MARIN MUNICIPAL
WATER DISTRICT

220 Nellen Avenue Corte Madera CA 94925-1169
marinwater.org

September 7, 2021

Erik Ekdahl, Deputy Director of Water Rights
State Water Resources Control Board
Division of Water Rights
PO Box 2000
Sacramento, CA 95812-2000

Re: Petition for Temporary Urgency Change – Permits 5633, 9390, and 18546

Dear Mr. Ekdahl:

Enclosed is the Petition for Temporary Urgency Change to modify the hydrologic index that sets the minimum instream flow requirements for Lagunitas Creek as established by Water Board Order 95-17 for Permits 5633, 9390, and 18546. Accompanying the petition are the following:

1) *Supplement to the September 2021 Temporary Urgency Change Petition*
2) Environmental Information for Petition
3) Notice of Exemption
4) California Department of Fish and Wildlife Review Fee Payment
5) State Water Resources Control Board Petition Fee Payment

The petition is being submitted due to drought conditions and severely low storage levels in Marin Water's reservoirs. As measured at Lake Lagunitas, one of Marin Water's reservoirs, recorded rainfall from January 1, 2020 through August 1, 2021 was approximately 32 inches, putting water year (WY) 2021 (12-month period) on track to be the second driest in our 142 year history.

I look forward to working with the Division of Water Rights staff on this important conservation effort.

Sincerely,

Bennett Horenstein
General Manager

S. Boland-Brien, J. Ling, S. McFarland, S. Westhoff – State Water Resources Control Board
R. Coey, J. Fuller – National Marine Fisheries Service
S. Sherman – California Department of Fish & Wildlife
X. Fernandez – San Francisco Bay Regional Water Quality Control Board
M. McLean, S. Horne – Marin Water
R. Donlan - Ellison Schneider Harris & Donlan llp

Please indicate County where your project is located here:

Marin

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P.O. Box 2000, Sacramento, CA 95812-2000
Tel: (916) 341-5300 Fax: (916) 341-5400
http://www.waterboards.ca.gov/waterrights

PETITION FOR CHANGE

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☐ **Point of Diversion** Wat. Code, § 1701
☐ **Point of Rediversion** Cal. Code Regs., tit. 23, § 791(e)
☐ **Place of Use** Wat. Code, § 1701
☐ **Purpose of Use** Wat. Code, § 1701

☐ **Distribution of Storage** Cal. Code Regs., tit. 23, § 791(e)
☒ **Temporary Urgency** Wat. Code, § 1435
☐ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211

☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☐ **Other**

Application 9892 Permit 5633 License Statement

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).
Present:

Proposed:

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.
Present:

Proposed:

Purpose of Use
Present:

Proposed:

Split
Provide the names, addresses, and phone numbers for all proposed water right holders.

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

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Proposed:

Temporary Urgency
This temporary urgency change will be effective from 11/01/2021 to 04/30/2022 .

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Upstream Location:

Downstream Location:

List the quantities dedicated to instream flow in either: ☐ cubic feet per second or ☐ gallons per day:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Will the dedicated flow be diverted for consumptive use at a downstream location? ☐ Yes ☐ No
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

Waste Water
If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ☐ Yes ☐ No

Will any legal user of the treated waste water discharged be affected? ☐ Yes ☐ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

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I (we) have access to the proposed point of diversion or control the proposed place of use by virtue of:
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If by lease or agreement, state name and address of person(s) from whom access has been obtained.

Give name and address of any person(s) taking water from the stream between the present point of diversion or rediversion and the proposed point of diversion or rediversion, as well as any other person(s) known to you who may be affected by the proposed change.

All Right Holders Must Sign This Form: I (we) declare under penalty of perjury that this change does not involve an increase in the amount of the appropriation or the season of diversion, and that the above is true and correct to the best of my (our) knowledge and belief. Dated 09/08/2021 at Corte Madera, CA .

Ben Horenstein Digitally signed by Ben Horenstein Date: 2021.09.08 12:30:29 -07'00'

Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

NOTE: All petitions must be accompanied by:
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☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
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Application 14278 Permit 9390 License Statement

I (we) hereby petition for change(s) noted above and described as follows:

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Proposed:

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Proposed:

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Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ☐ Yes ☐ No

Will any legal user of the treated waste water discharged be affected? ☐ Yes ☐ No

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Ben Horenstein Digitally signed by Ben Horenstein Date: 2021.09.08 12:32:04 -07'00'

Right Holder or Authorized Agent Signature

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Application 26242 Permit 18546 License Statement

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September 2021

Marin Municipal Water District

Supplement to the September 2021 Temporary Urgency Change Petitions Filed for State Water Resources Control Board Permit Nos. 5633, 9390, and 18546

The Marin Municipal Water District (District) files this temporary urgency change petition (TUCP or petition) for temporary modification to Ordering term numbers 1 and 2 (pages 109-111) of State Water Resources Control Board (State Water Board) Order 95-17, dated October 26, 1995 (Order 95-17), which are incorporated into the District water right Permits Nos. 5633 (Application No. 9892), 9390 (Application No. 14278), and 18546 (Application No. 26242). Permit Nos. 5633, 9390, and 18546 authorize District diversions from Lagunitas Creek at Peters Dam (Kent Lake) and upstream at Bon Tempe and Alpine Dams. Water collected by the District at Kent Lake is use to provide municipal water supplies to cities and communities in Marin County and to protect fish and wildlife species in Lagunitas Creek. This TUCP is submitted in response to 2020 and 2021's extremely dry hydrology and unprecedented low water levels in the District's reservoirs. The TUCP is necessary to conserve water supplies for fish, wildlife and municipal uses in Water Year 2021-22.

The TUCP seeks approval of modifications to streamflow schedules in Order 95-17 in response to unprecedented hydrologic conditions, and would implement a robust monitoring and adaptive management plan as part of the temporary modifications requested in this TUCP.

1.0 Background

The District controls releases from Kent Lake to implement the minimum instream flow schedules in Lagunitas Creek in accordance with its water rights permits and Order 95-17. Order 95-17 specifies minimum flows in Lagunitas Creek, measured at a USGS located approximately three miles downstream of Peters Dam. These minimum flow requirements vary based on hydrologic conditions in the Lagunitas Creek watershed, as specified in Order 95-17. Order 95-17 instream flow requirements for Lagunitas Creek are set forth in Ordering terms 1 and 2 of Order 95-17.

1.1 Minimum Flow Requirements – Term 1 (Order 95-17)

Term 1 in Order 95-17 requires a minimum base flow of 6 cubic feet per second (cfs) in Lagunitas Creek at the USGS gage located at Samuel P. Taylor state park (USGS Gage) under all hydrologic conditions, and adjusted minimum flow schedules based on time of year and hydrology, as follows:

Normal conditions
November 1st or 15th through December 31, 20 cfs;
January 1st to March 15th 25 cfs;
March 16th to March 31st 20 cfs;
April 1st through April 30th 16 cfs;
May 1st through June 15th 12 cfs;

June 16th through November 1st or 15th 8 cfs

Dry conditions
November 1st or 15th through December 31, 20 cfs;
January 1st to March 15th 20 cfs
March 16th to March 31st 20 cfs;
April 1st through April 30th 14 cfs ;
May 1st through June 15th 10 cfs;
June 16th through November 1st or 15th 6 cfs

The November 1st or 15th 20 cfs minimum flow schedule begins following the first storm that produces a "trigger" flow of 25 cfs as measured at the USGS gage. In the absence of a storm causing a "trigger" flow, the 20 cfs flow requirement begins on November 15th of each year. Additionally, to facilitate upstream fish migration, Term 2 requires four 35 cfs pulse flows that are to occur between November 1st and February 3rd at roughly the beginning of each month.

The figure attached at Exhibit A shows all of the required minimum instream flows specified in Order 95-17, the location of the gauging station used to monitor compliance, and the definitions of the various water supply conditions.

1.2 Water Year Classifications

Order 95-17 includes two water year type classifications, *Normal* year and *Dry* year, which establishes the minimum instream flow requirements based on the hydrologic conditions of the Lagunitas Creek watershed. Water year classifications are determined based on the amount of rainfall received at the Kent rain gage. The January 1 water year classification is based on the total rainfall measured during the preceding 15-month period. If the total rainfall during this period is less than 48 inches, *Dry* year flow requirements are triggered from January 1 through March 31. The April 1 water year classification is based on the total rainfall during the preceding 6-month period. If the total rainfall during this 6-month period is less than 28 inches, *Dry* year flow requirements are triggered from April 1 until the first upstream migration flow in November. *Normal* water year requirements exist whenever *Dry* year conditions are not present.

2.0 Current Hydrologic and Water Supply Conditions

The District controls seven reservoirs, four of which are located in the Upper Lagunitas Creek watershed. As of September 1, 2021, the water supply storage level in the reservoirs was 29,636 acre-feet. This storage level is approximately is 37% of total storage capacity and 50% of historical average for this date. The current low storage level is the result of severely low rainfall in the region since January 1, 2020. On April 20, the District's Board approved Resolution 8630, attached as Exhibit B, declaring a Water Storage Emergency. Subsequently, on May 18, 2021, the County of Marin approved Resolution 21-27, attached as Exhibit C, declaring a local emergency regarding drought conditions throughout the County. On July 8, 2021, Governor Newsom included Marin County in his 2021 drought proclamation, which is attached as Exhibit D.

2.1 Alternative Water Supplies

The District historically receives approximately 25% of its total water supply from the Sonoma County Water Agency (Sonoma Water), which is also experiencing these historical drought conditions. As a result of the dry conditions and lower than normal reservoir levels in the Russian River watershed, Sonoma Water has reduced allocations to their retail customers, including the District, in June 2021. From July through September the District will be restricted to 4-MGD and a slight increase in October to 4.6 MGD. This is compared to a typical import of 8-9 MGD for this same period. District staff expect that reduced allocations may continue if rainfall is below average in the fall 2021. Sonoma Water issued a Temporary Urgency Change Order on June 14, 2021 to reduce their instream flow requirements due to these severely dry conditions.

3.0 Approval of Temporary Urgency Change Petition to Permit(s) 5633, 9390, and 18546

Under Water Code section 1435, subdivision (b), the Board must make the following findings before issuing a temporary change order:

1. The permittee or licensee has an urgent need to make the proposed change;
2. The proposed change may be made without injury to any other lawful user of water;
3. The proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses; and
4. The proposed change is in the public interest.

3.1 Urgency of the Proposed Change

Under Water Code section 1435, subdivision (c), an urgent need to make a proposed changes exists when the State Water Board concludes that the proposed temporary change is necessary to further the constitutional policy that the water resources of the State be put to beneficial use to the fullest extent of which they are capable and that waste of water be prevented.

For this petition, an urgent need for the requested temporary change exists because of the extremely low water storage levels in the District's reservoirs and the fact that Sonoma Water will be restricting allocations due to its low reservoir storage levels. Without proposed changes, the applicable minimum instream flow requirements may require releases of water from Kent Lake that would risk significant depletions of storage and potential elimination of water supplies for fish and wildlife and for water users in the District's service area during the summer and fall of 2022. The District's reservoir storage levels are already at historic low levels and projections indicate that, even with continued conservation of from District customers of between 20 to 40 %, the District's reservoir storage levels could be below 10,000 AF in late summer early fall 2022 if current drought conditions persist. The District has never operated its reservoirs at this level and there exists a great deal of uncertainty as to whether the District would be able to continue to meet its water supply obligation and maintain instream flows under such conditions. The District's current water storage supply and projections are attached in Exhibit E. Such depletions in storage and resulting reductions of water supplies would cause serious impacts to human health and welfare within the District's service area, and would jeopardize storage and water supplies needed for fishery protection and stable flows in Lagunitas Creek in summer and fall 2022.

3.2 No Injury to Any Other Lawful User of Water

If this petition is approved, the District still will be required to maintain specific minimum flows in Lagunitas Creek. Because these minimum flows will be present, all other legal users of water still will be able to divert and use the amounts of water that they may legally divert and use. Accordingly, granting this petition will not result in any injury to any other lawful user of water. As noted in Section 1.3 North Marin Water District, a downstream legal user of water, has been involved throughout this process to discuss the proposed changes.

The only other significant water right holder downstream of Peters Dam during the period of the TUCP is the North Marin Water District (NMWD). The District has been coordinating with NMWD through the Lagunitas TAC subcommittee and in individual meetings to discuss the proposed changes. The District has worked collaboratively with all stakeholders to refine the study approach and has integrated feedback and comments into the study design to assure it addressed concerns and avoided injury to other lawful water users.

3.3 No Unreasonable Effect upon Fish, Wildlife, or Other Instream Beneficial Uses

Based on the Lagunitas Creek Instream Flow Study dated September 2021, attached as Exhibit F to this supplement, the District has determined that the change requested in this petition will not result in an unreasonable effect on the Coho, Steelhead and Freshwater Shrimp species listed as protected pursuant to Order 95-17. The District finds that the requested petition, if approved, would not result in any unreasonable effect to these or other fish and wildlife species or other instream beneficial uses. The petition proposes that winter baseflow releases would be delayed for up to one month or until coho spawning in Lagunitas Creek is observed, and the winter baseflow release would be reduced from 20 to 16 cfs as measured at the USGS gauge on Lagunitas Creek at S.P. Taylor State Park.

In anticipation of filing this petition, the District undertook a study of the potential effects of reducing instream flows in Lagunitas Creek (Exhibit F). As part of that process, District staff engaged stakeholders and resource agencies to seek input into the study parameters, review progress, and to solicit feedback on the flow release modifications and monitoring and adaptive management plan. To date, the Lagunitas Technical Advisory Committee (TAC) has received presentations on this item at two regular meetings, the Lagunitas TAC subcommittee has met four times since the study was initiated (May, June, July, August), and the resource agencies (CDFW, NMFS, and SFBRWQCB) have met with the District five times (April, May, June, July, August).

Analysis of observed coho spawning trends over the last 40 years shows that a delay of up to one month would conserve reservoir storage until spawning salmonids are present to benefit from the pulse flows and increased base flow. Habitat suitability modelling of a range of possible winter baseflows has shown that minor reductions in winter baseflow, from 20 cfs to 16 cfs, would maintain at least 83% of the suitable coho spawning habitat available at 20 cfs. This minor reduction in available spawning habitat will not result in unreasonable impacts to fisheries. The Study also finds that Freshwater Shrimp would not be unreasonably impacted given their preference for habitat in deeper pools or glides that are not expected to be impacted by the proposed instream flow reductions. Further, the petition proposes to

incorporate a robust monitoring and adaptive management plan that will provide early identification of and adverse impacts and provide for minimum flow increases as necessary to avoid fishery impacts.

3.4 The Proposed Change is in the Public Interest

Approval of the TUCP would provide minor temporary relief from minimum instream flow requirements for Lagunitas Creek to allow retention of previously stored water for the protection of fish, wildlife and human uses next year. The TUCP will help the District conserve stored water in Kent Lake, so that sufficient water is available to be released throughout 2022 to maintain instream flow for the benefit of all uses of Lagunitas Creek, including the salmonid fisheries. It is in the public interest to preserve these water supplies for these beneficial uses under present hydrological conditions.

As dry conditions persisted through the typically wet spring months and District storage levels continued to historically low levels, on April 20, 2021, the Board adopted Resolution No 8630 (Exhibit B) declaring a Water Shortage Emergency pursuant to Water Code sections 350 et seq. and 71640 et seq. On April 20, 2021, the Board also enacted Ordinance No. 449, attached as Exhibit I, a comprehensive set of mandatory water conservation measures pursuant to Water Code sections 350 and 71640, et seq. The purpose of these requirements was to significantly reduce the consumption of water during the drought in order to extend existing water supplies. On May 4, 2021, the Board adopted Ordinance No, 450, attached as Exhibit J, further mandatory conservation measures, limiting outdoor sprinkler irrigation system to two days per week and requiring all recreational pools and spas to be covered when not in use to reduce water loss through evaporation. On July 6, 2021, the Board adopted Ordinance No. 452, attached as Exhibit K, mandating more stringent irrigation measures, further limiting overhead sprinkler irrigation systems to one day per week on a day designated by the District and limiting drip irrigation to two days per week. On July 20, 2021, the Board adopted Ordinance No. 453, attached as Exhibit L, a prohibition for all new water services connections from use of potable water for landscape irrigation, requiring new water service connections to postpone until after the Water Shortage Emergency the installation of potable water irrigated landscaping.

District staff continues to monitor the District's limited water supply and are targeting a 40% reduction in overall water use through October 2021. District staff are in ongoing public discussions with the Board of Directors as it considers further actions on conservation measures, water use restrictions, fines and penalties to ensure ongoing water savings aimed at preserving reservoir storage levels. Additional details relating to Marin Water's water conservation activities are summarized in Section 6.2.

4.0 Requested Temporary Urgency Changes to Permits 5633, 9390, and 18546

To address the current and projected water supply conditions in the District's reservoirs, the District requests that the State Water Board make the following temporary urgency change to Permits 5633, 9390, and 18546 (Terms 1 and 2 of Order 95-17):

November 1st through 15th, 6 cfs;
November 16th through November 30th, 6 cfs (as modified based on trigger event);
December 1st or 15th through March 31, 16 cfs;
April 1st to April 30th, 14 cfs.

The proposed change from November 16th through November 30th requests a minimum flow of 6 cfs with an adaptive management component that is dependent on a "trigger" flow of 25 cfs as measured at the USGS gage. If a flow greater than 25 cfs occurs as measured at the USGS gage, then the minimum flow would increase to 10 cfs and monitoring for coho spawning would take place for one week following the flow event. If no coho spawning is observed within the one week period, a minimum flows would return to 6 cfs. If coho spawning is observed within the one week period, minimum flows would increase to 16 cfs for the remainder of this period.

The TUCP additionally proposes to extend the trigger date to December 1st or 15th for the minimum flow of 16 cfs following the first storm that produces a "trigger" flow of 25 cfs as measured at the USGS gage. In the absence of a storm causing a "trigger" flow, the 16 cfs flow requirement shall begin on December 15th. Additionally, there would be three upstream migration flows required at a minimum flow of 35 cfs that are to occur between December 1st and February 3rd at roughly the beginning of each month.

5.0 Monitoring and Reporting Proposal

As discussed in the proposed Monitoring and Adaptive Management Plan, attached as Exhibit G and part of this petition, the TUCP proposes that the District report monitoring results regularly to CDFW, NMFS, and the SFBRWQCB. In addition, the District proposes to provide weekly updates to the State Water Board, CDFW, NMFS, and the SFBRWQCB regarding the current hydrologic and environmental (water quality and fishery) conditions in Lagunitas Creek. This information will assist the resource agencies and the State Water Board to promptly consider the effects of the temporary change operations and assist the District to determine whether response actions or adjustments are necessary.

5.1 Monitoring

To monitor habitat conditions and hydrologic connectivity, the District proposes to conduct the following tasks for the duration of the temporary change:

- The District will establish a minimum of twelve (12) monitoring sites at shallow riffle locations (i.e. critical riffles) throughout Lagunitas Creek to assess and document passage and habitat conditions for salmonids. Each monitoring site will be surveyed once every two weeks or, as conditions allow, at target flows of approximately 10, 15, 20, 25, 30, and 35 cubic feet per second (cfs).

  At each site, temporary stakes and a field tape will be used to delineate a transect across the shallowest portion of the riffle crest (i.e. the critical riffle profile). During each visit, water depth and velocity will be measured along the transect at regular intervals (approximately every 1-2 feet depending on bed topography), making sure to capture the riffle crest thalweg. Photographs will be taken facing upstream and downstream to document habitat conditions during each visit.

  Monitoring sites will be distributed as follows:

  a. Upper Lagunitas Creek
     A minimum of eight transect sites will be established between Peters Dam and Tocaloma Bridge. An effort will be made to locate these transects within the four reaches used previously for flow/habitat suitability modeling. Exact locations will be based on reconnaissance surveys to be completed prior to November 1.

b. Lower Lagunitas Creek
A minimum of four transect sites will be established between Tocaloma Bridge and the USGS streamgage near Pt. Reyes Station. Exact locations will be based on reconnaissance surveys to be completed prior to November 1.

To monitor the effects on water quality and aquatic habitat, the District proposes to conduct the following tasks for the duration of the Temporary Urgency Change Order:

The District will monitor water quality and water temperature conditions in Lagunitas Creek continuously using electronic data loggers. Each logger will be anchored to the streambed in pool habitats with adequate mixing. A multi-parameter water quality data sonde will be installed in lower Lagunitas Creek. The data sonde will record continuous measurements of water temperature, dissolved oxygen (DO), specific conductance, and turbidity. All data will be collected at one-hour intervals and will be downloaded every two weeks at minimum.

Data loggers will be deployed at the following locations:

a. Upper Lagunitas Creek Water Temperature
    i. Immediately downstream of Peters Dam
    ii. At the USGS streamgage at Samuel P. Taylor State Park

b. Lower Lagunitas Creek Water Temperature
    i. Immediately downstream of Tocaloma Bridge
    ii. At the USGS streamgage near Point Reyes Station

c. Lower Lagunitas Creek Water Quality
    iii. At the USGS streamgage near Point Reyes Station

To monitor fisheries, the District proposes to conduct the following monitoring for the duration of the TUCO:

Spawner surveys will be conducted in main stem Lagunitas Creek according to existing protocols, which include counting live fish, mapping and measuring redds, and measuring and collecting tissue samples from carcasses. During the TUCO period, the District will note indicators of fish condition (e.g. presence of fungus or external injuries) and stress behaviors (e.g. gasping, unusual swimming patterns). Photographs will be taken of all redds encountered, and superimposition will be assessed using previous photographs for reference.

At a minimum of 10% of redds observed in main stem Lagunitas Creek, water depth and velocity will be measured to document inundation levels (i.e. redd viability). Measurements will be taken at redds only when live fish are not present and redd construction appears to be complete. Water depth will be measured at three locations per redd: 1) the deepest point within the excavation pit, 2) the shallowest point on the tail spill mound, and 3) a point on the streambed adjacent to the redd that is judged to have similar depth and velocity as was present

prior to redd construction. Average water column velocity will be measured at this same point adjacent to the redd.

Depending upon safety and water visibility considerations, spawner surveys will be conducted as follows:

a. Upper Lagunitas Creek

At a minimum, spawner surveys will be conducted once per week. In the event of a storm or other event that is expected to stimulate salmon migration and/or spawning, additional surveys may be conducted, as conditions allow.

Surveys will cover the following three reaches:

i. Peters Dam to Irving Bridge
ii. Irving Bridge to Swimming Hole Bridge
iii. Swimming Hole Bridge to Tocaloma Bridge

b. Lower Lagunitas Creek

At a minimum, surveys will be conducted once every two weeks. In the event of a storm or other event that is expected to stimulate salmon migration and/or spawning, additional surveys may be conducted, as conditions allow. Surveys will cover the following two reaches:

i. Tocaloma Bridge to Nicasio Creek
ii. Nicasio Creek to Tidal Extent

5.2 Reporting

The District proposes to conduct the following reporting and communications actions:

a. The District shall convene a weekly meeting with the resource agencies and submit notes of those meetings to State Water Board within one week after their occurrence. The District shall also provide fisheries and water quality updates on a weekly basis as part of the required TUCO hydrologic status updates submitted to State Water Board and posted to the District's website.

b. District staff shall convene monthly meetings with a subcommittee of the Lagunitas TAC and submit notes of those meetings to State Water Board, the TAC, and the resource agencies within one week after their occurrence.

c. At the conclusion of the TUCO, a summary report of monitoring activities and adaptive management measures associated with the TUCO will be submitted to the resource agencies by August 2022. This report will be publically available from the District.

5.3 Adaptive Management

To determine whether adaptive management actions are taken, the District proposes considering the following thresholds:

1. Salmonid adult passage

Shallow riffles should maintain a minimum water depth of 0.7 feet (21 cm) for at least 10% (contiguously) of the maximum wetted transect length to allow adult coho salmon and steelhead to migrate upstream to holding and spawning areas. Passage criteria will be met for a minimum of three days per month between December and March.

2. Salmonid smolt passage
   Shallow riffles should maintain a minimum water depth of 0.4 feet (12 cm) for at least 10% (contiguously) of the maximum wetted transect length to allow steelhead and coho smolts to migrate downstream to the ocean. Passage criteria will be met continuously from February 15 through the end of the Order (April 1).

3. Salmonid juvenile passage
   Shallow riffles should maintain a minimum water depth of 0.3 feet (9 cm) for at least 10% (contiguously) of the maximum wetted transect length to allow juvenile salmonids to move between habitats. Passage criteria will be met at all times.

4. Water depth over redds
   Salmonid redds should remain fully inundated to provide suitable conditions for egg incubation and fry emergence. Photo monitoring will be used to document redd inundation levels, specifically whether the shallowest point on the tail spill mound remains wetted.

5. Water velocity over redds
   Water velocities over salmonid redds should not become stagnant or so slow as to prevent exchange of oxygen and metabolic waste from incubating eggs and alevins. Visual indicators of water velocity, including presence of silt and algae, will be documented via photo monitoring. Water velocity measurements will be taken at approximately 10% of redds.

6. Water temperature
   Water temperature should be maintained at or below 56° Fahrenheit from November 1 through April 1, as required by Water Board Order WR95-17. This temperature threshold applies to the portion of Lagunitas Creek at the Samuel P. Taylor State Park monitoring site and upstream.

7. Water Quality
   Water quality (dissolved oxygen, conductivity, and turbidity) should remain suitable to support all life stages of salmonids.

8. Fish Condition and Behavior
   Adult salmon should not display visible signs of stress, or be exposed to elevated predation levels due to crowding or stranding during upstream migration and holding. Indicators include erratic or unusual swimming behavior, crowding into isolated habitats, gasping or displaying other signs of respiratory difficulty, having significant fungal growth or physical injuries.

An adaptive management approach will be used during the delayed winter baseflow period from November 1 through December 15. In the event of unusually early or heavy rainfall during this period, the District will respond as follows:

1. November 15 – December 1
   If a storm occurs during this period that results in a flow of 25 cfs or greater at the USGS streamgage at Samuel P. Taylor State Park, the District will release sufficient water to maintain a minimum flow of 10 cfs, measured at the same location, for a period of one week. During this one-week period, spawner surveys will be conducted. If coho salmon spawning is not observed, flows will be returned to the summer baseflow level. If spawning is observed, flows will be increased to the winter baseflow of 16 cfs.

2. December 1 – 15
   If a storm occurs during this period that results in a flow of 25 cfs or greater at the USGS streamgage at Samuel P. Taylor State Park, the District will increase releases to maintain the winter baseflow of 16 cfs. If no such storm occurs during this period, winter baseflow will begin on December 18, following the first three-day migration pulse release from December 15-17.

If monitoring identifies unfavorable conditions, the District will increase stream flow releases in increments of approximately 1-2 cfs for a period of one week. During this one-week period, additional monitoring will be conducted and conditions will be re-assessed in consultation with the resource agencies. If it is determined that flow can be returned to its original level without adverse impacts, flow will be returned to the original level. The resource agencies will be notified of any such monitoring result and subsequent change in stream flow release.

If salmonid passage thresholds are not being met, the District will investigate whether critical riffles could be modified to provide passage. Based on previous experience, this may entail reorienting instream wood or other debris by hand to provide favorable hydraulics and achieve passage criteria. Any such modifications would be presented to the resource agencies for discussion prior to carrying them out.

6.0 Water Conservation, Additional Supply and Demand Reduction Activities

6.1 Regional Activities

The District continues to implement water-use efficiency programs that align with the legacy programs of the California Urban Water Conservation Council's (CUWCC) Best Management Practices (BMPs) and comply with SB 7x-7. While these BMPs remain the baseline for the Marin & Sonoma region, the establishment of the Sonoma-Marin Water Saving Partnership (Partnership) in December 2010, and the subsequent ten year extension of the Partnership agreement in May 2018, memorialized the region's commitment to long-term, year-round water use efficiencies. The Partnership removes one of the most significant barriers to implementing conservation programs, namely funding. Each Partner has committed to a sustained level of funding that is allocated specifically to implementing conservation programs to reduce overall regional water use.

The Partnership represents twelve North Bay water utilities in Sonoma and Marin counties that have joined together to provide regional solutions for water use efficiency. The utilities (Partners) are: the

Cities of Santa Rosa, Rohnert Park, Petaluma, Sonoma, Cotati, Healdsburg; North Marin Water, Valley of the Moon and Marin Municipal Water Districts; Cal American Water Company-Larkfield; the Town of Windsor and Sonoma Water. The Partnership was formed to identify and recommend water use efficiency projects and to maximize the cost effectiveness of water use efficiency programs in our region.

On May 9, 2016, Governor Edmund G. Brown Jr. issued Executive Order B-37-16 that set forth actions to be taken to use water more wisely, eliminate water waste, strengthen local drought resilience, and improve agricultural water use efficiency and drought planning. Subsequent passage of SB 606, AB 1668, and SB 555 provided the needed authority for state agencies to begin the development of a new statewide framework for making conservation a California way of life. The Partners are committed to maintaining a conservation ethic in the region and will continue to implement conservation programs that are minimizing water demand rebound following the 2012-2016 drought, while working collaboratively with state agencies to develop and implement the new water use objectives of the statewide framework. The Partners, working alongside the California Water Efficiency Partnership as the successor organization to CUWCC, will continue to collect regional data and develop new programs that ensure our customers remain engaged in making conservation a California way of life.

In summer 2020, the Partnership conducted a successful multi-media public outreach campaign from June through September called “Saving Water Ensures Water for What You Love” which emphasized the importance of water conservation for long-term water supply reliability, fisheries, and summertime recreation in the Russian River. This campaign was a contributing factor in the successful preservation of storage in Lake Mendocino and the avoidance of further reduced flows in the Russian River this past summer. In addition to public outreach, the Partnership continued to offer a wide variety of water-use-efficiency incentive programs, workshops, trainings, school classes, and other resources for customers in spite of COVID Shelter-in-Place (SIP) Orders. The Partnership’s activities for calendar year 2020 were detailed in three separate update reports submitted to the State Water Board to meet the Term 10 requirements of Order WR 2020-0102-EXEC.

Because of continued low rainfall and reservoir levels at the end of 2020, the Partnership is undertaking a new public outreach campaign in winter 2021 that will initially focus on paid social media messages. In addition to social media ad buys, the Partners will continue with already underway winter savings messages using AMI billing software, more traditional bill inserts, website posts, E-news, local radio, and direct customer outreach. Should dry conditions persist, a further escalation of the winter outreach campaign will be implemented, along with consideration to include a regional reduction target that is aligned with needed savings.

The Partnership will also continue to provide programs that help customers make water conservation a way of life. This includes workarounds to SIP Orders, such as the upcoming virtual training for professional landscapers in February, titled Rehydrating the Russian River Watershed: Moving towards Regenerative Landscapes, or the virtual Garden Sense consultations offered to residential customers. Due to these and previous years’ efforts, water use by the Partnership near the end of 2020 was still 9% below the 2013 benchmark year chosen by the state for water use reductions during the drought. It is anticipated that the Partnership’s wintertime activities will continue the successful water use reductions of the past few years.

6.2 District Specific Activities

On February 16, 2021, in order to preserve the District's limited water supply, the District's Board of Director adopted Resolution No. 8624 (Exhibit H), declaring Initial Drought Water Conservation Actions for District customers to voluntarily reduce their water usage. As dry conditions persisted through the typically wet spring months and District storage levels continued to historically low levels, on April 20, 2021, the Board adopted Resolution No 8630 (Exhibit B) declaring a Water Shortage Emergency pursuant to Water Code sections 350 et seq. and 71640 et seq. On April 20, 2021, the Board also enacted Ordinance No. 449 (Exhibit I), a comprehensive set of mandatory water conservation measures pursuant to Water Code sections 350 and 71640, et seq. The purpose of these requirements was to significantly reduce the consumption of water during the drought in order to extend existing water supplies. Recognizing that in recent years, overall summer peak demand has averaged nearly twice winter demand due to outdoor water use and irrigation, the mandatory reduction measures targeted resections on outdoor water wastage. Mandatory water use prohibitions implemented at that time included:

- Washing of vehicles
- Use of private fire taps, also known as fire service lines, to solely provide water for fire protection and annual fire service line testing
- Power washing of buildings and homes
- Use of potable water for dust control, compaction, sewer flushing, street cleaning, or any other use that can be met with recycled water

On May 4, 2021, the Board adopted Ordinance No, 450 (Exhibit J), further mandatory conservation measures, including:

- Limiting outdoor sprinkler irrigation system to two days per week
- Requiring all recreational pools and spas to be covered when not in use to reduce water loss through evaporation

On July 6, 2021, the Board adopted Ordinance No. 452 (Exhibit K), mandating more stringent irrigation measures, including:

- Limiting overhead sprinkler irrigation systems to one day per week on a day designated by the District
- Limiting drip irrigation to two days per week

On July 20, 2021, the Board adopted Ordinance No. 453 (Exhibit L), a prohibition for all new water services connections from use of potable water for landscape irrigation, requiring new water service connections to postpone until after the Water Shortage Emergency the installation of potable water irrigated landscaping.

In conjunction with the significant restrictions on outdoor water use, the District developed and implemented a robust water waste patrol assigning District and temporary staff to foot patrols in neighborhoods throughout the District to ensure enforcement of the new water waste restrictions. The District water waste patrol hung hundreds of door tags and issued hundreds of letters to help educate District customers of the new restrictions. Where necessary, fines for water waste have been issued by the District.

Also in furtherance of the District's significant conservations efforts, the District undertook an extensive communication and outreach campaign, updating its website to include timely information regarding ongoing water savings, as well as updated information on reservoir storage levels. Additionally, the District has implemented some of the most aggressive turf replacement rebates in the state, as well as a host of other rebates aimed at supporting District customers achieve water savings.

See https://www.marinwater.org for further details.

District staff continues to monitor the District's limited water supply and are targeting a 40% reduction in overall water use through October 2021. District staff are in ongoing public discussions with the Board of Directors as it considers further actions on conservation measures, water use restrictions, fines and penalties to ensure ongoing water savings aimed at preserving reservoir storage levels.

The District has also embarked on a thorough investigation into additional water supplies that might be available to the District in the near term given the projections of continued drought and decline in reservoir storage levels, as well as further curtailment from Sonoma Water. The District is in the process of rehabilitating the Kastania Pump Station, located to the North of the District's service area along the North Marin Aqueduct. The rehabilitation of this pump station will provide greater operational flexibility in the transfer of the water from Sonoma Water through the North Marin Water District's system to the District, which at times is constrained when water transfers could be optimized. Additionally, the District has examined the use of pre-constructed desalination facilities, but found that production levels may be insufficient to meet supply demand. The District continues to view this as an option, if necessary. Primarily, the District is focusing its efforts on its Emergency Intertie Project, which would allow for the transfer of water through the East Bay Municipal Utilities District across the San Rafael-Richmond Bridge. The District is well into its feasibility analysis as well as looking into possible water transfer options. This project presents a possible solution for the second half of 2022 if severe drought conditions persist, but this timeline also presents significant challenges, making it of the upmost importance to preserve as much reservoir water storage as possible through continued conservation and this petition.

Exhibits:

A. Figure depicting Order 95-17 Streamflow Requirements
B. District Resolution 8630-Declaration Water Shortage Emergency
C. Marin County Declaration of Drought Emergency
D. State of California Emergency Proclamation
E. District Drought Conditions and Projections
F. Lagunitas Creek Instream Flow Study, September 2021
G. Lagunitas Creek TUCP Monitoring and Adaptive Management Plan
H. District Resolution 8624 – Initial Drought Conservation Actions
I. District Ordinance 449 – Comprehensive Drought Water Conservation and Enforcement Measures
J. District Ordinance 450 – Additional Water Conservation and Enforcement Measures
K. District Ordinance 452 – Additional Conservation Measures
L. District Ordinance 453 – Landscape Restrictions on New Water Service Connections
M. Regional Water Quality Control Board Comment Letter, August 20, 2021
N. National Marin Fisheries Services Comment Letter, August 27, 2021

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Tel: (916) 341-5300 Fax: (916) 341-5400
http://www.waterboards.ca.gov/waterrights

ENVIRONMENTAL INFORMATION FOR PETITIONS

This form is required for all petitions.

Before the State Water Resources Control Board (State Water Board) can approve a petition, the State Water Board must consider the information contained in an environmental document prepared in compliance with the California Environmental Quality Act (CEQA). This form is not a CEQA document. If a CEQA document has not yet been prepared, a determination must be made of who is responsible for its preparation. As the petitioner, you are responsible for all costs associated with the environmental evaluation and preparation of the required CEQA documents. Please answer the following questions to the best of your ability and submit any studies that have been conducted regarding the environmental evaluation of your project. If you need more space to completely answer the questions, please number and attach additional sheets.

DESCRIPTION OF PROPOSED CHANGES OR WORK REMAINING TO BE COMPLETED

For a petition for change, provide a description of the proposed changes to your project including, but not limited to, type of construction activity, structures existing or to be built, area to be graded or excavated, increase in water diversion and use (up to the amount authorized by the permit), changes in land use, and project operational changes, including changes in how the water will be used. For a petition for extension of time, provide a description of what work has been completed and what remains to be done. Include in your description any of the above elements that will occur during the requested extension period.

See 'Supplement to the September 2021 Temporary Urgency Change Petition filed for permits 5633, 9390, and 18546' for a summary of the requested changes.

Insert the attachment number here, if applicable:

Coordination with Regional Water Quality Control Board

For change petitions only, you must request consultation with the Regional Water Quality Control Board regarding the potential effects of your proposed change on water quality and other instream beneficial uses. (Cal. Code Regs., tit. 23, § 794.) In order to determine the appropriate office for consultation, see: http://www.waterboards.ca.gov/waterboards_map.shtml. Provide the date you submitted your request for consultation here, then provide the following information.

Date of Request

09/10/2021

Will your project, during construction or operation, (1) generate waste or wastewater containing such things as sewage, industrial chemicals, metals, or agricultural chemicals, or (2) cause erosion, turbidity or sedimentation? ☐ Yes ☒ No

Will a waste discharge permit be required for the project? ☐ Yes ☒ No

If necessary, provide additional information below:

Xavier Fernandez and Mike Napolitano of the San Francisco Bay Regional Water Quality Control Board were contacted on April 15, 2021, May 17, 2021, June 8, 2021, July 30, 2021, August 12, 2021, and August 20, 2021 by Marin Municipal Water District Staff Shaun Horne, Elysha Irish, and Jonathan Koehler.

Insert the attachment number here, if applicable:

Local Permits

For temporary transfers only, you must contact the board of supervisors for the county(ies) both for where you currently store or use water and where you propose to transfer the water. (Wat. Code § 1726.) Provide the date you submitted your request for consultation here.

Date of Contact

For change petitions only, you should contact your local planning or public works department and provide the information below.

Person Contacted: Date of Contact:

Department: Phone Number:

County Zoning Designation:

Are any county permits required for your project? If yes, indicate type below. ☐ Yes ☒ No

Grading Permit Use Permit Watercourse Obstruction Permit

Change of Zoning General Plan Change Other (explain below)

If applicable, have you obtained any of the permits listed above? If yes, provide copies. ☐ Yes ☐ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

Federal and State Permits

Check any additional agencies that may require permits or other approvals for your project:

☐ Regional Water Quality Control Board ☐ Department of Fish and Game

☐ Dept of Water Resources, Division of Safety of Dams ☐ California Coastal Commission

☐ State Reclamation Board ☐ U.S. Army Corps of Engineers ☐ U.S. Forest Service

☐ Bureau of Land Management ☐ Federal Energy Regulatory Commission

☐ Natural Resources Conservation Service

Have you obtained any of the permits listed above? If yes, provide copies. ☐ Yes ☒ No

For each agency from which a permit is required, provide the following information:

Agency	Permit Type	Person(s) Contacted	Contact Date	Phone Number

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

Construction or Grading Activity

Does the project involve any construction or grading-related activity that has significantly altered or would significantly alter the bed, bank or riparian habitat of any stream or lake? ☐ Yes ☒ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

Archeology

Has an archeological report been prepared for this project? If yes, provide a copy.	☐ Yes	☒ No
Will another public agency be preparing an archeological report?	☐ Yes	☒ No
Do you know of any archeological or historic sites in the area? If yes, explain below.	☐ Yes	☒ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

Photographs

For all petitions other than time extensions, attach complete sets of color photographs, clearly dated and labeled, showing the vegetation that exists at the following three locations:

- ☒ Along the stream channel immediately downstream from each point of diversion
- ☒ Along the stream channel immediately upstream from each point of diversion
- ☒ At the place where water subject to this water right will be used

Maps

For all petitions other than time extensions, attach maps labeled in accordance with the regulations showing all applicable features, both present and proposed, including but not limited to: point of diversion, point of rediversion, distribution of storage reservoirs, point of discharge of treated wastewater, place of use, and location of instream flow dedication reach. (Cal. Code Regs., tit. 23, §§ 715 et seq., 794.)

Pursuant to California Code of Regulations, title 23, section 794, petitions for change submitted without maps may not be accepted.

All Water Right Holders Must Sign This Form:
I (we) hereby certify that the statements I (we) have furnished above and in the attachments are complete to the best of my (our) ability and that the facts, statements, and information presented are true and correct to the best of my (our) knowledge. Dated at Corte Madera, CA .

