Priority Action Coho Team
Addendum to 2019 Report
Implementation Status of Recommendations
April 2024

Background

The main goals of the Priority Action Coho Team (PACT) are to prevent further extirpations of Coho Salmon populations in the Central California Coast Evolutionarily Significant Unit (CCC ESU), and to implement actions that will eventually lead to population recovery. The 2019 PACT Report, released early in 2020 (PACT 2019), outlines the PACT strategy and lists a wide range of recommendations made by six Technical Working Groups (TWGs) to promote the recovery of Coho Salmon populations throughout the CCC ESU. Since the PACT initiative was developed in 2011, a wide range of recommendations made by the six TWGs[1] have been fully implemented, are ongoing or in the planning phase. This addendum to the 2019 PACT report, completed in April 2024, highlights the current status of the recommendations made by the following TWGs: the Habitat Restoration TWG, the Captive Rearing and Rescue TWG, and the Instream Flow and Conservation TWG.

A total of 225 habitat restoration projects benefiting Coho Salmon recovery in the CCC Coho Salmon ESU was funded between 2011 and 2022 through the Fisheries Restoration Grants Program (FRGP), in which NOAA's Pacific Coast Salmon Restoration Fund (PCSRF) is administered by California Department of Fish and Wildlife (CDFW). More than $70 million in FRGP funds were granted during this period to restoration projects benefiting Coho Salmon recovery. Additionally, the NOAA Restoration Center and other public and private grant sources contributed to the funding and implementation of PACT recommendations through agency and partner staff time. Funded recovery actions include instream and riparian habitat restoration, upland erosion control, conservation hatchery operations, monitoring efforts, fish migration barrier removal and various other projects supporting Coho Salmon recovery.

All actions recommended in the PACT report were designed to benefit the recovery of Coho Salmon populations. Some actions that were fully implemented were shown to have immediate and positive benefits. For example, in the Russian River watershed in Sonoma County, a flashboard dam in upper Mill Creek constituted a significant migration barrier to Coho Salmon. The removal of the dam in 2016 was followed by the immediate recolonization of suitable habitat upstream of the dam site by adult Coho Salmon during the winter of 2016/17.

[1] The six TWGs were: Habitat Restoration and Protection; Captive Rearing and Rescue; Instream Flow and Conservation; Regulations, Permitting and Enforcement; Funding; and Education, Outreach & Media Interaction. The membership of the six TWGs included representatives from CDFW, NOAA Fisheries, and various stakeholder groups, including representatives from State and Federal agencies, environmental groups, land and water managers, sport fishing interests, and landowners.

From 2014-2016, and again in 2021-2022, California experienced exceptional drought conditions that impacted Coho Salmon populations and their habitat. In response to this environmental crisis, CDFW prioritized Departmental resources towards implementation of various actions to protect aquatic resources and their habitat. Although some recovery actions prompted by the prolonged drought do not correspond directly to a specific PACT recommendation, drought actions by CDFW and its partners do align with many of the actions recommended in the PACT report. The CDFW drought response included drought stressor monitoring of fish and their habitat and rescuing fish from drying streams. More details on drought stressor monitoring are available at the CDFW Drought webpage[2].

Exacerbated by drought conditions, drying over-summer habitat has caused repeated and widespread stranding of juvenile Coho Salmon in shallow pools, exposing them to predation and potentially lethal environmental conditions. In 2022 alone, CDFW rescued and relocated more than 7,800 juvenile Coho Salmon from several Russian River tributaries. Although it is not known how many of these rescued fish ultimately returned as adults to spawn, preventing mortalities at the juvenile life stage is likely to have contributed to the return of natural-origin adult Coho Salmon to the Russian River basin.

