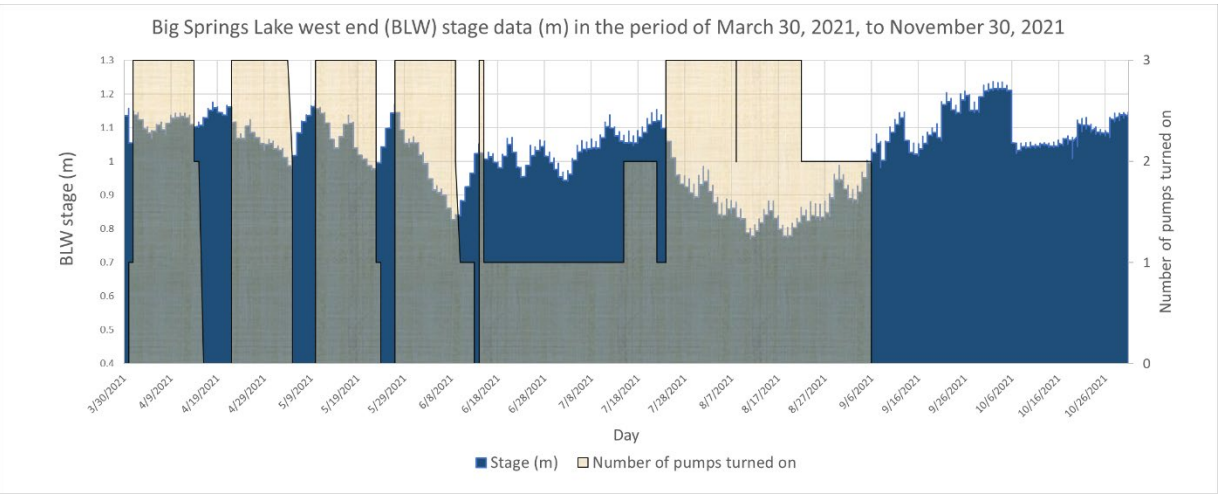

Figure 14. Big Springs Lake west with BSID pumping information for the year 2021 (from Scott 2022b)

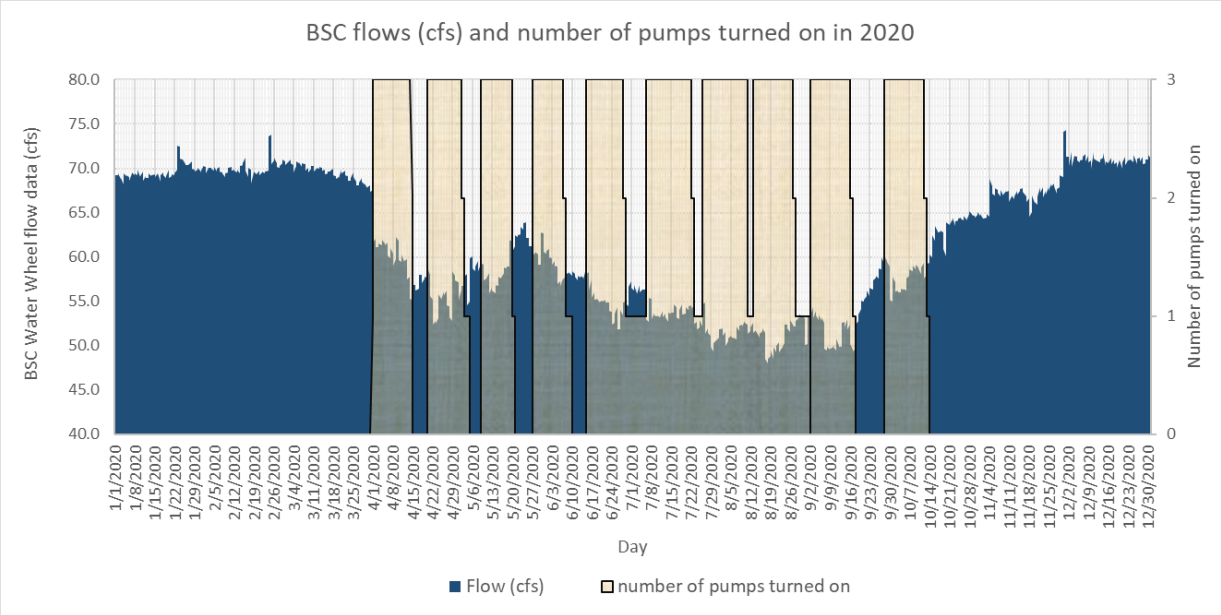

Figure 15: Big Springs Creek flow with BSID pumping information for the year 2020 (from Worth 2022b)

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 have to 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. 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.

Division of Water Rights 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[6], 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.

Less data is available on livestock watering diversions in the Shasta Watershed because most large diversions in the Shasta River watershed are watermastered, and diversions that are watermastered are reported in less resolution than diversions that are not watermastered. The conveyance systems and livestock watering practices in the Shasta Watershed 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

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[6] 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).

losses were 52 percent and 50 percent. Figure 16 shows the distribution of these losses (SWRCB, 1974).