Ben Horenstein Digitally signed by Ben Horenstein Date: 2021.09.08 12:34:32 -07'00'

Water Right Holder or Authorized Agent Signature

Water Right Holder or Authorized Agent Signature

NOTE:
- **Petitions for Change may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game. (Cal. Code Regs., tit. 23, § 794.)**
- **Petitions for Temporary Transfer may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game and the board of supervisors for the county(ies) where you currently store or use water and the county(ies) where you propose to transfer the water. (Wat. Code § 1726.)**

Environmental Checklist Photographs

1) Along the stream channel immediately downstream from each point of diversion

Lagunitas Creek immediately downstream of Peters Dam (Kent Lake), facing upstream, January 2021.

Lagunitas Creek immediately downstream of Peters Dam (Kent Lake), facing downstream, January 2021.

2) Along the stream channel immediately upstream from each point of diversion

Peters Dam (Kent Lake), facing downstream, 2015.

Peters Dam (Kent Lake), facing upstream, 2015.

3) At the place where water subject to this water right will be used

Lagunitas Creek approximately one mile downstream of Peters Dam (Kent Lake), January 2021.

Lagunitas Creek approximately three miles downstream of Peters Dam (Kent Lake), October 2020.

Print Form

Notice of Exemption

21-2021-181 **Appendix E**

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA 95812-3044

County Clerk
County of: Marin

From: (Public Agency): Marin Municipal Water District
220 Nellen Avenue, Corte Madera, CA 94925
Attn: Crystal Yezman, Director of Engineering
(Address)

Project Title: Petition Requesting Approval of Temporary Urgency Change in Water Rights Permits 5633, 9390, and 18546 in Marin County

Project Applicant: Marin Municipal Water District

Project Location - Specific:
Lagunitas Creek from Peters Dam/Kent Lake to confluence with Tomales Bay

Project Location - City: N/A Project Location - County: Marin County

Description of Nature, Purpose and Beneficiaries of Project:
See attached memo.

Name of Public Agency Approving Project: State Water Resources Control Board – Division of Water Rights

Name of Person or Agency Carrying Out Project: Marin Municipal Water District

Exempt Status: **(check one):**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☒ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☐ Categorical Exemption. State type and section number: 15301, 15308, 15309
- ☐ Statutory Exemptions. State code number:

FILED
AUG 31 2021
SHELLY SCOTT
MARIN COUNTY CLERK
BY: J. GILARDI, Deputy

Reasons why project is exempt:
See attached memo.

Lead Agency Contact Person: Crystal Yezman Area Code/Telephone/Extension: 415-945-1100

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? Yes No

Signature: Crystal Yezman Date: 08/30/2021 Title: Director of Engineering

Signed by Lead Agency ▪ Signed by Applicant

Authority cited: Sections 21083 and 21110, Public Resources Code.
Reference: Sections 21108, 21152, and 21152.1, Public Resources Code.

Date Received for filing at OPR:

POSTED 8/31/21 TO 9/30/21

Revised 2011

☐

State of California - Department of Fish and Wildlife

2021 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (REV. 01/01/21) Previously DFG 753.5a

Print | StartOver | Save

RECEIPT NUMBER:
21 — 08/31/21 — 181

STATE CLEARINGHOUSE NUMBER *(If applicable)*

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY	LEAD AGENCY EMAIL	DATE
MARIN MUNICIPAL WATER DISTRICT		08/31/21

COUNTY/STATE AGENCY OF FILING	DOCUMENT NUMBER
Marin	

PROJECT TITLE

PETITION REQUESTING APPROVAL OF TEMPORARY URGENCY CHANGE IN WATER RIGHTS PERMITS 5633, 9390 AND 18546 IN MARIN COUNTY

PROJECT APPLICANT NAME	PROJECT APPLICANT EMAIL	PHONE NUMBER
MARIN MUNICIPAL WATER DISTRICT		(415) 945-1100

PROJECT APPLICANT ADDRESS	CITY	STATE	ZIP CODE
220 NELLEN AVENUE	CORTE MADERA	CA	94925

PROJECT APPLICANT *(Check appropriate box)*

☐ Local Public Agency ☐ School District ☑ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,445.25	$	0.00
☐ Mitigated/Negative Declaration (MND)(ND)	$2,480.25	$	0.00
☐ Certified Regulatory Program (CRP) document - payment due directly to CDFW	$1,171.25	$	0.00

☑ Exempt from fee

- ☑ Notice of Exemption (attach)
- ☐ CDFW No Effect Determination (attach)

☐ Fee previously paid (attach previously issued cash receipt copy)

☐ Water Right Application or Petition Fee (State Water Resources Control Board only)	$850.00	$	0.00
☑ County documentary handling fee		$	50.00
☐ Other		$	

PAYMENT METHOD:

☐ Cash ☐ Credit ☐ Check ☐ Other **TOTAL RECEIVED** $ 50.00

SIGNATURE	AGENCY OF FILING PRINTED NAME AND TITLE
X	MARIN DEPUTY CLERK: J GILARDI

ORIGINAL - PROJECT APPLICANT | COPY - CDFW/ASB | COPY - LEAD AGENCY | COPY - COUNTY CLERK | DFW 753.5a (Rev. 01012021)

Assessor-Recorder-Co. Clerk
County of Marin
SHELLY SCOTT
Assessor-Recorder-Co. Clerk

1 FISH/GAME EXEMPTION	50.00
Total Charges	50.00
CHECK 1102152	50.00
Total Tendered	50.00
Change	.00

8/31/2021 11:22:36 AM 202108310025 2

Printed: Aug 31 2021 11:22AM by JG ARC1TLHJH2

Thank you!

Online Anytime. www.marincounty.org

Requested By Public

Attachment 1 - Notice of Exemption

Filing Requested By and When Filed Return To:

Marin Municipal Water District
220 Nellen Ave
Corte Madera, CA 94925
Attn: Crystal Yezman, Director of Engineering

Project Title: Petition Requesting Approval of Temporary Urgency Change in Water Rights Permits 5633, 9390, and 18546 in Marin County

Project Location: The proposed action would occur in Lagunitas Creek in Marin County from Peters Dam/Kent Lake to the confluence with Tomales Bay. Figure 1 shows the streamflow requirements for Lagunitas Creek. The only community along this portion of Lagunitas Creek is Tocaloma.

Project Location – County: Marin

Description of Nature, Purpose and Beneficiaries of Project:

Marin Municipal Water District (Marin Water) controls and coordinates water supply releases from Peters Dam in accordance with the provisions of State Water Board Order 95-17, which the State Water Resources Control Board (SWRCB) adopted on October 26, 1995. Order 95-17 specifies the minimum instream flow requirements for Lagunitas Creek, which vary based on hydrologic conditions of Lagunitas Creek watershed. Based on these conditions, there are two main water year classifications, *Normal* year and *Dry* year, which are based on the amount of rainfall received at the Kent Lake rain gage. The January 1 water year classification is based on the total rainfall measured during the preceding 15-month period. If the total rainfall during this period is less than 48 inches, *Dry* year flow requirements are maintained from January 1 through March 31. The April 1 water year classification is based on the total rainfall during the preceding 6-month period. If the total rainfall during this 6-month period is less than 28 inches, *Dry* year flow requirements are maintained from April 1 to the first upstream migration flow in November. *Normal* water year requirements exist whenever *Dry* year conditions are not present.

Water Rights Permits 5633, 9390, and 19546 require a minimum flow of 6 cubic feet per second (cfs) in Lagunitas Creek at the USGS gage located at Samuel P. Taylor state park under all water supply conditions. Throughout the year, Order 95-17 required minimum flows at this location are: November 1st or 15th through December 31, 20 cfs; from January 1st to March 15th, 25 cfs for Normal water supply conditions, 20 cfs for Dry conditions; March 15th to March 31st 20 cfs; April 1st through April 30th 16 cfs for Normal conditions, 14 cfs for Dry conditions; May 1st through June 15th 12 cfs for Normal conditions, 10 cfs for Dry conditions; June 16th through November 1st or 15th 8 cfs for Normal conditions, 6 cfs for Dry conditions. Order 95-17 has variation between November 1st or 15th for the minimum flow of 20 cfs in that it shall begin following the first storm that produces a "trigger" flow of 25 cfs as measured at the USGS gage. In the absence of a storm causing a "trigger" flow, the 20 cfs flow requirement shall begin on November 15th of each year. Additionally, there are four upstream migration flows required at a minimum flow of 35 cfs that are to occur between November 1st and February 3rd at roughly the beginning of each month.

Marin Water is requesting that the SWRCB make the following temporary urgency change to Water Rights Permits 5633, 9390, and 18546 to preserve Marin Water's water supply in case below-normal rainfall and hydrologic conditions continue. Starting November 1, 2021, Marin Water is proposing the following minimum instream flows schedule for the 180 day period: November 1st to November 15th, 6 cfs; November 15th to November 30th, 6 cfs unless a storm above 25 cfs occurs; December 1st or December 15th to March 31st, 16 cfs; April 1st to April 30th, 14 cfs. Between November 15th and November 30th, flows would remain at 6 cfs unless a flow event greater than 25 cfs occurs as measured at the USGS gage. If this happens, flows would increase to 10 cfs and monitoring for coho spawning would take place for one week following the event. If no coho spawning is observed within the one-week period, flows would return to 6 cfs until December 1st unless a subsequent storm event occurs. If coho spawning is observed within the one-week period, flows would increase to 16 cfs and remain there until March 31st. The proposal has variation between December 1st or 15th for the minimum flow of 16 cfs in that it shall begin following the first storm that produces a trigger flow of 25 cfs as measured at the USGS gage. In the absence of a storm causing a trigger flow, the 16 cfs flow requirement shall begin on December 15th. Additionally, the other three upstream

migration flows required at a minimum flow of 35 cfs would occur between December 1st and February 3rd at roughly the beginning of each month.

Summary of Marin Water Supply Sources. Marin Water supplies water to 191,000 customers in Marin County. Approximately 75 percent of Marin Water's water supply comes from water stored in a total of seven reservoirs on Mount Tamalpais and in west Marin, and approximately 25 percent of the water supply is imported from Sonoma Water via the North Marin Aqueduct. Both Marin Water and the North Marin Water District receive their imported water supply via the North Marin Aqueduct, which is owned by the North Marin Water District. Marin Water's imported water supply is received at its Ignacio Pump Station in Novato, which is located downstream of the North Marin Water District's Aqueduct turnouts. Marin Water's contracts with Sonoma Water identify the maximum volumes to be imported: 12.8 million gallons per day (mgd) during the months of May to September and 17 to 23 mgd from October to April. However, to date, Marin Water has never needed the maximum volumes, averaging 8.81 mgd during peak months over the last 5 years, with a high of 10.07 mgd in 2016.

Continuing Drought Conditions. The County of Marin and much of California is facing an extreme drought. After two successive dry winters with significantly below average rainfall, Marin Water reservoir storage volumes are at historically low levels. As of August 17, 2021, Marin Water's reservoirs are at 39.12 percent of average storage volume, or 31,128 AF, and are projected to have as little as 20,000 AF in storage on December 1, 2021 in the absence of above average rainfall and runoff over the remainder of the water year. Regarding supplies from Sonoma Water, as of July 26th, 2021, Lake Sonoma had 123,725 acre-feet of water, which is 50.5% of capacity and approximately 56% of historical average for this time of year. Sonoma Water has also field a Temporary Urgency Change Petition to reduce their instream flow requirements due to these severely dry conditions, and has reduced allocations to its retail customers, including Marin Water. From July through September 2021, Marin Water will be restricted to 4 mgd with a slight increase in October to 4.6 mgd (compared to a typical import of 8,8 mgd). The reduced allocations are expected to continue if rainfall is below average in the fall.

Drought Response. To preserve Marin Water's limited water supply, the Marin Water's Board of Directors (Board) adopted Resolution 8624 on February 16, 2021 providing initial drought water conservation actions for Marin Water customers to voluntarily reduce their water usage. At the April 20, 2021 meeting, the Board adopted Resolution 8630 declaring a water shortage emergency and adopted an ordinance setting forth a comprehensive list of mandatory water conservation measures and water use restrictions. At the May 18, 2021 meeting, the Marin County Board of Supervisors voted unanimously to declare a local emergency and acknowledge the imminent threat of disaster related to local dry conditions and water supplies. Subsequently, on July 8, 2021, Governor Gavin Newsom added Marin County to a list of 50 out of 58 counties in California that are in a drought state of emergency and calling for state agencies to provide assistance where appropriate, including considering modifications to reservoir releases as necessary to address the drought conditions. The goal of the mandatory water use restrictions adopted by Marin Water is to achieve a 40 percent reduction in water use districtwide. Restrictions include but are not limited to the following: spray irrigation is limited to one day a week, with each community having a designated watering day; drip irrigation is limited to any two days per week; recommendation to turn off irrigation systems and spot water by hand, only when necessary; prohibition on outdoor water between 9:00 a.m. and 7:00 p.m. to prevent evaporation; all pools and spas must be covered; no washing of vehicles at home; and no power-washing of any structures or hardscape; no installation of potable water irrigated landscaping for new water services connections during the drought. In addition to implementing restrictions, Marin Water also provides ways to help save water with conservation tips, water-efficient fixtures, rebates, and other programs. As of mid-July 2021, a 23 percent reduction was observed from baseline water use. Even with these aggressive mandatory conservation measures, Marin Water's 191,000 customers are projected to run out of water as early as next July if the drought continues.

Urgent Need for the Project. An urgent need for the requested temporary change exists because of the extremely low storage levels in Marin Water's reservoirs and the fact that Sonoma Water will be restricting allocations due to their low storage levels. Without proposed changes, the applicable minimum instream flow requirements may require releases of water from Kent Lake that would risk significant depletions of storage and potential elimination of water supplies for water users in the Marin Water's service area during the winter and spring of 2022. Such depletions in storage and reductions or eliminations of water supplies would cause serious impacts to human health and welfare, and reduce water supplies needed for fishery protection and stable flows in Lagunitas Creek in summer 2022. As indicated above, Marin Water's 191,000 customers are projected to run out of water as early as July 2022 if the drought continues. Approval of the TUCP is therefore necessary at this time to prevent and mitigate loss of, or damage to, public health and essential public services, the environment, and fishery resources.

Public Agency Approving Project: State Water Resources Control Board – Division of Water Rights

Name of Person or Agency Carrying Out Project: Marin Municipal Water District

CEQA Exemption Status: Emergency Project (Sec. 21080 (b)(4); 15269 (c)): Specific actions necessary to prevent or mitigate an emergency.

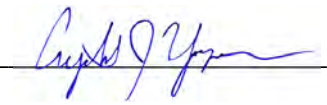
Reasons for Exemption: The proposed action is statutorily exempt under California Environmental Quality Act (CEQA) Statute 21080(b)(4) and categorically exempt under the State CEQA Guidelines Sections 15301, 15307 and 15308.

A. *Actions to Prevent or Mitigate an Emergency*
California Public Resources Code, Division 13, Section 21080(b)(4) provides that specific actions necessary to prevent or mitigate an emergency are exempt from CEQA. The County of Marin and much of California is facing an extreme drought. At the April 20, 2021 meeting, the Marin Water Board of Directors adopted Resolution 8630 declaring a water shortage emergency and adopted an ordinance setting forth a comprehensive list of mandatory water conservation measures and water use restrictions. At the May 18, 2021 meeting, the Marin County Board of Supervisors voted unanimously to declare a local emergency and acknowledge the imminent threat of disaster related to local dry conditions and water supplies. Subsequently, on July 8, 2021, Governor Gavin Newsom added Marin County to a list of 50 out of 58 counties in California that are in a drought state of emergency, which Proclamation included the suspension of environmental review by state and local agencies to the extent necessary to carry out actions pertaining to the drought response and mitigation[1]. As of August 23, 2021, the water supply storage level in Marin Water's reservoirs was 30,658 acre-feet, which is less 39% of capacity. The current low storage level is the result of severely low rainfall in the region. As measured at Lake Lagunitas, recorded rainfall for from January 1, 2020 through August 1, 2021 was approximately 32 inches, the lowest total rainfall for the 20-month period in 142 years. Furthermore, Marin Water typically receives about 25% of its supply from Sonoma Water, which is in similar drought conditions. As a result of this drought, Sonoma Water has begun curtailing the amount of water available to its contractors throughout this drought period and Marin Water's supply from Sonoma has been cut in half. Without significant storm events in the near future, results of modeling show storage levels in Marin Water's reservoirs to be below 25,000 acre-feet by December 2021 due in part to minimum instream flow requirements on Lagunitas Creek. If storage in Marin Water's reservoirs is depleted, then water to maintain Lagunitas Creek flows in 2022 will not be available to support the other critical life stages for aquatic species downstream of Kent Lake. Even with aggressive mandatory conservation measures, Marin Water's 191,000 customers are projected to run out of water as early as next July if the drought continues. Accordingly, the project is statutorily exempt from CEQA because it is necessary to prevent or mitigate an emergency—in this case, a proclaimed drought emergency—that poses a clear and imminent danger. (Pub. Resources Code, §§ 21060.3 & 21080, subd. (b)(4); Cal. Code Regs., tit. 14, § 15269, subd. (c).)

B. *Actions by Regulatory Agencies for Protection of Natural Resources and the Environment*
CEQA Guidelines Sections 15307 and 15308 provide that actions taken by regulatory agencies to assure the maintenance, restoration or enhancement of a natural resource and the environment are categorically exempt. The proposed temporary urgency changes to Marin Water's water right permits 5633, 9390, and 18546 would conserve water in Marin Water's reservoirs to support beneficial uses downstream of Kent Lake, including critical life stages and habitat for listed threatened and endangered species in Lagunitas Creek. Accordingly, these changes are categorically exempt from CEQA pursuant to Class 7 and Class 8 exemptions.

C. *Minor Alteration of Existing Public Facility*. CEQA Guidelines Section 15301 provide that actions consisting of "the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use" are categorically exempt. The proposed action consists of the operation of existing facilities involving negligible or no expansion of use beyond that existing, and accordingly is categorically exempt from CEQA under a Class 1 exemption.

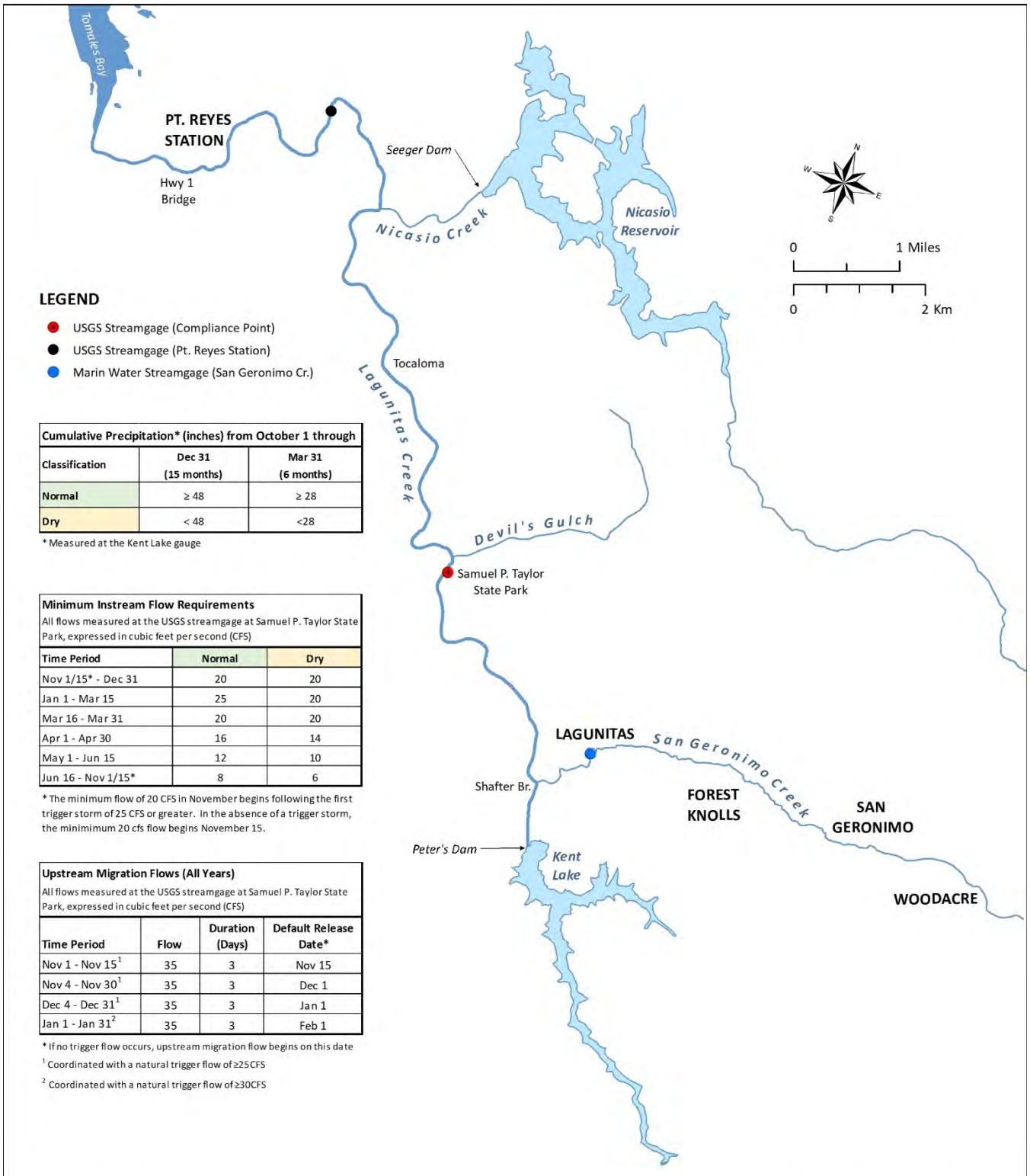
Lead Agency Contact Person: Crystal Yezman, Director of Engineering **Telephone:** (415) 945-1100



08/30/2021

Crystal Yezman, Director of Engineering **Date**

1. Emergency Declaration Executive Order N-10-21. https://www.gov.ca.gov/wp-content/uploads/2021/07/7.8.21-Conservation-Executive-Order-N-10-21-.pdf



Cumulative Precipitation* (inches) from October 1 through		
Classification	Dec 31 (15 months)	Mar 31 (6 months)
Normal	≥ 48	≥ 28
Dry	< 48	<28

* Measured at the Kent Lake gauge

Minimum Instream Flow Requirements

All flows measured at the USGS streamgage at Samuel P. Taylor State Park, expressed in cubic feet per second (CFS)

Time Period	Normal	Dry
Nov 1/15* - Dec 31	20	20
Jan 1 - Mar 15	25	20
Mar 16 - Mar 31	20	20
Apr 1 - Apr 30	16	14
May 1 - Jun 15	12	10
Jun 16 - Nov 1/15*	8	6

* The minimum flow of 20 CFS in November begins following the first trigger storm of 25 CFS or greater. In the absence of a trigger storm, the minimum 20 cfs flow begins November 15.

Upstream Migration Flows (All Years)

All flows measured at the USGS streamgage at Samuel P. Taylor State Park, expressed in cubic feet per second (CFS)

Time Period	Flow	Duration (Days)	Default Release Date*
Nov 1 - Nov 15[1]	35	3	Nov 15
Nov 4 - Nov 30[1]	35	3	Dec 1
Dec 4 - Dec 31[1]	35	3	Jan 1
Jan 1 - Jan 31[2]	35	3	Feb 1

* If no trigger flow occurs, upstream migration flow begins on this date

[1] Coordinated with a natural trigger flow of ≥25CFS

[2] Coordinated with a natural trigger flow of ≥30CFS

Lagunitas Creek Streamflow Requirements

Per State Water Resources Constrol Board Order WR95-17

Figure 1

MARIN WATER

State of California - Department of Fish and Wildlife

2021 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (REV. 01/01/21) Previously DFG 753.5a

Print | StartOver | Save

RECEIPT NUMBER:
21 — 09/03/21 —

STATE CLEARINGHOUSE NUMBER *(If applicable)*

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY	LEADAGENCY EMAIL	DATE
Marin Municipal Water District		09/03/21

COUNTY/STATE AGENCY OF FILING	DOCUMENT NUMBER
Marin	

PROJECT TITLE

Petition Requestiong Approval of Temporary Urgency Change in Water Rights Permits 5633, 9390, and 18546 in Marin County

PROJECT APPLICANT NAME	PROJECT APPLICANT EMAIL	PHONE NUMBER
Marin Municpal Water District		(415)945-1100

PROJECT APPLICANT ADDRESS	CITY	STATE	ZIP CODE
220 Nellen Avenue	Corte Madera	CA	94925

PROJECT APPLICANT *(Check appropriate box)*

☐ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,445.25	$	0.00
☐ Mitigated/Negative Declaration (MND)(ND)	$2,480.25	$	0.00
☐ Certified Regulatory Program (CRP) document - payment due directly to CDFW	$1,171.25	$	0.00

☐ Exempt from fee
- ☐ Notice of Exemption (attach)
- ☐ CDFW No Effect Determination (attach)

☐ Fee previously paid (attach previously issued cash receipt copy)

☑ Water Right Application or Petition Fee (State Water Resources Control Board only)	$850.00	$	850.00
☐ County documentary handling fee		$	
☐ Other		$	

PAYMENT METHOD:

☐ Cash ☐ Credit ☑ Check ☐ Other **TOTAL RECEIVED** $ 850.00

SIGNATURE	AGENCY OF FILING PRINTED NAME AND TITLE
X [signature]	Shaun Horne, Watershed Resources Manager

ORIGINAL - PROJECT APPLICANT | COPY - CDFW/ASB | COPY - LEAD AGENCY | COPY - COUNTY CLERK | DFW 753.5a (Rev. 01012021)

State of California - Department of Fish and Wildlife

2021 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (REV. 01/01/21) Previously DFG 753.5a

NOTICE

Each project applicant shall remit to the county clerk the environmental filing fee before or at the time of filing a Notice of Determination (Pub. Resources Code, § 21152; Fish & G. Code, § 711.4, subdivision (d); Cal. Code Regs., tit. 14, § 753.5). Without the appropriate fee, statutory or categorical exemption, or a valid No Effect Determination issued by the California Department of Fish and Wildlife (CDFW), the Notice of Determination is not operative, vested, or final, and shall not be accepted by the county clerk.

COUNTY DOCUMENTARY HANDLING FEE

The county clerk may charge a documentary handling fee of fifty dollars ($50) per filing in addition to the environmental filing fee (Fish & G. Code, § 711.4, subd. (e); Cal. Code Regs., tit. 14, § 753.5, subd. (g)(1)). A county board of supervisors shall have the authority to increase or decrease the fee or charge, that is otherwise authorized to be levied by another provision of law, in the amount reasonably necessary to recover the cost of providing any product or service or the cost of enforcing any regulation for which the fee or charge is levied (Gov. Code, § 54985, subd. (a)).

COLLECTION PROCEDURES FOR COUNTY GOVERNMENTS

Filing Notice of Determination (NOD):

- ☐ Collect environmental filing fee or copy of previously issued cash receipt. *(Do not collect fee if project applicant presents a No Effect Determination signed by CDFW. An additional fee is required for each separate environmental document. An addendum is not considered a separate environmental document. Checks should be made payable to the county.)*
- ☐ Issue cash receipt to project applicant.
- ☐ Attach copy of cash receipt and, if applicable, previously issued cash receipt, to NOD.
- ☐ Mail filing fees for **CRP** document to CDFW prior to filing the NOD or equivalent final approval (Cal. Code Regs. Tit. 14, § 753.5 (b)(5)). The CRP should request receipt from CDFW to show proof of payment for filing the NOD or equivalent approval. Please mail payment to address below made attention to the Cash Receipts Unit of the Accounting Services Branch.

If the project applicant presents a **No Effect Determination** signed by CDFW, also:

- ☐ Attach No Effect Determination to NOD *(no environmental filing fee is due)*.

Filing Notice of Exemption (NOE) *(Statutorily or categorically exempt project (Cal. Code Regs., tit. 14, §§ 15260-15285, 15300-15333))*

- ☐ Issue cash receipt to project applicant.
- ☐ Attach copy of cash receipt to NOE *(no environmental filing fee is due)*.

Within 30 days after the end of each month in which the environmental filing fees are collected, each county shall summarize and record the amount collected on the monthly State of California Form No. CA25 (TC31) and remit the amount collected to the State Treasurer. Identify the remittance on Form No. CA25 as "Environmental Document Filing Fees" per Fish and Game Code section 711.4.

The county clerk shall mail the following documents to CDFW on a monthly basis:

- ✓ A photocopy of the monthly State of California Form No. CA25 (TC31)
- ✓ CDFW/ASB copies of all cash receipts (including all voided receipts)
- ✓ A copy of all CDFW No Effect Determinations filed in lieu of fee payment
- ✓ A copy of all NODs filed with the county during the preceding month
- ✓ A list of the name, address and telephone number of all project applicants for which an NOD has been filed. If this information is contained on the cash receipt filed with CDFW under California Code of Regulations, title 14, section 753.5, subdivision (e)(6), no additional information is required.

DOCUMENT RETENTION

The county shall retain two copies of the cash receipt (for lead agency and county clerk) and a copy of all documents described above for at least 12 months.

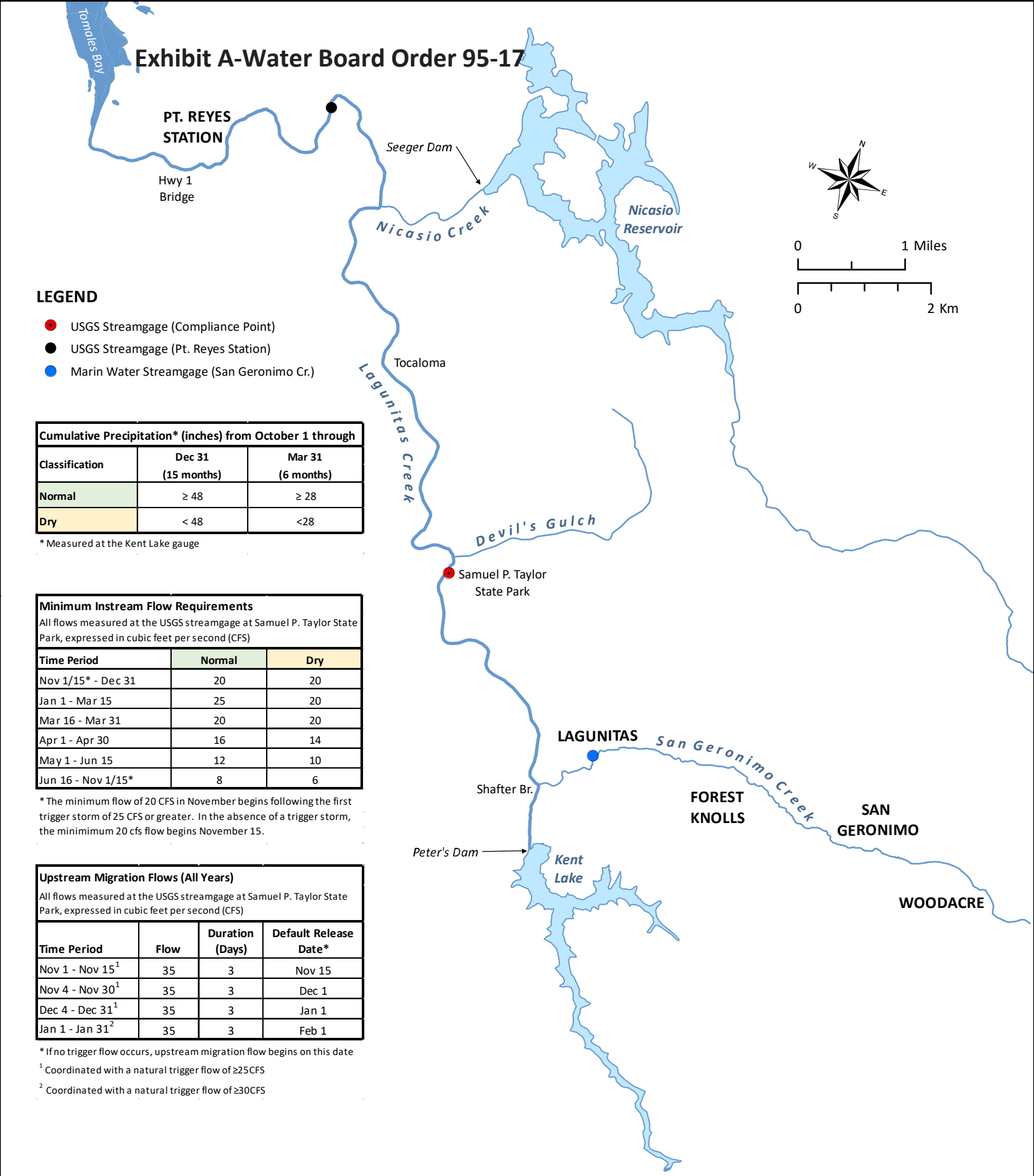
RECEIPT NUMBER

- # The first two digits automatically populate by making the appropriate selection in the County/State Agency of Filing drop down menu.
- # The next eight digits automatically populate when a date is entered.
- # The last three digits correspond with the sequential order of issuance for each calendar year. For example, the first receipt number issued on January 1 should end in 001. If a county issued 252 receipts for the year ending on December 31, the last receipt number should end in 252. CDFW recommends that counties and state agencies 1) save a local copy of this form, and 2) track receipt numbers on a spreadsheet tabbed by month to ensure accuracy.

DO NOT COMBINE THE ENVIRONMENTAL FEES WITH THE STATE SHARE OF FISH AND WILDLIFE FEES.

Mail to:
California Department of Fish and Wildlife
Accounting Services Branch
P.O. Box 944209
Sacramento, California 94244-2090

Exhibit A-Water Board Order 95-17



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Dec 4 - Dec 31[1]	35	3	Jan 1
Jan 1 - Jan 31[2]	35	3	Feb 1

* If no trigger flow occurs, upstream migration flow begins on this date

[1] Coordinated with a natural trigger flow of ≥25CFS

[2] Coordinated with a natural trigger flow of ≥30CFS

Lagunitas Creek Streamflow Requirements

Per State Water Resources Constrol Board Order WR95-17

Figure 1

MARIN WATER

Exhibit B-District Drought Resolution 8630

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO. 8630

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT DECLARING A WATER SHORTAGE EMERGENCY AND CALLING FOR THE IMPLEMENTATION OF MANDATORY WATER CONSERVATION MEASURES

WHEREAS, the Board of Directors (Board) of the Marin Municipal Water District (District) acknowledges that water is a limited and essential resource; and

WHEREAS, Article X, Section 2 of the California Constitution mandates that the water resources of the State be put to beneficial use to the fullest extent and that waste or unreasonable use or method of use of water be prevented; and

WHEREAS, the District's potable water supply is limited to water captured in its seven reservoirs and water conveyed from the Russian River, both dependent on annual rainfall, and further depends on conservation and the use of recycled water where available; and

WHEREAS, the District has experienced two successive dry winters in 2020 and 2021 with historically low rainfall and runoff; and

WHEREAS, in response to historically low rainfall over the past two winters and subsequent low reservoir storage levels, the Board adopted Resolution 8624 on February 16th, 2021 calling for initial drought voluntary water conservation actions; and

WHEREAS, the District has continued to receive below average rainfall throughout the spring months in 2021 since adoption of initial voluntary water conservation actions; and

WHEREAS, as of April 1, 2021, District reservoir storage was 43,385 acre feet (AF), 54.5% of total capacity, and nearly 41% below the District average of 73,543 AF; and

WHEREAS, District reservoir storage of 43,385 AF is the lowest storage level at the end of the normally wet weather season in the 38 years since Kent Dam was raised in 1983; and

WHEREAS, the District's analysis based on historical hydrological data indicates that in the absence of above average rainfall and runoff, reservoir storage levels are projected to be between 24,000 to 28,000 AF on December 1, 2021 if potable water demand is not further reduced; and

WHEREAS, with projected reservoir levels to be below 30,000 AF as of December 1, 2021, preservation of the District's water supply is essential to District customers and conservation actions taken now by District customers are essential to minimize the reduction in reservoir storage levels to conserve water for future use; and

WHEREAS, the District is targeting an overall 40% reduction in total water use; and

WHEREAS, in recent years, overall summer peak water demand has averaged nearly twice winter period water demand due to outdoor water use; and

WHEREAS, typically 15-30% of water used for irrigation and outdoor uses is wasted, most often due to excessive irrigation; and

WHEREAS, although the District's Water Conservation Program has made significant strides, additional water use reduction is required to conserve for beneficial use and preserve the District's limited water supply and thus staff is recommending the implementation of mandatory water conservation measures and adoption of water use restrictions set forth in proposed Ordinance No. 449 to be considered by the Board in conjunction with this resolution; and

WHEREAS, on March 22, 2021, the California State Water Resources Control Board mailed early warning notices to all water rights holders in California urging them to plan for potential shortages by reducing water use, adopting practical conservation measures, and reducing irrigated acreage; and

WHEREAS, pursuant to District Code section 13.02.015, "Declaration of Water Shortage Emergency," when the District's reservoir storage on December 1st is projected to be in the vicinity of, or less than, 30,000 AF, the Board may declare by resolution a Water Shortage Emergency as defined in the Water Code; and

WHEREAS, California Water Code sections 350 and 71640 authorize the governing body of a municipal water district to find the existence or threat of a drought emergency or other threatened or existing water shortage, and that finding is prima facie evidence of the fact or matter so found, and such fact or matter shall be presumed to continue unchanged unless and until a contrary finding is made by the board by resolution or ordinance; and

WHEREAS, pursuant to Water Code sections 353 and 71641, the District may restrict the use of district water during the drought emergency or other water shortage condition and may prohibit the wastage of district water or the use of district water during such periods for any purpose other than household uses or other restricted uses as the District determines to be necessary; and

WHEREAS, pursuant to Water Code sections 376 and 71641 and Government Code section 6061, the District must publish in a newspaper of general circulation any ordinance setting forth the restrictions, prohibitions, and exclusions determined to be necessary under Water Code sections 353 and 71640 within 10 days after its adoption; and

WHEREAS, the District has caused a notice of public hearing on this water shortage emergency declaration, as well as the other measures to be considered by the Board in

conjunction therewith, including the adoption of proposed Ordinance No. 449 implementing mandatory water conservation measures necessary to preserve the District's water supply for future use, to be published on April 13, 2021 in the Marin Independent Journal duly noticing the public hearing to be held on this day, April 20, 2021 at or following 7:30 p.m.

NOW, THEREFORE, BASED ON THE FINDINGS SET FORTH ABOVE WHICH ARE HEREBY ADOPTED BY THE BOARD, THE BOARD OF DIRECTORS RESOLVES AS FOLLOWS:

1. Pursuant to Water Code sections 350 and 71640, and for the reasons set forth herein, the Board finds the existence or threat of a drought emergency or other water shortage condition; and

2. The Board may adopt mandatory restriction and prohibitions on the consumption and use of water within the service area so that the water supply can be conserved for the greater public benefit; and

3. Pursuant to Water Code sections 376 and 71641 and Government Code section 6061, the Board hereby directs staff to publish in a newspaper of general circulation any ordinance, or a summary thereof, adopted by the Board setting forth the restrictions, prohibitions, and exclusions determined to be necessary under Water Code sections 353 and 71640 within 10 days of adoption; and

4. This emergency or water shortage condition shall be presumed to continue unchanged unless and until a contrary finding is made by the Board; and

5. The District requests that federal and state agencies provide financial and other assistance to residents, water suppliers, water rights holders, ranchers, farmers, business owners and any local governments who are harmed by the drought emergency in its territorial limits to help them mitigate the effects of the persistent drought conditions.

PASSED AND ADOPTED this 20th day of April, 2021, by the following vote of the Board of Directors.