CDFW's drought response in 2014 and 2015 included a Voluntary Drought Initiative (VDI) for vineyards and private landowners in several key Coho Salmon tributaries (Green Valley, Dutch Bill, Mill and Mark West creeks). The VDI was initiated in these tributaries to provide improved instream flow conditions. More recently, the California legislature in 2021 provided more than $50 million in funding for water resilience and drought-related activities, and in 2022 authorized an additional $100 million to allow CDFW to protect and restore salmon in 2022 and 2023. This funding will support restoration and protection projects that enhance salmon population resiliency to drought and climate change. In CDFW's Bay Delta Region, drought stressor monitoring activities implemented since 2022 with this new funding includes wet-dry mapping and drought refuge characterization, as well as stream flow and seepage investigations in several Russian River tributaries, continued fish rescues and relocations, and temporary stream flow augmentations with cooperating landowners.

The following tables provide updates on the implementation status of many of the recommended actions made by the PACT Technical Working Groups, as listed in the PACT (2019) report:

- Table 1 identifies the implementation status of recommendations compiled by the Habitat Restoration TWG. Most of these recommendations were selected from either

[2] https://wildlife.ca.gov/Drought

the State or Federal Coho Salmon Recovery Plans, while some were newly formulated by TWG partners during the TWG meetings (CDFG 2004; NMFS 2012).

- Table 2 identifies the implementation status of the recommendations provided by the Captive Rearing and Rescue TWG.
- Table 3 identifies the implementation status of the recommendations provided by the Instream Flow and Conservation TWG which were largely newly formulated but reflect priorities of the State and Federal recovery plans.

Table 1. Recommendations from the Habitat Restoration Technical Work Group (TWG) and status of implementation. A complete description of each recommendation can be found in Table 1 of the Habitat Restoration section of the PACT report (PACT 2019). Recommendations are listed by their original task identifiers (Task ID) from State and Federal recovery plans (CDFG 2004; NMFS 2012), except those denoted by "P" which indicates recommendations developed and supported by partner organization during the TWG proceedings. The implementation status of these recommendations is reported here as: Completed; Partially implemented; or In planning phase. In some cases, actions described under 'Implementation Status' include work preceding commencement of the PACT Initiative in 2011.

Task ID	Recommendation	Implementation Status
ScC-CCC-1.1.1.1 ScC-CCC-1.1.3.1	Restore estuarine habitat in Scott Creek, Santa Cruz Co.	**In planning phase** Restoration of the Scott Creek estuary for the benefit of Coho Salmon and other aquatic resources is in its planning phase. This effort includes the replacement of the Highway 1 bridge under an MOU between CalTrans, Santa Cruz RCD, Coastal Conservancy and Santa Cruz County Regional Transportation Commission. A 2019 CDFW Proposition 1 grant to the Regional Transportation Commission will help expedite the CalTrans bridge design that will be compatible with the conceptual estuary restoration designs. The 60% engineering designs and related technical studies for the ecological restoration components were completed in November 2020.

Task ID	Recommendation	Implementation Status
BB-SL-04	Improve adult Coho Salmon passage in the San Lorenzo River, Santa Cruz Co.	**Partially implemented** The removal of Cahill Dam in 2012 on Branciforte Creek (tributary to the San Lorenzo River) restored fish passage at that site. Bypass flows at the Newell Creek Dam and the Felton and Tait Street diversions have been in effect since 2008 and will be made permanent in the City of Santa Cruz Habitat Conservation Plan. Four additional fish passage projects were designed on Branciforte Creek by the Santa Cruz RCD and three were implemented.
BB-AP -01	Implement Soquel Creek Watershed Assessment and Enhancement Project Plan, Santa Cruz Co.	**Partially implemented** The Santa Cruz RCD and Trout Unlimited collaborated on a project to gauge and monitor stream flow conditions in Soquel Creek in 2017-2018 with the goal of identifying areas for water conservation and improved summer stream flows. The Soquel Creek Streamflow Assessment Study report was finalized in December 2019. Results will be used to develop land use practices and habitat restoration projects for the benefit of salmonids.
ScC-CCC-2.1.1.1 ScC-CCC-4.1.1.1	Breach old levees and install large woody debris in Scott Creek, Santa Cruz Co.	**Partially implemented** From 2014 to 2017, the Santa Cruz RCD implemented three phases of the Lower Scott Creek Enhancement Project. In total, 20 large wood structures and several levee notches and floodplain connections were installed in Scott Creek over a total of 5,600 feet of stream.
SVC-CCC-3.1.1.1	Increase habitat shelter ratings in San Vicente Creek, Santa Cruz Co.	**Partially implemented** The San Vicente Creek Habitat Enhancement Project was implemented by the Santa Cruz RCD during September and October of 2017. Approximately 52 pieces of large wood were placed into the channel along 2,200 feet of stream. Additionally, one small floodplain connection was installed on Mill Creek (tributary to San Vicente Creek).