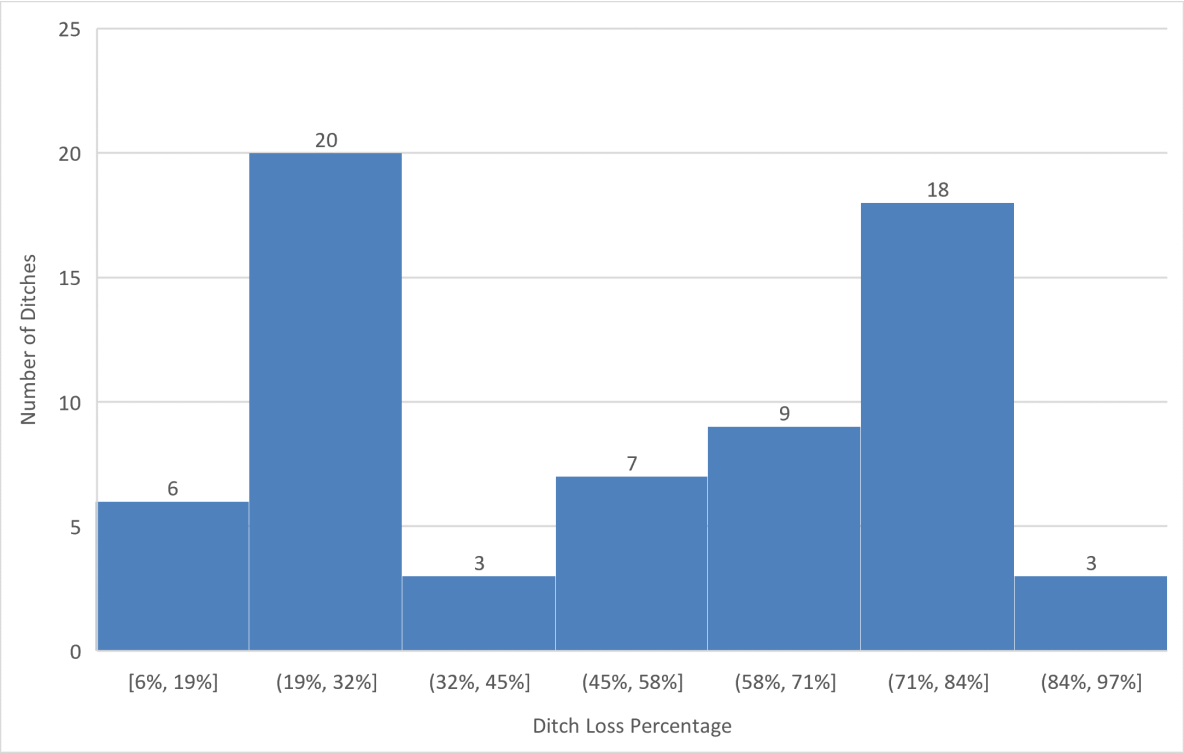

Figure 16. Scott Watershed Ditch Losses

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 running water typically does not freeze.

For properties issued curtailments or when the operation of an inefficient ditch is unreasonable and not allowed during the critical fall migration period for salmon, 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, 2021). 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.

Grant funding is available for alternative livestock watering systems, installing pipe, and reimbursement of costs associated with transporting water to livestock due to drought, as further detailed in the "Funding Resources" section at the end of this document.

The 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. 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 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 emergency regulation and associated limitation on inefficient livestock watering practices.

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 Regulation.**

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 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[7],

[7] 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).

Shackleford Adjudication[8], French Creek Adjudication[9], and the Scott River Adjudication.[10] 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. The Shackleford and French Creek Adjudications do not address groundwater, and the Scott River Adjudication addresses groundwater diversions only in part. None of these adjudications set forth the reasonable flow minimums necessary to protect the critical needs of SONCC coho 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 Fort Jones gage that are very close to the emergency instream flows set forth in the emergency regulation. However, the Scott River Adjudication specifically notes that it does not make reasonableness 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. It is also worth noting that, while adjudicated water users in the Shasta River watershed and French Creek and Wildcat Creek have enrolled the services of the Scott River and Shasta River Watermaster District, many adjudicated areas have elected not to engage watermaster services, and watermaster services are not available for these or 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.

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[8] 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).

[9] 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).

[10] 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).

Under existing law, the State Water Board may take enforcement action to prevent unauthorized diversions of water or violations of the terms and conditions of water rights permits and licenses. Diverting water when it is unavailable under a water right holder's priority of right, or in violation of water right permit and license terms, 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 the current drought. 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. 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.

Under existing law, the State Water Board also may initiate administrative proceedings to prevent the waste or unreasonable use of water. (Wat. Code, § 275.) The State Water Board lacks authority, however, to take direct 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 or in a regulation, and direct the diverter or user to cease the unreasonable diversion or use. In the event that the State Water Board has issued an order or decision, the State Water Board may 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 under section 1058.5, the State Water Board may issue a cease and desist order and simultaneously impose an ACL in response to violations of the regulation. (Wat. Code, §§ 1058.5, subd. (d), 1846, subd. (a)(2).)

Currently, the Water Code provides for measurement and periodic reporting for surface water diversions (and limited groundwater diversions), but this reporting is not at the level of specificity necessary in a severe drought to adequately track usage and project water availability. For example, diverters file, on an annual basis by April 1 or July 1 based on the water right type, their aggregated monthly water use for the prior calendar year. Moreover, 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.

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.

Comparable Federal Statutes and Regulations

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

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 and 875.4 of the regulation and for the suspension, reinstatement, or rescission of curtailment orders.

Summary of Water Supply Information

The regulation establishes the proposed drought emergency minimum flows as requirements at the USGS Shasta River gage near Yreka and USGS Scott River gage near Fort Jones. 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, meaning that 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

Projections of flow at the Yreka gage and Fort Jones gage are more certain for the remainder of calendar year 2022 (until the onset of the rainy season), than they are for calendar year 2023. Projections of flow after the onset of the rainy season in 2022 and

the January through July 2023 time period is less certain due to the uncertainties in the timing and amount of precipitation and associated stream flow response. For the analysis in the digest and fiscal impact statement, the State Water Board used similar dry water years to forecast what is likely to happen for the remainder of 2022. Going into 2023, it is possible that the watersheds will receive substantial precipitation and transition out of a drought. To be conservative however, the State Water Board has assumed that 2023 will be another dry year similar to recent dry years. As 2022/2023 progresses, the State Water Board will monitor conditions and use the best available information to forecast expected conditions which can help with planning decisions.