AYES: Directors Larry Bragman, John Gibson, Larry Russell, Monty Schmitt, and Cynthia Koehler

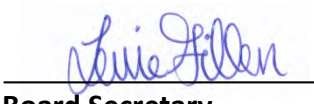
NOES: None

ABSENT: None

Cynthia Koehler

President, Board of Directors

ATTEST:



Board Secretary

Exhibit C-Marin County Declaration of Drought

RESOLUTION NO. 2021-27
RESOLUTION OF THE MARIN COUNTY BOARD OF SUPERVISORS
DECLARING A LOCAL EMERGENCY AND IMMINENT THREAT OF DISASTER
DUE TO DROUGHT CONDITIONS

WHEREAS, California Government Code Section 8630, Article 14 of the California Emergency Services Act and Section 2.99, et seq., of the Marin County Code empower the Board of Supervisors of the County of Marin, or the County's Director of Emergency Services or Assistant Director of Emergency Services, to proclaim the existence of a local emergency when said County is affected or likely to be affected by a public calamity; and

WHEREAS, climate change is intensifying the impacts of droughts on our communities, environment and economy, and we must all therefore improve drought resiliency and prepare to respond to more frequent, prolonged, and intense dry periods; and

WHEREAS, much of the West is experiencing severe to exceptional drought and California is in a second consecutive year of extremely dry conditions due to historically low rainfall totals, resulting in extreme drought conditions in the entire Bay Area, including in Marin County; and

WHEREAS, these drought conditions result in degraded water quality, fallowing of productive farmland, setbacks to vulnerable and rural communities through job losses and longer-lasting recoveries, significant impacts to commercial and recreational salmon fisheries, constraints on access to traditional lifeways, loss of aquatic and terrestrial biodiversity, and ecosystem impacts; and

WHEREAS, to date in the region, rainfall totals for the current water year are approximately 40% percent of average for Marin County; and

WHEREAS, due to the current drought conditions in the County, the County's two largest water suppliers, the Marin Municipal Water District and the North Marin Water District, have declared Water Shortage Emergencies within their respective service areas pursuant to Water Code Section 350 et seq. and enacted mandatory water conservation measures; and

WHEREAS, on March 5, 2021, the Secretary of the United States Department of Agriculture designated 50 California counties, including Marin County, as primary natural disaster areas due to drought; and

WHEREAS, on April 21, 2021, the Governor of the State of California proclaimed a state of emergency in Sonoma County and Mendocino County due to extreme drought conditions, and on May 10, 2021 significantly expanded this drought emergency proclamation to add 39 additional counties where accelerated action is needed to protect public health, safety and the environment; and

WHEREAS, the Russian River in Sonoma County provides Marin County's largest water supplier, the Marin Municipal Water District, nearly 25% of its water supply and the County's second largest water supplier, the North Marin Water District, approximately 75% of its Novato Service Area water supply; and

WHEREAS, given the current drought conditions, both Marin Municipal Water District and the North Marin Water District are facing curtailments in their water supply allotments provided by the Sonoma County Water Agency, which is further limiting available water supplies within the County; and

WHEREAS, in Marin County drought impacts are disproportionately impacting farming and dairy communities in West Marin, with little to no water or feed for livestock; and

WHEREAS, the situation for ranchers and dairies in Marin County is grim and deteriorating, with several dairies importing water by truck for many months to keep their animals alive, and with far less grass on the ground, ranchers are required to import feed from other states at extremely high cost; and

WHEREAS, due to the current drought conditions, the Marin Municipal Water District, the North Marin Water District, and several local municipal and private water systems that depend on rainfall for their yearly supply, must seek out additional and more costly sources of water, including increased investment in water conservation measures, to ensure sufficient future water supply for essential uses; and

WHEREAS, the adverse environmental, economic, health, welfare and social impacts of the drought pose an imminent threat of disaster and threaten to cause widespread potential harm to people, businesses, agriculture, property, communities, the environment, wildlife and recreation in the County of Marin.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Supervisors of the County of Marin declares as follows:

1. Conditions of extreme peril to the safety of persons and property have arisen within Marin County due to drought conditions; and

2. All water suppliers in the County are facing water supply shortages, with the two largest water suppliers within the County already declaring water shortage emergencies within their respective service areas, and are seeking out additional sources of water supply and conservation measures necessitating significant additional resources, which may be beyond what is currently available; and

3. As a consequence of said conditions, and pursuant to Government Code section 8630, a local emergency now exists throughout Marin County as a result of the drought conditions; and

4. During this local emergency the powers, functions and duties of the Marin County Administrator and the emergency organization of Marin County shall be those prescribed by State law, and the ordinances, resolutions and approved emergency services plans of the County of Marin; and

5. This resolution shall be submitted to the Director of the California Governor's Office of Emergency Services requesting a Director's Concurrence and to the Governor requesting a State declaration of emergency that extends the Governor's April 21st, 2021 State of Emergency Proclamation for Sonoma and Mendocino Counties to include Marin County due to the given impacts as well as making California Disaster Assistance and all applicable state funding and resources, including waiver of regulations which may hinder response and recovery efforts, available to the County, water suppliers, farmers, impacted businesses and the citizens of Marin County; and

6. Furthermore, the County of Marin requests that the Governor request a Presidential Declaration of Emergency and/or Major Disaster.

PASSED AND ADOPTED at a regular meeting of the Board of Supervisors of the County of Marin held on this 18th day of May 2021, by the following vote:

AYES: SUPERVISORS Damon Connolly, Katie Rice, Stephanie Moulton-Peters, Judy Arnold, Dennis Rodoni

NOES: NONE

ABSENT: NONE

PRESIDENT, BOARD OF SUPERVISORS

ATTEST:

CLERK

Exhibit D-State of California Emergency Proclamation

EXECUTIVE DEPARTMENT
STATE OF CALIFORNIA

State of Emergency Proclamation

WHEREAS climate change is intensifying the impacts of droughts on our communities, environment and economy, and California must therefore improve drought resiliency and prepare to respond to more frequent, prolonged, and intense dry periods; and

WHEREAS much of the West is experiencing severe to exceptional drought and California is in a second consecutive year of dry conditions, resulting in drought or near-drought throughout many portions of the State; and

WHEREAS these drought conditions can result in degraded water quality, fallowing of productive farmland, setbacks to vulnerable and rural communities through job losses and longer-lasting recoveries, significant impacts to tribal, commercial, and recreational salmon fisheries, constraints on access to traditional lifeways, loss of aquatic and terrestrial biodiversity, and ecosystem impacts; and

WHEREAS drought conditions vary across the State and some watersheds, including the Russian River and Klamath Basin, are extremely dry and are facing substantial water supply and ecosystem challenges; and

WHEREAS it is necessary to expeditiously mitigate the effects of the drought conditions within the Russian River Watershed, located within Mendocino and Sonoma counties, to ensure the protection of health, safety, and the environment; and

WHEREAS experience in the last drought has demonstrated the value of preparing earlier for potential sustained dry conditions, the need to improve our monitoring and forecasting capabilities, and many other lessons that are captured in the Administration's *Report to the Legislature on the 2012-2016 Drought*; and

WHEREAS the State and its many partners have strengthened drought resilience since the last drought including state investments in water management systems, implementation of the Sustainable Groundwater Management Act, establishment of the Safe and Affordable Fund for Equity and Resilience Program, development of the Administration's *Water Resilience Portfolio*, and continued water conservation by Californians whose current statewide urban water use is 16% lower than at the beginning of the last drought; and

WHEREAS state agencies have been actively responding to current drought conditions and preparing for the possibility of a third dry year including through convenings of the interagency drought team, which was established at my direction, to organize, focus, and track changing conditions, coordinate state agency responses, and work closely with partners across the State; and

WHEREAS under the provisions of Government Code section 8558(b), I find that the conditions caused by the drought conditions, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single local government and require the combined forces of a mutual aid region or regions to appropriately respond; and

WHEREAS under the provisions of Government Code section 8625(c), I find that local authority is inadequate to cope with the drought conditions; and

WHEREAS to protect public health and safety, it is critical the State take certain immediate actions without undue delay to prepare for and mitigate the effects of, the drought conditions within the Russian River Watershed, and under the provisions of Government Code section 8571, I find that strict compliance with various statutes and regulations specified in this Proclamation would prevent, hinder, or delay the mitigation of the effects of the drought conditions of the Russian River Watershed, located within Mendocino and Sonoma counties.

NOW THEREFORE, I, GAVIN NEWSOM, Governor of the State of California, in accordance with the authority vested in me by the State Constitution and statutes, including the California Emergency Services Act, and in particular, section 8625, **HEREBY PROCLAIM A STATE OF EMERGENCY** to exist in Mendocino and Sonoma counties due to drought conditions in the Russian River Watershed.

IT IS HEREBY ORDERED THAT:

1. To further the success of California's water conservation efforts and increase our drought preparedness, state agencies shall partner with local water districts and utilities to make all Californians aware of drought, and encourage actions to reduce water usage by promoting the Department of Water Resources' Save Our Water campaign (https://saveourwater.com) and other water conservation programs.

2. To continue coordination with partners across the State for the potential of prolonged drought impacts, the Department of Water Resources, the State Water Resources Control Board (Water Board), the Department of Fish and Wildlife, and the Department of Food and Agriculture shall work with regional and local governments, including groundwater sustainability agencies, to identify watersheds, communities, public water systems, and ecosystems that may require coordinated state and local actions to address issues stemming from continued dry conditions, to ensure that we can respond to water shortages and protect people, natural resources and economic activity.

3. To continue partnership and coordination with Californian Native American tribes, state agencies shall engage in consultation, collaboration, and communication with California Native American tribes to assist them in necessary preparation and response to drought conditions on tribal lands and potential impacts to cultural and traditional resources within ancestral lands.

4. To prioritize drought response and preparedness resources, the Department of Water Resources, the Water Board, the Department of Fish and Wildlife and the Department of Food and Agriculture, in consultation with the Department of Finance, shall:

    a. Accelerate funding for water supply enhancement, water conservation, or species conservation projects.
    b. Identify unspent funds that can be repurposed to enable projects to address drought impacts to people, ecosystems, and economic activities.
    c. Recommend additional financial support for water resilience infrastructure projects and actions for potential inclusion in the upcoming May Revision.

5. To increase resilience of our water supplies during drought conditions, the Department of Water Resources shall:

    a. Work with counties to encourage reporting of household water shortages, such as dry residential wells, on the website the Department maintains for that purpose, to enable tracking of drought impacts.
    b. Work with counties, and groundwater sustainability agencies as appropriate, to help ensure that well drillers submit required groundwater well logs for newly constructed and deepened wells in a timely manner.
    c. Work with agricultural water suppliers and agricultural water users to provide technical assistance, including implementation of efficient water management practices and use of technology such as the California Irrigation Management Information System.
    d. Work with urban and agricultural water suppliers to encourage timely submittal by water districts and public posting of urban water management and water shortage contingency plans and agricultural water management and drought plans.
    e. Accelerate updating the land subsidence data it is providing to support implementation of the Sustainable Groundwater Management Act.

6. To increase resilience of our water systems during drought conditions, the Water Board shall:

    a. Use its authority, provide technical assistance, and where feasible provide financial assistance, to support regular reporting of drinking water supply well levels and reservoir water levels where the Water Board determines that there is risk of supply failure because of lowering groundwater levels or reservoir levels that may fall below public water system intakes.
    b. Prioritize the permitting of public water systems that anticipate the need to activate additional supply wells where water quality is a concern and treatment installation needs to proceed to relieve a system's potential supply concerns.
    c. Provide annual water demand data, information on water right priority, and other communications on water availability on its website.
    d. Identify watersheds where current diversion data is insufficient to evaluate supply impacts caused by dry conditions, and take actions to ensure prompt submittal of missing data in those watersheds.

7. To address the acutely dry conditions in the Russian River Watershed, the Water Board shall consider:

    a. Modifying requirements for reservoir releases or diversion limitations in that watershed to ensure adequate, minimal water supplies for critical purposes.
    b. Adopting emergency regulations to curtail water diversions when water is not available at water rights holders' priority of right or to protect releases of stored water.

    For purposes of carrying out this directive, Public Resources Code, Division 13 (commencing with section 21000) and regulations adopted pursuant to that Division are suspended in the counties of Mendocino and Sonoma to the extent necessary to address the impacts of the drought in the Russian River Watershed. The Water Board shall identify the projects

eligible for the suspensions pursuant to this paragraph and maintain on its websites a list of the activities or approvals for which these provisions are suspended.

8. To ensure that equipment and services necessary for drought response in the Russian River Watershed can be procured quickly, the provisions of the Government Code and the Public Contract Code applicable to procurement, state contracts, and fleet assets, including, but not limited to, advertising and competitive bidding requirements, are hereby suspended to the extent necessary to address the effects of the drought in the Russian River Watershed, located within Mendocino and Sonoma counties. Approval of the Department of Finance is required prior to the execution of any contract entered into pursuant to this provision.

9. To increase the resilience of our natural habitats to protect vulnerable species during drought conditions, the Department of Fish and Wildlife shall:

    a. Evaluate and take actions to protect terrestrial and aquatic species and, wherever possible, work with water users and other parties on voluntary measures to protect species.
    b. Work to improve State hatcheries and increase water use efficiency on State wildlife areas and ecological reserves to maintain habitat for vulnerable species.
    c. Respond to human-wildlife interactions related to ongoing dry conditions and increase public messaging and awareness.
    d. Work with commercial and recreational salmon fishing and tribal representatives to anticipate and develop strategies to mitigate and respond to salmon fishery impacts, with particular emphasis on addressing impacts to salmon fisheries in the Klamath Basin.

10. To support our agricultural economy and food security during drought conditions, the Department of Food and Agriculture shall:

    a. Provide technical assistance to support conservation planning, on-farm water and energy conservation practices and technologies, including augmenting the State Water Efficiency and Enhancement Program.
    b. Conduct an economic analysis of drought impacts to agriculture, including land use, jobs, and rural food economies, expanding on existing research done in the last drought to include thorough regional analysis especially in the Central Valley, and in the implementation of the Sustainable Groundwater Management Act and alternative land uses for fallowed land.
    c. Maintain a web page with drought resources for farmers and ranchers, including the United States Department of Agriculture and other federal and state resources.
    d. Work with federal agencies to assist Klamath Basin farmers and ranchers contending with reduced water supplies.

11. To ensure the potential impacts of drought on communities are anticipated and proactively addressed, the Department of Water Resources, in coordination with the Water Board, shall develop groundwater management principles and strategies to monitor, analyze, and minimize impacts to drinking water wells.

12. To provide critical information on the different drought conditions across the State, the Department of Water Resources, in consultation with the Department of Fish and Wildlife, the Department of Food and Agriculture,

and the Water Board, shall develop a California Drought Monitor by December 31, 2021, as recommended in the Administration's *Report to the Legislature on the 2012-2016 Drought*.

13. To prepare for potential salinity issues in the Delta, the Department of Water Resources, in consultation with the Water Board, the Department of Fish and Wildlife, the Delta Stewardship Council, and the Central Valley Flood Protection Board, shall initiate actions necessary to prepare for and address potential Delta salinity issues during prolonged drought conditions.

14. To prepare for potential impacts of drought conditions on species, the Water Board and the Department of Fish and Wildlife shall work with federal agency partners to manage temperature conditions for the preservation of fish in the Sacramento River downstream of Shasta Dam while balancing water supply needs.

This Proclamation is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this Proclamation.

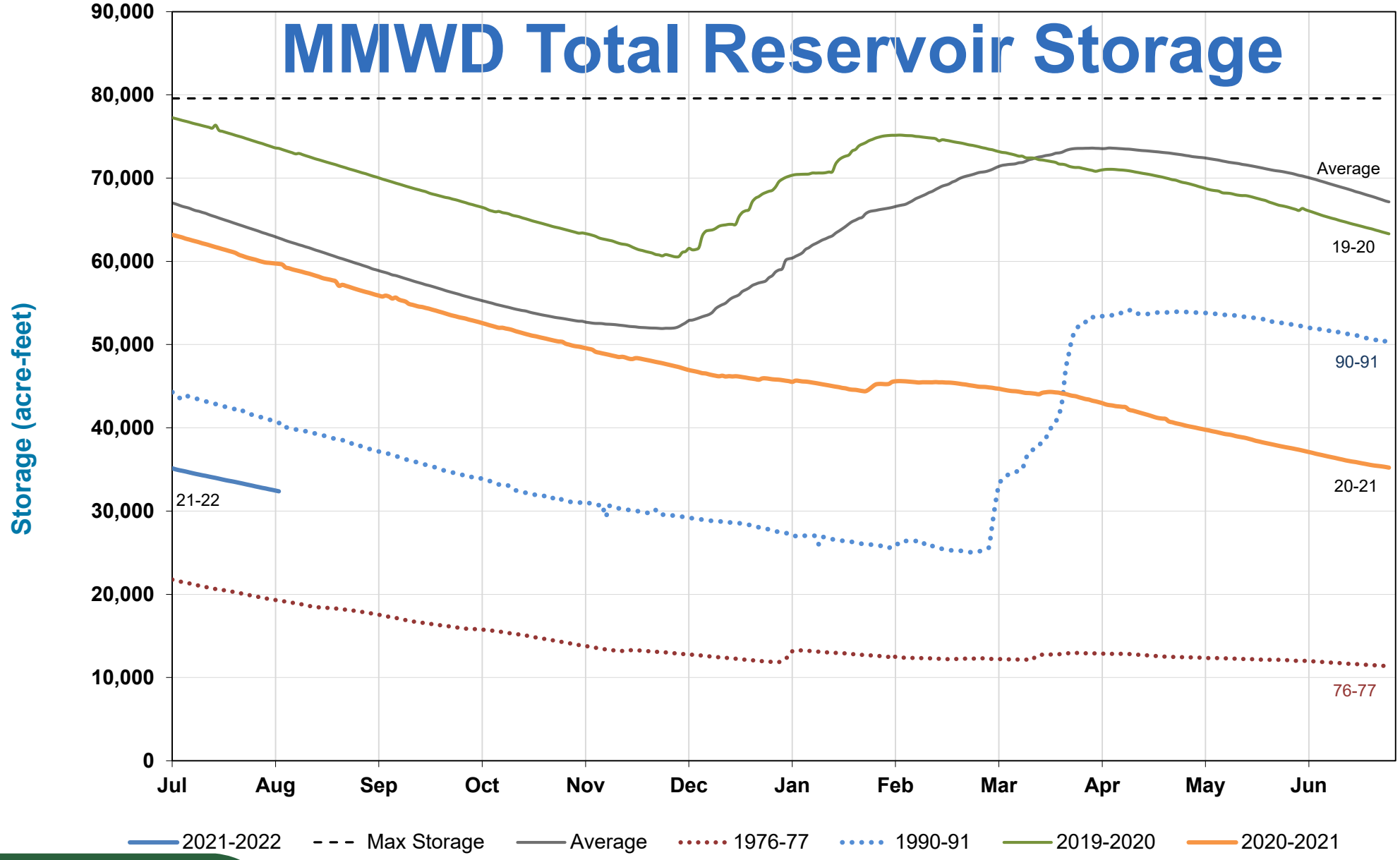
IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 21st day of April 2021

GAVIN NEWSOM
Governor of California

ATTEST:

DR. SHIRLEY WEBER
Secretary of State

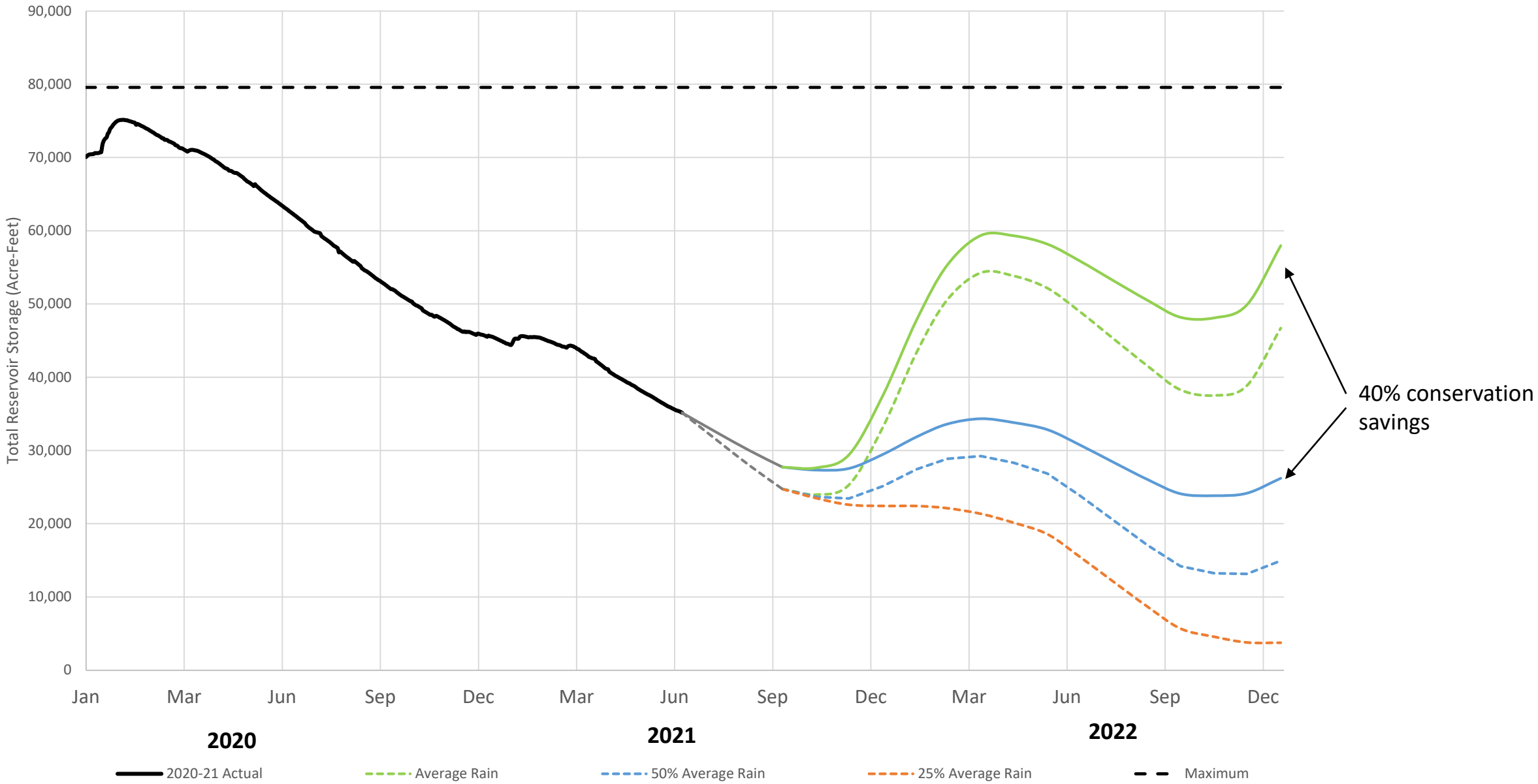
Exhibit E-District Drought Conditions & Projections



Storage includes:

- Phoenix Lake
- Lake Lagunitas
- Bon Tempe Lake
- Alpine Lake
- Kent Lake
- Nicasio Lake
- Soulajule

MMWD Projected Reservoir Storage



Drought Project Planning

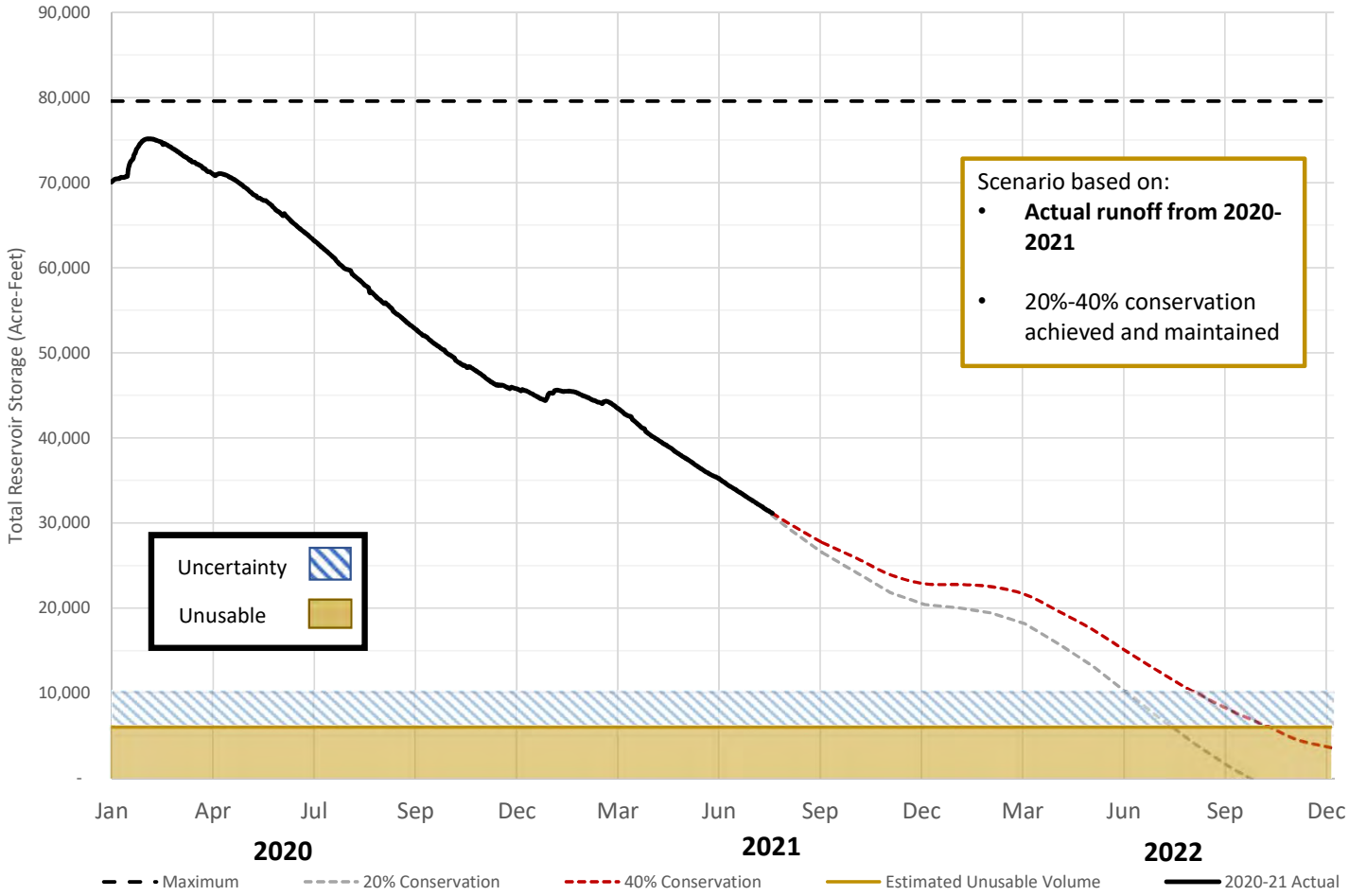


Exhibit F-Lagunitas Creek Instream Flow Study

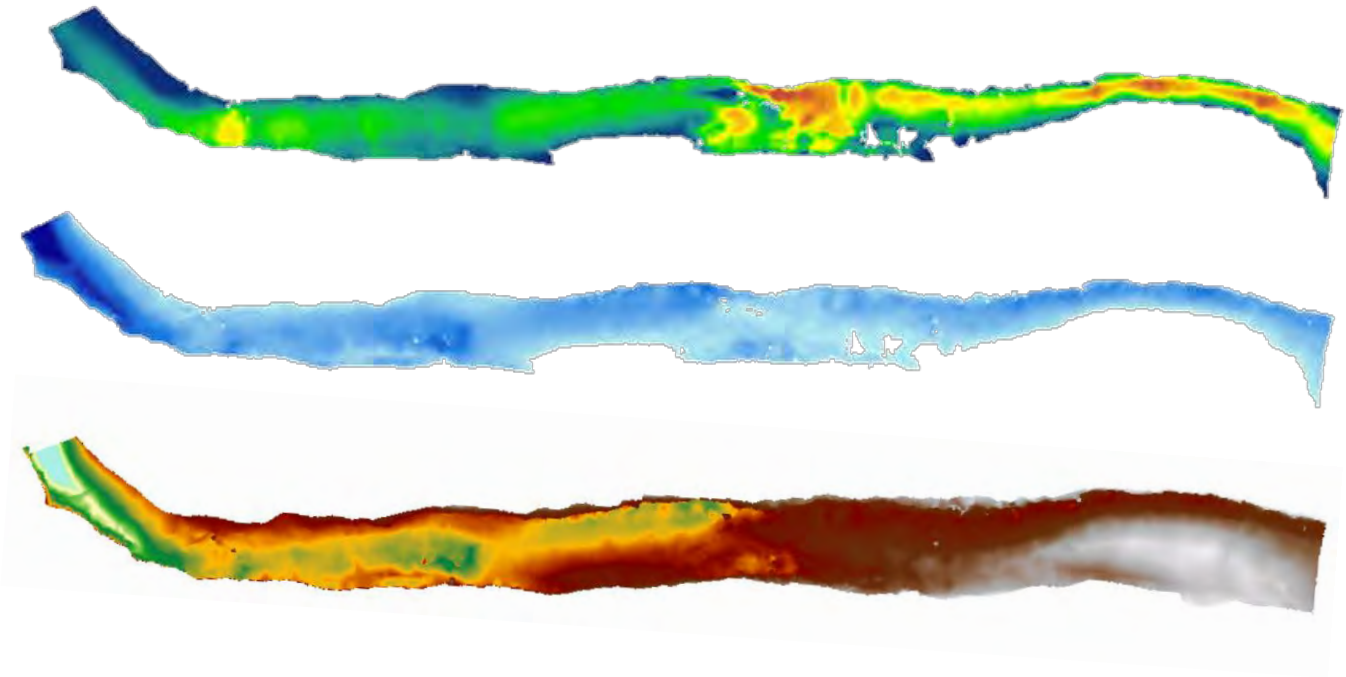
Final

LAGUNITAS CREEK INSTREAM FLOW STUDY

Prepared for
Marin Water

September 2021

ESA



Final

LAGUNITAS CREEK INSTREAM FLOW STUDY

Prepared for
Marin Water

September 2021

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ESA

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EXECUTIVE SUMMARY

Lagunitas Creek drains an 82 square mile watershed in west Marin County to the Pacific Ocean and is regulated by four dams operated by Marin Water (see **Figure ES1**). The creek supports three species that are Federally or State listed as threatened or endangered: coho salmon, steelhead, and California freshwater shrimp. Instream flows in Lagunitas Creek downstream of Kent Lake are regulated by State Board Water Rights Order (WR) 95-17, which includes the flow release schedule shown in **Figure ES2**. In years classified as dry[1], the schedule requires a summer baseflow of 6 cfs between 15th June and October 31st, increasing to a 20 cfs winter baseflow during a window between November 1st and 15th. The winter baseflow increase is triggered by the first flow after November 1st exceeding 25 cfs at the Lagunitas Creek USGS gauge in S.P. Taylor State Park, or by November 15th if no such flow has occurred, and is intended to support salmonid migration, spawning, incubation and winter rearing. Winter baseflow lasts until March 31st and is punctuated by a series of migration pulses of 35 cfs, then recedes in a series of steps between April 1st and June 15th to the summer baseflow of 6 cfs.

Marin Water is currently facing an unprecedented water shortage: Water Years 2020 and 2021 are the third driest and driest years within a 90-year period of record, and water supplies are at their lowest since Kent Lake was expanded in 1983, as shown in **Figure ES3.** Marin Water is applying for a Temporary Urgency Change Petition (TUCP) to conserve water for supply to customers and to meet environmental flow releases in the summer and fall of 2022. TUCP applications require supporting studies showing that "*the proposed change will not result in an unreasonable effect on fish, wildlife, or other instream resources.*" (State Board TUCP Information and Guidance, 2021.)

ESA performed the instream flow study described in this report to assess potential water conservation measures, and to help identify flow reductions that avoided or minimized impacts to the three listed species. This study builds on work carried out in the 1980s that informed WR 95-17, and includes additional lines of evidence to support temporarily reducing or delaying instream flows:

1. Review of 40 years of flow data and 25 years of salmonid migration and spawning data to examine when flow releases provide the most benefit to salmonids.
2. Detailed 2D habitat suitability modeling of four reaches of Lagunitas Creek that represent almost a quarter of the observed spawning sites in Lagunitas Creek below Kent Lake, to assess the sensitivity of salmonid spawning, and fry and juvenile coho rearing to different potential reductions in flow.

[1] Water Year 2022 will meet the criteria for a dry year until at least December 31st 2021, and unless approximately 20 inches of rain falls between the summer of 2021 and December 31st, the period from January 1st until March 31st 2022 will also be designated as a dry year.

Based on the study, the following temporary changes in flow release schedule are proposed (shown in Figure ES2):

1. Delay the summer to winter baseflow trigger window from the existing November 1-15th period to December 1-15th. Winter baseflow will be activated if a flow of 25 cfs or more is measured at the Lagunitas Creek USGS gauge at Samuel P. Taylor State Park between December 1-15th, or by December 15th if no such flow has occurred.
2. Between November 15th and December 1st, if flows at the USGS gauge exceed 25 cfs then maintain a baseflow of at least 10 cfs for 1 week following the flow peak and monitor the creek for evidence of coho spawning. If no coho spawning is observed after one week, return flow to the summer baseflow value of 6 cfs. If coho spawning is observed, increase flow to winter baseflow.
3. Reduce the winter baseflow rate from 20 cfs to 16 cfs between the new December 1-15th trigger date and March 31st. From April 1st the flow regime will revert back to the appropriate Normal or Dry Year schedule in WR 95-17.

The reasoning for the proposed temporary changes is as follows. Review of flow (**Figure ES4**) and coho migration and spawning records for Lagunitas Creek (**Figure ES5**) shows that the WR 95-17 winter baseflow release takes place almost a month earlier than the average date when unregulated pulse flows occur in this watershed, and about a month earlier than when the majority of coho migrate upstream and spawn (steelhead typically migrate and spawn even later). Delaying the winter baseflow release by up to a month will conserve water at a time when it is least used by the listed species and lifestages, avoiding or minimizing impacts. Review of water temperature data during this time period shows that Kent Lake doesn't have a cooling effect during November-December, so having less flow from this water source should not expose fish waiting to spawn to adverse temperatures, and Marin Water will monitor water for dissolved oxygen during this period if fish do migrate before winter baseflows commence.

To assess the effects of reducing winter baseflow, highly detailed habitat suitability models were constructed for four study reaches using 2D hydraulic models. The models cover the area where 24% of coho redds were constructed in Lagunitas Creek's mainstem during the 2021 spawning season and represent a range of field conditions. Simulations of habitat area were conducted at 20, 15 and 10 cfs to identify the sensitivity of habitat to flow, then an additional set of runs were performed at 16 cfs to hone in on a recommended flow rate.

Habitat suitability modeling of Lagunitas Creek showed that reducing winter baseflow from 20 to 16 cfs would have a small, but not unreasonable, impact on the area and quality of suitable spawning and rearing habitat. The average reduction in water level for a flow reduction from 20 to 16 cfs was found to be less than 1.0 inches for riffles and 1.1 inches for pools. Velocities were reduced by an average of less than 0.1 ft/sec. The study estimates that comparing winter baseflows of 20 cfs and 16cfs, the total area of channel suitable for spawning coho would be reduced by 17% and the total area suitable for steelhead would be reduced by 12% (see **Table ES1**), though high suitability habitat would be more impacted than low suitability habitat. Redds are not likely to become dewatered at 16 cfs as the wetted channel area will shrink by less than 4% at 16 cfs, and redds are typically made in areas that are deeper than those that would dewater. While comparisons between area of suitable habitat and the number of redds that can be

supported are subject to uncertainty (e.g., salmonids may not spread out to utilize all the available spawning habitat) it provides an approximation of spawning capacity (see **Figures ES6** and **ES7**). The area of suitable spawning habitat in the four study sites at 16 cfs is estimated to be large enough to support around 56 coho and 44 steelhead redds. Over the last four years[2] the observed number of coho redds in the study site has varied from nine to 35 while the number of steelhead redds has varied from one to 22. The study authors recognize that comparing suitable spawning areas and redd numbers should be done with caution as it does not capture complicating factors such as potential competition for the same sites as well as superimposition of later steelhead redds on earlier coho redds.

The analysis shows that winter rearing habitat suitability for 1 year plus coho and steelhead juveniles is less sensitive to the proposed flow reduction than spawning habitat: 1 plus year coho rearing habitat is expected to reduce by 7% at 15 cfs, while steelhead rearing is expected to reduce by 9% (see Table ES1, **Figures ES9** and **ES10**). The area of suitable coho and steelhead fry rearing should be 44% larger at 15 cfs than at 20 cfs (see Table ES1, **Figure ES8**) due to reductions in depth and velocity along the edges of the channel and in side channels.

While the study focused on coho and steelhead, which are believed to be most sensitive to the scale and timing of the flows to which changes are proposed, it also provided insight into the likely effect of flow reductions on California freshwater shrimp. Freshwater shrimp in Lagunitas Creek are mostly found in glides and pools that are 1-3 feet deep, and so less sensitive to small changes in flow. Our modeling showed that pools that could be potential shrimp habitat experienced on average around 1.1 inch of depth reduction when flows were reduced from 20 to 15 cfs, against a typical pool depth of 3-4 feet. This indicates that the proposed flow reductions to 16 cfs are unlikely to impact shrimp habitat.

We recognize that many other species and habitats depend on flows in Lagunitas Creek, including other aquatic organisms, and the birds and animals that rely on the riparian corridor. The salmonids studied in this report are believed to be the most sensitive aquatic species, and minimizing impacting them is likely to provide ‘umbrella’ protection for a range of other aquatic species. The proposed flow reductions are not thought likely to impact the riparian corridor, since water levels will remain within an inch of those currently maintained.

[2] Redd location data from the last four years were overlain on the habitat suitability model to compare utilization with area of suitable habitat. Older redd data were not overlain on the model because the bed morphology and therefore habitat suitability pattern change with large flow events. Ten-year recurrence flow events in 2017 and 2019 likely changed the bed morphology to some degree, making predictions of habitat suitability prior to 2019 increasingly uncertain.

TABLE ES1
CHANGE IN MODELED SUITABLE HABITAT FOR FOUR STUDY SITES ON LAGUNITAS CREEK

	Percent Change in Area (relative to 20 cfs)		Approximate Equivalent Redds[1]		
Coho spawning	16 cfs	10 cfs	20 cfs	16 cfs	10 cfs
High suitability habitat	-24%	-66%	39	30	13
Low suitability habitat	-8%	-31%	32	29	22
Total suitable habitat	-17%	-36%	71	59	35
Steelhead spawning	16 cfs	10 cfs	20 cfs	16 cfs	10 cfs
High suitability habitat	-24%	-59%	19	13	8
Low suitability habitat	-5%	-16%	30	29	26
Total suitable habitat	-12%	-32%	49	42	33
Coho and steelhead fry rearing	16 cfs	10 cfs			
Total suitable habitat	+28%	+40%			
Total wetted channel (unsuitable)	-6%	-16%			
Total wetted channel	-4%	-13%			
Coho 1+ year rearing	16 cfs	10 cfs			
High suitability habitat	-7%	-13%			
Low suitability habitat	-4%	-20%			
Total suitable habitat	-5%	-17%			
Total wetted channel	-4%	-13%			
Steelhead 1+ year rearing	16 cfs	10 cfs			
High suitability habitat	-15%	-39%			
Low suitability habitat	+2%	0%			
Total suitable habitat	-6%	-19%			
Total wetted channel	-4%	-13%			

NOTES:

1. Equivalent redds estimated based on 125 and 250 square feet per redd for coho and steelhead respectively (rounded from 128 and 241 in Bratovich and Kelley, 1998). Study sites represented 24% of coho redds in Lagunitas Creek mainstem in WY2021.

Figure ES1
Lagunitas Creek Watershed and Key Study Locations

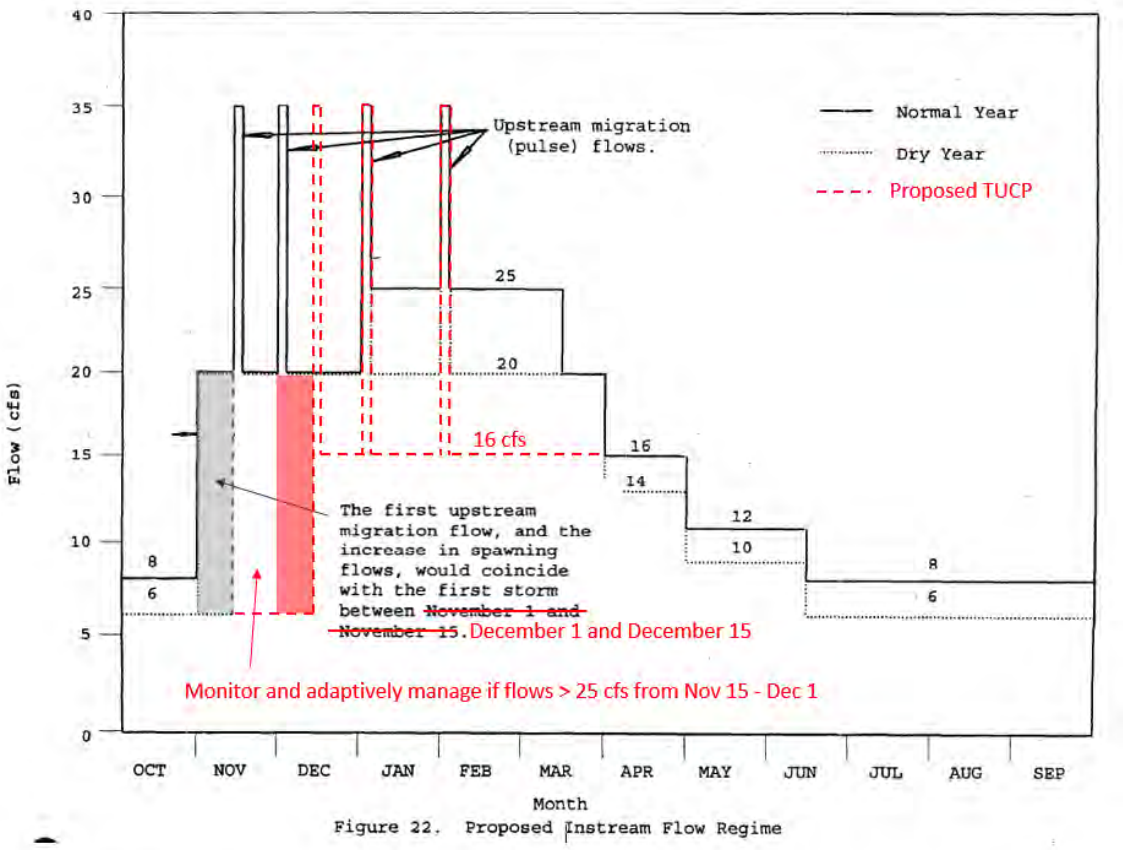
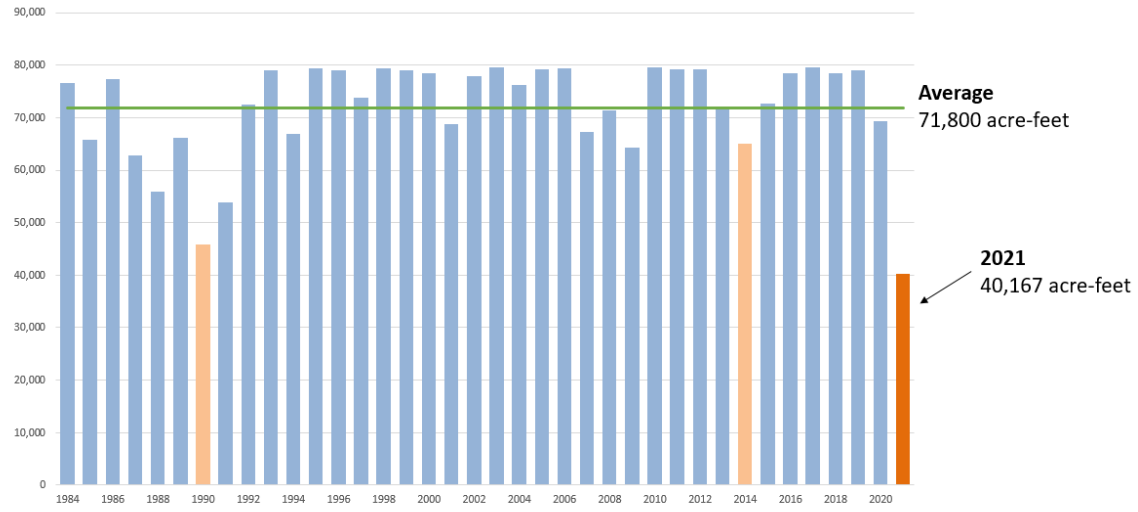


Figure 22. Proposed Instream Flow Regime

SOURCE: WR 95-17, TUCP modifications by ESA.