Task ID	Recommendation	Implementation Status
BB-SL-01	Reduce sediment input in the San Lorenzo River, Santa Cruz Co.	**Partially implemented** The Santa Cruz RCD has a Rural Road Erosion Control Assistance Program that provides landowners and other entities technical assistance with road erosion control measures, such as culvert replacements and upgrades, water bars, road shaping, stream crossings and bank stabilization.
P2	Address blockage into Butano Creek.	**Completed** Implementation completed by San Mateo RCD in 2018-19 and passage of Coho Salmon and steelhead has been observed. A passage project at Little Butano Creek falls (Butano Chute) is in the planning phase. The waterfall constitutes a total barrier. Recent assessment revealed this is an unnatural feature which resulted from channelization and incision of Little Butano Creek. Passage would provide access for Coho Salmon and steelhead to nearly 3000 linear feet of high-quality habitat in Butano State Park, and additional habitat could be provided pending passage improvement at another upstream barrier.
ApC-CCC-3.1.1.1	Install large woody material, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth.	**In planning phase** Accelerated recruitment LW project along two miles of Aptos Creek is being planned.
ScC-CCC-2.1.1.1	Encourage breaching of old levees in the lower riparian reaches of Scott Creek.	**Partially implemented** From 2014 to 2017, the Santa Cruz RCD implemented three phases of the Lower Scott Creek Enhancement Project. In total, 20 large wood structures and several levee notches and floodplain connections were installed in Scott Creek over a total of 5,600 feet of stream.

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RW-ES-02	Restore estuarine and associated wetland ecosystems.	**Partially implemented** In Pescadero Creek, restoration is ongoing. Several projects have been completed, several other projects are being planned, and several structures have been placed in Butano Creek to retain sediment. Restoration project for Pescadero Lagoon North Marsh is being considered and currently is at feasibility stage.
RW-SD-04	Restore natural drainage patterns and minimize hydrologic connectivity of roads, where feasible. Provide annual funding for restoring natural drainage patterns.	**Partially implemented** This recommendation is implemented for every timber harvest plan (THP). In 2013 the Board of Forestry (BOF) passed a "Road Rules" package that updated the Forest Practice Rules to include hydrologic disconnection of roads, preventing erosion and sediment discharge, and other measures. The BOF's Effectiveness Monitoring Committee that evaluated the effectiveness of those rules can be found here: https://bof.fire.ca.gov/media/9048/concept-proposal-draft-emc-2015-004-coe-07_27_16-ada.pdf During THP reviews, CDFW and other agencies make appropriate recommendations in the field, including outsloping of roads, installation of water bars and rolling dips to divert water off the road, rerouting of roads and skid trails to avoid impacts, and other recommendations.
SM-HU-08	Restore Coho Salmon passage to Coho Salmon habitat by using the prioritized list. San Gregorio Creek Watershed (remediate passage to fish ladder on Alpine Creek located approximately 8,000 ft upstream of confluence with San Gregorio Creek	**Completed** Implementation completed by the San Mateo RCD in 2019.