Summary of Water Demand and Water Right Priority Information

Water Rights Priority

Implementing curtailments requires information on water rights priorities and projected water demands. 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 come 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. 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 (DWR) 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 DWR Northern Region office maintains records for well permits issued before 1991 and maintains well information that Siskiyou County transmits to DWR for post-1991 records.

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 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 the past year has been helpful in more carefully tailoring curtailment orders as flows have approached the drought emergency minimum flow requirements. 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 this drought emergency regulation, the State Water Board will make use of 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 and watermaster, and Division of Drinking Water reporting; and
    - Adjudication and other legal records establishing the face value of individual water rights.

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.

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 Division of Drinking Water;
- County and DWR records of wells; and
- Studies that delineate which fields are irrigated by groundwater and related remote sensing data that estimates how much water those fields use.

Each of the available data sources contain uncertainty. 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.

Stream Flow 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.

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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.

SUSPENSION OF CALIFORNIA ENVIRONMENTAL QUALITY ACT

On May 10, 2021, Governor Gavin Newsom issued a Proclamation addressing the drought state of emergency for counties in the Klamath River Basin. Among other things, the Proclamation suspended the California Environmental Quality Act (CEQA) as applied to the State Water Board’s adoption of an emergency regulation to curtail diversions in the Klamath River Watershed when water is not available under the diverter’s priority of right, to protect releases of stored water, and to ensure critical instream flows for species protection through emergency minimum drought instream flow regulations. CEQA is therefore suspended as to adoption of this regulation.

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.

The State Water Resources Control Board (State Water Board) estimates the total cost to all state and local (including city, county, schools and publicly owned water suppliers) agencies due to the proposed emergency regulation as $3,790,370.00. The total revenue loss for municipal water supply agencies is estimated to be $2,846,682.00. Total revenue losses for non-municipal water supply agencies is estimated to be $531,905.00. Total county and state agricultural tax revenue losses are estimated to be $403,710. 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 $8,073.00.

FUNDING RESOURCES

The following opportunities provide funding for habitat restoration, water efficiency, ditch lining, instream flow dedications, fish passage, and other project types. Examples of project types eligible for funding or eligible uses are included in this digest because the funding could be used to 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)

- **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 measures, flow monitoring, water diversion measuring devices, project design, etc.
  - Webpage: https://wildlife.ca.gov/Grants/FRGP
- **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/Organization/WRGB
- **CDFW SB 170, Section 51, Biodiversity Conservation Program**
  - Eligible uses include water purchases for wildlife, protection of instream flows, and building water conservation projects.
  - Contact: Robert.Hawkins@Wildlife.ca.gov
  - Webpage: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/docs/2022/cdfw_drought_funding_presentation.pdf
- **Department of Water Resources, SB 170, Section 80, Small Community Drought Relief**
  - Eligible Uses related to small drinking supply system reliability
  - Contact: SmallCommunityDrought@water.ca.gov
  - Webpage: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/docs/2022/cdfw_drought_funding_presentation.pdf
- **Environmental Lab Accreditation Program – Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program**
  - Example Project Types:
    - Costs of transporting water to livestock due to drought
    - Honeybee feed and hive losses

        - Can cover eligible costs associated with wildfire and other weather events
    - Webpage: fsa.usda.gov/ELAP
- **United States Bureau of Reclamation, WaterSMART Program**
    - Example Projects Types:
        - Canal lining/piping,
        - Water Use Efficiency improvements
    - Webpage: www.grants.gov
- **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
- **Wildlife Conservation Board, SB 170, Sections 53, 54**
    - Eligible Uses Include: aquatic or riparian habitat improvements, projects that provide water to fish and wildlife, acquisition of water or land with water rights, restoration projects and projects to protect listed species.
    - Contact: Shannon.Lucas@wildlife.ca.gov
    - Webpage: https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/scott_shasta_rivers/docs/2022/cdfw_drought_funding_presentation.pdf

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 et seq. 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; and (4) reporting costs to complete and submit initial compliance certification forms and ongoing diversion reporting in response to a curtailment order; (5) reporting costs to complete and submit the information required by an information order, including supporting documentation.

The State Water Resources Control Board (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 $3,790,370.

The total revenue loss for municipal water supply agencies is estimated to be $2,846,682. Total revenue losses for non-municipal water supply agencies is estimated to be $531,905. Total county and state agricultural tax revenue losses are estimated to be $403,710.[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 complete and submit the information required by an informational order is estimated to be $8,073.

Water Demand and Supply Data for Fiscal Impact Analysis

The State Water Board used 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 United States Geological Survey (USGS) Scott River near Fort Jones gage (USGS gage no. 11519500) is about 21 miles upstream of the outlet of the Scott River watershed and represents the observed (impaired) flow of the watershed. Observed

[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 $5,209,156. 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.

Fort Jones gage information from the recent dry Water Year (WY) 2020-2021 was used to create an impaired flow forecast for the period of July 2022 through July 2023. The water year used for the forecast represents a combination of hydrology and water use in the watershed during recent dry conditions. The State Water Board used WY 2020-2021 flows as a conservative scenario of what may occur during the July 2022 through July 2023 time period if conditions remain dry.

As shown in Figure A, forecasted impaired (i.e., without curtailment of diversions) flows are not likely to meet the proposed drought emergency minimum flows until January 2023, if rainfall patterns this water year track those of 2020-2021. However, if rains arrive earlier in the fall, which has happened in other dry years, the flows could be met as early as October. Additionally, the timing of when flows increase in the Scott River during the fall is influenced by groundwater levels at the end of the irrigation season. In dry years, groundwater levels are lower, and it takes more fall precipitation to recharge groundwater in the basin and realize sustained increases in flow in the Scott River and its tributaries. Decreased groundwater pumping (Harter, 2021a), as well as earlier precipitation, would provide for earlier reconnection of the stream system. Once the forecasted impaired flows exceed the proposed drought emergency minimum flows in January 2023, they are projected to stay above the minimum flows until June 2023. Accordingly, it is assumed that curtailment of diversions is needed to achieve the proposed drought emergency minimum flows from July 2022 through December 2022, and from June 2023 through July 2023 for the purpose of this fiscal analysis.