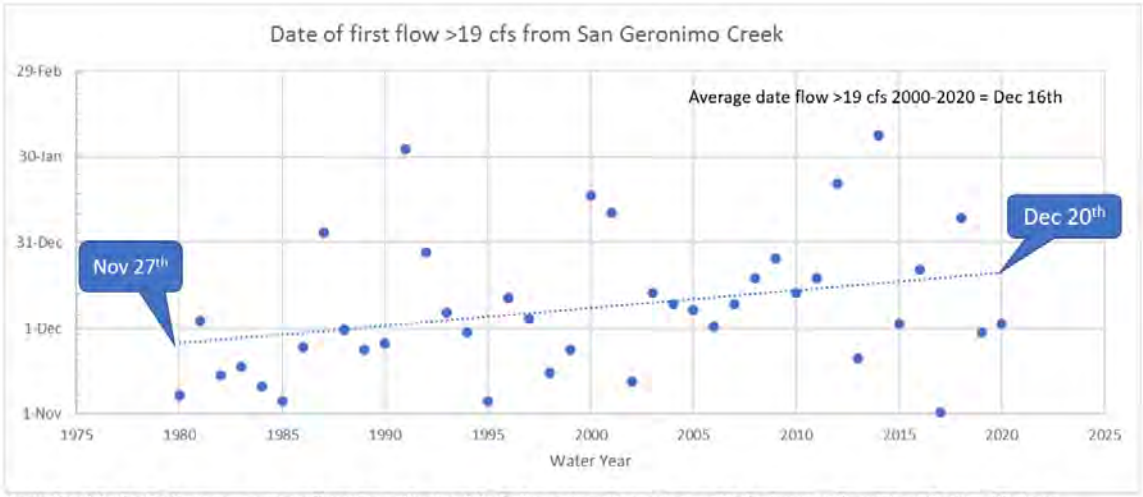
Figure ES2

WR 95-17 Instream Flow Schedule for Lagunitas Creek and Proposed TUCP Changes



SOURCE: Marin Water

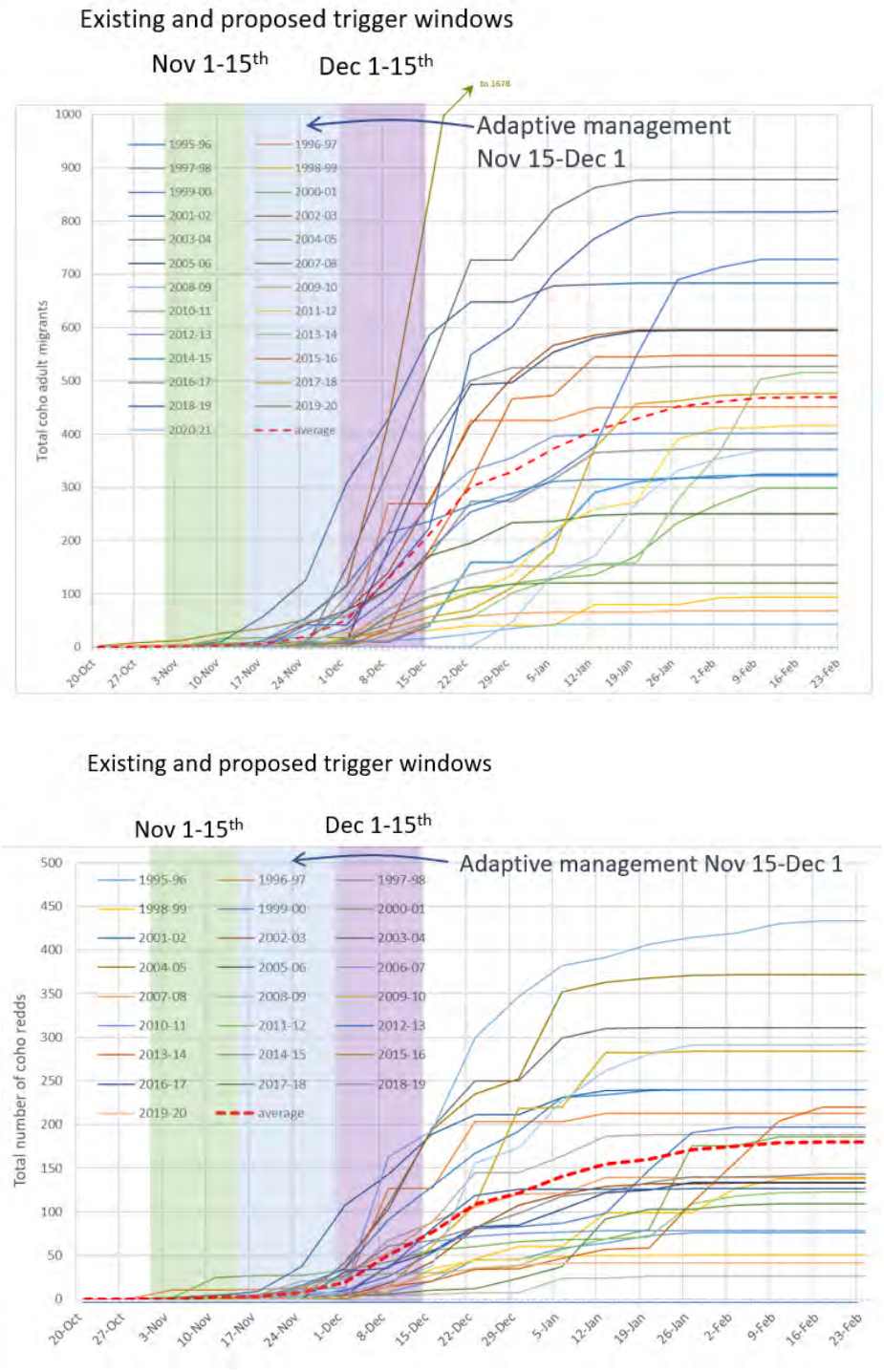
Figure ES3
Total Reservoir Storage Volume for Marin Water, 1983-2021



Basis for 19 cfs: 6 cfs summer baseflow from Kent + 19 cfs from San Geronimo = 25cfs, lowest flow identified as likely to trigger migration

SOURCE: Marin Water

Figure ES4
Date of First Winter Pulse Flow from San Geronimo Creek



SOURCE: Marin Water

Figure ES5
Cumulative Number of Coho Migrants (upper) and Redds (lower), 1995-2020

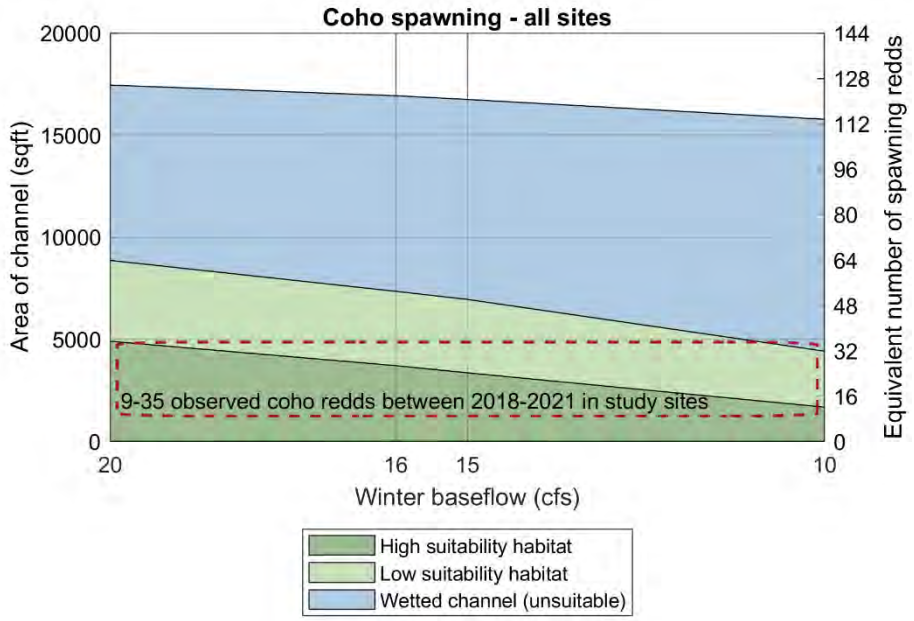


Figure ES6
Habitat Suitability for Coho Spawning at Flows from 20 to 10 cfs

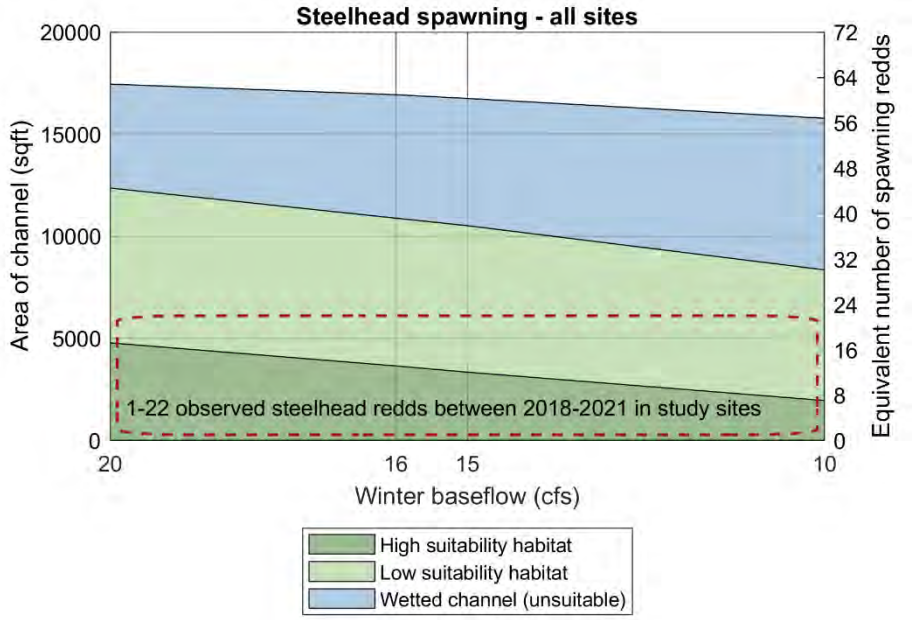


Figure ES7
Habitat Suitability for Steelhead Spawning at Flows from 20 to 10 cfs

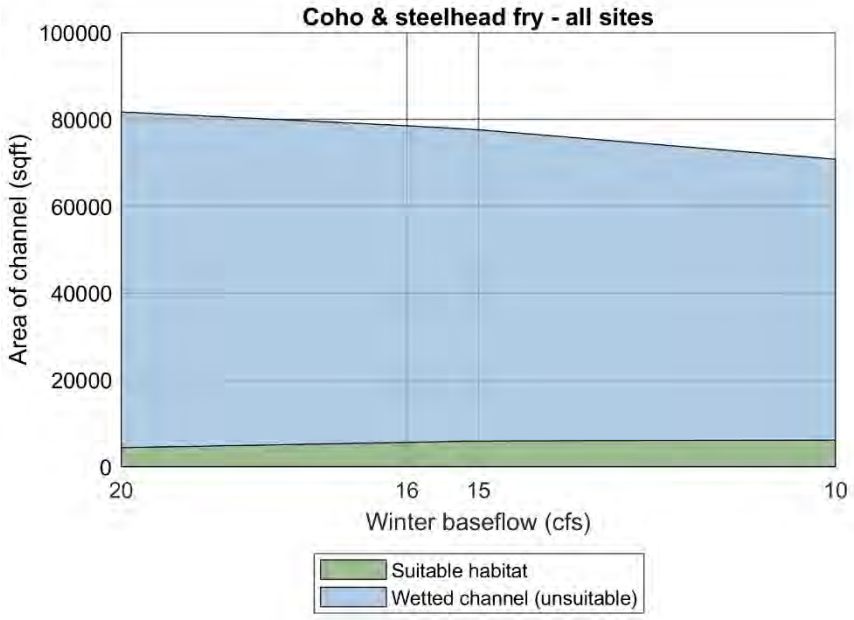


Figure ES8
Habitat Suitability for Coho and Steelhead Fry Rearing at Flows from 20 to 10 cfs

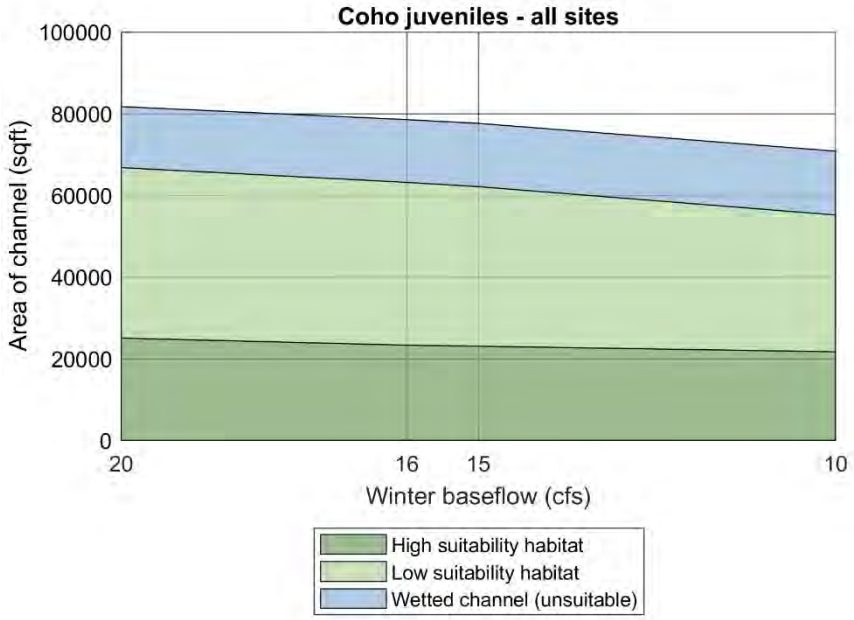


Figure ES9
Habitat Suitability for Coho 1+ Year Juvenile Rearing at Flows from 20 to 10 cfs

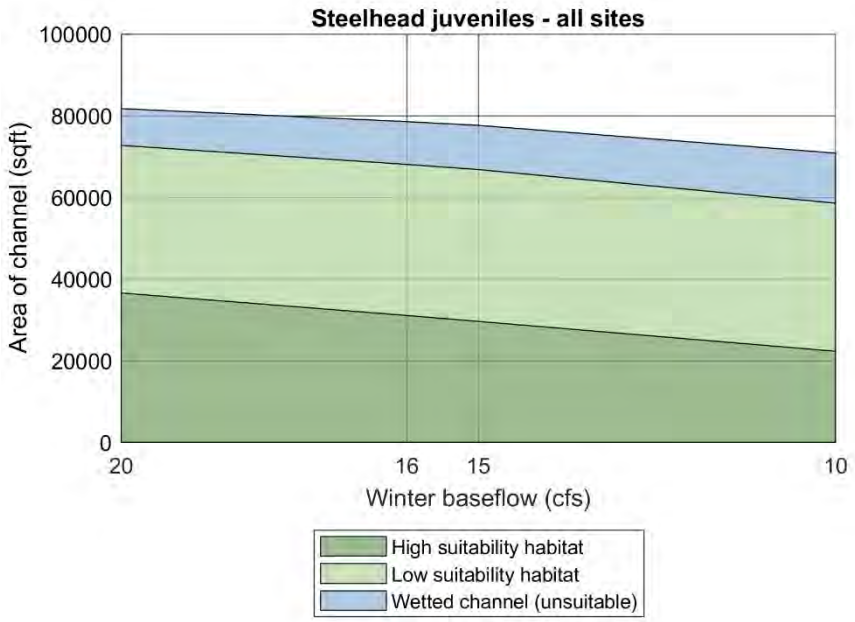


Figure ES10
Habitat Suitability for Steelhead 1+ Year Juvenile Rearing at Flows from 20 to 10 cfs

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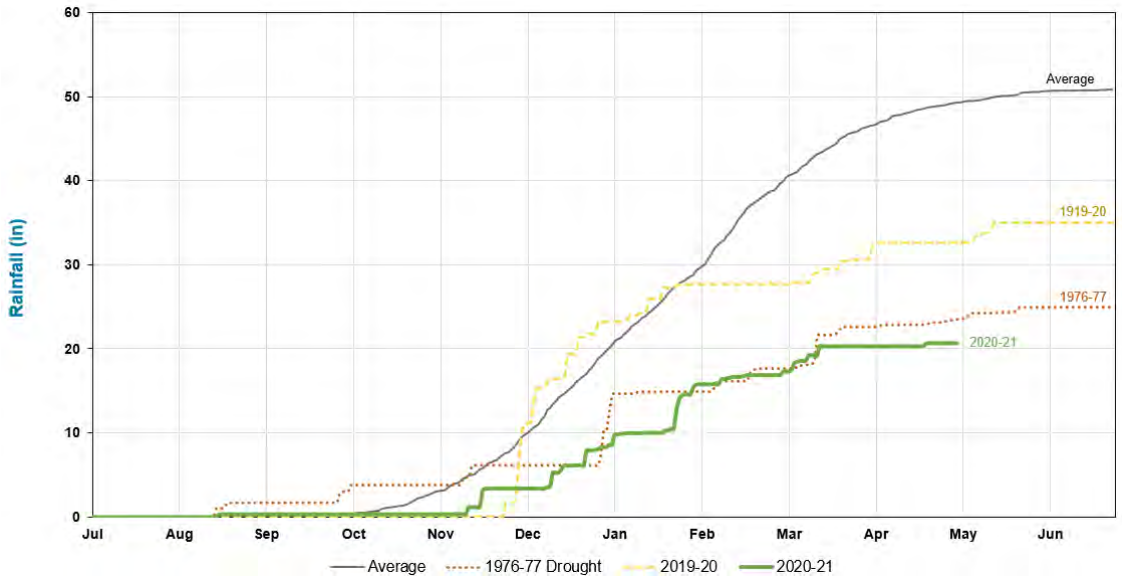
SECTION 1
Study Background and Watershed Geography

Lagunitas Creek drains an 81 square mile watershed in west Marin County to the Pacific Ocean at Tomales Bay (see Figure ES1). Much of watershed (59 square miles or 82% of the area) is regulated by four dams and reservoirs that supply water to Marin Water's customers: Kent Lake, Alpine Lake and Bon Tempe Lake on Lagunitas Creek's main channel and Nicasio Reservoir on the Nicasio Creek tributary. The three mainstem reservoirs on Lagunitas Creek provide around 75% of Marin Water's total water supply. San Geronimo Creek is the main unregulated sub-watershed draining to Lagunitas Creek, with a watershed area of 9.4 square miles. San Geronimo Creek joins Lagunitas Creek 3000 feet downstream of Kent Lake.

Lagunitas Creek is also habitat for three State or Federally listed species: coho salmon and California freshwater shrimp (listed as State and Federally Endangered Species) and steelhead (listed as a Federally Threatened Species). Marin Water's releases from Kent Lake, the most downstream reservoir on the mainstem of Lagunitas Creek, are subject to California State Water Resources Control Board (State Board) Water Rights Order WR 95-17 which requires instream flows to be released to support the three listed species. The schedule of releases is described below in more detail, but in summary 11,050 AF are released in a wet/normal year and 9,000 AF in a dry year to meet the instream flow requirements in WR 95-17.

At the time of this study in spring and summer of 2021, Marin Water is facing an unprecedented water supply shortage. A shown in Figure ES2, the volume of water storage in Kent Lake as of May 2021 is the lowest since Peters Dam was raised in 1983. Water Years 2020 and 2021 are set to be the third driest and driest water years based on 90 years of data at Lake Lagunitas, as shown in **Figure 1.** In light of the water shortage, Marin Water is carrying out studies to inform an application to the State Board for a Temporary Urgency Change Petition (TUCP) that would temporarily reduce flows from Kent Lake into Lagunitas Creek below those specified in WR 95-17. The TUCP guidelines state that the application should assess whether changes to instream flows are likely to cause an "unreasonable effect" on the downstream fishery. The purpose of this study is to assess potential flow reduction scenarios from Kent Lake and evaluate the effects on the three species named in the Water Rights Order; coho salmon, steelhead and freshwater shrimp. This study has been carried out by ESA and Marin Water technical staff, with considerable input and feedback from the Lagunitas Creek Technical Advisory Committee (LagTAC) and a group drawn from the following resource agencies: California Department of Fish and Wildlife, San Francisco Regional Water Quality Control Board, and the National Marine Fisheries Service.



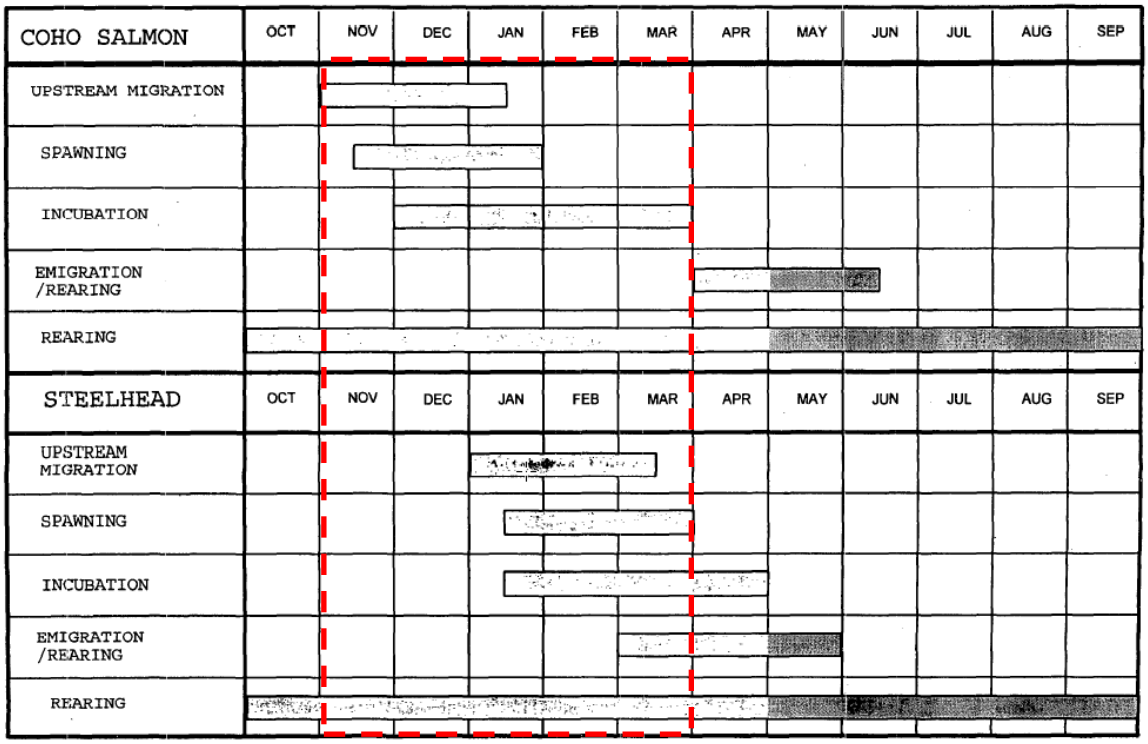
SOURCE: Marin Water

Figure 1
Cumulative Rainfall at Lake Lagunitas for Water Years 2020-2021 Compared with Average Years and Historic Drought Years.

SECTION 2

Spatial and Temporal Distribution and Needs of Target Species in Lagunitas Creek

Water Rights Order WR 95-17 names the species that the flow schedule is intended to protect as coho, steelhead, and California freshwater shrimp. Coho are considered to be especially important as Lagunitas Creek is one of four watersheds considered priority habitat on the Central California Coast. The lifestages of coho and steelhead are shown in **Figure 2** with the period for which flow changes are requested by the TUCP overlain.

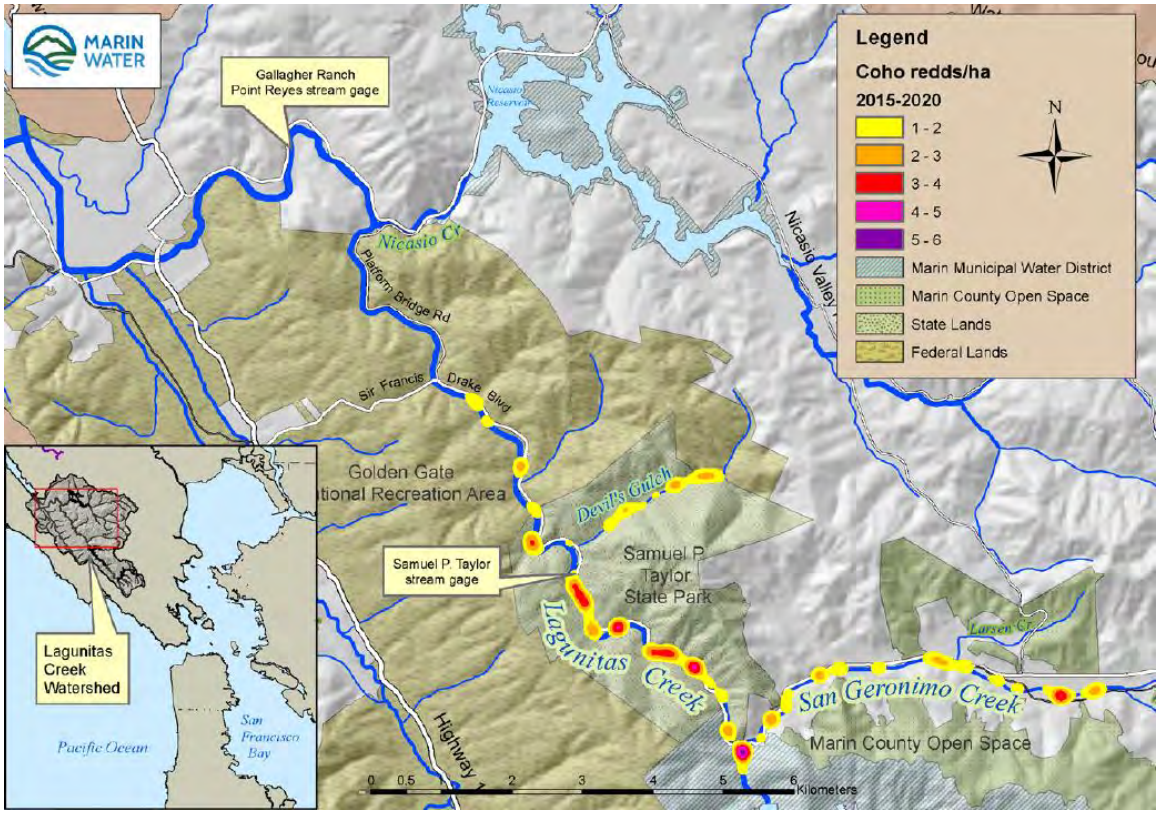


SOURCE: WR 95-17

Figure 2
Life Stages of Coho Salmon and Steelhead (with TUCP Period in Red Dashes)

Coho Salmon

As described in Bratovitch and Kelley (1988), adult coho move from the Pacific Ocean into Tomales Bay in early fall, and congregate in the Lagunitas Creek estuary until flows trigger migration upstream. A mean daily flows of at least 35 cfs was found necessary to trigger upstream migration and to provide desirable levels of flow over partial migration barriers such as riffle crests (though adult upstream passage is observed at lower flows). Coho spawning is observed to start in late November and peak in December, then tail off in January (Marin Water data). As shown in **Figure 3**, most coho spawning in Lagunitas Creek's mainstem occurs in the upstream reaches between Jewel and Peters Dam, with a few areas in the middle reach around Tocaloma. A significant number of coho also migrate up Lagunitas Creek to spawn in San Geronimo Creek, and a smaller number migrate and spawn in Devil's Gulch. Most spawning in Lagunitas Creek (89% of coho redds measured by Bratovitch and Kelley, 1988) is focused on glide tails within 25 feet of riffle crests. Most spawning occurs in gravel substrate with a median size range from 8-45 mm, and in water between 0.5 – 1.2 feet deep and with velocities from 0.7 – 2.6 ft/sec. Studies in other creeks have found coho spawning and rearing to be most successful in water temperatures below 13°C (55°F) and with ambient dissolved oxygen (DO) levels of around 11 mg/l in the water column and 8-10 mg/l in redds (Carter, 2008).



SOURCE: Marin Water

Figure 3
Coho Spawning Locations and Density in Lagunitas Creek Watershed, 2015-2020

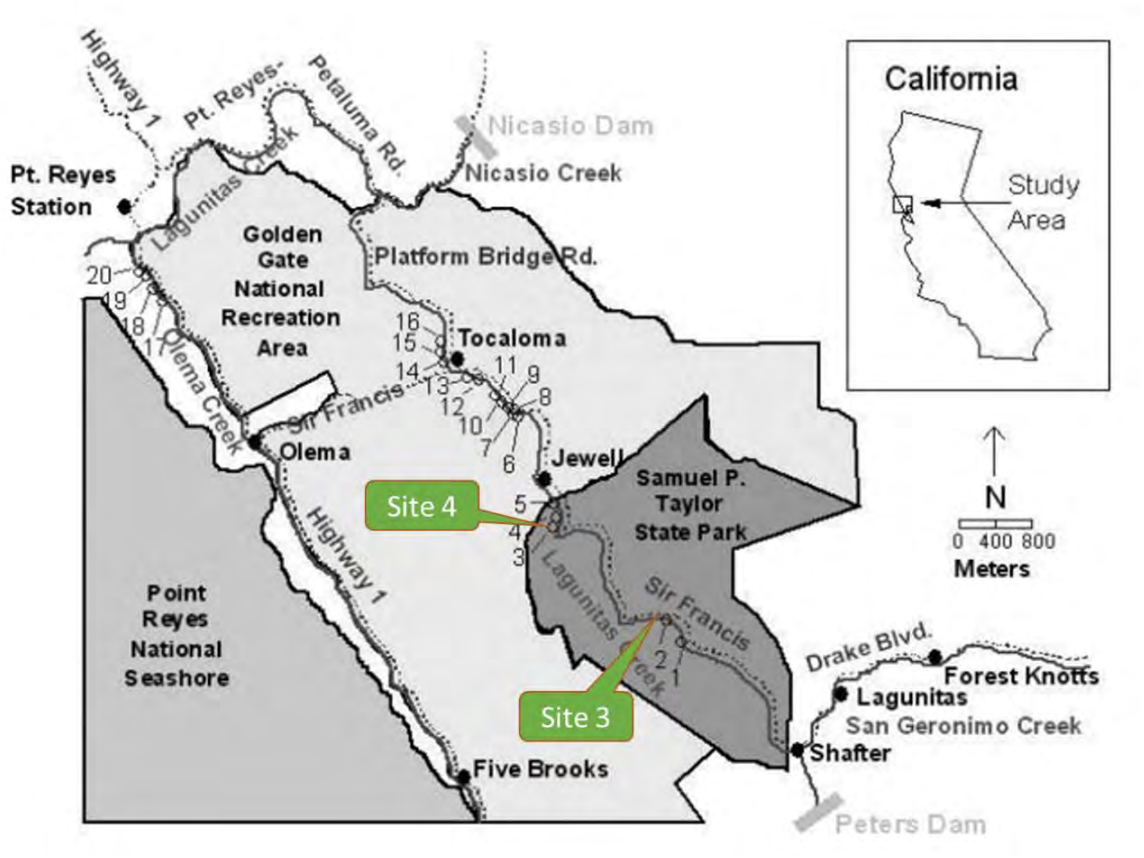
Coho embryo incubate in the gravel substrate for 5-7 weeks between December and March, with fry emerging in February and March, and juveniles either rearing for around 18 months or, after a few months, emigrating. Fry initially rear in shallow (<0.5 feet), slow moving water in and around gravel or cobble substrate, often along the edges of the creek, in side channels or in slack water areas (Bratovitch and Kelley, 1988). As the juveniles grow in the spring (later than the period for which flows may be reduced under this TUCP application) they move into deeper and slightly faster moving habitat. Studies by others have found juvenile coho to favor habitat from around 3 inches to 3 feet deep and from zero to about 1 ft/sec velocity (Gast, 2013). In addition to fry from the current year, juvenile coho that spawned the previous year will also be present during the winter baseflow period.

Steelhead

Steelhead follow a similar calendar to coho but can migrate and spawn later in the season. Steelhead spawning habitat overlaps with coho in the upper mainstem, as well as in the tributaries. Bratovitch and Kelley (1988) measured velocity and depth over 16 steelhead redds in Lagunitas Creek and found them to be in water deeper than 0.6 feet, with velocities between 0.7 and 2.0 ft/sec, and substrate with a median particle size of 8 – 45 mm. Steelhead fry emerge early March to mid-May and rear in edge habitat similar to coho. Juvenile steelhead from previous years rear in deeper water during the winter period and favor faster flowing water than juvenile coho.

California Freshwater Shrimp

Freshwater shrimp spend their entire 2 to 3-year lifespan in Lagunitas Creek. Martin et al. 2009 carried out a habitat utilization study of freshwater shrimp in Lagunitas Creek and found them to be most numerous in glides (64% of observed shrimp), then pools (31%), and occasionally in riffles (5%). The Martin study found that freshwater shrimp were mostly in areas where flow velocities were between 0.003-0.005 ft/sec with sandy substrate, undercut banks and overhanging vegetation. Occupied glides were mostly around 12 inches deep while pools were mostly between 16 and 18 inches deep. The majority of shrimp habitat was found from Big Bend to just below Tocaloma (see **Figure 4**). In general, shrimp appear to be less vulnerable to the proposed temporary flow reductions since they favor slow moving water and live in deeper water where lowering the water level by a few inches has less effect than it would in riffle habitat: Smith (1986) did raise concerns about the detrimental effects of fluctuating flows (not proposed in this TUCP).



SOURCE: Martin et. a. 2009

Figure 4
Sites Surveyed for Martin et al., 2009 California Freshwater Shrimp Habitat Study, With Habitat Study Sites from this Study (Green Callouts)

SECTION 3
Lagunitas Creek Instream Flow Requirements (WR 95-17) and Supporting Studies

Following the raising of Peters Dam in 1983, a series of studies and hearings evaluated instream habitat needs and the relationship to flows, culminating in the State Board instream flow requirements for Lagunitas Creek downstream of Kent Lake in WR 95-17. Based on the narrative in the order, the flow recommendations appear to have relied heavily on three studies; CDFW, 1986; Bratovich and Kelley, 1988; and Kelley/ENTRIX, 1992 (for Marin Water). These are summarized here.

Instream Flow Requirements, Anadromous Salmonids Spawning and Rearing, Lagunitas Creek (Gary Smith - CDFW 1986). This study used the Instream Flow Incremental Methodology (IFIM) to assess the relationship between flow and habitat. The study compared measurements of velocity and depth against habitat suitability criteria. Velocity and depth were measured in four study reaches each with 10-14 cross sections, at three different flow ranges (7-11 cfs, 20-22 cfs, and 30-35 cfs) as summarized in **Table 1**.

TABLE 1
HABITAT MEASUREMENTS FROM CDFW LAGUNITAS CREEK IFIM STUDY 1986

Reach	Location	Study Reach Length (feet)	Channel Length Study Reach Was Assumed to Represent (miles)	Number of Transects Measured
1	Irving Bridge	414	2.6	11
2	Camp Taylor	396	5.9	10
3	Tocaloma	576	1.5	14
4	Gallagher Ranch	1191	3.6	14
Total		**2577**	**13.6**	**49**

The relationship between flow and habitat suitability, and the resulting flow recommendations, were based on habitat suitability criteria from a range of sources. Steelhead fry criteria were based on observations in Lagunitas Creek, while steelhead and coho spawning and juvenile rearing were assessed using data from other creeks and rivers across the west coast compiled in Bovee, 1978. The study recommended normal year flow rates of around 10 cfs in the summer, rising from 40 to 50 cfs between January and March before ramping down. Recommended summer flow rates were variable based on a proportional formula that accounted for the availability of water in Kent Lake.

Investigations of Salmon and Steelhead in Lagunitas Creek, Marin County, Volume 1. (Bratovich and Kelley, 1988). This study measured a range of issues relating instream flows to

the various lifestage needs of coho and steelhead including attraction flows, migration, spawning, emergence and rearing. Habitat suitability was assessed by making measurements of velocity, depth, dissolved oxygen concentration and substrate conditions at 26 coho redds and 16 steelhead redds in WY1982-83 and WT1983-83, and developed spawning frequency curves with velocity and depth.

Habitat Recommendations for Lagunitas Creek (Kelley/ENTRIX, 1992). This study reviewed and synthesized Bratovich and Kelley, 1988, and made recommendations for minimum flow releases. The recommended flows were as follows:

- Upstream migration pulses of 35 cfs for 3 days following triggering flows of 25 cfs occurring after November 1st
- Winter baseflows of 10 cfs in dry years and up to 16 cfs in normal or high flow years, between the first migration pulse and April 30th (normal or wet years) or March 31st drier than normal years
- Dry season baseflows of 4 to 12 cfs following the winter baseflow, with the lower flows in drier years

The State Board flow schedule in WR 95-17 mandated flows that lie between the levels recommended in those three reports. The flow schedule took a Functional Flows Approach and specified four hydrograph components to meet different ecological needs.