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SGC-CCC-3.1.1.2	Install LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth.	**Partially implemented** Two phases of LWD enhancement were implemented in San Gregorio Creek by the San Mateo RCD. The second phase was completed in 2018.
SC-CCC-3.2.2.1	Increase LWD frequency to optimal conditions in select reaches of Fay, Tannery, Finley, and Thurston Creeks	**Partially implemented** In 2013, 24 LWD structures were placed in two Salmon Creek tributaries (Nolan and Thurston creeks) by Gold Ridge RCD, funded by an FRGP grant which helped create pools. In addition, riparian wood loading was implemented in upper Tannery Creek in 2014. In 2019, an FRGP-funded grant placed fifty 50-foot logs, harvested on site, in 0.4 miles of Tannery Creek.
SC-CCC-8.1.1.1	Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers in Salmon Creek.	**Partially implemented** A water conservation grant to Gold Ridge RCD and partners, funded through the FRGP in 2015, installed a rainwater catchment system and a 1.4 million gallon off-channel pond on Salmon Creek, resulting in a permanent forbearance agreement with the landowner. Similar projects are under consideration.
BM-BO-02	Continue restoration efforts on Bolinas and Big lagoons to benefit Coho Salmon during all life phases and seasons.	**Partially implemented** From 2009 to 2013, the Redwood Creek estuary at Muir Beach was restored through a collaborative effort involving many restoration partners. The project involved parking lot re-design and rotation away from the creek, new channel connection and side channel restoration, and riparian restoration. This multi-year project included many partner organizations and was partially funded through an FRGP grant. In 2014, through a grant to San Francisco Zen Center, lower Green Gulch, tributary to Redwood Creek estuary, was restored with a large meander bend and 11 LWD structures. Also, multiple water conservation projects have been

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		implemented in Green Gulch Creek to improve the amount of streamflow into Redwood Creek estuary.

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BM-HU-18	Systematically work to restore Coho Salmon passage at county facilities.	**Partially implemented** In 2016, the County of Marin restored fish passage at a County culvert on San Geronimo Creek.
BM-LA-19	Continue riparian protection and sediment control projects in Lagunitas Creek.	**Partially implemented** In 2016 through a grant to SPAWN, more than one mile of riparian habitat was restored in Lagunitas Creek by removing a concrete parking lot and restoring additional riparian habitat, funded by an FRGP grant.
LaC-CCC-1.2.2.1	Restore estuarine wetlands and sloughs, develop floodplain and backwater habitat projects in Lagunitas Creek.	**Partially implemented** In 2017 and 2019, new instream structures were installed in the mainstem of Lagunitas Creek by Marin Water to create additional floodplain habitat. Floodplain habitat was created at the Tocaloma reach of Lagunitas Creek in 2018. Both projects were primarily funded through a Proposition 1/68 grant.
LaC-CCC-6.1.1.1	Restore fish passage at Roy's Pools to facilitate unimpeded passage for all life stages into the San Geronimo Core Area.	**Completed** This project led by SPAWN has been funded through FRGP and was implemented and finalized in summer 2021.
LaC-CCC-3.1.1.2	Increase shelter ratings to optimal conditions by installing multiple log structures in select reaches of Larsen, San Geronimo, Woodacre, and Olema Creeks	**Partially implemented** In 2013, riparian habitat was restored by plantings along a reach of San Geronimo Creek on the former Golf Course. In 2020, a Proposition 1 grant provided funding to SPAWN (grant number #Q2096006) for the design of restoration projects on Larsen and San Geronimo Creeks. These projects will achieve multiple objectives, including the installation of large woody debris structures. Two FRGP-funded grants installed multiple large wood structures in San Geronimo Creek in summer 2021.