Table A shows the Scott River forecasted average daily impaired flows, the proposed drought emergency minimum flows, and the expected shortfall needed to meet the proposed drought emergency minimum flows for the period of July 2022 to July 2023, as calculated under the assumptions above. Shortfall is calculated as the difference between daily forecasted flows and the proposed drought emergency minimum flows and is reported as monthly averages of the daily calculations.

Table B compares the Scott River forecasted shortfall with reported water demand. Estimated surface water demand was calculated by combining information from the electronic Water Rights Information Management System (eWRIMS) database with information from the Scott River Adjudication. After removing ineligible water right records (cancelled, inactive, pending, rejected, revoked, and state filing) from the eWRIMS data, the data were checked for duplicates, unit errors, and unrealistically high diversion values. The surface water demand is an average of Water Year (WY) 2017-2018 and WY 2019-2020 reported water use, which represents the two most recent dry water years with reported water use data. Groundwater demand is based on land use estimations from the SVIHM developed by UC Davis (Foglia et al., 2018; Harter, 2021ab)

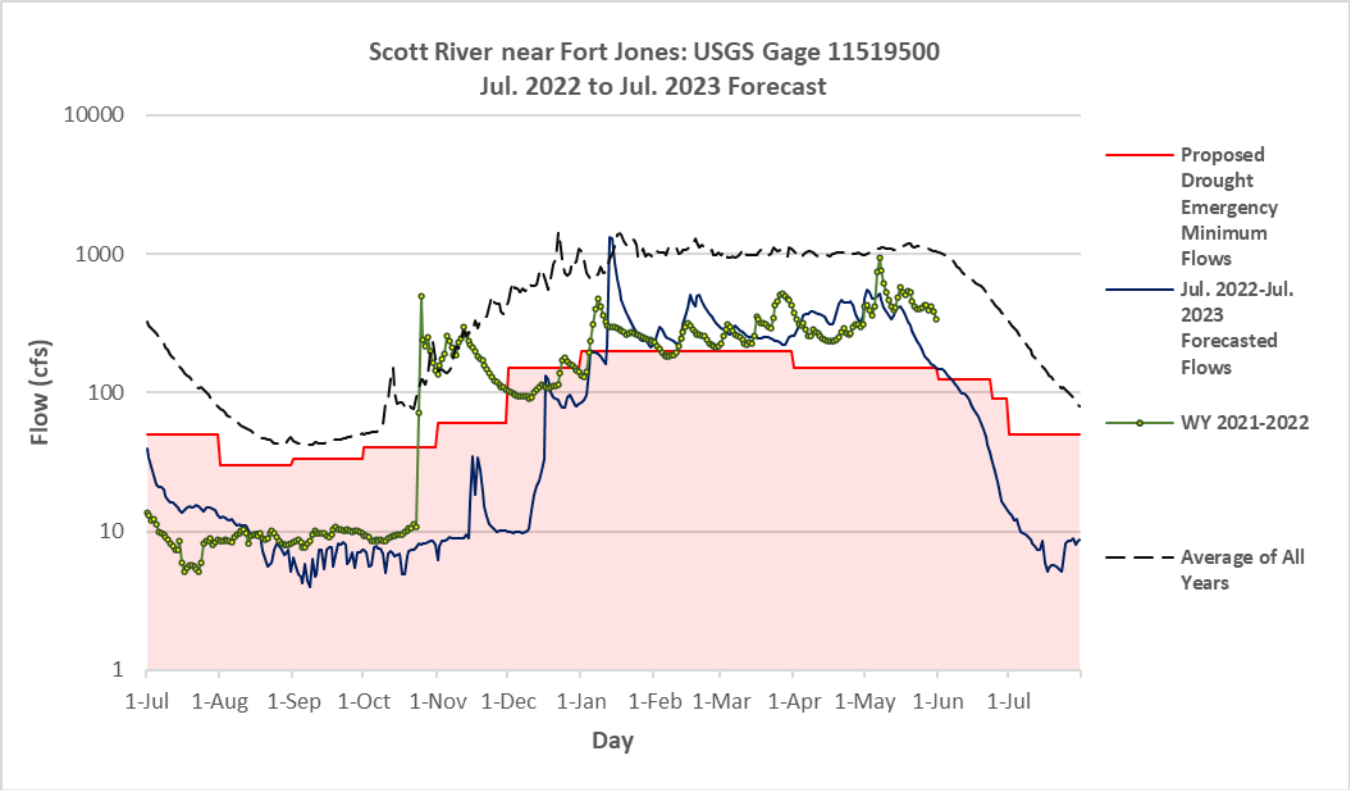

Figure A. Scott River Average Daily Impaired Flow at Fort Jones Gage. *(Note: Water Year 2020-2021 used to forecast potential impaired flow during July 2022 through July 2023. Flows in Water Year 2021-2022 as shown with a green line with circles is influenced by curtailment orders that were mailed to water right holders starting September 10, 2021, in the Scott River watershed. The vertical scale (y-axis) is logarithmic.)*

Table A. Average Daily Forecasted Flow, Proposed Drought Emergency Minimum Flows, and Expected Shortfall as Compared to Proposed Drought Emergency Minimum Flows for Period of July 2022 to July 2023 at Fort Jones Gage, Scott River. *Note: Forecasted shortfalls (negative values only) are calculated each day and then averaged for the month, and the forecasted flow is shown as a daily average for the month. Therefore, the difference between the monthly forecasted average daily flow and the drought emergency minimum flow does not always equal the average daily forecasted shortfall. In January for example, there is an average daily forecasted shortfall even though it looks like the average daily forecasted flows are greater than the drought emergency minimum flow.*