The flow schedule components are shown in **Table 2** and **Figure 5.**

TABLE 2
WR 95-17 FLOW SCHEDULE

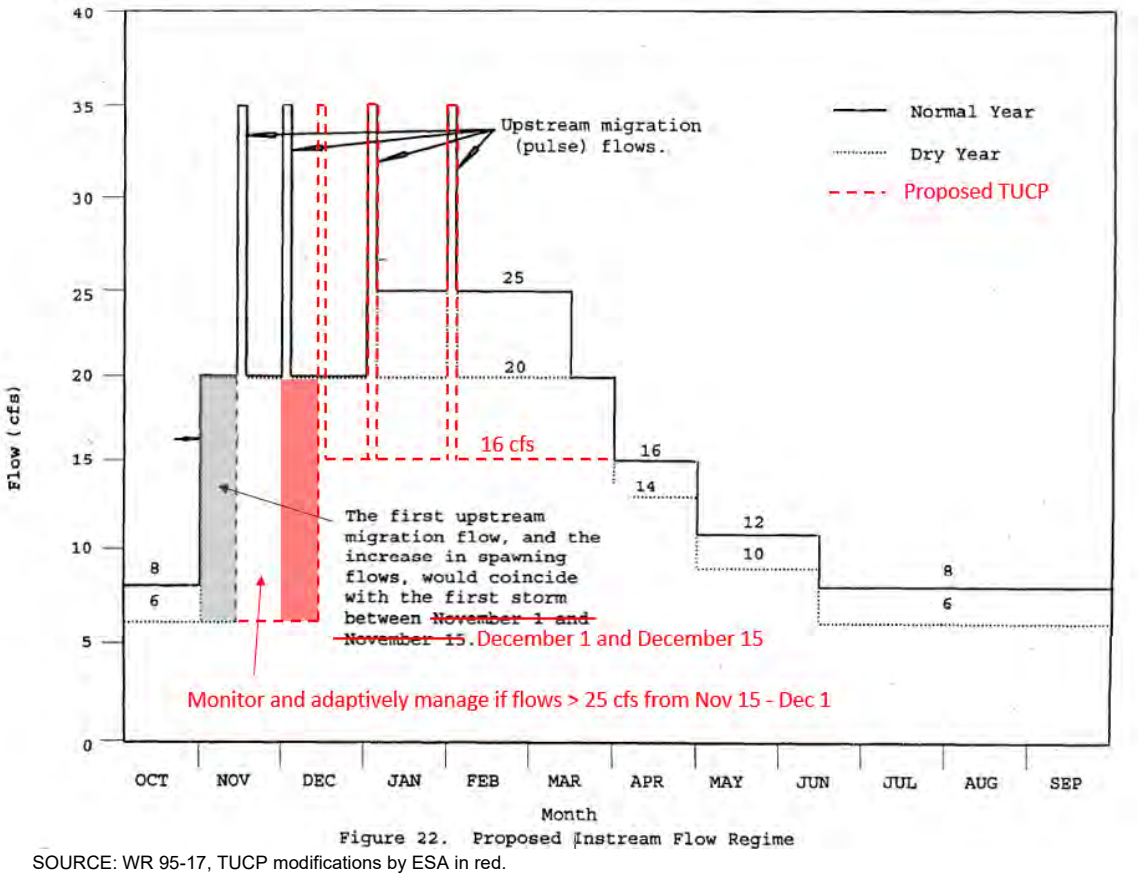
Functional Flow Component	Timing	Normal Year Flow (cfs)	Dry Year Flow (cfs)	Notes
Summer baseflow	June 16 - November 1/15	8	6	
Migration pulses	3 days per pulse (see notes for timing)	35	35	1st pulse starting between November 1-15 coincident with natural flow over 25 cfs if such flow occurs, or by dam release. 2nd pulse starting no later than Dec 1 coincident with natural flow over 25 cfs if such flow occurs, or by dam release. 3rd pulse starting no later than January 1 coincident with natural flow over 25 cfs if such flow occurs, or by dam release. 4th pulse between January 4-31 coincident with natural flow over 30 cfs only if such flow occurs.
Winter baseflow	November 1/15 – December 31	20	20	Start winter baseflow between November 1-15 coincident with a natural flow peak of 25 cfs if such flow occurs, or by dam release.
	January 1 – March 15	25	20	
	March 16 – March 31	20		
Spring recession	April 1 – April 30	16	14	
	May 1 – June 15	12	10	

All flows are determined by the value measured at the USGS Lagunitas Creek gauge at Samuel P. Taylor State Park

SOURCE: WR 95-17 with functional flow descriptions added by ESA

Whether a year is defined as "Normal" or "Dry" is determined as follows:

- On April 1st – if rainfall during the previous 6 months was less than 28 inches then the year type is "Dry" until Dec 31st, otherwise the year is "Normal"
- On January 1st – if rainfall during the previous 15 months was less than 48 inches then the year type is "Dry" until March 31st, otherwise the year is "Normal"



SOURCE: WR 95-17, TUCP modifications by ESA in red.

Figure 5
WR 95-17 Instream Flow Schedule for Lagunitas Creek and Proposed TUCP Changes

As shown in Figure 1, 2021 will meet the criteria for a dry year until at least December 31st 2021 based on measured rainfalls in the 6 months prior to April 1st 2021, and unless approximately 20 inches of rain falls between the summer of 2021 and December 31st, the period from January 1st until March 31st 2022 will also be designated as a dry year. This study assumed that WY2022 would be a dry year through at least March 31st, 2022 and assumed that the baseline condition from which flow modifications would be made is the dry year flow release.

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SECTION 4
Potential Temporary Changes to Instream Flow Schedule

Four potential temporary changes to the WR 95-17 flow schedule were evaluated in this study. They are described below, along with a brief rationale for considering them.

Delayed Start of Winter Baseflow

This temporary change scenario would delay the transition from the summer baseflow of 6 cfs to the winter baseflow (20 cfs in a dry year, 16 cfs proposed in this TUCP) by approximately four weeks. Under WR 95-17, in a dry year this transition occurs coincident with the first flow greater than 25 cfs as measured at the S. P. Taylor State Park flow gauge between November 1st and 15th, or by releasing a migration pulse by November 15th if no such natural flow has occurred: this study evaluated increasing baseflows starting between December 1st and 15th. The rationale for delaying winter baseflows is that in an average year, the unregulated watershed events that play an important role in triggering salmonid migration don't occur until around mid-December; elevating baseflows before such events provides relatively little benefit compared to the volume of water released. This is supported by migration and spawner surveys that show the majority of coho moving into potential spawning reaches in December rather than November, and by climate change data showing the onset of high flows in San Geronimo Creek occurring later in the year compared with the 1980s and 1990s when the flow schedule in WR 95-17 was being formulated.

Elimination of the November Migration Pulse Flow and Delay of December Pulse Flow

If the start of winter baseflow is delayed until December 1-15th, there would be little benefit and some potential impacts from releasing the first migration pulse between November 1st and 15th, as this might attract salmonids upstream before baseflow was high enough to inundate potential spawning areas. Under a delayed start scenario, the first migration pulse would be eliminated, and the second migration pulse delayed to coincide with the December 1-15th start of winter baseflow. The third and fourth migration pulses would be unchanged from the schedule described in WR 95-17.

Reduced Rate of Winter Baseflow

This temporary change scenario would reduce the winter baseflow from 20 cfs to 16 cfs, as determined by a combination of previous studies and modeling of habitat suitability properties.

The predictive modeling takes the form of a sensitivity analysis of habitat suitability at a series of different flow rates between 10 and 20 cfs.

The rationale for a lower winter baseflow is that during some dry and critically dry years baseflow in Lagunitas Creek would, if unregulated, likely be lower than the flows released under WR 95-17 (see The Nature Conservancy Natural Flows Database for Lagunitas Creek between S.P. Taylor State Park and San Geronimo Creek https://rivers.codefornature.org/#/map), and that small reductions in baseflow can be made without causing an unreasonable effect on spawning and rearing habitat quality.

Combination of Delayed Start with Reduced Winter Baseflow

This temporary change scenario would combine elements from the three modifications above, i.e. delaying the start of winter baseflow by one month, eliminating the November migration pulse, and then releasing baseflow at a rate between 10 and 20 cfs, to be determined by the combination of methods described above.

Instream Study Approach

To evaluate the effects of the changes described above, ESA performed a series of analyses:

- Review of 25 years of salmonid migration and spawning records and 40 years of flow data from Lagunitas Creek to identify when flows are most effective at supporting spawning and rearing
- Habitat suitability modeling of four reaches that collectively account for almost a quarter of coho and steelhead spawning, to assess the sensitivity of spawning and fry rearing habitat suitability to a range of potential flows

SECTION 5
Assessment of Delayed Winter Baseflow

This temporary change would delay the transition from the summer baseflow of 6 cfs to the winter baseflow (currently 20 cfs under WR 95-17, with proposed TUCP flow rate of 16 cfs) from November 1-15th to December 1-15th. As with the window described in WR 95-17, the increase within the designated 15-day window would be triggered by a flow of more than 25 cfs occurring at the S.P. Taylor State Park USGS flow gauge, or by December 15th if no such flow had occurred in the preceding 15 days.

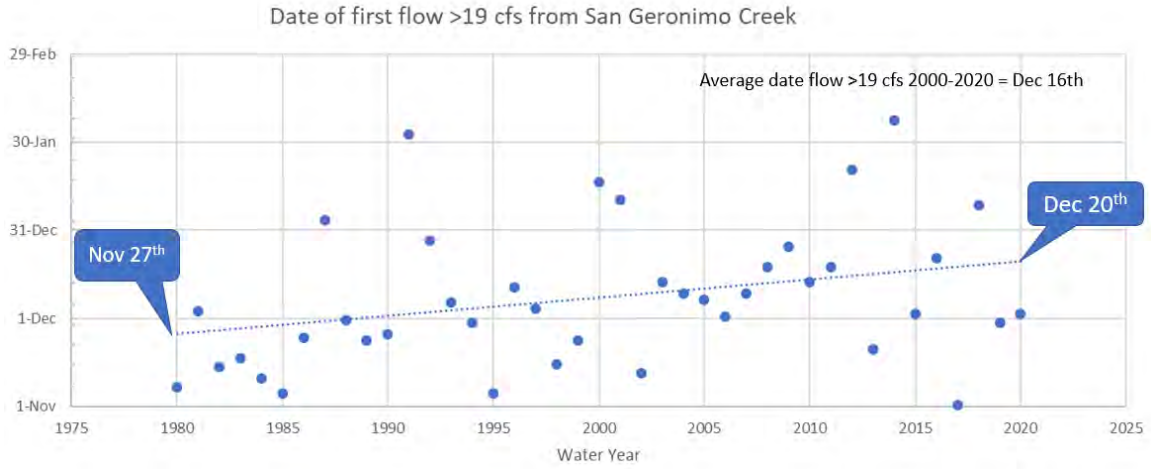
Working Hypothesis

The main purpose of the winter baseflow release from Kent Lake is to support salmonid migration, spawning and rearing once pulse flows from either San Geronimo Creek or Kent Lake have triggered upstream migration. However, the main period of salmonid migration in Lagunitas Creek tends to occur in December once unregulated watershed flows have occurred, so reservoir water released in the first few weeks of the winter provides comparatively less benefit for instream spawning and rearing habitat by salmonids. Additionally, analysis of the onset of peak flows in San Geronimo Creek (forming natural attraction flows in Lagunitas Creek) shows that they are occurring later now than in the 1980s and 1990s when WR 95-17 was written. Finally, migration and spawning data shows that salmonids are migrating and spawning in December rather than November.

Analysis of Scenario

ESA analyzed 40 years of flow data to compare the timing of natural pulse flows that might trigger upstream migration by salmonids with the onset of winter baseflows released under WR 95-17. Flows from San Geronimo Creek were used in addition to flows from Lagunitas Creek at the Camp Taylor USGS gauge, since the latter reflect the current artificial flow release schedule. The question being asked by this analysis is "if the artificial Kent Lake November 1st – 15th migration pulses and baseflow increases did not happen until later in the season, when would natural flows from San Geronimo Creek likely trigger salmonid migration?" The goal of our analysis was to estimate when higher baseflows from Kent Lake would be needed to avoid a situation in which natural flows from San Geronimo Creek attracted adult salmonids and then potentially left them with insufficient flow to spawn. A second questions was "if winter baseflow is not increased around November 1st and fish migrate upstream anyway (e.g., due to a natural migration flow from San Geronimo Creek) could the lower flows from Kent Lake expose fish to temperature or water quality stresses while they wait for higher flows that allow spawning?"

Previous studies (e.g., Bratovich and Kelley, 1988) and observations by Marin Water have shown that a flow of at least 35 cfs is needed to draw fish up the creek, and WR 95-17 triggers migration flows from Kent Lake once flows in Lagunitas Creek below the San Geronimo Creek confluence exceed 25 cfs. We assumed that a flow of 19 cfs from San Geronimo Creek combined with 6 cfs of flow released from Kent Lake as part of the summer baseflow, could potentially trigger migration[3]. (Note that selecting values between 25 and 35 cfs for this threshold only affected the resulting day of first exceedance by 1-2 days.) The timing of the first day in which the average flow exceeding 35 cfs was extracted from the period of record, and the results for each year are plotted in **Figure 6**. This shows that since 1980 the average onset of winter pulse flows from San Geronimo Creek has become 23 days later, with the average first exceedance over the last 20 years occurring on December 16th. This observation is similar to the findings of Lukovic et al., 2021, which showed that the onset of the winter rainy season in California has been delayed by an average of 27 days since the 1960s. A reasonable interpretation of these results is that winter migration and baseflows from Kent Lake in November under WR 95-17 are increasingly out of sync with the watershed dynamics and serve less purpose than flows in December when watershed flows are more likely to naturally trigger and support migration and spawning.



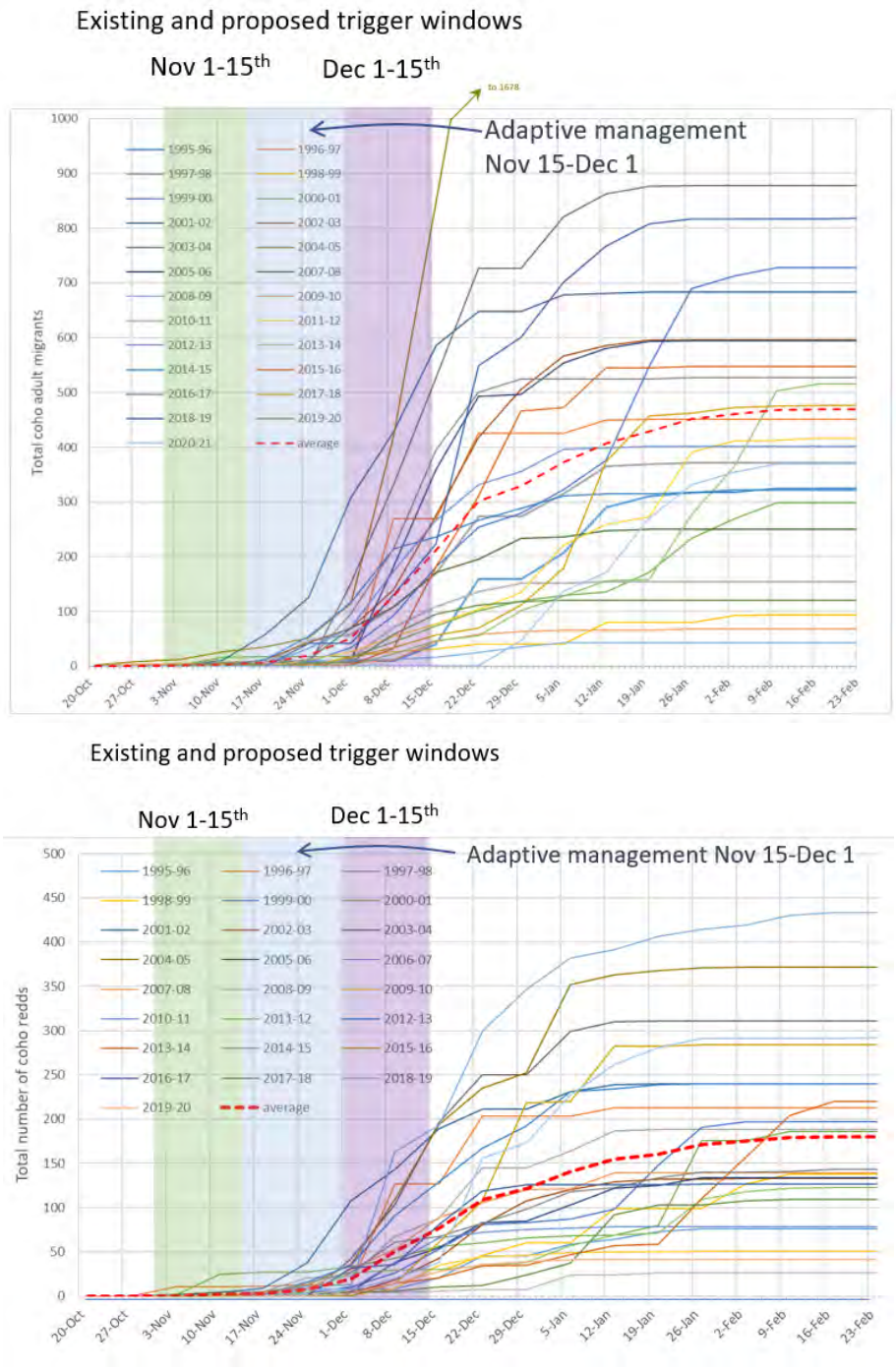
NOTES: Basis for 19 cfs: 6 cfs summer baseflow from Kent + 19 cfs from San Geronimo = 25 cfs, lowest flow identified as likely to trigger migration.

SOURCE: Marin Water.

Figure 6
Date of First Flow Exceeding 19 cfs in San Geronimo Creek.

A second line of evidence for this interpretation comes from analysis of migration and spawning data. **Figure 7** shows the cumulative counts of coho migration and coho redds for the period 1996-2020, with the November 1-15th window for raising baseflow under WR 95-17 shown in blue and the proposed delayed window in tan. As can be seen, in most years very little migration occurs before December 1st even though Kent Lake migration pulse releases start by November 15th at the latest. Between December 1st and 15th approximately half of the migration occurs in most years, often linked to unregulated flows from San Geronimo Creek.

[3] The data was taken from San Geronimo Creek rather than S.P. Taylor State Park because flows at S.P. Taylor State Park automatically increase to 35 cfs if no flow exceeding 25 cfs has occurred by November 15th, regardless of runoff from the watershed.



SOURCE: Marin Water

Figure 7
Cumulative Number of Coho Migrants (upper) and Redds (lower), 1995-2020

Temperature analysis of delayed winter baseflow

In discussion with the Lagunitas Technical Advisory Committee (LagTAC) and resource agencies, questions were raised about whether delaying winter baseflow could create the following situation: a natural migration pulse occurs in October or November due to an early season storm in San Geronimo Creek, adult salmonids migrate upstream and then hold, unable to spawn due to the lower flows, and become exposed to high temperatures or water quality issues due to the lower than usual November flows. A literature review of temperature needs during migration and holding (Carter, 2008) suggested that coho prefer to migrate in temperatures between 12 and 14.5°C (54-58°F) and that holding temperatures should not exceed 16.5°C (62°F).

To examine the scenario outlined above, ESA reviewed available water and air temperature data from Kent Lake, San Geronimo Creek and Lagunitas Creek at S.P. Taylor State Park.

Due to the irregular and sparse nature of some records as well as the lack of temporal overlap between the records listed above, ESA aggregated the data by month. As shown in **Figure 8**, water temperatures in San Geronimo and Lagunitas Creeks broadly follow air temperatures at the nearby Barnaby weather station, varying from a low of around 50° F in January to a high of around 60° F in August, while Kent Lake water is much more constant with a monthly average temperature ranging from around 51 to 53° F. For the period of time analyzed, Kent Lake was cooler than Lagunitas Creek from April to October, about the same temperature in November and March, but was warmer than Kent Lake from December to February. Therefore, if Kent Lake flow releases were lowered in the period around November to December when adult salmonids might be holding in the upper creek waiting for suitable spawning conditions, the reductions in flow would be expected to result in similar or slightly cooler water temperatures. Furthermore, the temperatures recorded in Kent Lake and Lagunitas Creek during the TUCP period lie below the thresholds of concern for migration, adult holding, and spawning.

Conclusions

Three lines of evidence support a delay in the summer to winter baseflow increase from a window between November 1-15th to a window between December 1-15th:

- Natural flows in the watershed that trigger salmonid migration occur about three weeks later in the year than in the 1980s when the studies supporting WR 95-17 were conducted, arriving on average around December 16th. Delaying the onset of winter baseflow to this time window, including an adaptive trigger to coincide flows with natural runoff events, conserves water for when salmonids are most likely to migrate upstream.
- Migration and spawning also take place mostly starting in December, coincident with natural flows from the watershed. Delaying winter baseflows to early December focusses releases for a time when fish are present and likely to spawn.
- Analysis of existing temperature data shows that reducing Kent Lake releases between November and March is not likely to warm Lagunitas Creek and stress adults waiting to spawn; the most likely change is a very slight reduction in temperature in the early part of the winter.

Data coverage

Name	Location	Start	End
Kent Lake	Reservoir	May-96	Dec-01
Barnaby	Air	Jan-97	Dec-01
San Geronimo Creek	Stream	Mar-21	Jul-21
Lagunitas Creek @ Samuel P. Taylor Park	Stream	Oct-03	Jul-06

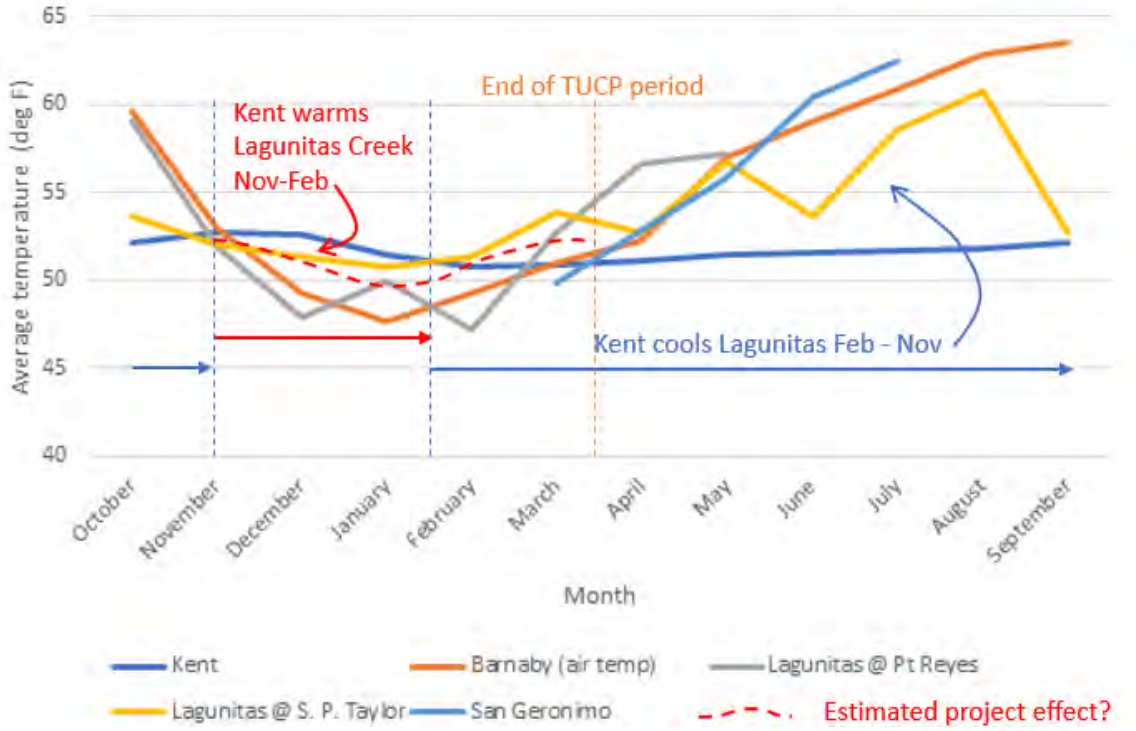


Figure 8
Seasonal Water and Air Temperature in Lagunitas Creek Watershed

Recommended Flow Release Modification

If a flow of 25 cfs is observed at the USGS gauge at S.P. Taylor State Park between December 1st and 15th, Marin Water will release a migration pulse from Kent Lake so that the flow at S.P. Taylor State Park is 35 cfs for at least three days, then lower the release to the proposed winter baseflow value of 16 cfs (discussed in the next section) until March 31st, before resuming the schedule in WR 95-17.

A potential risk in delaying winter baseflow is that a natural event (e.g., flow from San Geronimo Creek) prior to December 1st might trigger coho migration and spawning but leave redds vulnerable to dewatering when baseflow returns to 6 cfs. To avoid this, Marin Water proposes a monitoring and adaptive management plan between November 15th and December 1st. During this period, if flows at the S.P. Taylor State Park USGS gauge exceed 25 cfs then Marin Water will release flows from Kent Lake that result in a flow of at least 10 cfs at S.P. Taylor State Park for a period of one week following the peak flow. This will allow time for Marin Water fisheries staff to monitor for coho spawning (10 cfs covers most of the spawning areas typically used by coho). If no coho

spawning is observed within 10 days, Marin Water will lower flows back to 6 cfs until the next triggering event. If spawning is observed Marin Water will switch to the winter baseflow value.

SECTION 6
Assessment of Lower Winter Baseflows

This temporary change would reduce the winter baseflow from 20 cfs for a dry year to a value of 16 cfs. That value was identified from the analysis described below, which evaluated flows between 10 and 20 cfs in habitat suitability models. The models were developed using very high resolution 2D hydraulic models of four reaches that collectively account for 24% of the observed coho and steelhead redds in the mainstem of Lagunitas Creek in 2021, and 22% of coho and steelhead redds between 2000 and 2020.

Working Hypotheses and Assumptions

1. The most sensitive species and lifestages to of flow reductions between November and March are coho and steelhead, with a focus on spawning and incubation habitat as well as rearing conditions for emergent fry. This is because suitable spawning habitat requires medium velocity flow water while fry spawning requires very shallow water, and both these habitats are potentially sensitive to flow reductions. By contrast, California freshwater shrimp are unlikely to be as sensitive to flow reductions since they utilize deeper, slow moving pool and glide habitat that is less sensitive to small changes in flow rate.
2. Small reductions in winter baseflow (e.g., 2-4 cfs) are expected to have little to no measurable effect on habitat suitability for the targeted species and lifestages, but below a certain discharge lower flows will cause conditions to become less suitable and eventually to cause an unreasonable[4] impact to fisheries.
3. Based on previous studies we assume that the effects of flow reduction on habitat may be non-linear; often the first increment of flow reduction has little effect or may even be beneficial due to velocity reductions, but once a threshold is crossed equivalent incremental reductions may have larger impacts.
4. Flow reductions may affect rearing habitat suitability for emerging coho and steelhead fry by altering food productivity; we assume that this effect can be estimated by changes in wetted channel area.

2D Habitat Suitability Modeling Approach

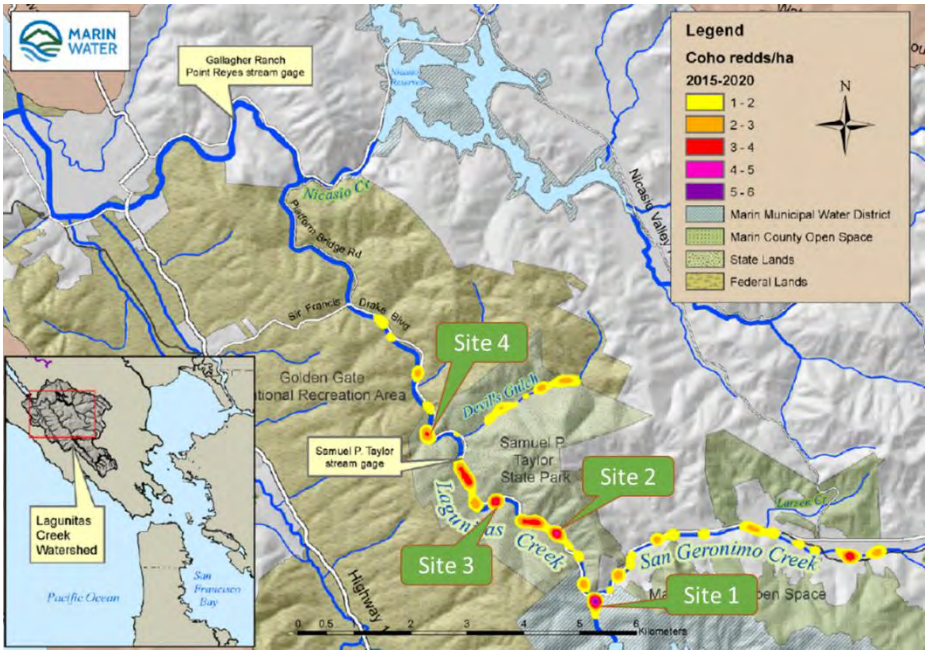
Habitat suitability modeling uses hydraulic models to estimate the distribution of flow velocity and depth in response to different flow rates and boundary conditions and compares those values with the favored habitat for different aquatic species and life stages to quantify how much suitable habitat will be available at different flow increments. Velocity and depth may be overlaid

[4] State Board TUCP language describes "unreasonable" effects as a key criterion for rejecting a petition to reduce flows, but does not define how the term should be measured.

with other relevant properties such as substrate, cover, or water temperature. For this study, velocity and depth were estimated using a 2D hydraulic model in the Hydrologic Engineering Center's River Analysis System (HEC-RAS) set up to model four representative study reaches at a range of flows between 10 and 20 cfs. The models generate output for a mesh of cells, with each cell being 2 feet by 2 feet. Substrate suitability was evaluated by field mapping and eliminating areas where the sediment was unsuitable (e.g., bedrock, cobbles, or fine sediment). A habitat suitability score was calculated for each cell, at each flow rate, to estimate the area of suitable habitat. This method is much more detailed than earlier studies such as CDFW, 1986, and models such as PHABSIM, which measure velocity and depth at widely spaced cross sections.

Habitat Suitability Study Reach Selection

Because it was not feasible to model the entire river within the time available, ESA selected four representative reaches to model in detail (see **Figure 9**). The reaches were focused on the upper river between Big Bend and Peters Dam where the majority of salmonid spawning and fry rearing occurs. Potential reaches were identified based on review of the last 5 years of spawning location data, and field reconnaissance. The reaches were then reviewed by the LagTAC and representatives from CDFW, NMFS and the SF RWQCB, including an additional field reconnaissance with RWQCB staff before final site selections were made. The sites were selected to cover as much salmonid spawning and fry rearing habitat as feasible, and to cover a diverse range of conditions in case some areas were more sensitive to flow reductions than others. This included having reaches both upstream and downstream of the San Geronimo Creek confluence, and having reaches in the confined, narrow, straight canyon area as well as the more open, meandering, alluvial areas in and below Camp Taylor.



SOURCE: Marin Water and ESA.

Figure 9
Habitat Suitability Modeling Sites Superimposed on Coho Spawning Density Map, 2015-2020

As shown in Table 3, the study sites represent 24% of the coho and steelhead spawning sites observed in 2021, and 22% of the historic spawning sites in the mainstem of Lagunitas Creek (i.e. between Kent Lake and Highway 1 excluding tributaries) over the last 20 years (**Table 3**). We note that by comparison the three studies that informed the WR 95-17 flow release schedule were based on a smaller number of redds and a shorter distance of channel surveyed at a much lower point density. The Bratovich and Kelley study was based on 26 coho redds and 16 steelhead redds, while the CDFG study was based on 810 feet of channel surveyed in main spawning area upstream of Tocaloma.

TABLE 3
COHO AND STEELHEAD REDDS IN LAGUNITAS CREEK AND THE STUDY SITES

Location	2000 – 2020 monitoring		2021 Monitoring	
	Coho redds	Steelhead redds	Coho redds	Steelhead redds
Study sites 1-4	339	unknown	35	11
Lagunitas Creek mainstem	1543	unknown	144	45
Redds in study site as percent of redds in mainstem	22%	unknown	24%	24%

Reach Descriptions

Site 1. Leo Cronin Site. This site is between Peters Dam and Shafter Bridge near the Leo T. Cronin Fish Viewing Area (**Figure 10**). It is immediately upstream of the San Geronimo Creek confluence, so its hydrologic and geomorphic regimes is very different than those of the remaining three sites. It does not receive frequent small and medium peak flows or inputs of sediment like reaches below San Geronimo Creek confluence but is dominated by baseflow releases from Kent Lake punctuated by occasional overtopping of the dam during high flows when the reservoir is full. This reach is also the steepest part of Lagunitas Creek at around a 2% channel gradient. The surveyed area of the reach is about 700 feet long and had 14 coho redds in WY 2021, with one steelhead redd.

Note that the flows mandated in WR 95-17 are measured at the USGS gauge at S.P. Taylor State Park, not immediately below Peters Dam. Site 1 experiences drops in flow below the baseflow values as, per its operating license, Kent Lake releases can be reduced to as low as 2 cfs when there is sufficient flow from San Geronimo Creek to supply the required winter baseflow at S.P. Taylor State Park.

Site 2. Canyon Site. This site is located 1500 feet upstream of Irving Road Bridge and about 2.5 miles downstream of the San Geronimo Creek confluence, and is typical of the confined, relatively straight canyon reaches between the San Geronimo Creek confluence and the upstream end of Camp Taylor (**Figure 11**). It contains a series of glides and riffles and has been one of the most heavily used areas for steelhead and coho spawning in recent years, with 11 coho redds and three steelhead redds in WY 2021. As with sites 3 and 4, this site receives flow from Kent Lake releases plus unregulated (i.e. natural) flows of water and sediment from San Geronimo Creek.

SOURCE: ESA.

Figure 10
Habitat Suitability Modeling Site 1

SOURCE: ESA.

Figure 11
Habitat Suitability Modeling Site 2

Site 3. Upper Camp Taylor site. This site is at the upstream end of Camp Taylor, where the creek emerges from the canyon reach and begins to meander across the historic floodplain, which forms a series of high terraces here (**Figure 12**). Though less confined than in the canyon, this reach is more confined than the wider, more alluvial conditions found downstream. There were six coho redds and five steelhead redds in WY2021 in the roughly 600-foot-long surveyed area. One of the potential freshwater shrimp habitat sites evaluated by Martin et al. (2009) is either within or very close to this site based on visual comparison of their mapped data.

Site 4. Big Bend site. This site is at the downstream end of Camp Taylor below the Devil's Gulch confluence, extending from the Green Bridge swimming hole downstream for 425 feet, and including a 200-foot-long secondary channel (**Figure 13**). This area has a very different geomorphic character than sites 1-3, with the least confined setting and the most extensive coarse bedload deposits. Its location below Devil's Gulch results in a very high gravel bedload delivery, and this reach has several split channels with a main channel and a secondary channel in several areas. This site had four coho redds and two steelhead redds in WY2021, and also includes some areas studied as potential freshwater shrimp habitat by Martin et al., 2009. It has more overhanging vegetation than the other sites, and the combination of vegetation and gravel deposits has led to a more concentrated low flow channel than sites 1-3.

Site Survey

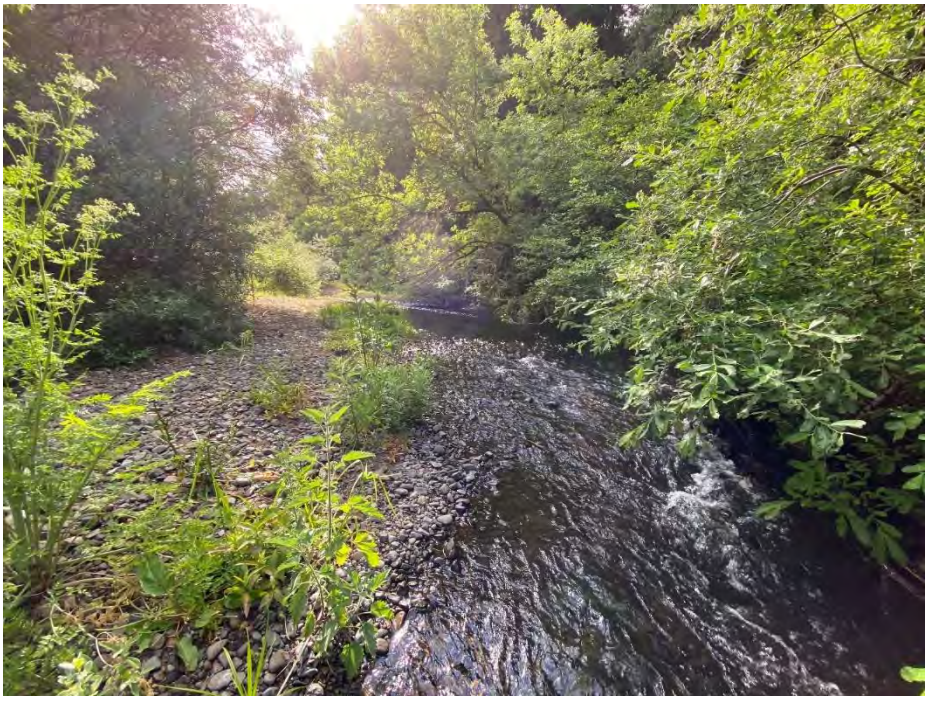
For each of the four sites ESA performed a detailed topographic survey using a total station. Survey limits were set based on reconnaissance by a geomorphologist and a fisheries biologist, with lengths ranging from 575 to 800 feet for a total length of 2,090 feet, and included a deep pool at each end to provide a buffer area for the model to equilibrate to its boundary conditions away from the spawning or rearing habitat that was the main focus of the study. The lateral extent of the survey was typically the edge of the actively scoured winter channel about 2 feet above the water surface elevation at the time of the survey. Sites 1-3 were surveyed between April 28th and June 17th, 2021 when flows were at 10 cfs[5]; Site 4 was surveyed in late June at flows between 10 and 6 cfs as flows were reduced to summer baseflow after June 15th. At all sites a series of water surface elevation points were either surveyed directly at around 10 cfs or marked with nails at the water level while flows were at around 10 cfs and surveyed later for hydraulic model calibration. Four cross sections, each consisting of around 20-25 individual velocity measurements, were recorded at each site while flows were around 10 cfs. The cross sections were divided between riffles and glides and served two purposes. The individual velocity measurements were used for model calibration, and also to make a more locally precise measurement of discharge, particularly at Site 1 which is upstream of the San Geronimo Creek confluence. Field photos were taken to allow validation of wetted area during model calibration.

Approximately 3000 topographic and bathymetric points were surveyed at each site, resulting in highly detailed topographic surface. The surfaces were produced in AutoCAD and then exported to HEC-RAS, where the model and computational mesh were created. The mesh elements were 2 feet by 2 feet. The topographic and bathymetric surfaces for the four sites are shown in **Figure 14**.

5 Flows at Site 2 were at 14 cfs on the first day of survey; WSE and velocities were recorded when flows were at 10 cfs.

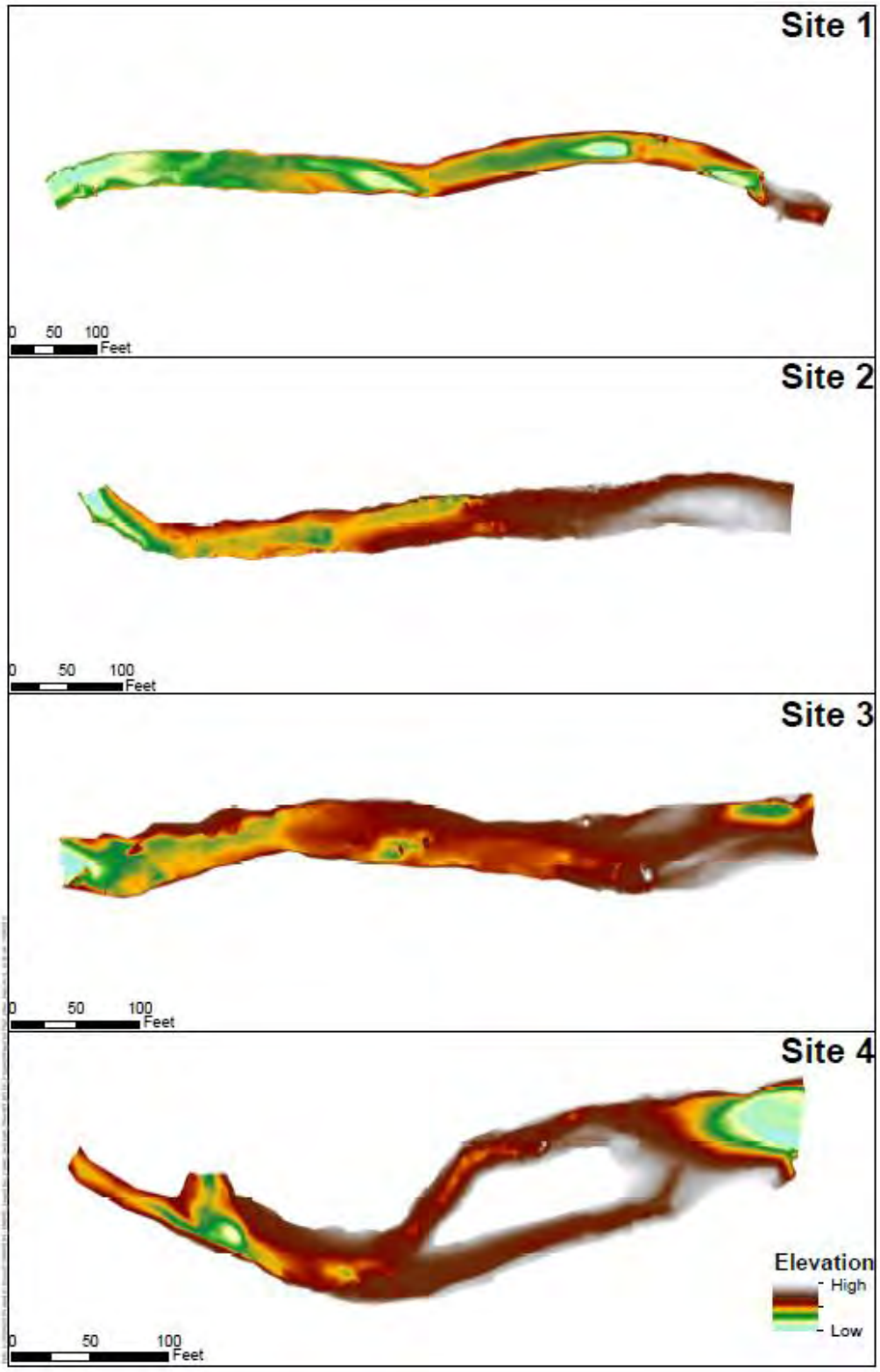
SOURCE: ESA.

Figure 12
Habitat Suitability Modeling Site 3



SOURCE: ESA.