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LaC-CCC-3.1.4.3	Increase LWD frequency to optimal conditions in select reaches of Larsen, Woodacre, San Geronimo, and Devils Gulch creeks.	**Partially implemented** Eight large wood structures were installed in Devil's Gulch in 2015, funded by an FRGP grant. In 2020, a Proposition 1 grant provided funding to SPAWN (grant number #Q2096006) for the design of restoration projects on Larsen and San Geronimo Creeks. These projects will achieve multiple objectives, including the installation of large woody debris structures.
MC-GA-06	If appropriate, restore estuary function to benefit Coho Salmon in the Garcia River, Mendocino Co.	**Partially implemented** Planning, design, and permitting work for the first phase of the Garcia Estuary Enhancement Project was completed by The Nature Conservancy (TNC) in 2018 and focused on the middle estuary. The NOAA Restoration Center (RC) funded the project permitting and environmental compliance. Project construction began in summer 2022 with funding from CDFW and NOAA RC. Potential future phases may include restoration of the lower and upper estuary zones and adjacent floodplains, as well as Hathaway Creek.
GR-CCC-6.1.1.10	Evaluate, design, and implement appropriate fish passage at culvert at mouth on SF Garcia River (See CALFISH: PAD_ID 712859; Passage ID 16063), Mendocino Co.	**Completed** Fish passage improved during phase II of the Pacific Watershed Associates (PWA) South Fork Garcia Erosion Control and Prevention Implementation Project in 2010.
GR-CCC-6.1.1.11	Evaluate, design, and implement appropriate fish passage at culvert on Fleming Creek (See CALFISH: PAD_ID 723441 Passage ID 9525), Mendocino Co.	**Completed** Fish passage improved during phase II of PWA's South Fork Garcia Erosion Control and Prevention Implementation Project in 2010.

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GR-CCC-6.1.1.12	Evaluate, design, and implement appropriate fish passage at unnamed tributary to SF Garcia River (See CALFISH: PAD_ID 723443 Passage ID 9523), Mendocino Co.	**Completed** Fish passage improved during phase II of PWA's South Fork Garcia Erosion Control and Prevention Implementation Project in 2010.
GR-CCC-6.1.1.2	Evaluate, design, and implement appropriate fish passage at Bridge at Highway 1 on Hathaway Creek (Gasker Slough) (See CALFISH: PAD_ID 716762; Passage ID 26883), Mendocino Co.	**Completed** In 2015, this crossing was evaluated, and determined not to have passage constraints. There was a FRGP grant to TNC funded in 2015 to study restoration in this location (Garcia River Enhancement Plan).
GR-CCC-6.1.1.4	Evaluate, design, and implement appropriate fish passage at Fish Rock Road on Mill Creek (See CALFISH: PAD_ID 705892; Passage ID 7210), Mendocino Co.	**Completed** In 2001, this crossing was surveyed by Ross Taylor and Associates (RTA) and for the range of migration flows (Qlp – Qhp), FishXing determined culvert is at least 90% passable for all species and life stages presumed present (Coho Salmon and steelhead). It was determined that the current crossing was properly sized, provides passage, and no treatment was required.
GR-CCC-6.1.1.5	Evaluate, design, and implement appropriate fish passage at Fish Rock Road on Mill Creek (See CALFISH: PAD_ID 705893; Passage ID 7211). Mendocino Co.	**Partially implemented** This crossing was evaluated in 2001 by RTA. For the range of migration flows (Qlp – Qhp), FishXing determined the culvert is 72% passable for adult Coho Salmon and steelhead; but is a total barrier for juveniles due to the leap required to enter culvert (1.3 feet), and excessive velocities on higher winter migration flows. A treatment was recommended to modify current crossing with an outlet beam, baffles, and/or outlet pool weirs to