Year	2022	2022	2022	2022	2022	2023	2023	2023	2023	2023	2023	2023	2023
Month	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Drought Emergency Minimum Flow (cfs)	50	30	33	40	60	150	200	200	200	150	150	125-90[1]	50
Average Daily Forecasted Flow (cfs)	18.0	9.3	6.3	7.1	12.7	52.6	345.0	336.6	258.0	367.0	343.7	78.7	8.3
Number of Shortfall Days	31	31	30	31	30	31	10	0	0	0	0	24	31
Average Daily Forecasted Shortfall (cfs)	-32.0	-20.7	-26.7	-32.9	-47.3	-97.4	-15.7	0.0	0.0	0.0	0.0	-41.2	-41.7

[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 September 2021 to August 2022 Flows at Fort Jones Gage, Scott River.

Year	2022						2023						
Month	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Average Daily Forecasted Shortfall[1] (cfs)	-32.0	-20.7	-26.7	-32.9	-47.3	-97.4	-15.7	0.0	0.0	0.0	0.0	-41.2	-41.7
Average Daily Surface Demand[2] (cfs)	80	55	44	24	12	20	24	28	37	139	160	140	80
Average Daily Irrigation Groundwater Demand[3] (cfs)	197	170	32	8	0	0	0	0	5	51	114	185	197
Average Daily Total Demand[4] (cfs)	277	225	76	32	12	20	24	28	42	190	274	325	277

[1] *cfs=cubic feet per second;* [2] *Total surface demand = average 2017-2018 and 2019-2020 reported water use from eWRIMS and watermaster reporting (this does not account for unreported surface water use)*; [3] *Land use-based irrigation groundwater demand from SVIHM;* [4] *Total of surface and groundwater demands.*

Curtailments may need to be higher than what can be estimated from available supply and demand information because of uncertainty related to reported and unreported surface water demand, streamflow depletion losses, and potential dry stream segments in some parts of the watershed and wet stream segments in other parts of the watershed. In the Scott River specifically, curtailments have the potential to extend to adjudicated and overlying groundwater users during approximately July through October when groundwater demand is high and supply is limited because the mainstem Scott River is known to have reaches that go dry during this time period due to low groundwater levels. Once the surface flows become disconnected, attainment of the minimum flows are highly reliant on precipitation events to reconnect the river and provide the flows needed to support salmon. Because surface water flows can go subsurface during the dry season when groundwater levels are low, 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.

Shasta River Watershed

The USGS Shasta River gage near Yreka (USGS gage no. 11517500) is at the outlet of the Shasta River watershed and represents the impaired flow of the entire watershed. Data from WY2020-2021 was used to create impaired flow forecasts at the Yreka gage for July 2022 through July 2023. WY2020-2021 represents a combination of hydrology and water use in the watershed during recent drought events. The Shasta River is fed by large spring sources and is less dependent on heavy rains to increase flows in the fall season compared to the Scott River. Typically, when irrigation diversions end around October, the flows at the Yreka gage of the Shasta River increase in a pattern that is not dependent on rainfall timing.

Figure B shows forecasted impaired flows (based on WY 2020-2021) are not likely to meet the CDFW drought minimum flows from July 2022 until mid-December 2022. Forecasted impaired flows are also not likely to meet the proposed drought emergency minimum flows after mid-April 2023. Accordingly, it is assumed that flows will need to be curtailed during these periods to achieve the proposed drought emergency minimum flows for the purpose of this fiscal analysis.

Table C shows the average daily forecasted flows, proposed drought emergency minimum flows, and the expected shortfall as compared to the proposed drought emergency minimum flows for the period of July 2022 through July 2023. Shortfall is calculated as the difference between the daily forecasted flows and the proposed drought emergency minimum flows and is reported as monthly averages of the daily calculations.

Table D compares the forecasted shortfall with reported water demand. Surface water demand was calculated by combining information from the eWRIMS database, the Shasta River Adjudication (Siskiyou County Superior Court, 1932), and the Scott Valley and Shasta Valley Watermaster District Annual Statement of Diversion and Water Use (2017-2018 and 2019-2020 as reported to the State Water Board by the watermaster). Similar to the Scott River, surface water demand was calculated by removing ineligible

water right records. This included removing rights that are labeled as cancelled, inactive, pending, rejected, revoked, and state filings from the eWRIMS data. The data was then checked for duplicates, unit errors, and unrealistically high diversion values. The surface water demand is an average of WY 2017-2018 and WY 2019-2020 reported water use, which represents the two most recent dry water years with reported water use data. 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. The water demand under the adjudication for Willow, Yreka, and Julian creeks and other miscellaneous springs, which do not have watermaster service, was estimated based on the Shasta River Adjudication. Estimated water demand for these streams was adjusted to reflect actual adjudicated 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 Siskiyou County Sustainable Groundwater Management Act (SGMA) effort, Larry Walker Associates and Davids Engineering modified the DWR 2010 land use map 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). Davids Engineering (2020) data were used to estimate groundwater demands.