Figure 13
Habitat Suitability Modeling Site 4



SOURCE: ESA

Figure 14
Topographic/Bathymetric Surfaces for the Four Habitat Suitability Models

Hydraulic Model Calibration

Two-dimensional hydraulic models were created in HEC-RAS version 6.0. The hydraulic models were calibrated by running the flow measured by the velocity survey team at a range of roughness values, from 0.040 to 0.055 at 0.005 increments. The wetted channel areas were mostly composed of gravel and cobble with no vegetation, simplifying selection of an appropriate Manning's n value. Measured and modeled water surface elevations (WSE) and velocities were compared. Velocity was found to be most sensitive to roughness, with the water levels typically varying within about a tenth of a foot at all the roughness values tested. As a result, the models were optimized for velocity based on both the coefficient of determination (r^2 value) and the slope and intercept of the regression line. Where several roughness values had high and similar r^2 values to each other, more weight was given to selecting roughness values with a modeled to observed slope as close as possible to 1:1 and an intercept of zero rather than to maximizing r^2, to avoid systematically biasing the model towards over or under prediction of velocity and depth. Previous studies describe an r^2 of 0.5 (California Water and Environmental Modeling Forum, 2021) or 0.6 or higher (Sonoma County Water Agency, 2016) as being considered an acceptable fit for velocity when performing habitat suitability modeling. The mean r^2 value for velocity was 0.57 and the mean r^2 for depth was 0.75. Cross sections with lower fits between measured and modeled velocity were examined in detail and found to occur where flow split around semi submerged bars, where partially submerged cobbles that were not picked up by the topographic surface likely exerted some form roughness at the shallow 10 cfs flows. Rather than selectively change the roughness of those features we elected to use a uniform roughness for each reach, since at higher flows that form roughness would likely be drowned out or reduced.

Hydraulic Model Output

Once calibrated, each model was initially run for flows of 10, 15 and 20 cfs to identify general patterns in habitat suitability change. Based on the initial model results and feedback from the LagTAC and resource agencies, additional runs were carried out at 16 cfs to hone in on a potential flow rate for the TUCP. Flows were run in unsteady state, ramping up to the desired discharge, and results were extracted once the model had reached equilibrium at the selected rate. Velocity, depth, and wetted area were exported to GIS for each model cell (see **Figures 15-18**).

Several general patterns were observed, in addition to specific findings at the species and lifestage level. For the range of flows tested, reducing flows from 20 to 15 cfs lowered water levels by about a tenth of a foot and reduced velocities by about a tenth of a foot per second. Flow depth changes were spot checked at 11 riffles and 11 pools across the study reaches and are shown in **Table 4**.

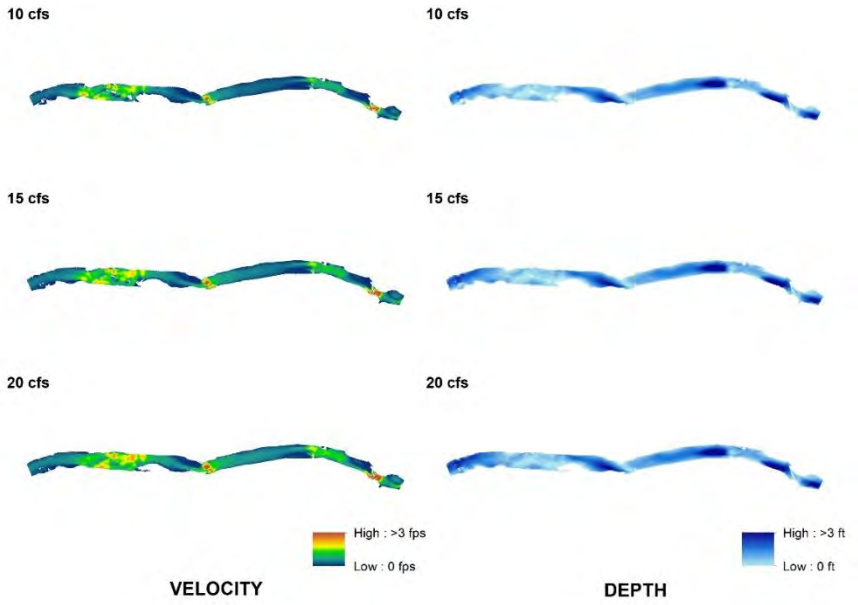


Figure 15
Velocity (left) and Depth (right) Output from the Site 1 Hydraulic Model at 10-20 cfs

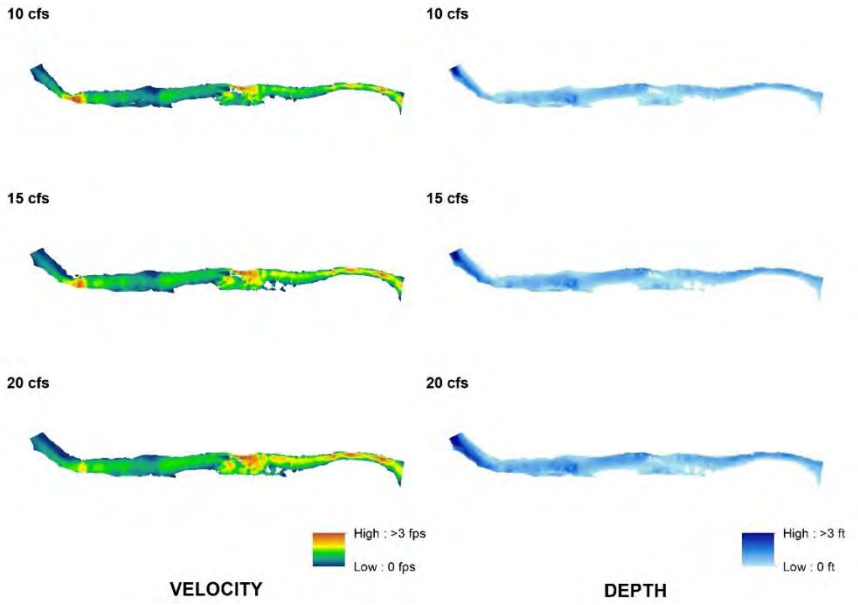


Figure 16
Velocity (left) and Depth (right) Output from the Site 2 Hydraulic Model at 10-20 cfs

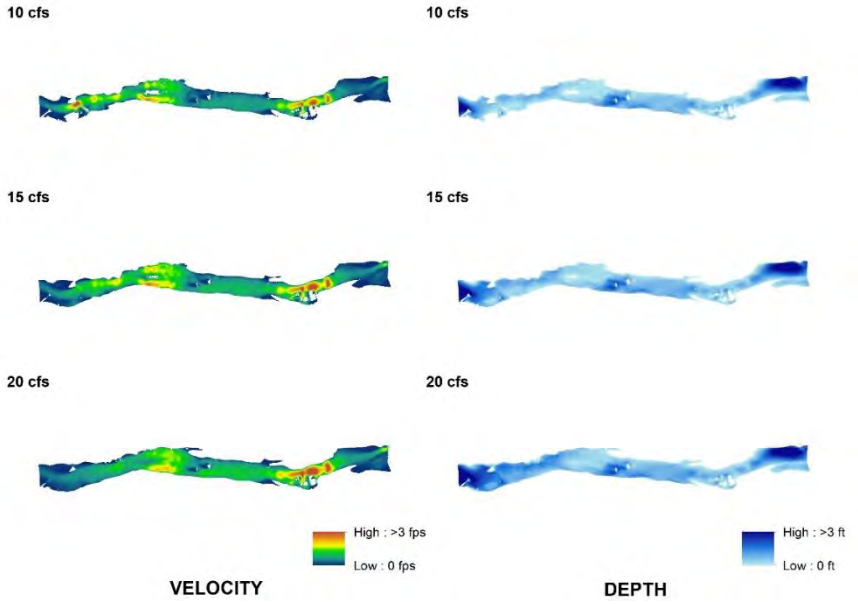


Figure 17
Velocity (left) and Depth (right) Output from the Site 3 Hydraulic Model at 10-20 cfs

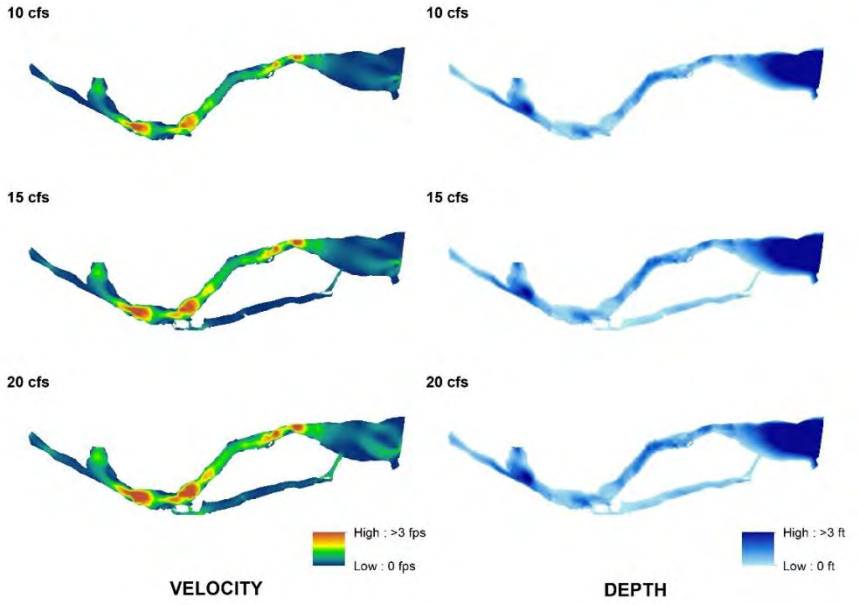


Figure 18
Velocity (left) and Depth (right) Output from the Site 4 Hydraulic Model at 10-20 cfs

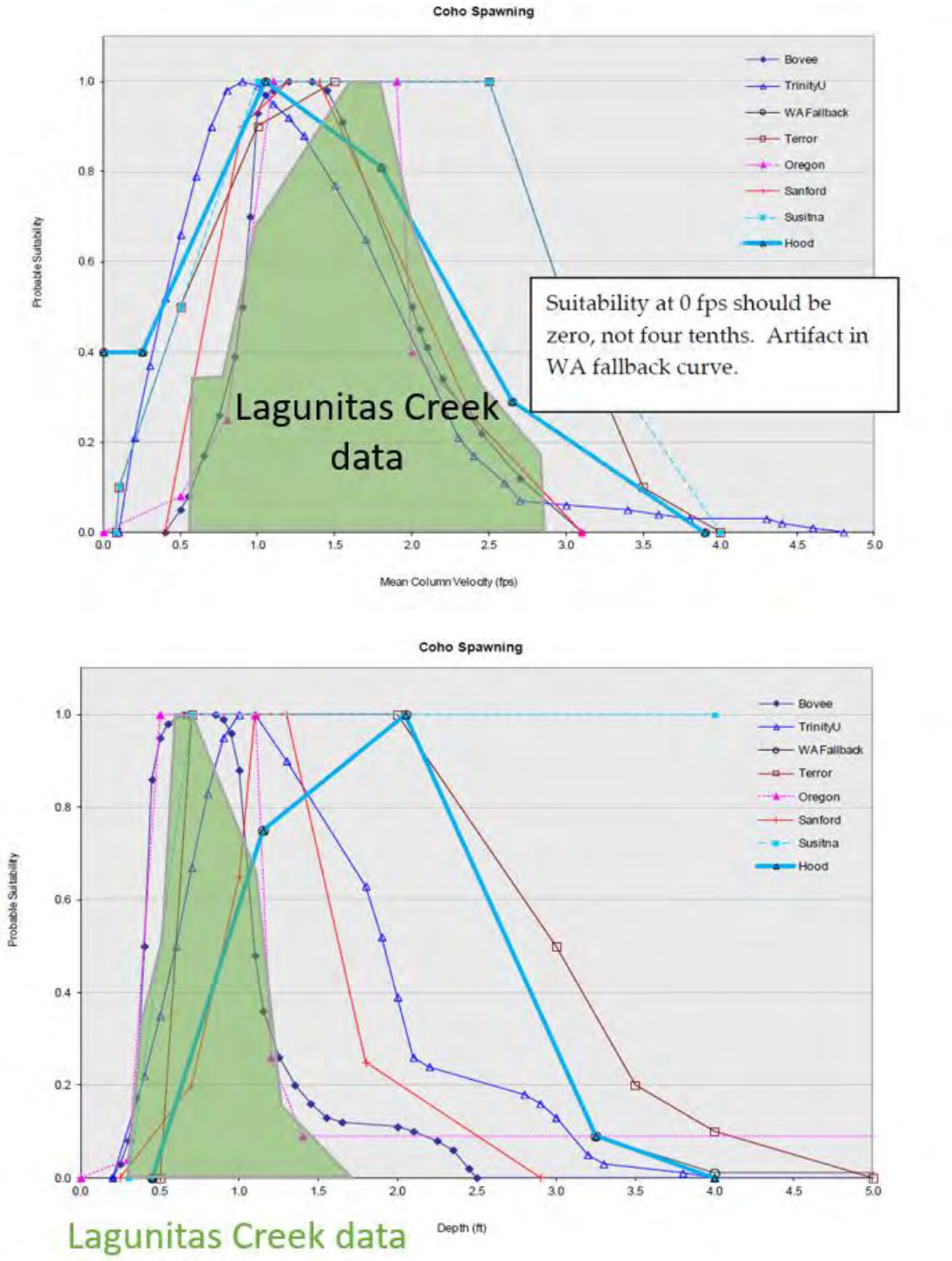
TABLE 4
DECREASE IN WATER LEVEL WITH REDUCED FLOW

	Depth (ft)		Decrease in water level (ft)			
	at 20 cfs		20 to 15 cfs		15 to 10 cfs	
	pool	riffle	riffle	pool	riffle	pool
Site 1	3.89	0.72	0.07	0.09	0.08	0.11
Site 2	1.28	0.52	0.10	0.11	0.08	0.10
Site 3	3.19	0.58	0.07	0.07	0.08	0.09
Site 4	3.47	0.96	0.09	0.11	0.11	0.13

NOTES:
Sample size: 11 riffles, 11 pools

Habitat Suitability Modeling

Habitat suitability modeling uses hydraulic model output (velocity and depth) and converts that output to estimated habitat suitability based on habitat suitability criteria or curves. Habitat suitability curves are based on the observed frequency with which fish occupy areas of particular velocity and depth during different life stages (spawning, rearing etc). Bratovich and Kelley (1988) is the only study known to the authors that developed habitat suitability criteria specifically from observations of salmonids in Lagunitas Creek. Their study identified the velocity, depth, dissolved oxygen concentration and substrate conditions at 26 coho redds and 16 steelhead redds, and developed histograms that showed spawning frequency relative to velocity and depth. In addition, they made general observations of habitat usage by coho fry (static to slow moving water shallower than half a foot) but without precise velocity criteria. In the absence of local quantitative studies, habitat suitability criteria for steelhead fry and coho fry rearing were derived from a literature review by Tom Gast (2013) based on measurements in nine steelhead and eight coho bearing streams in Northern California and the Pacific Northwest. The combined data are shown in **Table 5**. The full range of observed values for the different species and life stages is shown in the first row, while the row titled "most frequently observed use" encompasses the center of the frequency distributions where the majority of observations were made. For the Gast dataset this was delineated by identifying the range of velocities and depths corresponding to a Habitat Suitability Index value of at least 0.5. Because the coho spawning suitability curve is based on a small (though local) population, we have shown it superimposed on the larger data set in Gast, 2013 for comparison with larger but non-local data sets (**Figure 19**).



SOURCE: Gast, 2013; Bratovich and Kelley, 1988

Figure 19
Lagunitas Creek Coho Spawning Frequency Curves (Bratovich and Kelley) Overlain on Habitat Suitability Curves (Gast)

TABLE 5
HABITAT SUITABILITY CRITERIA USED IN THIS STUDY

	Coho spawning[1]		Steelhead spawning[2]		Coho and steelhead fry rearing[1]		Coho 1+ yr juvenile rearing[2]		Steelhead 1+ yr juvenile rearing[2]	
	Velocity (feet/sec)	Depth (feet)	Velocity (feet/sec)	Depth (feet)	Velocity (feet/sec)	Depth (feet)	Velocity (feet/sec)	Depth (feet)	Velocity (feet/sec)	Depth (feet)
Full range of observed use	0.7–2.6	0.4–1.6	0.3-4.1	0.3-3.2	"low velocity"	0-0.5	0-2.0	0.2-5.0	0-4.0	0.2-7.0
Most frequently observed use	1.0-2.2	0.5-1.1	0.6-2.2	0.7–1.4	0–0.2	0-0.5	0-0.8	0.8–3.5	0.2-2.5	0.7-3.0

NOTES:

"Most frequently used" habitat = habitat with HSI value of 0.5-1.0 for a preponderance of curves
"Full range" = habitat with HSI values of 0 – 0.5 for a preponderance of curves

SOURCES: 1. Bratovitch and Kelley, 1988 (Lagunitas Creek) 2. Tom Gast, Normandeau and Associates, 2013 (Literature review of habitat suitability curves from 9 steelhead and 8 coho bearing streams)

For this study velocity and depth output from the hydraulic model were binned into two suitability classes[6] based on Table 5 and areas of creek were mapped as suitable if both the velocity and depth criteria were met. We then eliminated some areas of the model domain from analysis for coho or steelhead spawning habitat where fieldwork showed that habitat was not suitable due to other factors, primarily the presence of unsuitable substrate (bedrock, cobble or fines). For rearing areas, we used velocity and depth output on their own and did not add substrate. The area of suitable habitat suitability is shown for each individual site and life stage (**Figures 20-24**) and composite summaries for all sites and life stages are shown in **Figures 25-29**.

6 Based on draft results for all sites, CDFW recommended using a continuous Weighted Usable Area method of habitat suitability analysis, rather than the binned high and low utilization method presented in this report, and provided a slightly different coho spawning HSI curve that they recommended we use for this purpose. ESA repeated the analysis for one site (Site 1) for coho spawning suitability to see if the different method and HSI curve significantly affected the results. The estimated reduction of suitable spawning habitat was similar using both methods: between 20 and 15 cfs the CDFW recommended method and HSI curve estimated a 20% reduction in coho spawning suitability for Site 1 whereas the binned method presented in this report estimated a 23% reduction. Based on this comparison ESA finalized the report using the original (binned) analysis.

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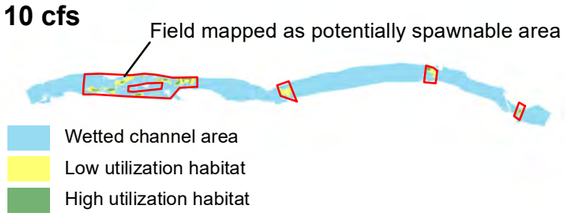
SITE 1

SITE 2

SITE 3

SITE 4

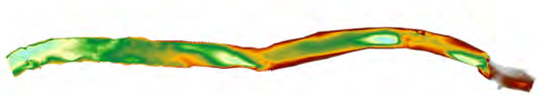
10 cfs

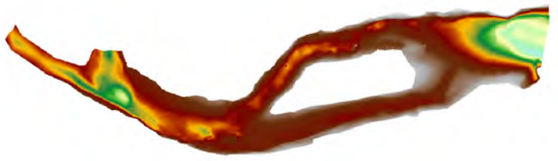


15 cfs

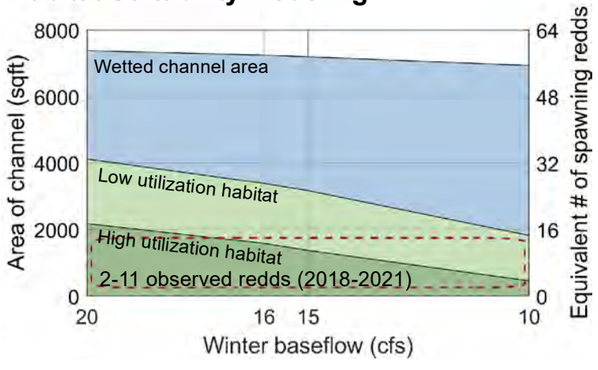
20 cfs

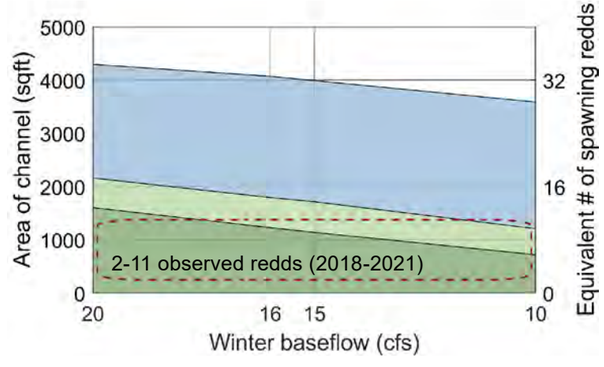
Topography

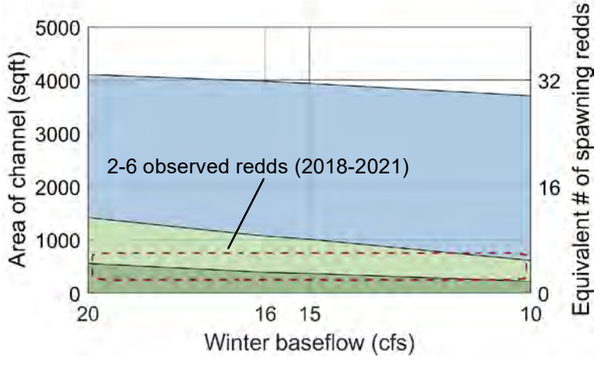


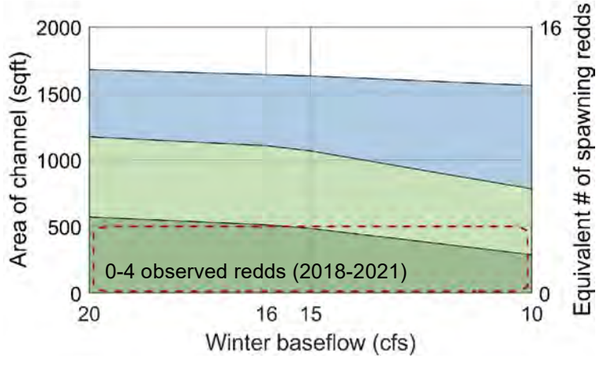


Habitat Suitability Modeling









SOURCE: ESA, Marin Water.

Lagunitas Creek Instream Flow Study

Figure 20
Habitat Suitability at All Sites for Coho Spawning

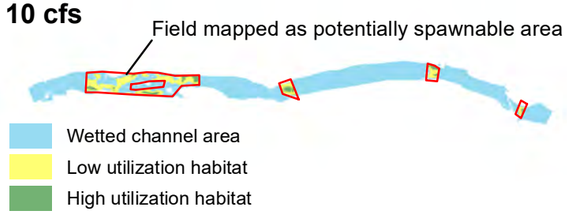
SITE 1

SITE 2

SITE 3

SITE 4

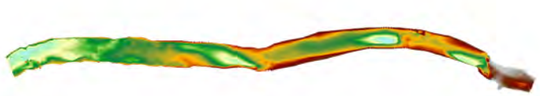
10 cfs



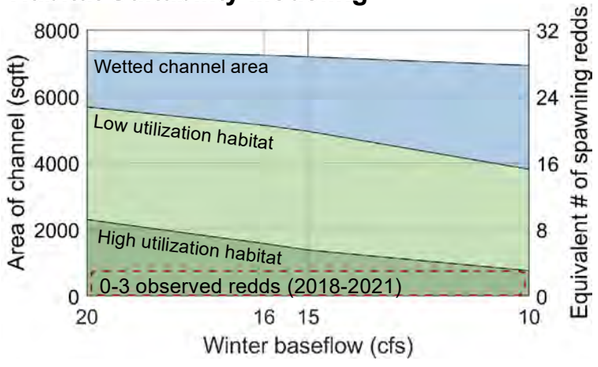
15 cfs

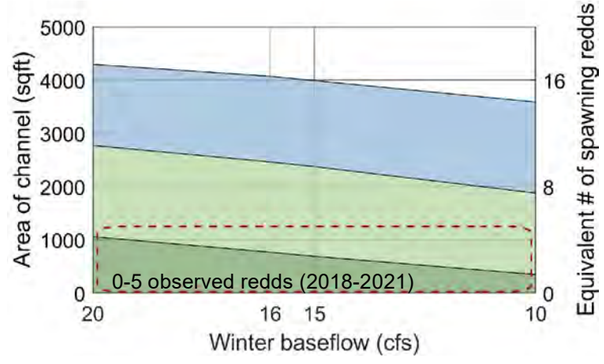
20 cfs

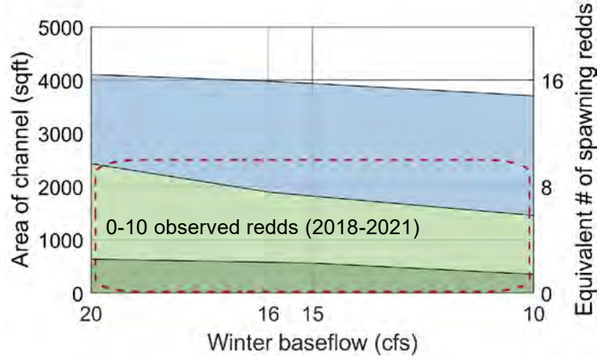
Topography

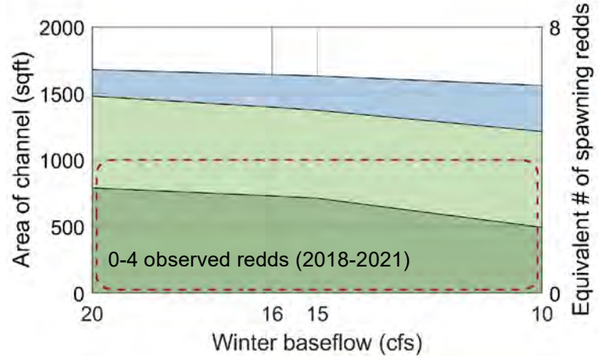


Habitat Suitability Modeling









SOURCE: ESA, Marin Water.

Lagunitas Creek Instream Flow Study

Figure 21
Habitat Suitability at All Sites for Steelhead Spawning

SITE 1

SITE 2

SITE 3

SITE 4

10 cfs

Field mapped as potentially spawnable area

Unsuitable habitat

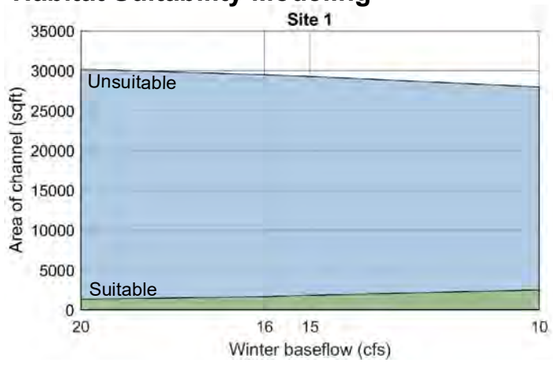
Suitable habitat

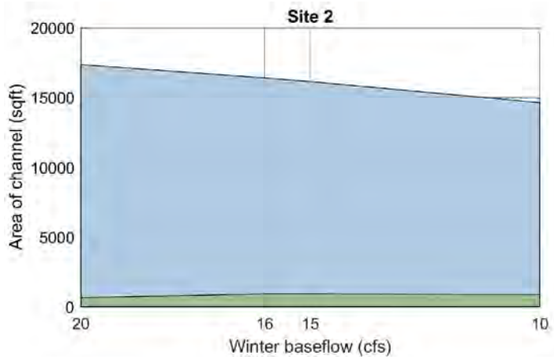
15 cfs

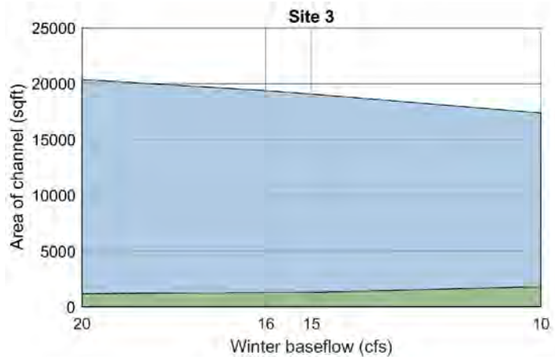
20 cfs

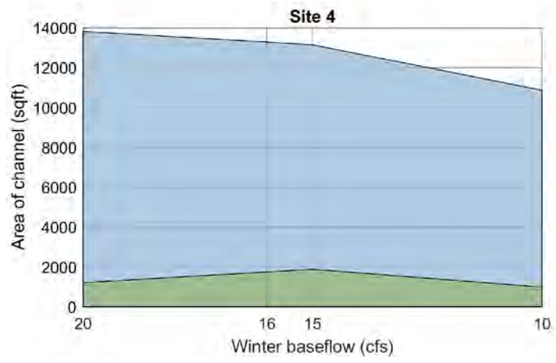
Topography

Habitat Suitability Modeling









SOURCE: ESA, Marin Water.

Lagunitas Creek Instream Flow Study

Figure 22
Habitat Suitability at All Sites for Coho and Steelhead Fry Rearing

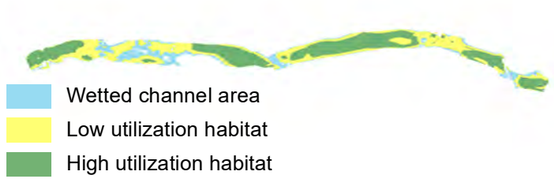
SITE 1

SITE 2

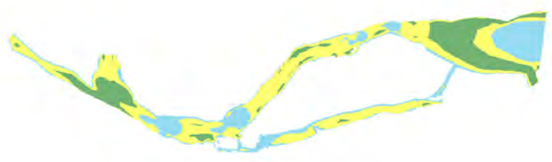
SITE 3

SITE 4

10 cfs

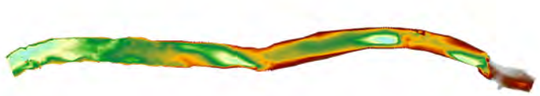


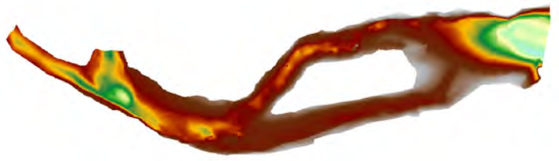
15 cfs



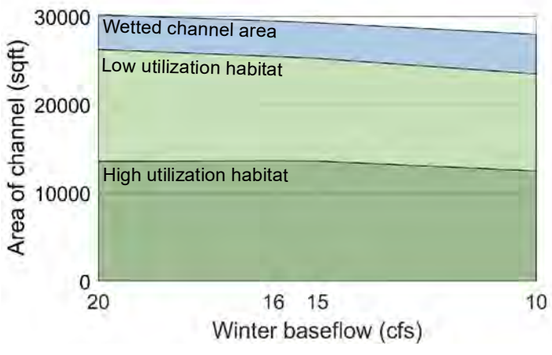
20 cfs

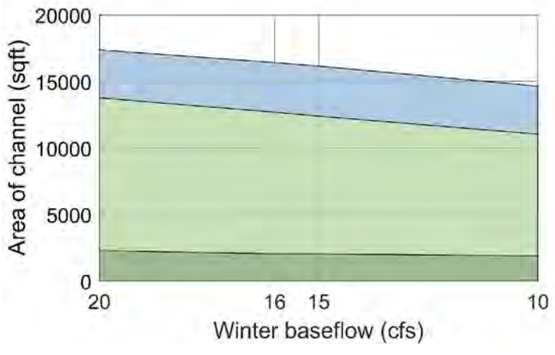
Topography

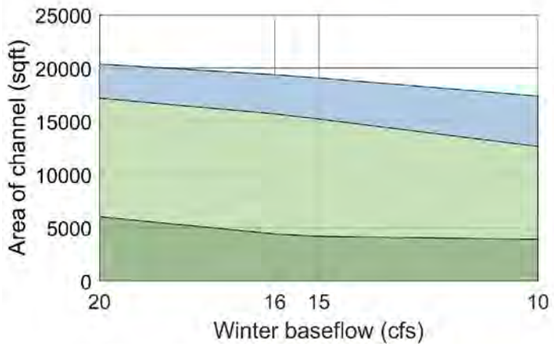


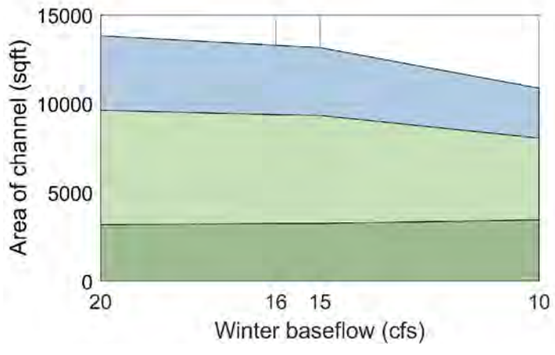


Habitat Suitability Modeling









SOURCE: ESA, Marin Water.

Lagunitas Creek Instream Flow Study

Figure 23
Habitat Suitability at All Sites for Coho 1+ Year Juvenile Rearing

SITE 1

SITE 2

SITE 3

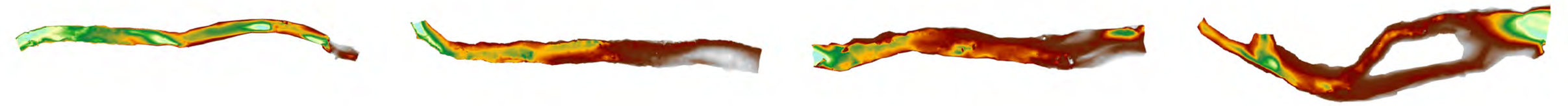
SITE 4

10 cfs

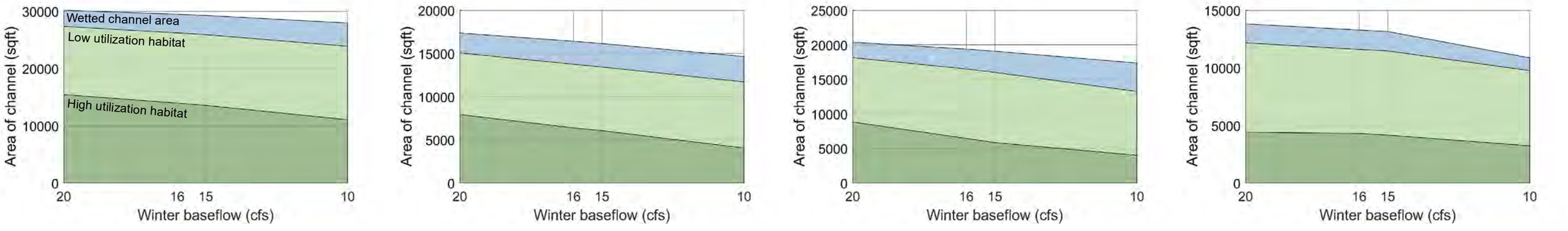
15 cfs

20 cfs

Topography



Habitat Suitability Modeling



SOURCE: ESA, Marin Water.

Lagunitas Creek Instream Flow Study

Figure 24
Habitat Suitability at All Sites for Steelhead 1+ Year Juvenile Rearing

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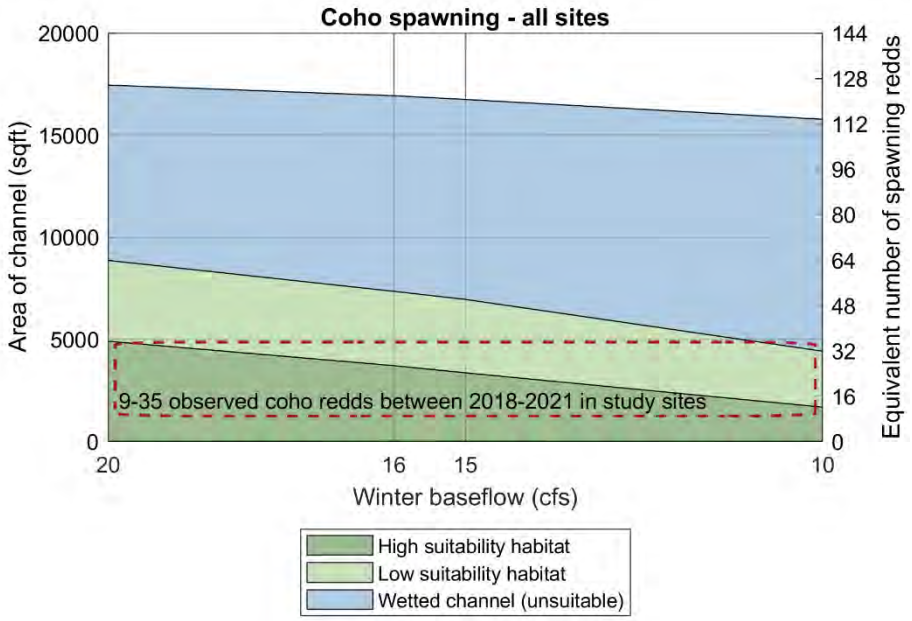

Figure 25
Coho Spawning Suitability at Flows from 10 to 20 cfs (Summary)

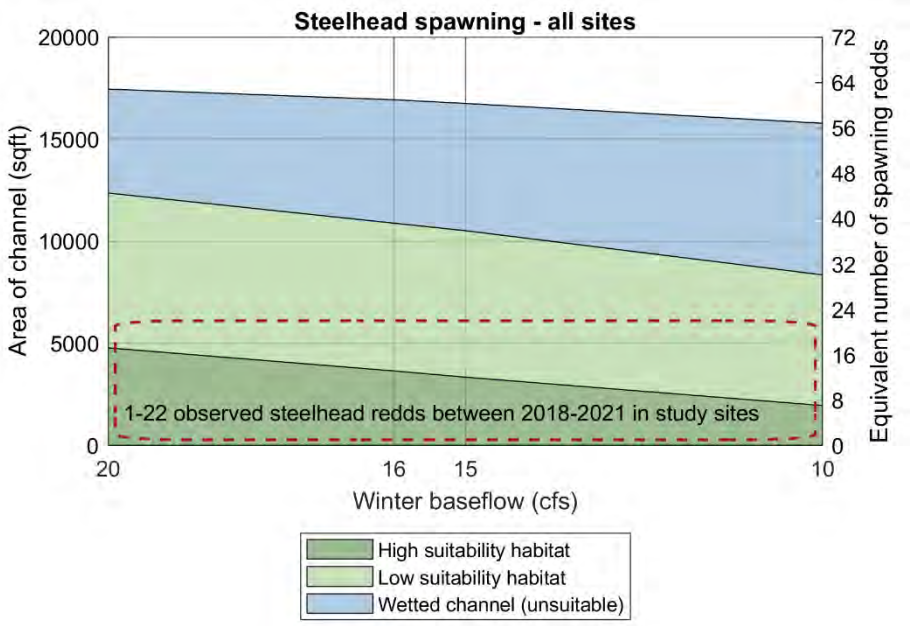

Figure 26
Steelhead Spawning Suitability at Flows from 10 to 20 cfs (Summary)

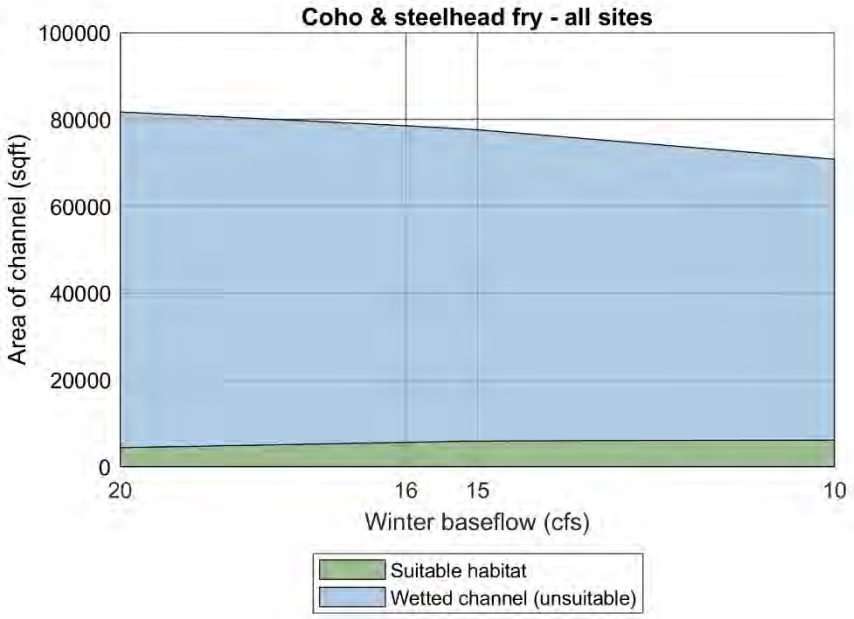

Figure 27
Coho and Steelhead Fry Rearing Suitability at Flows from 10 to 20 cfs (Summary)

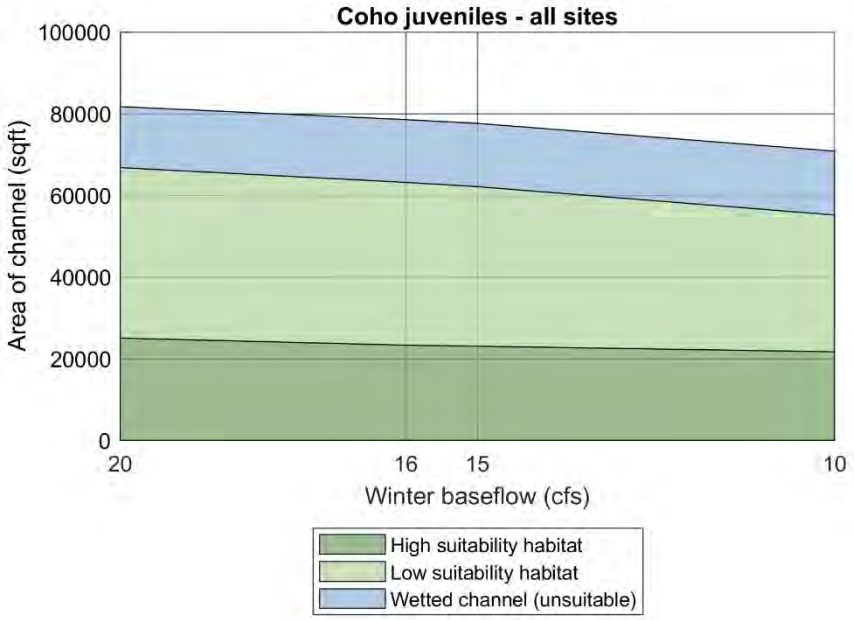

Figure 28
Coho 1+ Year Juvenile Rearing Suitability at Flows from 10 to 20 cfs (Summary)

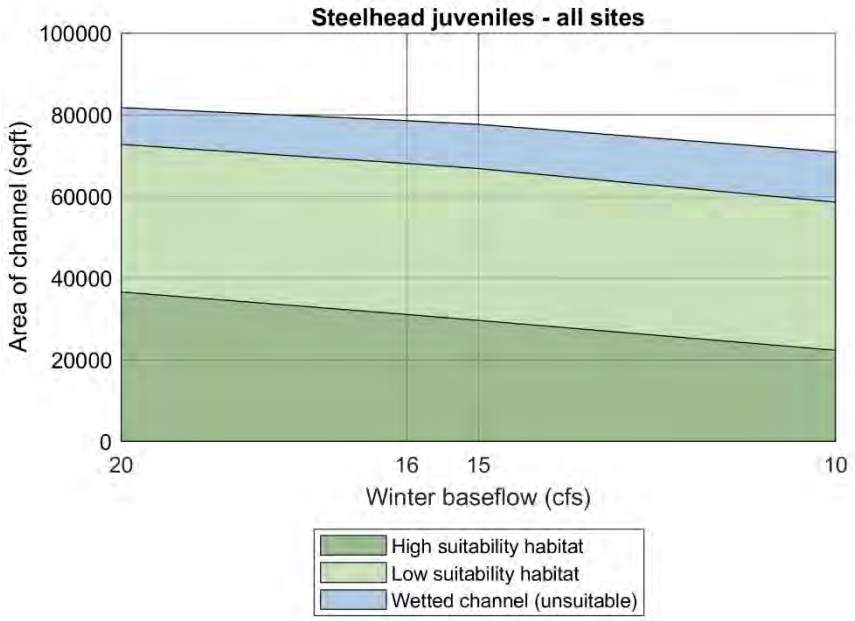

Figure 29
Steelhead 1+ Year Juvenile Rearing Suitability at Flows from 10 to 20 cfs (Summary)

Converting Areas of Suitable Spawning Habitat into Approximate Equivalent Capacity

The habitat model outputs square feet of suitable habitat for a given flow rate. For spawning habitat this was converted into an approximation of spawning capacity based on the average size of redds and territory around redds in Lagunitas Creek. Bratovich and Kelley made measurements of coho and steelhead redd size, with the addition of a buffer around steelhead redds for territorial defense. The measured dimensions of steelhead redds in Lagunitas Creek varied from 33 to 119 sq ft and averaged 60 sq ft. The resulting values accounting for a territorial buffer around each redd were 128 sq ft for coho redds and 241 sq feet for steelhead redds. (Note that for the graphical output in Figures 20-29 and Tables 8 and 9 these values were rounded to 125 and 250 sq ft respectively to allow square feet and equivalent number of redds to be easily plotted on paired Y axes.) The authors of this report recognize that the redd areas shown are approximate values: redd sizes vary and suitable habitat may not always be arranged spatially in a pattern that allows the optimum number of salmonids to spawn in it. Nonetheless, it provides an approximate way to convert area of suitable habitat into a measure of potential fish spawning potential.