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		increase depth and reduce velocities. No remediation actions have been implemented.
GR-CCC-6.1.1.8	Evaluate, design, and implement appropriate fish passage at Fish Rock Road on Sled Creek (See CALFISH: PAD_ID 713211; Passage ID 16599), Mendocino Co.	**Partially implemented** This crossing was evaluated in 2001 by RTA and for the range of migration flows (Qlp – Qhp), FishXing determined this crossing meets the 8-16-16 ft/sec velocity criteria, and the 0.5' minimum depth passage criteria for adult anadromous salmonids on approximately 87% of the range of estimated migration flows (range for adults = 3.0 – 26.6 cfs). The slightly perched outlet and excessive velocities created by the nearly 5% culvert slope probably prevent all juvenile salmonid migration. The current crossing is in poor condition, is undersized and should be replaced with a properly sized embedded SSP culvert or an open-bottom arch set on concrete footings. No remediation actions have been implemented.
NaR-CCC-2.1.1.2	Evaluate Highway 128 and associated crossings with focus on the segment from the North Fork Navarro Bridge to Barton Gulch. Many crossings may need to be modified to provide access to historical floodplain habitats. Mendocino Co.	**Partially implemented** Two stream crossings between North Fork Navarro River Bridge and Barton Gulch were assessed and determined not to be barriers, Coon Creek (PAD ID 707191) and Ray Gulch (PAD ID 707186). However, while the crossing at Coon Creek meets all passage criteria, the inlet width is narrower than the active channel. Four crossings between North Fork Navarro River Bridge and Barton Gulch were assessed and identified as partial barriers including Mustard Gulch and three unnamed tributaries. Five crossings between the North Fork Navarro Bridge and Barton Gulch remain unassessed including Flynn Creek and four unnamed tributaries. The unnamed tributaries have no record of salmonid presence.

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NaR-CCC-6.1.1.1	Restore passage in high priority areas of the Navarro watershed as identified by the Mendocino RCD, MRC, the County of Mendocino, Caltrans (HWY 128), and existing fish passage databases.	**Partially implemented** None of the Highway 128 crossings on Class I, Coho Salmon streams in high priority Coho Salmon areas have been upgraded. Appian Way Road crossing over Neefus Gulch (PAD ID 758251) was upgraded for fish passage (2022) using CDFW FRGP and NOAA RC grant funds. The 2020 CDFW R1 high priority passage list includes projects on Barton Gulch (undersized culvert), Deadhorse Gulch (undersized culvert), Mustard Gulch (partial barrier), and Soda Creek (smooth undersized boiler culvert with steep slope). FRGP funded a fish passage and winter refugia design project on Soda Creek. In the North Fork Navarro Watershed, there are multiple remaining known fish passage barriers including Neefus Gulch Dam (PAD ID 758252) and small road crossings upstream of the dam (PAD IDs 758263,758264); Soda Creek (PAD IDs 723469, 707192); Coon Creek (PAD ID 707191); and Dead Horse Gulch (PAD ID 707190). All other known Class I road crossings have been improved in the North Fork Navarro Watershed. Tributaries to mainstem Navarro River, Mustard Gulch (PAD ID 707187) and Barton Gulch (PAD ID707185) require upgrades for fish passage. The Holmes Ranch Road crossing over Meyer Gulch (PAD ID 706977) will have FRGP funded 100% designs for fish passage completed March 2023.

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PC-CCC-1.1.1.2	Evaluate habitat potential and benefits of providing passage under Highway 1 to the impoundment at Ocean Lake Mobile Home Park, Mendocino Co.	**Completed.** Evaluation was completed. Implementation was determined to not be cost effective at this site.
NoR-CCC-6.1.1.1	Assess and restore passage at barriers associated with the California Western Railroad, Mendocino Co.	**Partially implemented** The railway corridor was assessed in 2010. Gulch C crossing (PAD_ID 737367) and the upper-most Noyo River Class I crossing (758774) were upgraded in 2020. Burbeck Creek (758255) and Redwood Creek (758772) have been evaluated and need fish passage upgrades. The Duffy Gulch crossing is a fish barrier. Fish passage designs were completed to 100% in 2017 by TU using FRGP funding.
MC-AR-07	Modify stream barriers to allow Coho Salmon passage while maintaining LWD in the Albion River, Mendocino Co.	**Partially implemented** Since 2000, undersized culverts have been upgraded for fish passage on Tom Bell Creek, mainstem Albion River and Marsh Creek. An earthen dam was removed on Glenbrook Gulch. Additionally, large wood placement and riparian planting were implemented in association with the Glenbrook dam removal. FRGP funded these four projects to provide unimpeded passage for all life stages of salmonids. CA Fish Passage Database identifies Class I stream barriers on mainstem Albion, NF Albion and SF Albion and its tributaries. A log debris accumulation (LDA) on mainstem Albion between Tom Bell Creek and NF Albion should be assessed for fish passage. The accumulation is retaining many large and long conifer logs that could be redistributed downstream to be captured by large wood features installed by CCC in 2021 and 2022.