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

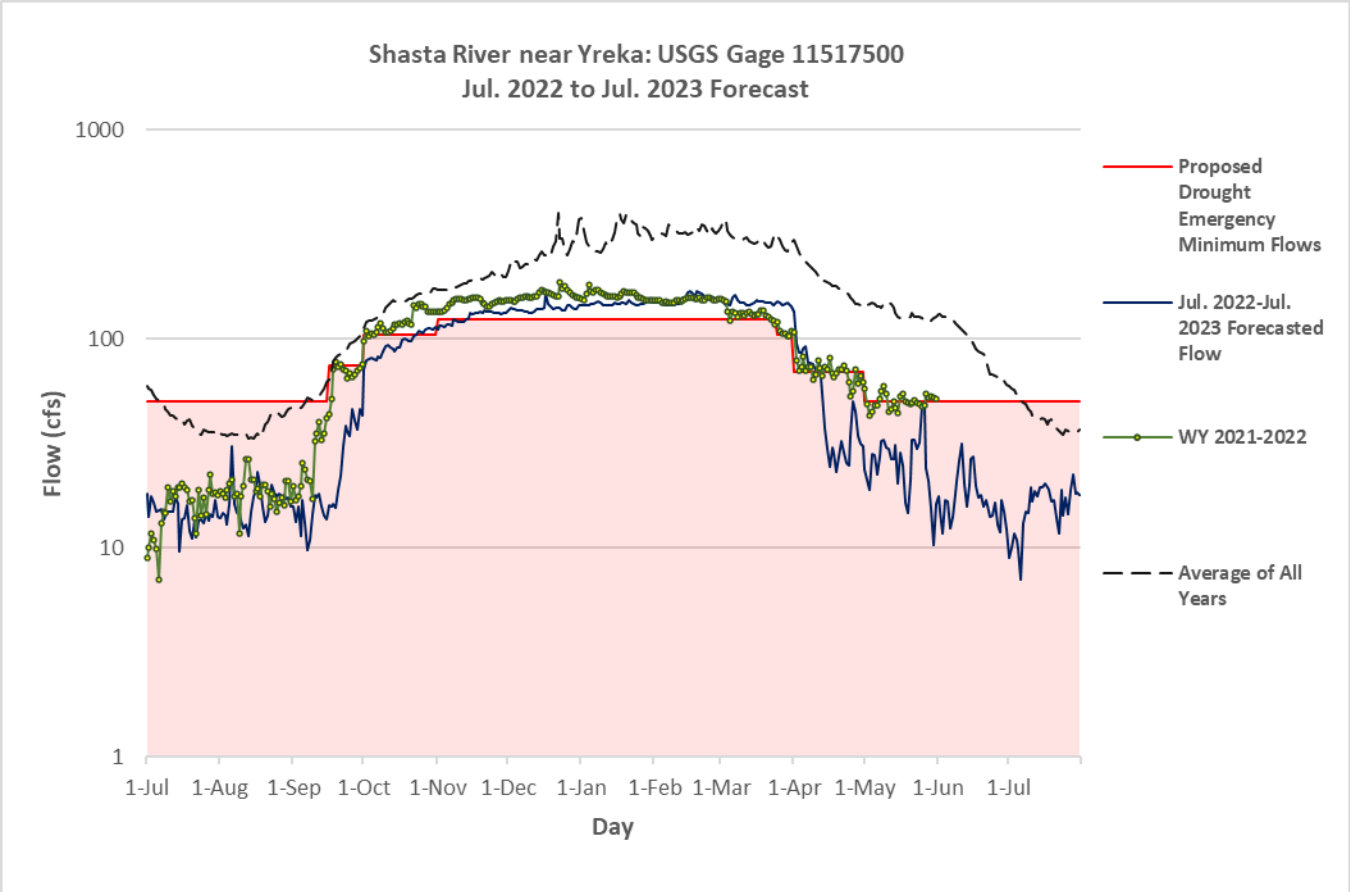

Figure B. Shasta River Average Daily Impaired Flow at Yreka Gage for Forecast for July 2022 to July 2023. *Note: Water Year 2020-2021 used to forecast potential impaired flow during July 2022 through July 2023. Flows in Water Year 2021-2022 as shown with a green line with circles is influenced by curtailment orders that were mailed to water right holders starting September 10, 2021, in the Shasta River watershed. The vertical scale (y-axis) is logarithmic.*

Table C. Average Daily Forecasted Flow, Proposed Drought Emergency Minimum Flows, and Expected Shortfall as Compared to Proposed Drought Emergency Minimum Flows for Period of July 2022 to July 2023 at Yreka Gage, Shasta River. *Note: cfs = cubic feet per second. Forecasted shortfalls (negative values only) are calculated each day and then averaged for the month and the forecasted flow is shown as a daily average for the month. Therefore, the difference between the monthly forecasted average daily flow and the drought emergency minimum flow does not always equal the average daily forecasted shortfall. For example, in November there is an average daily forecasted shortfall even though it looks like the average daily forecasted flows are greater than the proposed drought emergency minimum flows.*

Year	2022						2023						
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Proposed Drought Emergency Minimum Flows (cfs)	50	50	50-75[1]	105	125	125	125	125	125-105[2]	70	50	50	50
Average Daily Forecasted Flow (cfs)	14.5	16.7	22.6	95.0	126.9	140.3	148.1	154.7	149.7	54.3	26.3	17.7	15.9
Number of Shortfall Days	31	31	30	22	13	0	0	0	0	18	31	30	31
Average Daily Forecasted Shortfall (cfs)	-35.5	-33.3	-39.9	-11.4	-2.8	0.0	0.0	0.0	0.0	-22.2	-23.7	-32.3	-34.1

[1] *The drought emergency minimum flow is 50 cfs from September 1 to September 15, and it is 75 cfs from September 16 to September 31;* [2] *The drought emergency minimum flow is 125 cfs from March 1 to March 24, and it is 125 cfs from March 25 to March 31.*

Table D. Shasta River Watershed Demand Compared to Forecast Shortfall for July 2022 to July 2023 at Yreka Gage, Shasta River. *Note: cfs = cubic feet per second.*

Year	2022						2023						
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Average Daily Forecast Shortfall (cfs)	-35.5	-33.3	-39.9	-11.4	-2.8	0.0	0.0	0.0	0.0	-22.2	-23.7	-32.3	-34.1
Average Daily Surface Demand (cfs)[1]	232	200	207	114	88	112	100	98	248	364	354	307	232
Average Daily Ground- water Demand (cfs)[2]	109	102	98	65	36	4	4	11	9	21	62	98	109
Average Daily Total Demand (cfs)[3]	341	302	305	179	124	116	104	109	257	385	416	405	341

[1] Total surface demand = averaged 2017-2018 and 2019-2020 reported water use from eWRIMS and watermaster reporting (this does not take in account unreported surface water use); [2] Land use-based groundwater demand from Siskiyou County SGMA effort; [3] Total of 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 translate 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 what their water demands are.