Comparison of Suitable Spawning Area with Number of Redds

It is helpful to compare available spawning area with the number of spawning adults typically present to utilize them. For example, if a reach had sufficient suitable spawning habitat for 100 salmonid redds but in an abundant year for returning adults the cohort of potential spawners was only 75, then a 25% reduction in suitable spawning area could in theory be accommodated with much less than a 25% impact to spawning. By comparison, if the reach was fully utilized with 100 spawners in an abundant year, then a 25% reduction in usable area would likely result in at least a 25% reduction in the number of redds created. In reality fish do not spread themselves out optimally to use suitable space, may compete or superimpose redds on one another in the most desirable areas, or produce redds in unsuitable areas. Recognizing these limitations, we attempted to overlay the area of suitable spawning habitat with the number of spawners in the study reaches to allow some level of comparison to be made. GPS data on observed coho redds were overlain on the study reach outlines in GIS and the resulting number of redds per year was identified (**Tables 6 and 7**). Four years of data were used to provide a range of cohort sizes, recognizing that the further back redd data are superimposed on the model output, the greater the risk that the creek would have changed morphologically and that suitable habitat areas would not be the same size or areas as predicted in the model. Spawning data from 2020 and 2021 are likely highly representative of suitable bed conditions in the model since the peak flows in those years were only 354 and 182 cfs respectively. Data collected by Balance Hydrologics (provided by Matt O'Connor, email communication 8/13/2021) suggests that a flow of around 600 cfs is required to mobilize bedload. Some bed reorganization is believed to have taken place in 2017 and 2019 (Matt O'Connor, email communication 8/13/2021) when peak flows were more than 4000 cfs.

TABLE 6
OBSERVED COHO REDD NUMBERS IN THE FOUR STUDY SITES

Water Year	Observed coho redds in study sites				Total in study sites
	Site 1	Site 2	Site 3	Site 4	
2018	8	4	2	1	15
2019	4	9	4	2	19
2020	2	2	5	0	9
2021	14	11	6	4	35

TABLE 7
OBSERVED STEELHEAD REDD NUMBERS IN THE FOUR STUDY SITES

Water Year	Observed steelhead redds in study sites				Total in study sites
	Site 1	Site 2	Site 3	Site 4	
2018	0	4	4	2	10
2019	1	0	0	0	1
2020	3	5	10	4	22
2021	1	3	5	2	11

TABLE 8
HABITAT AREA AT A RANGE OF FLOWS

	Site 1				Site 2				Site 3				Site 4				All Sites			
	20 cfs	16 cfs	15 cfs	10 cfs	20 cfs	16 cfs	15 cfs	10 cfs	20 cfs	16 cfs	15 cfs	10 cfs	20 cfs	16 cfs	15 cfs	10 cfs	20 cfs	16 cfs	15 cfs	10 cfs
Coho spawning																				
High suitability habitat	2,176	1,581	1,369	456	1,603	1,229	1,139	718	555	389	368	219	571	513	486	288	4,904	3,712	3,361	1,681
Low suitability habitat	1,940	1,803	1,798	1,364	556	564	575	490	862	680	640	392	602	594	582	494	3,960	3,640	3,595	2,739
Wetted channel (unsuitable)	3,259	3,856	4,025	5,105	2,135	2,278	2,275	2,379	2,687	2,910	2,928	3,093	505	534	563	777	8,585	9,577	9,792	11,355
Steelhead spawning																				
High suitability habitat	2,297	1,577	1,381	762	1,056	766	689	347	636	577	562	353	789	730	712	494	4,778	3,649	3,344	1,955
Low suitability habitat	3,384	3,553	3,568	3,047	1,714	1,696	1,686	1,529	1,794	1,319	1,258	1,104	690	667	662	719	7,582	7,235	7,173	6,399
Wetted channel (unsuitable)	1,694	2,110	2,242	3,116	1,523	1,609	1,614	1,712	1,673	2,082	2,116	2,248	200	244	257	346	5,090	6,044	6,230	7,421
Coho and steelhead fry rearing																				
Suitable habitat	1,345	1,656	1,835	2,503	663	933	934	884	1,188	1,289	1,304	1,812	1,218	1,753	1,885	995	4,414	5,631	5,957	6,193
Wetted channel (unsuitable)	28,837	27,825	27,437	25,455	16,697	15,475	15,211	13,756	19,183	18,083	17,761	15,559	12,602	11,534	11,264	9,871	77,318	72,917	71,673	64,640
Wetted channel (total)	30,181	29,482	29,272	27,958	17,360	16,408	16,144	14,640	20,371	19,372	19,065	17,371	13,819	13,286	13,149	10,866	81,731	78,548	77,630	70,834
Coho 1 year + juvenile rearing																				
High suitability habitat	13,558	13,635	13,605	12,465	2,286	2,039	2,034	1,888	6,041	4,411	4,189	3,906	3,175	3,241	3,243	3,448	25,060	23,325	23,071	21,706
Low suitability habitat	12,678	11,819	11,622	11,010	11,481	10,636	10,346	9,141	11,135	11,277	11,015	8,731	6,443	6,128	6,084	4,604	41,736	39,859	39,067	33,486
Wetted channel (unsuitable)	3,945	4,028	4,044	4,483	3,594	3,733	3,764	3,611	3,196	3,684	3,861	4,733	4,202	3,918	3,822	2,815	14,936	15,363	15,491	15,641
Steelhead 1 year + juvenile rearing																				
High suitability habitat	15,443	13,962	13,567	11,042	7,919	6,379	6,063	4,048	8,821	6,447	5,850	4,006	4,411	4,298	4,159	3,230	36,595	31,085	29,638	22,326
Low suitability habitat	11,928	12,257	12,338	12,842	7,133	7,372	7,370	7,647	9,318	10,063	10,152	9,236	7,756	7,296	7,311	6,530	36,133	36,988	37,170	36,255
Wetted channel (unsuitable)	2,810	3,263	3,368	4,074	2,308	2,657	2,712	2,945	2,232	2,862	3,064	4,129	1,653	1,693	1,679	1,105	9,003	10,475	10,822	12,253

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TABLE 9
CHANGE IN MODELED SUITABLE HABITAT FOR FOUR STUDY SITES ON LAGUNITAS CREEK

	Percent Change in Area (relative to 20 cfs)		Approximate Equivalent Redds[1]		
Coho spawning	16 cfs	10 cfs	20 cfs	16 cfs	10 cfs
High suitability habitat	-24%	-66%	39	30	13
Low suitability habitat	-8%	-31%	32	29	22
Total suitable habitat	-17%	-36%	71	59	35
Steelhead spawning	16 cfs	10 cfs	20 cfs	16 cfs	10 cfs
High suitability habitat	-24%	-59%	19	13	8
Low suitability habitat	-5%	-16%	30	29	26
Total suitable habitat	-12%	-32%	49	42	33
Coho and steelhead fry rearing	16 cfs	10 cfs			
Total suitable habitat	+28%	+40%			
Total wetted channel (unsuitable)	-6%	-16%			
Total wetted channel	-4%	-13%			
Coho 1+ year rearing	16 cfs	10 cfs			
High suitability habitat	-7%	-13%			
Low suitability habitat	-4%	-20%			
Total suitable habitat	-5%	-17%			
Total wetted channel	-4%	-13%			
Steelhead 1+ year rearing	16 cfs	10 cfs			
High suitability habitat	-15%	-39%			
Low suitability habitat	+2%	0%			
Total suitable habitat	-6%	-19%			
Total wetted channel	-4%	-13%			

NOTES:

1. Equivalent redds estimated based on 125 and 250 square feet per redd for coho and steelhead respectively (rounded from Bratovich and Kelley, 1988). Study sites represented 24% of coho redds in Lagunitas Creek mainstem in WY2021, 20% of all redds between 2000 and 2020).

Results

Results from the habitat suitability modeling are shown in **Tables 8 and 9** and described below.

Coho spawning suitability

Lowering winter baseflow from 20 to 16 cfs would reduce the total usable spawning area by 17%. The effects of flow reduction are more pronounced for highly suitable habitat, which shrinks by 24% at 16 cfs, whereas for lower suitability habitat the reduction is 8%. The main effect of flow reduction would be a reduction in habitat quality rather than dewatering of redds produced at higher flows: the total wetted area would decline by 4% across all four study sites with a

reduction from 20 to 16 cfs. Translating the area of habitat to hypothetical redd numbers, the total number of equivalent redds would decline from 71 at 20 cfs (39 in high suitability and 32 in low suitability habitat) to 59 at 16 cfs (30 and 29 redds in high and low suitability habitat respectively). For comparison, the study sites have supported between 9 and 35 coho redds in the last four years (see Table 6).

Comparing the area of suitable spawning habitat with the number of observed redds in the study sites between 2018-21, and recognizing that fish may require more than this equivalent area for the reasons described above, or be superimposed by later steelhead redds, it can be seen that there is not an obvious inflection point where flows cause a greater reduction in carrying capacity, but that all the sites have more suitable spawning area at 16 cfs than they did equivalent redd area in the most abundant spawning year of the last four years, with the potential for most redds to be made in the high suitability areas.

Steelhead spawning suitability

Lowering winter baseflow from 20 to 16 cfs would reduce the total usable spawning area by 12%. The effects of flow reduction would be more pronounced for highly suitable habitat, which would shrink by 24% at 16 cfs, whereas for lower suitability habitat the reduction would be 5%. Steelhead spawning suitability appeared to be slightly less sensitive to the range of flow reductions considered than coho spawning suitability.

The main effect of flow reduction would be a reduction in habitat quality rather than dewatering of redds produced at higher flows: the total wetted area would decline by 4% across all four study sites with a reduction from 20 to 16 cfs.

Translating the area of habitat to hypothetical redd numbers with the same caveats as for coho redd area, the total number of equivalent redds would decline from 49 at 20 cfs (19 in high suitability and 30 in low suitability habitat) to 42 at 16 cfs (13 and 29 redds in high and low suitability habitat respectively). For comparison, the study sites have supported between one and 22 steelhead redds in the last four years (see Table 7).

Steelhead and coho fry rearing suitability

Steelhead and coho fry habitat is focused on slow moving, shallow habitat in side channels, along emergent gravel bars, and on the edges of the main channel. Assuming other factors such as cover are distributed evenly across the flow range, the area of suitable habitat expands by 28% as flows reduce from 20 to 16 cfs.

1+ year juvenile coho rearing suitability

Winter rearing habitat for 1+ year coho juveniles is less sensitive to the proposed flow reduction than spawning habitat, with a modeled 5% reduction in total suitable habitat, with a 7% reduction in high suitability habitat and a 4% reduction in low suitability habitat.

1+ year juvenile steelhead rearing suitability

Winter rearing habitat for 1+ year steelhead juveniles would undergo a 6% reduction in total suitable habitat for a flow of 16 cfs, with a 15% reduction in high suitability habitat and a 2% reduction in low suitability habitat.

California freshwater shrimp habitat

Although the habitat suitability modeling sites were selected to focus on the main coho and steelhead spawning areas within the mainstem of Lagunitas Creek, Sites 3 and 4 overlap with areas of suspected California freshwater shrimp habitat (Martin et al. 2009, as shown in Figure 4). ESA extracted flow depth data for pools in Sites 3 and 4 during the 15 cfs habitat simulations: the average reduction in depth from 20 to 15 cfs was 0.07 feet for pools in Site 3 with an average depth of 3.2 feet, and 0.11 feet for pools in Site 4 with an average depth of 3.5 feet.

Conclusions

The relationship between flow rate and habitat suitability in Lagunitas Creek is complex, varying between sites, species, and life stage. There is not an obvious flow rate where multiple life stages show a dramatic decline in habitat suitability: the decline in habitat suitability is relatively gradual and linear, though for coho spawning and juvenile rearing the decline becomes slightly steeper from 15 to 10 cfs than from 20 to 15 cfs. Of the species and life stages modeled, coho spawning habitat is most sensitive (shows the greatest decline in area with flow), and at flows between 15 and 10 cfs the area available for spawning approaches the equivalent area of redds from 2021, indicating the risk of redd superimposition at lower flows. The area of wetted channel also decreases markedly between 16 cfs and 10 cfs, and fieldwork conducted at flows of 16 and 10 cfs showed that several mid and side channel bars that were submerged at 16 cfs were exposed at 10 cfs. These lines of evidence suggest that a flow of 16 cfs is not likely to have an unreasonable effect on fisheries, by keeping flow depth reductions to less than one inch, reductions in habitat less than 20% and by preserving an area of suitable coho and steelhead spawning greater than the approximate equivalent area that has been occupied by redds over the last four years.

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SECTION 7
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Lagunitas Creek Temporary Urgency Change Petition (TUCP)

Monitoring and Adaptive Management Plan

8/26/2021

Summary

In support of a Temporary Urgency Change Petition request for California State Water Resources Control Board Order WR95-17 for Lagunitas Creek, Marin Water will implement this Monitoring and Adaptive Management Plan (Plan). Marin Water has developed habitat suitability models and conducted extensive analysis of streamflow and hydrologic conditions in the Lagunitas Creek watershed to predict how conditions are expected to change under different flow scenarios. The monitoring tasks outlined in this Plan will be carried out to ensure that the TUCP flow release schedule is not resulting in changes to stream habitat conditions that may have impacts to sensitive species, specifically coho salmon, steelhead, and California freshwater shrimp. These monitoring tasks will be in addition to the annual monitoring that Marin Water conducts in accordance with the Lagunitas Creek Stewardship Plan (Marin Water 2011) and Order WR95-17.

This Plan will be implemented for the period when the TUCP flow release schedule is in effect from November 1, 2021 through April 1, 2022. Throughout the TUCP monitoring period, weekly meetings will be held with resource agencies (California Department of Fish and Wildlife, National Marine Fisheries Service, California State Water Resources Control Board, US Fish and Wildlife Service), and monthly meetings will be held with a subcommittee of the Lagunitas Technical Advisory Committee. Adaptive management measures will be determined and implemented, as needed, based on monitoring results. Potential monitoring thresholds, which may trigger the need for adaptive management measures, are described for each monitoring metric in this Plan. Adaptive management measures may include additional or modified monitoring and/or increasing flow releases in small increments to attain desirable habitat conditions.

Monitoring Locations

Monitoring activities for the TUCP are focused on main-stem Lagunitas Creek (Figure 1). Marin Water conducts additional monitoring in San Geronimo Creek, Devil's Gulch, and Nicasio Creek, which will be used to supplement data collected as part of this TUCP monitoring plan.

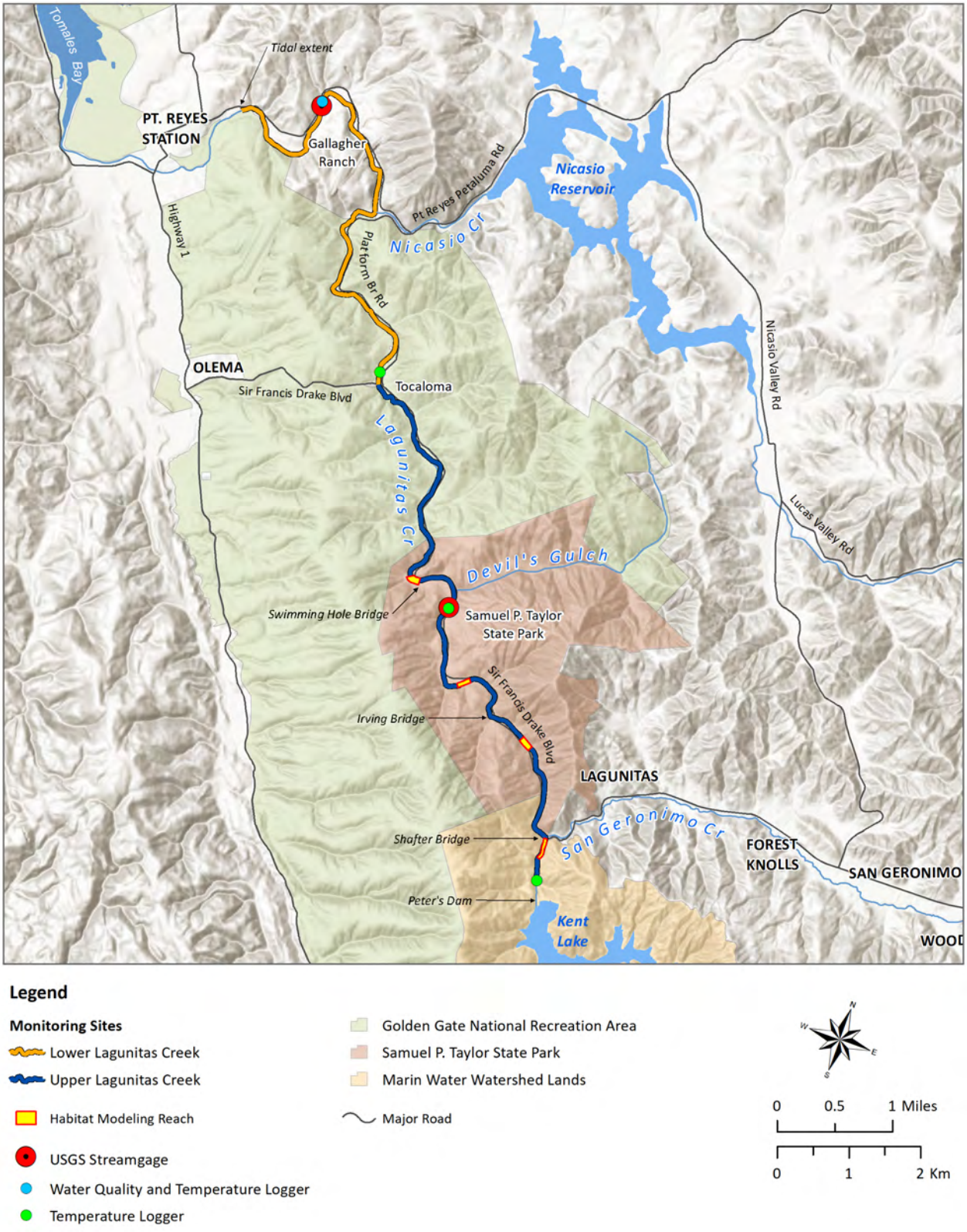


Figure 1. Lagunitas Creek TUCP monitoring locations

Based on the geomorphic and habitat characteristics of Lagunitas Creek, monitoring tasks will be divided between the following two areas:

- Upper Lagunitas Creek - Peters Dam to Tocaloma Bridge
- Lower Lagunitas Creek - Tocaloma Bridge to extent of tidal influence

Upper Lagunitas Creek is characterized by a higher degree of channel confinement, extensive bedrock outcrops, and the highest historical salmonid spawning densities. Lower Lagunitas Creek is characterized by longer, deeper pool habitats in a less confined channel setting with dense riparian overgrowth, and historically lower salmonid spawning densities, due at least in part to a lack of suitable spawning riffles.

Monitoring Methods

Table 1 provides a summary of monitoring tasks, locations, and timing. Detailed descriptions of each monitoring method are provided below.

Habitat Conditions and Hydrologic Connectivity

Marin Water will conduct a reconnaissance survey of Lagunitas Creek between Peter's Dam and the extent of tidal influence to map all riffles. This survey will be completed prior to November. Measurements of riffle crest thalweg depth and general observations of fish passage conditions will be recorded for each riffle. Based on the results of this survey, a minimum of twelve (12) monitoring sites will be established at shallow riffle locations (i.e. critical riffles) throughout Lagunitas Creek to assess passage for salmonids and document habitat conditions throughout the TUCP period. Each monitoring site will be surveyed once every two weeks or, as conditions allow, at target flows of approximately 10, 15, 20, 25, 30, and 35 cubic feet per second (cfs) according to methods described in CDFW 2017.

At each site, temporary stakes and a field tape will be used to delineate a transect across the shallowest portion of the riffle crest (i.e. the critical riffle profile). During each visit, water depth and velocity will be measured along the transect at regular intervals (approximately every 1-2 feet depending on bed topography), making sure to capture the riffle crest thalweg (RCT). Photographs will be taken facing upstream and downstream to document habitat conditions during each visit.

Monitoring sites will be distributed as follows:

a. *Upper Lagunitas Creek*
   A minimum of eight transects will be established between Peters Dam and Tocaloma Bridge. An effort will be made to locate these transects within the four reaches used previously for flow/habitat suitability modeling. Exact locations will be based on reconnaissance surveys to be completed prior to November 1.

b. *Lower Lagunitas Creek*
   A minimum of four transects will be established between Tocaloma Bridge and the USGS streamgage near Pt. Reyes Station. Exact locations will be based on reconnaissance surveys to be completed prior to November 1.

Water Quality

Marin Water will monitor water quality and water temperature conditions in Lagunitas Creek continuously throughout the TUCP period using electronic data loggers. Each logger will be anchored to the streambed in pool habitats with adequate mixing. A multi-parameter water quality data sonde will be installed in lower Lagunitas Creek. The data sonde will record continuous measurements of water temperature, dissolved oxygen (DO), specific conductance, and turbidity. All data will be collected at one-hour intervals and will be downloaded every two weeks at minimum.

Data loggers will be deployed at the following locations:

a. *Upper Lagunitas Creek Water Temperature*
   i. Immediately downstream of Peters Dam
   ii. At the USGS streamgage at Samuel P. Taylor State Park

b. *Lower Lagunitas Creek Water Temperature*
   i. Immediately downstream of Tocaloma Bridge
   ii. At the USGS streamgage near Point Reyes Station (Gallagher Ranch)

c. *Lower Lagunitas Creek Water Quality*
   iii. At the USGS streamgage near Point Reyes Station (Gallagher Ranch)

Fisheries

Spawner surveys will be conducted in main stem Lagunitas Creek throughout the TUCP period according to existing protocols, which include counting live fish, mapping and measuring redds, and measuring and collecting tissue samples from carcasses. During the TUCP period, Marin Water will note indicators of fish condition (e.g. presence of fungus or external injuries), elevated predation levels, and/or stress behaviors (e.g. gasping, unusual swimming patterns). Photographs will be taken of all redds encountered, and superimposition will be assessed using previous photographs for reference.

At all redds observed in main stem Lagunitas Creek, water depth will be measured to document inundation levels (i.e. redd viability). Measurements will be taken only when live fish are not present and redd construction appears to be complete. Water depth will be measured at the shallowest point on the tail spill mound, and at the nearest downstream hydraulic control (i.e. riffle crest thalweg

depth). At a minimum of 10% of these redds, water velocity will be measured at a point on the streambed adjacent to the redd that is judged to have similar depth and velocity as was present prior to redd construction.

Depending upon safety and water visibility considerations, spawner surveys will be conducted as follows:

a. *Upper Lagunitas Creek*
   At a minimum, spawner surveys will be conducted once per week. In the event of a storm or other event that is expected to stimulate salmon migration and/or spawning, additional surveys may be conducted, as conditions allow. Surveys will cover the following three reaches:
   i. Peters Dam to Irving Bridge
   ii. Irving Bridge to Swimming Hole Bridge
   iii. Swimming Hole Bridge to Tocaloma Bridge

b. *Lower Lagunitas Creek*
   At a minimum, surveys will be conducted once every two weeks. In the event of a storm or other event that is expected to stimulate salmon migration and/or spawning, additional surveys may be conducted, as conditions allow. Surveys will cover the following two reaches:
   i. Tocaloma Bridge to Nicasio Creek
   ii. Nicasio Creek to Tidal Extent

Table 1. Lagunitas Creek TUCP monitoring categories and details.

Category	Location	Methods	Sites	Frequency
Habitat Conditions and Hydrologic Connectivity	Upper Lagunitas Creek	Riffle Transect Surveys and Photo Monitoring	Minimum of 8 transects at shallow riffles	Every two weeks minimum, or at target flows of 10, 15, 20, 25, 30, 35 cfs
	Lower Lagunitas Creek	Riffle Transect Surveys and Photo Monitoring	Minimum of 4 transects at shallow riffles	Every two weeks minimum, or at target flows of 10, 15, 20, 25, 30, 35 cfs
Water Quality	Upper Lagunitas Creek	Water Temperature Monitoring	1. Peters Dam (Kent Lake outlet) 2. Samuel P. Taylor State Park	Continuous (1-hour interval)
	Lower Lagunitas Creek	Water Temperature Monitoring	1. Tocaloma Bridge 2. Gallagher Ranch	Continuous (1-hour data interval)
		Water Quality Monitoring (DO, conductivity, turbidity)	Gallagher Ranch	Continuous (1-hour data interval)
Fisheries	Upper Lagunitas Creek	Spawner Surveys	1. Peters Dam - Irving 2. Irving - Swimming Hole 3. Swimming Hole - Tocaloma	Weekly, as conditions allow
		Redd Photo Monitoring	All redds observed	Coincident with spawner surveys
		Redd Water Depth and Velocity	Depth : all redds	Once, after redds are fully constructed and fish have left the site
			Velocity: 10% of redds	
	Lower Lagunitas Creek	Spawner Surveys	1. Tocaloma - Nicasio 2. Nicasio - Tidal Extent	Every two weeks minimum, and following storms
		Redd Photo Monitoring	All redds observed	Coincident with spawner surveys
		Redd Water Depth and Velocity	Depth: all redds	Once, after redds are fully constructed and fish have left the site
			Velocity: 10% of redds	

Reporting

Resource Agencies

Marin Water will hold weekly meetings with staff from the following resource agencies: California Department of Fish and Wildlife, National Marine Fisheries Service, California State Water Resources Control Board, US Fish and Wildlife Service. Notes from these meetings will be provided to agency staff within one week after their occurrence. At each meeting, Marin Water will provide a written or tabular summary of monitoring results and operational conditions in relation to the TUCP. This summary will include, but is not necessarily limited to the following information:

- reservoir storage status
- water conservation status
- rainfall/runoff totals within reporting period and to date
- streamflow record at USGS streamgages (Samuel P. Taylor, Pt. Reyes Station)
- monitoring results relative to threshold values
- adaptive management actions taken and/or recommended
- rainfall and streamflow forecast for the upcoming 7-14 days

Marin Water will also provide SWRCB with the required Temporary Urgency Change Order hydrologic status updates, which will be posted on the SWRCB website.

At the conclusion of the TUCP period, a summary report of monitoring activities and adaptive management measures associated with the TUCP will be submitted to the resource agencies by August, 2022. This report will be publically available from Marin Water.

Lagunitas Creek Technical Advisory Committee (TAC)

Marin Water will hold monthly meetings with a subcommittee of the Lagunitas Creek TAC. Notes from these meetings will be provided to TAC members, resource agency staff, and the SWRCB within one week after their occurrence. At each meeting, Marin Water will provide a written or tabular summary of monitoring results and operational conditions in relation to the TUCP, as described above for the resource agency meetings.

Adaptive Management

Monitoring Thresholds

Monitoring threshold values will be used to assess potential adverse effects during the modified TUCP flow release schedule (see Attachment A). The following thresholds, which have been selected based on existing literature and Marin Water's extensive monitoring experience in Lagunitas Creek, will be considered when determining whether adaptive management actions should be made.

1. Salmonid adult passage

   Shallow riffles should maintain a minimum water depth of 0.7 feet (21 cm) for at least 10% (contiguously) of the maximum wetted transect length (CDFW 2017) to allow adult coho salmon and steelhead to migrate upstream to holding and spawning areas. Passage criteria will be met for a minimum of three days per month between December and March. Adult passage is not required at all times, as spawners are more likely to migrate during relatively short duration runoff events. Therefore, this threshold should be evaluated throughout the TUCP period in conjunction with other monitoring observations.

2. Salmonid smolt passage

   Shallow riffles should maintain a minimum water depth of 0.4 feet (12 cm) for at least 10% (contiguously) of the maximum wetted transect length (CDFW 2017) to allow steelhead and coho smolts to migrate downstream to the ocean. Smolt passage is not required at all times, as the smolt outmigration period has been well documented in Lagunitas Creek, occurring from late February through early June.

3. Salmonid juvenile passage

   Shallow riffles should maintain a minimum water depth of 0.3 feet (9 cm) for at least 10% (contiguously) of the maximum wetted transect length (CDFW 2017) to allow juvenile salmonids to move between habitats. Juvenile salmonids are always present in Lagunitas Creek, so this threshold should be met at all times.

4. Water depth over redds

   Salmonid redds should remain fully inundated during the TUCP period to provide suitable conditions for egg incubation and fry emergence. Photo monitoring will be used to document redd inundation levels, specifically at the shallowest point on the tail spill mound.

5. Water velocity over redds

   Water velocities over salmonid redds should not become stagnant during the TUCP period to allow for exchange of oxygen and metabolic waste from incubating eggs and alevins. Visual indicators of water velocity, such as presence of silt and algae, will be documented via photo monitoring. Water velocity measurements will be taken at approximately 10% of redds observed; however, such measurements are prone to error at low flows in natural-bedded channels. The mean of these measurements, minus one standard deviation, should not be less than 0.5 ft/sec.

6. Water temperature

   Water temperature should be maintained at or below 56° Fahrenheit during the TUCP period, as required by Order WR95-17. This temperature threshold applies

to the portion of Lagunitas Creek at the Samuel P. Taylor State Park monitoring site and upstream, where the highest salmonid spawning and rearing densities have historically been observed. Quantitative water temperature thresholds for lower Lagunitas Creek do not currently exist, and data should therefore be evaluated throughout the TUCP period in light of other monitoring observations.

7. Water Quality

   The median dissolved oxygen concentration for any three-month period should not be less than 80% saturation or 7 mg/L. Water quality monitoring data should be evaluated throughout the TUCP period in conjunction with other monitoring observations to determine their significance.

8. Fish Condition and Behavior

   Adult salmon should not display visible signs of stress, or be exposed to elevated predation levels due to crowding or stranding during upstream migration and holding. Indicators include erratic or unusual swimming behavior, crowding into isolated habitats, gasping or displaying other signs of respiratory difficulty, having significant fungal growth or physical injuries. All of these indicators occur to some degree under ideal conditions, so any such observations should be evaluated in conjunction with other monitoring observations during adult migration periods.

Delayed Winter Base Flow Period

An adaptive management approach will be used during the delayed winter baseflow period from November 1 through December 15 (see Attachment A). In the event of unusually early or heavy rainfall during this period, Marin Water will respond as follows:

1. November 15 – December 1

   If a storm occurs during this period that results in a flow of 25 cfs or greater at the USGS streamgage at Samuel P. Taylor State Park, Marin Water will release sufficient water to maintain a minimum flow of 10 cfs, measured at the same location, for a period of one week. During this one-week period, spawner surveys will be conducted. If coho salmon spawning is not observed, flows will be returned to the summer baseflow level. If spawning is observed, flows will be increased to the winter baseflow stipulated in the TUCP.

2. December 1 – 15

   If a storm occurs during this period that results in a flow of 25 cfs or greater at the USGS streamgage at Samuel P. Taylor State Park, Marin Water will increase releases to maintain the winter baseflow stipulated in the TUCP. If no such storm occurs during this period, winter baseflow will begin on December 18, following the first three-day migration pulse release from December 15-17.

Chain of Communication

Throughout the TUCP period, an adaptive management approach will be used to ensure that field monitoring results are informing stream flow release operations. Marin Water will establish a chain of communication, whereby any adverse effects that may be observed or documented in the field are relayed to the appropriate managers and resource agencies for consideration and response.

Adaptive Management Procedure

If monitoring identifies unfavorable conditions attributable to the TUCP flow release schedule, Marin Water will increase stream flow releases in increments of approximately 1-2 cfs (within 24 hours) for a period of one week. During this one-week period, additional monitoring will be conducted and conditions will be re-assessed in consultation with the agencies. If it is determined in coordination with the resource agencies that flow can be returned to its original level without adverse impacts, with special attention paid to any redds constructed during this interim elevated flow period, flow will be returned to the original level. The resource agencies will be notified of any such monitoring result and subsequent change in stream flow release.

If salmonid passage thresholds are not being met, Marin Water will investigate whether critical riffles could be modified to provide passage. Based on previous experience, this may entail reorienting instream wood or other debris by hand to provide favorable hydraulics and achieve passage criteria. Any such modifications would be presented to the resource agencies for discussion prior to carrying them out.

References

CDFW. 2017. Standard Operating Procedure for Critical Riffle Analysis for Fish Passage in California. California Department of Fish and Wildlife, Instream Flow Program, Sacramento, California, CDFW-IFP-001. Table 1, Pg. 20.

MMWD. 2011. Lagunitas Creek Stewardship Plan. Marin Municipal Water District. Final - June 2011.

Exhibit H-District Resolution 8624

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO. 8624

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT DECLARING INITIAL DROUGHT WATER CONSERVATION ACTIONS

WHEREAS, average annual rainfall at Lake Lagunitas is approximately 52 inches; and

WHEREAS, the district has received just over 20 inches of rain in calendar year 2020, the second lowest rainfall total in 90 years; and

WHEREAS, the previous 12 months have been the fifth driest on record in the 142 year history of District rainfall records; and

WHEREAS, the District's Urban Water Management Plan (UWMP) contains water shortage contingency planning that is tied to Chapter 13.02 of the District's Code which was adopted in 1999 and contains trigger points for voluntary and mandatory water rationing based upon reservoir levels; and

WHEREAS, Chapter 13.02 calls for voluntary water use reductions when District reservoir storage levels are below 50,000 acre-feet (AF) on April 1; 25% mandatory water use reductions when District reservoir storage levels are below 40,000 AF on April 1 and 50% mandatory water usage reduction when reservoir storage levels on December 1 are projected to be in the vicinity or less than 30,000 AF; and

WHEREAS, the purpose of the contingency plan contained in Chapter 13.02, as described in the staff report that accompanied that item was designed to " ... provide some guidance to decision makers, not to limit their-options;" and

WHEREAS, as of February 1, District reservoir storage is 45,275 AF, well below the District average of 66,087 AF and the 75,108 AF of storage in District reservoirs at this same time last year; and

WHEREAS, with reservoir levels below 50,000 AF, preservation of the District's water supply is essential to District customers and conservation actions taken now by District customers can minimize the reduction in reservoir storage levels in order to conserve water for future use; and

WHEREAS, given all of the above described considerations, additional measures are necessary by District customers until the current weather conditions have abated.

NOW, THEREFORE, BASED ON THE FINDINGS SET FORTH ABOVE WHICH ARE HEREBY ADOPTED BY THE BOARD, THE BOARD OF DIRECTORS RESOLVES AS FOLLOWS:

1. In an effort to preserve the District's limited water supply and maximize the time available for the effect of conservation measures, the Board is activating an early voluntary phase of its water shortage contingency planning and is calling for District customers to voluntarily reduce their water usage.
2. The Board is asking all District customers to be judicious and prudent with every gallon of water used and to voluntarily turn off outdoor irrigation systems and minimize outdoor watering.
3. The Board and staff are committed to working with customers to lower water usage and towards that end, the Board is calling all customers to save water by:

    - Compliance with District's water waste prohibitions.
    - Participation in the District's conservation programs, for example;
        a. Request a conservation assistance program audit of water usage in your home.
        b. Install water efficient faucet aerators and showerheads. Free aerators and showerheads are available from Marin Water.
        c. Install a high-efficiency clothes washer and get a rebate from Marin Water.
        d. Install a WaterSense labeled smart irrigation controller and get a rebate from Marin Water.
        e. Convert lawns to a low water use landscape with free materials from Marin Water or get a rebate from Marin Water.
        f. Install a graywater system to irrigate your garden. Participate in Marin Water's Graywater Webinar and receive a discounted DIY Graywater Kit.
    - Other suggested water use reduction actions beyond water waste provisions;
        a. Check for leaks and repair them immediately.
        b. Turn off automatic sprinkler systems and water plants only as needed.
        c. Check your water meter and learn to read it and spot unusual usage and leaks.
        d. Add compost and mulch to gardens.
        e. Hold off on refilling decorative fountains, swimming pools and hot tubs until drought conditions end.
        f. Don't wash your car at home, take your car to a carwash that recycles water.
        g. Do not power wash buildings and homes.

4. District Staff is directed to:
    a. Communicate to all District customers advising them of the Board's call for the water usage reductions described above, asking for their cooperation and educating them on the top ways to save water.

b. Provide customers with updates on the drought conditions, District reservoir storage levels and any anticipated changes through local and social media and the District's website.
c. Continue with the operational adjustments staff has been discussing with the Board.
d. Closely monitor water supply to determine if further action is needed.

5. The Board recognizes that weather conditions could change and intends to be agile in its approach and response to dealing with the drought and any changes in weather conditions.
6. The Board thanks District customers for their anticipated cooperation and fully understands that it will take all of us, customers, staff and the Board to successfully navigate this situation.

PASSED AND ADOPTED this 16th day of February, 2021, by the following vote of the Board of Directors.

AYES: Directors Bragman, Gibson, Russell, Schmitt, and Koehler

NOES: None

ABSENT: None

Cynthia Koehler
President, Board of Directors

ATTEST:

Lewis Gibson
Board Secretary

Exhibit I-District Ordinance 449

MARIN MUNICIPAL WATER DISTRICT

ORDINANCE NO. 449
AN ORDINANCE ADDING CHAPTER 13.04 ENTILED " COMPREHENSIVE DROUGHT WATER CONSERVATION AND ENFORCEMENT MEASURES" TO TITLE 13 OF THE MARIN MUNICIPAL WATER DISTRICT CODE ENTITLED "WATER SERVICE CONDITIONS AND WATER CONSERVATION MEASURES" ADOPTING ADDITIONAL WATER CONSERVATION AND ENFORCEMENT MEASURES PURSUANT TO WATER CODE SECTION 375

BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose: Due to the current drought conditions, existing in the service area of the Marin Municipal Water District (District), the purpose of this ordinance is to adopt a comprehensive list of mandatory water conservation measures to enhance the District's water conservation program pursuant to Water Code section 375. The adoption of these conservation measures is aimed at reducing the quantity of water used both indoors and outdoors by all District customers to preserve the District's limited water supply due to the current drought. This action is necessary to preserve remaining water supply given the uncertainty of future supply conditions.