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GuaR-CCC-3.1.3.1	Evaluate, design, and implement strategies to improve shelter pools ratings within the Rockpile and Buckeye sub-basins and the following tributaries: Boyd, Buckeye, Camper, Carson, Danfield, Doty, Dry, Franchini, Fuller, Grasshopper, Groshong Gulch, House, Little NF GR, Log Cabin, Marshall, McGann, McKenzie, NF Fuller, Lower NF GR, Palmer Canyon, Pepperwood, Rockpile, SF Fuller, Sullivan, Tombs, Wheatfield Fork, and Wild Hog creeks, Mendocino Co.	**Partially implemented** From 2000 to 2006, a multi-phase project directed at improving stream habitat through the installation of LWD was coordinated by the Sotoyome Resource Conservation District (SRCD, now Sonoma RCD), the Gualala Redwoods, Inc. (GRI), and the Gualala River Watershed Council (GRWC). A total of 491 logs was placed in the North Fork Gualala, Little North Fork Gualala River, Pepperwood Creek, Little Pepperwood Creek, Big Pepperwood Creek, Doty Creek, South Fork Gualala River, Groshong Gulch, Rockpile Creek, Buckeye Creek and Robinson Creek to improve instream habitat.
GuaR-CCC-3.1.4.1	Evaluate, develop, and implement strategies to increase primary pool frequency in high priority reaches within the following tributaries: Boyd, Doty, Dry, Fuller, Little NF GR, Log Cabin, Marshall, McGann, McKenzie, Palmer, Robinson, Tombs, and West Fork Fuller Creek, Mendocino Co.	**Partially implemented** From 2000 to 2006, 358 logs were placed in the Little North Fork Gualala River, Doty Creek, Fuller Creek, and Robinson Creek to improve instream habitat.

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GR-CCC-3.1.4.2	Improve shelter ratings in pools within the mainstem Garcia River and the following tributaries: Blue Waterhole, Fleming Creek, Graphite Creek, Inman Creek, Little SF Garcia, NF Garcia, and Signal Creek (and tributaries), Mendocino Co.	**Partially implemented** From 2012 to 2018, organizations including the Mendocino County RCD, TU, TNC, and The Conservation Fund (TCF) coordinated the implementation of instream habitat projects to improve Coho habitat in Olsen Gulch, North Fork Garcia River, South Fork Garcia River, Signal Creek, Signal Creek, Graphite Creek, Inman Creek, and Blue Waterhole Creek. Approximately 507 pieces of LWD were used to construct approximately 113 structures across 85,871 feet of stream.
GuaR-CCC-6.1.1.1	Place instream structures to improve pool depth and habitat complexity in the Gualala River, Mendocino Co.	**Partially implemented** From 2000 to 2006, a multi-phase project directed at improving stream habitat through the installation of LWD was coordinated by the Sonoma RCD, the Gualala Redwoods, Inc (GRI) and the Gualala River Watershed Council (GRWC). A total of 491 logs was placed in the North Fork Gualala, Little North Fork Gualala River, Pepperwood Creek, Little Pepperwood Creek, Big Pepperwood Creek, Doty Creek, South Fork Gualala River, Groshong Gulch, Rockpile Creek, Buckeye Creek, and Robinson Creek to improve instream habitat. In 2018, TNC coordinated the decommissioning of six stream crossings and the redistribution of 31 pieces of LWD from a LDA that were blocking fish passage on Rockpile Creek.