To estimate projected curtailments to specific water suppliers resulting from the proposed emergency regulation in the Scott and Shasta watersheds, the State Water Board additionally used: DWR groundwater well completion reports; the watermaster yearly narrative reports (2014-2017) ("Summary of Watermaster Services", Scott Valley and Shasta Valley Watermaster District); and Division of Drinking Water (DDW) Electronic Annual Reports (EAR).

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 and priority dates in the watermaster Field Schedules notes for the Shasta Adjudication water rights. 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. 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.

Groundwater appropriations have a priority date from when the well was constructed, and/or water 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 as a way to conservatively estimate potential curtailments for the purposes of the fiscal analysis. For public municipal water suppliers, the monthly estimated water supply reductions are limited to maintain 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 DDW EAR for information on the number of individuals served, amount of water supplied, and the water rate charged to customers. The current standard for indoor residential use is 55 gpcd, as established in Water Code, section 10609.4. Statewide, the median indoor residential water use is 48 gpcd. (DWR, 2021a.) Sixteen 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 1,147 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 599 acre-feet. See Table G (Public Drinking Water Systems in Scott and Shasta River Watersheds Included in the Fiscal Impact Analysis) below for shortages for individual municipal water suppliers.

The State Water Board used a conservative water rate estimate of $65.46 per 600 cubic feet of water. This was the water rate for the City of Montague in 2019 and was the highest rate charged to customers in the DDW EAR reports that were available for the Scott and Shasta watersheds. The water rate was converted to $4,752.39 per acre-foot of water to develop a cost estimate.

Municipal water systems included in this fiscal impact analysis serve a population of 16,581 individuals in the two watersheds. The public water systems not included in this analysis serve a population of 2,572 individuals. The estimated loss in revenue (income before expenses are subtracted) to municipal water suppliers from the proposed regulation is estimated to be $2,846,682. This was calculated as $4,752.39 per acre-foot of water multiplied by 599 acre-feet.

Table E. Public Drinking Water Systems in Scott and Shasta Watersheds Included in Fiscal Impact Analysis. *Note: Information provided from State Water Board Division of Drinking Water Electronic Annual Report database.*

Basin	Public Water System ID	Public Water System Name	Service Connections	Population	Water Source
Shasta	CA4710011	City of Yreka	2,993	7,786	Surface water
Shasta	CA4710007	City of Montague	503	1,495	Surface water
Shasta	CA4710009	City of Weed	1,110	2,669	Surface water and groundwater
Shasta	CA4710013	Lake Shastina CSD	1,272	2,877	Groundwater
Shasta	CA4700523	Grenada Sanitary District	92	289	Groundwater
Scott	CA4710004	City of Etna	410	720	Surface water
Scott	CA4700503	Callahan Water District	34	70	Recycled water and surface water
Scott	CA4710003	Town of Fort Jones	366	675	Surface water and groundwater

Table F. Public Drinking Water Systems Not Included in Fiscal Impact Analysis in Scott and Shasta Watersheds.
Note: Information provided from State Water Board Division of Drinking Water Electronic Annual Report database. AF = acre-feet; gpcd = gallons per capita per day.

Basin	Public Water System ID	Public Water System Name	Service Connections	Population	Water Source
Shasta	CA4700591	Delphic Elementary School	No record	No record	No record
Shasta	CA4700577	Big Springs Union Elementary School	1	240	No record
Shasta	CA4700521	Siskiyou County Service Area #5/Carrick	58	142	No record
Shasta	CA4700582	Gazelle School	95	315	No record
Shasta	CA4700559	Butteville Union School	No record	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	11	110	Groundwater

Table G. Public Drinking Water Systems in Scott and Shasta River Watersheds Included in the Fiscal Impact Analysis. *Note: Information provided from State Water Board Division of Drinking Water Electronic Annual Report database. AF = acre-feet; gpcd = gallons per capita per day.*

Public Water System Name	Population	Water Source	Annual Total Demand[1] (AF)	Annual Health and Safety Demand[2](AF)	Estimated Water Supply Reduction (AF)
City of Etna	720	SW	213	44	17
Callahan Water District	70	SW	77	4	63
Town of Fort Jones	675	SW	184	42	0
City of Yreka	7,786	SW	2,182	480	142
City of Montague	1,495	SW	274	92	0
City of Weed	2,669	GW	232	164	22
Lake Shastina Community Services District	2,877	GW	717	177	312
Grenada Sanitary District	289	GW	66	18	43

[1] The most recent reported 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.

It is estimated that the proposed regulation would result in an unmet demand to non-municipal water suppliers of 9,671 acre-feet from July 1, 2022 to July 31, 2023. A water sales price of $55/per acre-foot was used to calculate losses in water sales in the Scott and Shasta watersheds. The water sales price estimate was obtained from the Montague Water Conservation District's website (MWCD, 2021), which is an irrigation district located in the Shasta River watershed. The estimated loss in water sales revenue for non-municipal water suppliers from the proposed regulation is estimated to be $531,905. Water sales losses were calculated as $55 per acre-foot multiplied by 9,671 acre-feet of unmet water demand. 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 Analysis. *Note: AF = acre-feet; cfs = cubic feet per second. 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.*

Basin	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 (2,542)	Surface Water
Shasta	Montague Water Conservation District	Irrigation (Adjudication/ Permit)	49,000 (AF)	22,683 (AF)	Surface Water
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 Scott and Shasta Watersheds Not Evaluated in the Economic Analysis. *Note: AF = acre-feet.*