SECTION 2. Chapter 13.04 entitled "Comprehensive Drought Water Conservation and Enforcement Measures" is hereby added to the Marin Municipal Water District Code.

SECTION 3. Section 13.04.010 entitled "Declaration of purpose and application" is added to read as follows:

13.04.010 Declaration of purpose and application.
The purpose of this chapter is to provide a comprehensive mandatory list of water conservation and enforcement measures to preserve the District's remaining water supply during the current drought conditions by adopting provisions that will significantly reduce the consumption of water, thereby preserving and extending the available water supply for the District's customers while reducing the hardship on the general public to the greatest extent possible. The water conservation and enforcement measures set forth in this chapter are adopted in accordance with Chapter 13.02 of the District's Code and District Board of Directors Resolutions declaring a water shortage emergency and calling for voluntary and mandatory water conservation measures. This chapter is intended to provide a comprehensive list of mandatory water conservation measures, water waste prohibitions and water use restrictions as well as an enforcement program, to address the current drought and water supply shortage. Notwithstanding any other existing provision in the District Code this chapter shall, unless otherwise expressly stated, take precedent over any other inconsistent section of the District Code and shall apply uniformly across the District to all existing and future customers until such time as the District Board of Directors shall act to curtail the current water use conservation measures.

SECTION 4. Section 13.04.020 entitled "Drought water waste prohibitions" is added to read as follows:

13.04.020 Drought water waste prohibitions.

The following prohibitions shall be in addition to all existing normal year water conservation measures under section 13.02.021 of the District Code. No customer of the District shall make, cause, use or permit the use of potable water from the District for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to any provision of this section.

(1) Prohibited Nonessential Uses Applicable to Customers. It is unlawful for any person, firm, partnership, association, corporation, or political entity to use potable water from the District for the following nonessential uses:

(A) The washing of sidewalks, walkways, driveways, parking lots and all other hard surfaced areas by direct hosing, except as may be permitted by current regulations pertaining to urban water runoff pollution prevention as defined by the Marin County Stormwater Pollution Prevention Program and other controlling agencies, or as determined necessary by any public agency for the health and safety of the public.

(B) The escape of water through breaks or leaks within the customer's plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. A period of forty-eight hours after the customer discovers such a leak or break, or receives notice from the District of such leak or break, whichever occurs first, shall constitute a "reasonable time" within which to correct such leak or break for the purposes of this section. Failure of the customer to correct the break or leak within the time period stated above shall constitute a violation of District Code and may result in enforcement actions being taken by the District pursuant to section 6.02.030 of the District Code.

(C) Decorative water fountains or pools, including the refilling or make-up of any decorative fountain or pool.

(D) Irrigation shall not be conducted in a manner or to an extent that allows water to run off or overspray the areas being watered. Every customer is required to have his or her water distribution lines and facilities under control at all times to avoid water waste.

(E) Any excess water runoff flowing onto the public right-of-way at a rate of one gallon per minute or greater not caused by storm water or naturally occurring groundwater, is prohibited.

(F) Using a garden hose without a shut-off nozzle.

(G) Any landscape irrigation between the hours of 9:00 a.m. and 7:00 p.m.

(H) The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall.

(I) Irrigating ornamental turf on public street medians.

(J) Powerwashing of any structure, or using potable water to wash vehicles except at commercial carwash facilities.

(K) Use of private fire lines or private fire taps for any purposes other than fire suppression and necessary testing.

(L) As of May 20, 2021, Golf course irrigation, with potable or raw water, of any areas beyond the greens and tee areas.

(M) Dust control, compaction, sewer flushing, street cleaning, or any other use, as determined by the District, which can be met with disinfected tertiary recycled water.

(2) Restrictions on Reverse Osmosis Units. The installation of reverse osmosis water purifying systems not equipped with an automatic shutoff unit is prohibited.

(3) The following are prohibited for all new connections:

(A) Single pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons.

(B) Non-recirculating systems for conveyer carwash applications.

(4) Exemption From Daytime Water Prohibition. Notwithstanding anything contained in this chapter, necessary testing and repair of irrigation systems for the purpose of eliminating water waste is permitted during the hours of 9:00 a.m. and 7:00 p.m. Customers shall maintain appropriate documentation of any necessary testing and repairs for these purposes. For example, this documentation may include, but not be limited to, any applicable reports, invoices, photos, videos, and/or receipts for materials and labor related to the testing and repairs. Customers who fail to do so may be assessed the penalties set forth in section 13.04.040.

SECTION 5. Section 13.04.030 entitled "Variances" is added to read as follows:

13.04.030 Variances.

The District may grant variances for use of water otherwise prohibited by this chapter if it is found and determined that:

(1) Failure to do so would cause an unnecessary and undue hardship on applicant or the public, including but not limited to, adverse economic impacts;

(2) Failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or the public; or

(3) Customer is able and agrees to provide an alternative means of providing comparable water conservation.

Any request for a variance shall be submitted to the District in a writing providing sufficient detail regarding the request and the reasons therefore. After consideration of the variance request, a written decision shall be provided to the customer rejecting, partially approving or approving the variance request. If the customer disagrees with the initial determination, the customer may avail themselves of the appeal process set forth in section 13.04.060.

SECTION 6. Section 13.04.040 entitled "Enforcement" is added to read as follows:

13.04.040 Enforcement.

(1) As of May 1, 2021, for violations of the provisions set forth in section 13.04.020, other than subsection (1)(B), the following enforcement procedures shall apply:

(A) First Notice- Warning Letter

(i) Any customer violating the regulations and restrictions on water use set forth in section 13.04.020, other than subsection (1)(B), of this chapter shall receive a written warning informing them of the violation for the first such violation and warning that a second such violation will result in a penalty.

(B) Notice of Violation

(i) If, after receiving a written warning of violation for the same category of violation within a two week period, the District shall issue a Notice of Violation imposing a $25 fine on the customer's next water bill.

(2) Repeat Violations

For customers found by the District to incur a further violation within the same category for which customer has already received a Notice of Violation within the past sixty (60) calendar days, customer shall be charged a fine of $250 for each successive violation noticed by the District.

(3) Additional Enforcement Procedures

(A) Failure by the customer to correct the violation and pay the applicable fine, after following the procedures set forth above in this section, may cause the District to install a flow restrictor to be installed in the service. If a flow restrictor is placed, a charge of $150 for cost of installation and an additional $150 cost for removal shall be paid by the violator.

(B) Any willful violation occurring subsequent to the issuance of the third written notice of violation may constitute a misdemeanor and may be referred to the Marin County district attorney's office for prosecution. An individual convicted shall be punished by imprisonment in the county jail for not more than 30 days, or by a fine not exceeding one thousand dollars ($1,000) or both.

(C) The District may also disconnect the water service pursuant to section 11.28.020 of this code. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the board of directors under the provisions of section 11.08.150 of this code.

SECTION 7. Section 13.04.050 entitled "Further prohibitions" is added to read as follows:

13.04.050 Further prohibitions.

It is unlawful for any person, firm, partnership, association, corporation or political entity to remove, replace, alter or damage any water meter or components thereof, including but not limited to the meter face, its dials or other water usage indicators and any flow restricting device installed pursuant to Section 13.04.040.

SECTION 8. Section 13.04.060 entitled "Appeals" is added to read as follows:

Section 13.04.060 Appeals.

(1) Customers may appeal a decision regarding a variance or an enforcement action by following the procedures set forth below:

(A) Within thirty (30) calendar days of the variance denial or partial denial or a notice of violation, customer shall mail a written appeal containing all applicable evidence supporting their position to the Water Efficiency Department at 220 Nellen Avenue, Corte Madera, CA 94925. For purposes of this section an appeal shall be deemed received by the District on the day of post-mark by the U.S. Postal Service.

(B) The District shall respond to the appeal in writing either denying, granting or partially granting the appeal. If customer disputes the initial written determination of his/her appeal, then customer may request a further appeal by submitting a further writing to the District within fifteen (15) calendar days from the date of the initial written response to the appeal.

(C) Upon receipt of a timely further appeal, a hearing on the appeal will be scheduled and the District will mail notice of this date to the customer at least ten (10) calendar days before the hearing.

(D) The General Manager or designee shall conduct a hearing on the appeal considering all applicable facts and issue a written decision containing his or her decision on the appeal. The General Manager's or designee's decision shall be final.

(E) Any action not timely appealed shall be deemed final.

(F) Pending receipt of a written appeal or pending hearing pursuant to an appeal, the District may take appropriate steps to prevent unauthorized use of water as appropriate to prevent waste.

(G) This notice and hearing procedure shall not apply to those water waste situations charged as misdemeanors.

SECTION 9. Section 13.04.070 entitled "Remedies/cumulative" is added to read as follows:

The remedies available to the District to enforce this chapter are in addition to any other remedies available under the District's code, or any state statutes or regulations, and do not replace or supplant any other remedy, but are cumulative.

SECTION 10. Section 13.04.080 entitled "Chapter controlling" is added to read as follows:

The provisions of this chapter shall prevail and control in the event of any inconsistency between this chapter and any other rule, regulation, ordinance or code of this District.

SECTION 11. Findings of Necessity: The Board of Directors, after considering all of the information and testimony presented at its April 20, 2021 meeting regarding this ordinance, finds as follows:

I. Historic and Current Water Supply Overview

A. Water is a finite and precious resource.

B. The District's water supply currently remains limited to water captured in its seven reservoirs; water transported from the Russian River via the North Marin aqueduct;

and recycled water produced at the Las Gallinas Valley Sanitary District Plant (for a variety of non-potable purposes). About 73% of the District's water supply comes from its reservoirs, 25% from the Russian River through the North Marin aqueduct and 2% from recycled water. Although options to increase the District's water supply are being evaluated, the implementation of any preferred alternative will not be immediate.

C. Based upon rainfall patterns for the District, very little rainfall occurs from May to October each year. In recent years, the overall summer peak-period has found water use averages about twice winter use. Outdoor water use is more discretionary than interior water use. Some reductions in water use can be achieved by reduction in the demand for water for exterior uses.

D. Typically 15%-30% of water used for irrigating (water use outside the home) is wasted and the most typical cause of the waste is excess irrigation.

E. The water conservation program required by this ordinance is necessary to conserve additional water for beneficial use and to preserve the District's water supply.

II. Conservation Measures.

A. The Board of Directors determines that this conservation program is a fundamental and necessary step in its on-going efforts to reduce overall water use District wide, especially discretionary summer water use for irrigation.

B. Mindful of the fact that water use doubles during the normally warm summer months and that in any given year the District's reservoirs store a two year supply of water, the Board determines that it reasonable and necessary to expand its conservation effort along the lines described in this ordinance to further preserve and conserve the District's water supply.

C. Article X Section 2 of the California Constitution declares that the general welfare requires that water resources be put to beneficial use to the fullest extent of which they are capable and that the waste, unreasonable use or unreasonable method of use of water be prevented, and that conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare.

D. California Water Code section 375 authorizes water suppliers to adopt and enforce a comprehensive water conservation program to reduce water consumption and conserve supplies.

E. The adoption and enforcement of the water conservation program contained in this ordinance is necessary to manage and conserve the District's water supply and ensure the sustainability and reliability of the same by preventing water waste.

F. The Board finds this ordinance is exempt from the provisions of the California Environmental Quality Act (CEQA) in accordance with Section 21080(b)(4) of the Public Resources Code.

SECTION 12. Environmental Determination: This project has been reviewed for compliance with the California Environmental Quality Act (CEQA) and based upon the above findings and purposes of this ordinance, qualifies for an exemption pursuant to section 21080(b)(4) in that the Board of Directors find that these measure are necessary to preserve water supply to avoid a more severe water supply emergency.

SECTION 13. Severability: If any section, subsection, sentence, clause, phrase, portion or part of this ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such section shall not affect the validity of the remaining portions of this code. The Board of Directors hereby declares that it would have adopted this ordinance and each section, subsection, sentence, clause, phrase, part or portion thereof, irrespective of the fact that any one or more sections subsections, clauses, phrases, parts or portions be declared invalid or unconstitutional.

SECTION 14. Effective Date: Pursuant to Water Code section 376, this ordinance shall be effective on the day of its adoption. Within 10 days of adoption, this ordinance, or a summary hereof, shall be published in the Marin Independent Journal pursuant to Section 6061 of the Government Code.

PASSED AND ADOPTED this 20th day of April, 2021, by the following vote of the Board of Directors:

AYES: Directors Larry Bragman, John Gibson, Larry Russell, Monty Schmitt, and Cynthia Koehler

NOES: None

ABSENT: None

Cynthia Koehler

President, Board of Directors

ATTEST:

Lesa Heldon

Secretary, Board of Directors

Exhibit J-District Ordinance 450

MARIN MUNICIPAL WATER DISTRICT

ORDINANCE NO. 450
AN ORDINANCE AMENDING CHAPTER 13.04 ENTILED " COMPREHENSIVE DROUGHT WATER CONSERVATION AND ENFORCEMENT MEASURES" OF TITLE 13 OF THE MARIN MUNICIPAL WATER DISTRICT CODE ENTITLED "WATER SERVICE CONDITIONS AND WATER CONSERVATION MEASURES" ADOPTING ADDITIONAL WATER CONSERVATION AND ENFORCEMENT MEASURES PURSUANT TO WATER CODE SECTION 375

BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose: Due to the current drought conditions existing in the service area of the Marin Municipal Water District (District), the District adopted Ordinance No. 449 on April 20, 2021 setting forth a comprehensive list of mandatory water conservation measures to enhance the District's water conservation program pursuant to Water Code section 375. The purpose of these conservation measures is aimed at reducing the quantity of water used by all District customers to preserve the District's limited water supply due to the current drought given the uncertainty of future water supply conditions. The purpose of this ordinance is to amend Ordinance No. 449 to add additional water conservation measures to help the District reach its overall goal of 40% water use reduction, while still providing customers flexibility in achieving individual water use reductions. For example, customers may achieve 40% water use reduction by reducing water use by 20% indoors and 60% outdoors during the warmer months when outdoor irrigation water usage peaks.

SECTION 2. Section 13.04.020 of the Marin Municipal Water District Code entitled "Drought water waste prohibitions" is hereby amended to add the following subsections:

13.04.020(1)(N) Operating outdoor sprinkler irrigation systems delivering overhead spray more than two days within any calendar week and drip irrigation more than three days per week within any calendar week, but excluding hand-watering. For the purpose of this section, "calendar week" shall mean a period running from Monday-Sunday.

13.04.020(5) All recreational pools and spas shall be covered when not in use to reduce the amount of water evaporation.

SECTION 3. Findings of Necessity: The findings supporting this ordinance are those set forth and adopted by the Board pursuant to Ordinance No. 449, Section 11.

SECTION 4. Environmental Determination: This project has been reviewed for compliance with the California Environmental Quality Act (CEQA) and based upon the above findings and purposes of this ordinance, qualifies for an exemption pursuant to section 21080(b)(4) in that the Board of Directors find that these measures are necessary to preserve water supply to avoid a more severe water supply emergency.

SECTION 5. Severability: If any section, subsection, sentence, clause, phrase, portion or part of this ordinance is for any reason held to be invalid or unconstitutional by any court of competent

jurisdiction, such section shall not affect the validity of the remaining portions of this code. The Board of Directors hereby declares that it would have adopted this ordinance and each section, subsection, sentence, clause, phrase, part or portion thereof, irrespective of the fact that any one or more sections subsections, clauses, phrases, parts or portions be declared invalid or unconstitutional.

SECTION 6. Effective Date: Pursuant to Water Code section 376, this ordinance shall be effective on the day of its adoption. Within 10 days of adoption, this ordinance, or a summary hereof, shall be published in the Marin Independent Journal pursuant to Section 6061 of the Government Code.

PASSED AND ADOPTED this 4th day of May, 2021, by the following vote of the Board of Directors:

AYES: Directors Larry Bragman, John Gibson, Larry L. Russell, Monty Schmitt, and Cynthia Koehler

NOES: None

ABSENT: None

Cynthia Koehler

President, Board of Directors

ATTEST:

Lesie Allen

Secretary, Board of Directors

Exhibit K-District Ordinance 452

MARIN MUNICIPAL WATER DISTRICT

ORDINANCE NO. 452

AN ORDINANCE AMENDING CHAPTER 13.04 ENTILED " COMPREHENSIVE DROUGHT WATER CONSERVATION AND ENFORCEMENT MEASURES" OF TITLE 13 OF THE MARIN MUNICIPAL WATER DISTRICT CODE ENTITLED "WATER SERVICE CONDITIONS AND WATER CONSERVATION MEASURES" ADOPTING ENHANCED WATER CONSERVATION AND ENFORCEMENT MEASURES PURSUANT TO WATER CODE SECTION 375

BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose: Due to the current drought conditions existing in the service area of the Marin Municipal Water District (District), the District adopted Ordinance No. 449 on April 20, 2021 and Ordinance No. 450 on May 4, 2021 setting forth a comprehensive list of mandatory water conservation measures to enhance the District's water conservation program pursuant to Water Code section 375. The purpose of those conservation measures was aimed at reducing the quantity of water used by all District customers to preserve the District's limited water supply due to the current drought given the uncertainty of future water supply conditions. The purpose of this ordinance is to amend those previously adopted water use restrictions to further reduce outdoor water use for irrigation and enhance water conservation measures to help the District reach its overall goal of 40% water use reduction.

SECTION 2. Subsection (1) (N) of Section 13.04.020 of the Marin Municipal Water District Code entitled "Drought water waste prohibitions" is hereby deleted and replaced in its entirety to read as follows:

13.04.020(1)(N) Operating outdoor sprinkler irrigation systems delivering overhead spray more than one day within any calendar week, as assigned by the District, and drip irrigation more than two days per week within any calendar week, but excluding hand-watering. For the purpose of this section, "calendar week" shall mean a period running from Monday-Sunday. These irrigation restrictions equally apply to any new landscaping. It is therefore strongly encouraged that all District customers refrain from installing any new landscaping during the current drought conditions as the water user restrictions set forth in this section may not provide sufficient water use necessary for newly planted landscapes to survive.

SECTION 3. Findings of Necessity: The Board of Directors, after considering all of the information and testimony presented at its July 6, 2021 meeting regarding this ordinance, finds as follows:

A. On April 20, 2021, the Board of Directors declared a water shortage emergency pursuant to Water Code sections 350 et seq. and 71640 et seq. and adopted Ordinance No. 449 setting forth mandatory water conservation measures and findings supporting the Board's actions, which findings set forth in Section 11 of the ordinance, are hereby incorporated herein by this reference.
B. On May 4, 2021, the Board adopted Ordinance No. 450 setting forth additional water conservation measures and findings, which findings set forth in Section 3, are hereby incorporated herein by this reference.
C. On May 18, 2021, the Marin County Board of Supervisors declared a local emergency to exist throughout all of Marin County, including all of the District's service area, due to the current drought conditions.
D. As of June 28, 2021, District reservoir storage was 35,398 acre feet (AF) compared to the average reservoir storage for that date of 67,038 AF and conservation savings within the District has fallen short of the District's overall goal of 40% savings relative to the average usage for the past three years.
E. If current conditions continue into next year, the District could deplete its available water supply within a year.
F. Given the limited water supply remaining in District reservoirs, the anticipated continuation of historically low rainfall patterns, and the approaching hot summer months, the Board of Directors finds that the additional mandatory water use restrictions set forth herein are necessary to preserve the District's remaining water supply and that additional water use restrictions may be necessary in the immediate future to preserve remaining water supply.

SECTION 4. Environmental Determination: This project has been reviewed for compliance with the California Environmental Quality Act (CEQA) and based upon the above findings and purposes of this ordinance, qualifies for an exemption pursuant to section 21080(b)(4) in that the Board of Directors find that these measures are necessary to preserve water supply to prevent or mitigate a more severe water supply emergency.

SECTION 5. Severability: If any section, subsection, sentence, clause, phrase, portion or part of this ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such section shall not affect the validity of the remaining portions of this code. The Board of Directors hereby declares that it would have adopted this ordinance and each section, subsection, sentence, clause, phrase, part or portion thereof, irrespective of the fact that any one or more sections subsections, clauses, phrases, parts or portions be declared invalid or unconstitutional.

SECTION 6. Effective Date: Pursuant to Water Code section 376, this ordinance shall be effective on the day of its adoption. Within 10 days of adoption, this ordinance, or a summary hereof, shall be published in the Marin Independent Journal pursuant to Section 6061 of the Government Code.

PASSED AND ADOPTED this 6th day of July, 2021, by the following vote of the Board of Directors:

AYES: Directors Larry Bragman, John C. Gibson, Larry L. Russell, Monty Schmitt, and Cynthia Koehler

NOES: None

ABSENT: None

Cynthia Koehler
President, Board of Directors

ATTEST:

Terrie Gillen
Secretary, Board of Directors

Exhibit L-District Ordinance 453

MARIN MUNICIPAL WATER DISTRICT

ORDINANCE NO. 453

AN ORDINANCE AMENDING CHAPTER 13.04 ENTITLED " COMPREHENSIVE DROUGHT WATER CONSERVATION AND ENFORCEMENT MEASURES" OF TITLE 13 OF THE MARIN MUNICIPAL WATER DISTRICT CODE ENTITLED "WATER SERVICE CONDITIONS AND WATER CONSERVATION MEASURES" ADDING POTABLE WATER LANDSCAPE INSTALLATION RESTRICTIONS FOR NEW WATER SERVICE CONNECTIONS

BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose: Due to the current drought conditions and low storage reservoir levels existing in the service area of the Marin Municipal Water District (District), the Board of Directors (Board) declared a water shortage emergency on April 20, 2021 pursuant to Water Code sections 350, et seq. and 71640, et seq. as set forth in Board Resolution No. 8630 and subsequently adopted Ordinance Nos. 449, 450 and 452 instituting mandatory water conservation measures for all District customers. The purpose of this ordinance is to add restrictions on potable water landscape installation for new water service connections within the District's service area. The adoption of these additional measures is aimed at reducing increased water demand to preserve the District's limited water supply due to the current drought. This action is necessary to preserve the remaining water supply given the uncertainty of future supply conditions due to drought.

SECTION 2. Section 13.04.020(3) of the Marin Municipal Water District Code entitled "Drought water waste prohibitions" is hereby deleted and replaced to read as follows:

13.04.020(3) The following are prohibited for all new water service connections:

(A) Single pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons.

(B) Non-recirculating systems for conveyer carwash applications.

(C) The use of potable water for the installation of any new landscaping until after the termination of the current Water Shortage Emergency. For purposes of this subsection (C), "new water service connection" shall mean and include new, additional, expanded or increased-in-size potable water service connections, meters, and service lines approved as of July 21, 2021. During the Water Shortage Emergency, applications for new water service connections will be approved only if the Applicant acknowledges in writing that either (i) the proposed project does not include any new landscaping that will be irrigated using potable water, or (ii) no new landscaping that will be irrigated with potable water will be installed in connection with the proposed project until after the termination of the Water Shortage Emergency. For purposes of this subsection, landscaping shall include fountains and ponds.

SECTION 3. Findings of Necessity: The Board of Directors, after considering all of the information and testimony presented at its July 20, 2021 public hearing regarding this ordinance, finds as follows:

I. Historic and Current Water Supply Overview

A. Water is a finite and precious resource.

B. The District's water supply currently remains limited to water captured in its seven reservoirs; water transported from the Russian River via the North Marin aqueduct; and recycled water produced at the Las Gallinas Valley Sanitary District Plant (for a variety of non-potable purposes). About 73% of the District's water supply comes from its reservoirs, 25% from the Russian River through the North Marin aqueduct and 2% from recycled water. Although options to increase the District's water supply are being evaluated, the implementation of any preferred alternative will not be immediate.

C. Based upon rainfall patterns for the District, very little rainfall occurs from May to October each year. In recent years, the overall summer peak-period has found water use averages about twice winter use.

D. As of July 7, 2021, the District's water storage level is 34,550 acre feet, which is 43.42% of average for this time of year. As a result of this drought, the District reservoirs are projected to be as low as 25,000 acre-feet on December 1, 2021 in the absence of above average rainfall and runoff, which is less than one year of water supply based on recent demand.

E. The water conservation program already adopted by this Board is necessary to conserve additional water for beneficial use and to preserve the District's water supply.

II. New Water Service Connections.

A. On April 20, 2021, pursuant to Board Resolution No. 8630, the District declared a water shortage emergency pursuant to Water Code sections 350, et seq. and 71460, et seq.

B. Based upon projected demand and current storage levels, the District must preserve its remaining water supply to assure sufficient supply in the coming months given the uncertainty of future weather and water storage.

C. Article X Section 2 of the California Constitution declares that the general welfare requires that water resources be put to beneficial use to the fullest extent of which they are capable and that the waste, unreasonable use or unreasonable method of use of water be prevented, and that conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare.

D. California Water Code section 356 authorizes water suppliers, and the Board finds it necessary, to restrict applications for new water service connections during a water shortage emergency to conserve supplies for the greatest public benefit.

E. California Water Code section 71640 authorizes the District to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and prohibit the wastage of District water or the use of District water during such periods for any purpose other than household uses or such other restricted uses as the District determines to be necessary. The District may also prohibit use of District water during such periods for specific uses which it finds to be nonessential.

F. Pursuant to Water Code section 353 when the Board declares the existence of an emergency condition of water shortage within its service area, it shall thereupon adopt such regulations and restrictions on the delivery of water and the consumption within said area of water supplied for public use as will in the sound discretion of such governing body conserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

SECTION 4. Environmental Determination: This project has been reviewed for compliance with the California Environmental Quality Act (CEQA) and based upon the above findings and purposes of this ordinance, qualifies for an exemption pursuant to Section 21080(b)(4) of the Public Resources Code in that the Board of Directors find that these measures are necessary to preserve water supply to prevent or mitigate a water supply emergency.

SECTION 5. Severability: If any section, subsection, sentence, clause, phrase, portion or part of this ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such section shall not affect the validity of the remaining portions of this code. The Board of Directors hereby declares that it would have adopted this ordinance and each section, subsection, sentence, clause, phrase, part or portion thereof, irrespective of the fact that any one or more sections subsections, clauses, phrases, parts or portions be declared invalid or unconstitutional.

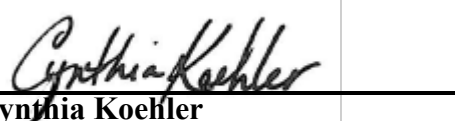
SECTION 6. Effective Date: Pursuant to Water Code section 376, this ordinance shall be effective on the day of its adoption. Within 10 days of adoption, this ordinance, or a summary hereof, shall be published in the Marin Independent Journal pursuant to Section 6061 of the Government Code.

PASSED AND ADOPTED this 20th day of July, 2021, by the following vote of the Board of Directors:

AYES: Directors Larry Bragman, John Gibson, Larry L. Russell, and Monty Schmitt

NOES: None

ABSTAIN: Director Cynthia Koehler



Cynthia Koehler
President, Board of Directors

ATTEST:

Terrie Gillen
Secretary, Board of Directors

Exhibit M-Regional Water Quality Control Board Comment Letter

GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

San Francisco Bay Regional Water Quality Control Board

August 20, 2021

Board of Directors
Marin Municipal Water District
220 Nellen Ave.
Corte Madera, CA 94925

Subject: Comments on Proposed Temporary Urgency Change Petition

Honorable Marin Municipal Water District Board Members:

Thank you for the opportunity to comment on the proposed temporary urgency change petition (Petition), and for the opportunity to work with your staff to provide input to the model and study prepared to support the Petition. We appreciate the challenges that Marin Water faces in trying to maintain water supplies for people and fish. We commend your staff for working closely with the California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), the Lagunitas Technical Advisory Committee and our agency through regular meetings and joint field reconnaissance, and for a willingness to address our concerns and input in designing the study. We appreciate Marin Water staff's refinements to the scope and resolution of the model prepared in response to input from our agency, and others as listed above, to the extent feasible given constraints of schedule and summer baseflow conditions.

Overarching Context

It is important first to frame our comments in the proper context. Lagunitas Creek supports the only stable population of Coho salmon south of Mendocino County, and one of the most important remaining populations in California. Flow releases required under Water Rights Order 95-17 together with significant habitat restoration have been essential to maintaining a stable population. We applaud Marin Water's commitment in both arenas, and trust that you will be judicious and precautious in your Petition.

Summary of Modeling Results

The model prepared for Marin Water infers a linear relationship between baseflow and the amount spawning habitat in Lagunitas Creek. The relationship was modelled at three values of baseflow: 20, 15, and 10 cubic feet per second (CFS). The model predicts that if winter baseflow is reduced from 20 to 15 CFS, there will be about a 20 percent reduction in the amount of spawning habitat for Coho salmon. These results are nearly identical to earlier studies in Lagunitas Creek (Bratovich and Kelley 1988) that informed Water Rights Order 95-17. In summary, Bratovich and Kelley also inferred a linear relationship between baseflow and the amount of spawning habitat in Lagunitas Creek, with an approximately 20 percent reduction in total habitat also forecast to occur if baseflow is reduced from 20 to 15 CFS, and a 40 percent

reduction in the amount of spawning habitat for Coho salmon if baseflow is reduced from 25 to 15 CFS.

Specific Comments

We are encouraged by Marin Water staff's efforts to minimize reductions in winter baseflow as proposed under the Petition in response to the extreme drought conditions. Accordingly, we support Marin Water staff's recommendation to limit the requested reduction in winter baseflow to 16 CFS. Additional considerations in support of limiting the reduction to 16 CFS are as follows:

1. In evaluating potential impacts to Coho salmon, the appropriate benchmark for comparison is the baseflow that is required under a "Normal Year." Specifically, the amount of spawning habitat available when baseflow is 25 CFS (Water Rights Order 95-17). Based on the information summarized above, we infer that there would be at least a 40 percent reduction in the amount of spawning habitat for Coho salmon at 15 CFS as compared to a "Normal Year." Conditions under a "Normal Year" are the appropriate benchmark for comparison in considering potential impacts to Coho salmon spawning.
2. The potential magnitude of this impact (of winter baseflow being reduced from 25 to 15 CFS) is likely even greater than what would be inferred solely from a 40 percent overall reduction in habitat area in Lagunitas Creek, because in a "Normal Year" a large proportion of the Coho salmon run has access to and spawns in the tributaries; on average half-or-more of the total run. Similarly, in a "Normal Year" most steelhead spawn in the tributaries. If runoff conditions this winter are like Water Year 2021, only a few Coho salmon and steelhead will gain access to the tributaries, and most of the spawning of both populations will be in Lagunitas Creek.
3. Under such a scenario, we would expect a much greater amount of superimposition - where some of the nests prepared by female salmon that spawned earlier in the season are excavated/partially excavated by a female salmon or steelhead that spawn later - further reducing overall spawning success of Coho salmon beyond what would be expected alone from a 40 percent reduction in habitat area.
4. Also, in recent years there has been a modest run of Chinook salmon in Lagunitas Creek that also compete with Coho salmon to establish nests at suitable spawning sites. The Chinook salmon run was not documented at the time that releases were established under Water Rights Order 95-17. As such, under the scenario of a dry start to Water Year 2022, it is plausible that three species of spawning adult salmonids would be confined largely to Lagunitas Creek and be competing to spawn within a suitable habitat area that has been reduced by approximately 40 percent.
5. Available habitat suitability models for Lagunitas Creek, define suitable spawning habitat as being simply the overlap of suitable gravel sizes, flow depth, and velocity for spawning. It's clear that other habitat attributes influence selection by the fish of spawning sites including cover, and likely a recognition of streambed areas where hyporheic flow is accentuated (Geist and Dauble 1998). These are important limitations of the models for Lagunitas Creek that lend additional credence to a precautionary approach.

Also, we note a motivation stated by Marin Water staff for considering potential reductions in releases to support winter baseflow is to ensure that reservoir storage will be sufficient to maintain adequate summer baseflows in Lagunitas Creek. We urge Marin Water to predicate the proposed reduction in winter baseflow to 16 CFS on a commitment to maintain dry season baseflows at 6 CFS throughout Water Year 2022. Thank you for your time and consideration.

Sincerely,

Xavier Fernandez
Planning Division Manager

Exhibit N-NMFS Letter

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

August 27, 2021

Board of Directors
Marin Water
220 Nellen Avenue
Corte Madera, California 94925

Re: NOAA's National Marine Fisheries Service's Comments on Marin Water's Proposed Winter 2021-2022 Flow Reduction within the Lagunitas Creek Watershed in Marin County

Dear Board Members:

This letter represents NOAA's National Marine Fisheries Service's (NMFS) comments to the Marin Water Board regarding the pending Temporary Urgent Change Petition (TUCP) for their Kent Lake reservoir operations and instream flow requirements in Lagunitas Creek. In response to this year's drought and low reservoir storage conditions, we understand Marin Water's proposed TUCP will request changes to the State Water Resources Control Board's (SWRCB) 95-17 Order, which established instream flow requirements to protect fishery resources in Lagunitas Creek. Marin Water's analysis indicates that as of August 15, 2021, storage from its seven available reservoirs was critically low (*i.e.,* 39.3 percent of capacity and 51.2 percent of the average storage for this date) due to record low rainfall last winter. Thank you for considering our comments as you prepare to submit the TUCP during the week of September 6, 2021 for approval by SWRCB.

As you are aware, the Lagunitas Creek Watershed supports populations of federally endangered Central California Coast (CCC) coho salmon (*Oncorhynchus. kisutch*), and threatened CCC steelhead (*O. mykiss*) and California Coastal (CC) Chinook salmon (*O. tshawytscha*) listed under the Endangered Species Act of 1973 (ESA)(16 U.S.C. 1531 et seq.). The Lagunitas Creek Watershed is identified as a core recovery area or essential population for coho salmon and steelhead in our recovery plans (NMFS 2012 and 2016). Records show that coho salmon historically occurred in at least 31 small coastal streams in Marin County, and have recently only been observed in 17 (55 percent) of these streams, most of which are tributaries to Lagunitas Creek (Moyle et al. 2008). The watershed today supports approximately 10 percent of the remaining CCC coho salmon along the Pacific Coast, is the southernmost wild independent population and, therefore, is considered to be critical to the survival and recovery of the species. In drought conditions, the natural streamflow in tributaries is largely absent, therefore, we expect that the majority of ESA-listed salmonids will spawn and rear in the mainstem Lagunitas Creek and will depend mainly on flow releases from Kent Lake for survival and spawning this fall and winter.

Marin Water is preparing to submit a TUCP to SWRCB, which includes requesting the following changes to the SWRCB 95-17 Order:

1. Delaying the timeframe (from November 1-15 until December 1-15) in which the summer baseflow would be increased to the winter baseflow regime.
2. Decreasing the regular 'dry-year' winter baseflow from 20 cubic feet per second (cfs) to 16 cfs.
3. Eliminating the first (early November) migration pulse flow of 35 cfs.
4. Adaptively managing the initiation of the second migration pulse flow (from November 15 to December 1) to coincide with the timing of natural storm and spawning migration events.

The timeframe of these changes spans a large portion of the CCC coho salmon spawning season. Consequently, in April 2021, Marin Water began developing a PHABSIM hydraulic model to study the potential effects of the proposed changes to salmonid habitat requirements in Lagunitas Creek. The study area included four reaches (modeled at 20, 15, and 10 cfs) that in sum, represent 25 percent of the coho salmon spawning habitat in the mainstem of Lagunitas Creek. Although the model was performed for several life stages of coho salmon and steelhead, the study was focused on habitat availability for spawning coho salmon.

Since April 2021, NMFS staff have worked with Marin Water staff, and other resource agencies to refine the model, review the results of the study, and develop a monitoring plan with adaptive management actions to minimize and avoid impacts to listed salmonids (*i.e., The Lagunitas TUCP Monitoring and Adaptive Management Plan* (AMP)). Our comments on the habitat suitability study and potential impacts to ESA-listed salmonids that may occur as a result of implementing the proposed flow regime, and recommendations for the AMP are as follows:

1. The current fall-spring flow regime in Lagunitas Creek, as mandated by Order 95-17, is significantly lower than the historical unimpaired flows that would have occurred before dams were built in the watershed. These regulated flows are also much lower than the flow recommendations provided by California Department of Fish and Game to SWRCB in 1986 and again in 2008 (DFG 1986, 2008). Given that it is likely that federally-listed fish and their habitats in the watershed are already compromised due to the current regulated flow regime, it is critical that the AMP incorporate actions to avoid substantial impacts to listed salmonids, particularly during this unprecedented drought.

2. We appreciate Marin Water's efforts to assess the effects of the reduced flows associated with the proposed TUCP and AMP. The results from the current habitat suitability model show that reducing streamflow may significantly reduce the area of suitable spawning substrate and potentially decrease redd viability (*i.e.*, unsuitable depths and velocity on redds). This may adversely affect coho salmon and steelhead by increasing the likelihood of redd superimposition and decreased incubation survival. The model showed that a reduction of flows from 20 cfs to 15 cfs will result in approximately a 30 percent reduction of high suitability habitat for coho salmon and steelhead at the four study sites combined. These results are further validated by a

previous study which indicated a 40 percent reduction in spawning habitat suitability for coho salmon when flows were decreased from 25-15 cfs (Bratovich and Kelley 1988).

The PHABSIM hydraulic model was limited to habitat criteria, including depth, velocity and spawning substrate suitability. NMFS recommends that Marin Water also consider the results from previous flow studies in the watershed, as well as findings from their upcoming monitoring efforts to develop a California Environmental Flows Framework (ceff.ucdavis.edu) when making adaptive management decisions. CEFF is a hydrologically based method that uses the functional flows approach and provides ecological-flow criteria for all streams in the State of California.[1]

3. Based on recent monitoring results by Marin Water's fisheries staff, redd superimposition (resulting from competition for insufficient spawning habitat), which can reduce egg survival, occurs in the mainstem Lagunitas Creek at 20 cfs (the SWRCRB Order 95-17 dry-year winter baseflow). NMFS expects these impacts to increase with the proposed decrease in baseflows to 16 cfs, thus the implications of reduced flows on redd superimposition should be studied further.

4. The AMP should include thresholds triggers and provisions for adjusting flow conditions to minimize impacts to salmonids. We recommend that these triggers for temperature, DO, velocity, water surface level over redds, critical riffle depth to maintain passage for spawners, and migration pulse flow (spawning activity) be finalized in coordination with the resource agencies. We would propose that once thresholds are reached, flows should be increased within 24 hours to levels agreed upon in the AMP to avoid or minimize potential impacts to listed fish. For example, critical riffle depths are a major concern which should be monitored. Bratovich and Kelley (1998) used three methods for evaluating flows needed over critical riffles in Lagunitas Creek during the 1982-83 water year and concluded that a minimum flow of 35 cfs was needed for the passage of adult salmon through critical riffles.[2] Therefore, flow should be adaptively managed if critical riffle depths are not met to ensure that no adult migration or smolt outmigration barriers exist during the TUCP period.

5. We request weekly reports on reservoir storage and river flow conditions, and monitoring results be provided to the resource agencies and the Lagunitas TAC to inform and validate the success of management actions, or the need to adjust them adaptively. Additionally, if winter storms materialize and Marin County reservoirs accumulate storage through normal or extreme precipitation events during the winter of 2021-2022, the agencies should reconvene to determine at what capacity the TUCP

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[1] This functional flows approach preserves key aspects of the natural hydrograph and establishes flow-ecology relationships through development of a conceptual model of various flow components and subsequent selection of flow metrics that represent those relationships (*i.e.*, the interaction of different life history stages of listed fish with the condition of riparian vegetation, food production, bench inundation, deposition process, nutrient transport, migration cues, and floodplain connectivity)(Yarnell et al. 2015, 2020).

[2] This study noted that "lack of flows sufficient for passage may have contributed to the decline of the salmon runs in Lagunitas Creek."

flow regime is discontinued and regular dry-year or normal-year reservoir flow releases resume.

To conserve storage and extend and preserve river flows, Marin Water adopted mandatory water use restrictions for its service area on April 20, 2021, with the goal of a 40 percent reduction in water use. We applaud these efforts and understand a 30 percent savings was reported for the week of August 13 through August 19. Marin Water has obligations under the ESA to ensure that no "take" (defined as:" harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct") of federally listed species occurs as a result of their reservoir operations (including Lagunitas and Walker creeks). Moving forward, we are available to discuss options and assist you in fulfilling your obligations under the ESA. Meanwhile, NMFS supports the development of the AMP to utilize water storage savings for the implementation of adaptive management actions as we have identified, in minimizing impacts to salmonid resources in Lagunitas Creek.

Thank you for considering our input to ensure all beneficial uses of winter water resources be utilized to the fullest extent possible. We appreciate your collaborative efforts during all phases of this process and expect the County will continue water conservation efforts as a priority to balance water storage and fisheries concerns in the development of this proposed order. Should you have questions regarding this letter, please contact me at the letterhead address above, or at bob.coey@noaa.gov or 707-575-6090, or Jodi Charrier of my staff at jodi.charrier@noaa.gov or 707-575-6069.

Sincerely,

RMCoey

Robert Coey
North Coast Branch Chief
North Central Coastal Office

cc: Ryan Watanabe, Manfred Kittel, Jessie Maxfield, Mark Gard - CDFW
Leslie Ferguson, Mike Napolitano, Nicole Fairly, Xavier Fernandez – RWQCB

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