Basin	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.
Notes: AF = acre-feet

Basin	Public Water System Name	Estimated Water Supply Reduction (AF)
Scott	Callahan Water District	2
Scott	Scott Valley Irrigation District	2,816
Shasta	Montague Water Conservation District	946
Shasta	Grenada Irrigation District	12
Shasta	Greenhorn Water District	3
Shasta	Big Springs Irrigation District	5,892

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 eWRIMS database, Annual Statements of Diversion and Water Use for 2019 and 2020 from the watermaster (Scott Valley and Shasta Valley Watermaster District), DWR groundwater well completion reports, DDW EAR Reports, DWR 2018 seasonal crop soil water balance data for the Scott and Shasta watersheds (DWR 2021b), DWR 2010 Land Use Maps, a land use and water use analysis conducted by Davids Engineering (2020), SVIHM (Foglia et al., 2018; Harter, 2021ab), Siskiyou County 2020 Annual Crop and Livestock Report (Siskiyou County, 2022), and the tax rate for the cities of Yreka and Dunsmuir (the maximum tax rate found for Siskiyou County)(CDTFA, 2022).

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. Estimated reductions in crop yields were calculated separately for 2022 and 2023. Table K (Siskiyou County and State Estimated Tax Revenue Loss) provides an overview of the calculations discussed below. It was assumed the proposed emergency regulation will become effective July 1, 2022 and water curtailments will begin at that time. It was assumed the 2022 irrigation season will extend to October 31, 2022. The estimated reduction in agricultural irrigation supply due to proposed emergency regulation from July through October 2022 is 10,497 acre-feet of water. This reduction represents a 10.9 percent reduction in agricultural irrigation supply. The percent reduction in water supply was multiplied by total the amount of acres of irrigated agriculture (71,638 acres) in the two watersheds to estimate the affected acreage and reduction in crop yield. The estimated reduction in crop yield acreage in 2022 due to the proposed emergency regulation is therefore estimated to be 7,809 acres of the annual total crop production. The crop categories of Field Crops, Seed Crops, Vegetable Crops, and Nursery Crops were used to calculate the total crop revenue in Siskiyou County ($300,798,693) and total crop acreage in Siskiyou County (773,608.60 acres) (Siskiyou County, 2022). Based on this information the average crop value per acre used in this analysis was calculated as $388.33. The loss in crop sales revenue in 2022 is estimated to be $3,036,374. This results in an estimated $15,182 loss in tax revenue for Siskiyou County and $220,137 loss in tax revenue for the state in 2022.

For 2023, a conservative approach was used to estimate the timeframe for reduced crop yields. The timeframe that was selected is March 1, 2023 to July 31, 2023. It was assumed the irrigation season will begin March 1, 2023; therefore, the crop yield analysis would begin with that date. The emergency regulation will expire by June 30, 2023, but reduced crop yields were analyzed through July 31, 2023, and included in the estimation of total reduced crop yields. The estimated reduction in agricultural irrigation

supply due to proposed emergency regulation in March through July 2023 is 11,689 acre-feet of water. This reduction represents a 7.8 percent reduction in agricultural irrigation supply. The percent reduction in water supply was multiplied by total the amount of acres of irrigated agriculture (71,638 acres) in the two watersheds to estimate the affected acreage and reduction in crop yield. The estimated reduction in crop yield acreage in 2023 due to the proposed emergency regulation is therefore estimated to be 5,588 acres of the annual total crop production. The loss in crop sales revenue in 2023 is estimated to be $2,172,782. This results in an estimated $10,864 loss in tax revenue for Siskiyou County and $157,527 loss in tax revenue for the state in 2023. The total loss in crop revenue due to the emergency regulation for the period from July 1, 2022 to July 31,2023 for the county and the state is estimated to be $5,209,156. The total estimated tax revenue loss due to the emergency regulation is $26,046 for Siskiyou County and $377,664 for the state.

Table K. Siskiyou County and State Estimated Tax Revenue Loss due to the Proposed Drought Emergency Regulation. Note: AF = acre-feet

Estimates	July through October 2022	March through July 2023	Total
Estimated Agricultural Irrigation Demand	96,738 AF	150,258 AF	246,996 AF
Estimated Reduction in Agricultural Irrigation Supply due to proposed emergency regulation	10,497 AF	11,689 AF	22,186 AF
Estimated amount of crop acreage affected by reduction in water supply due to proposed emergency regulation	7,809 acres	5,588 acres	13,397 acres
Estimated crop value per acre	$388.83	$388.83	Not applicable
Estimated revenue loss from the affected crop acreage	$3,036,374	$2,172,782	$5,209,156
Tax Losses to Siskiyou County and the State 7.75% tax rate.	$235,319	$168,391	$403,710

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), 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 one (1) state agency and two (2) local agencies in the Scott and Shasta watersheds that may be required to submit reports. The Fiscal Impact Statement for the drought emergency regulation that went into effect on August 30, 2021 had identified a total of three (3) state agencies, sixteen (16) local public agencies, and five (5) schools that divert surface water or use groundwater in the Scott and Shasta watersheds. Water rights for most of these agencies and for all the schools were curtailed and reports were submitted. However, some water rights of three agencies were not curtailed under the 2021 drought emergency regulation because they had more senior priority rights than the other agencies and schools, and no reporting was required. In this analysis, the fiscal impacts are estimated on reporting for these three agencies.

To conservatively estimate the cost of the emergency regulation, the State Water Board multiplied the total number of local and state government agencies 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 $67 per hour (hourly rate includes wages plus retirement and health care benefits) for local agency staff time, representing a Deputy Director position in Siskiyou County. A conservative estimate of $100 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 2019 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 $3,450 and local agencies is $4,623. The estimated costs are calculated as follows: the total number of state agencies (1) or local agencies (2) 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 $8073 due to the proposed drought emergency regulation.

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