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NaR-CCC-3.1.1.1	Install or enhance existing LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth (CDFG 2004). Focus on tributaries of Flynn Creek, North Fork Navarro, South Branch Navarro, and Mill Creek, Mendocino Co.	**Partially implemented** From 2012 to 2021, the Mendocino County RCD, TU, and the California Conservation Corps (CCC) coordinated the implementation of instream habitat projects to improve Coho Salmon habitat. Project areas included the Little North Fork Navarro River, Redwood Creek, Big Gulch, Spooner Creek, South Branch North Fork Navarro River, Cooks Creek, Neefus Gulch, North Fork Navarro River, North Branch North Fork Navarro River, Flynn Creek, John Smith Creek, and Bottom Creek. Approximately 1,071 pieces of LWD were used to create 649 structures across 137,112 feet of stream. Retreatment with LWD should be designed in locations where state and federal recovery plan wood loading targets were not met.
NoR-CCC-3.1.1.2	Install or enhance existing LWD, boulders, and other instream features to increase habitat complexity and improve pool frequency and depth (CDFG 2004). Use information, where germane, from MRC Noyo Watershed Analysis to determine stream locations with high instream LWD demand and utilize CDFG stream habitat data to help determine reaches for LWD placement. Core areas of the South Fork Noyo, Little North Fork Noyo and Redwood Creek are priorities for restoration of LWD, Mendocino Co.	**Partially implemented** Between 2006 and 2022, the CCC, TU, and the Mendocino Land Trust (MLT) coordinated the installation of 981 LWD structures in the mainstem Noyo River, Hayworth Creek, Kass Creek, North Fork Noyo River, McMullen Creek, Redwood Creek, North Fork of the South Fork Noyo River, South Fork Noyo River, Little North Fork Noyo River, Olds Creek, Marble Gulch, Gulch Seven, and Bear Gulch. FRGP funded large wood (LW) projects are ongoing in the North Fork Noyo River Watershed (Dewarren Creek and MFNF Noyo River (Grant #Q2010502)), and South Fork Noyo River Watershed (Brandon Gulch (Grant #Q2110506)). One LW project in McMullen Creek is proposed for FRGP in 2023. Projects funded by FRGP, starting in 2016, have been designed the Good or Very Good wood loading target ratings in state and federal recovery plans. Projects funded prior to 2016 should be assessed for wood loading and if they do not meet the highest wood loading targets in recovery plans, projects should be pursued to increase those project reach wood loading values to meet the Very Good wood loading target.

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PC-CCC-3.1.1.1	Implement a large woody debris supplementation program to increase stream complexity and gravel retention and improve pool frequency and depth in Pudding Creek, Mendocino Co. (CDFG 2004).	**Partially implemented** In 2015, TU coordinated the installation of 236 LWD structures throughout Pudding Creek, treating 80% of the watershed. Post treatment, habitat assessments indicated that wood densities were below the NOAA recommendations and therefore there may be a need for retreatment.
UsC-CCC-3.1.1.2	Mechanically recruit alder from floodplain surfaces into the stream channel of Usal Creek, Mendocino Co.	**Partially implemented** Between 2015 and 2016, TU and TNC coordinated the installation of 104 LWD structures in the South Fork Usal Creek and Julias Creek which included alders.

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P6	(1) Add LWD to Little North Fork Big River; (2) Establish connectivity to Dry Dock Gulch and Railroad Gulch; (3) Complete LWD installations in tributaries with insufficient wood in Big River, Mendocino Co.	**Partially implemented** (1) Completed two FRGP funded large wood projects on Little North Fork (2011 & 2018) and one Region Water Quality Control Board funded project (2018). (2) An evaluation and 30% conceptual restoration design of Dry Dock Gulch was completed by TU in May 2017. Final 100% engineered designs were completed in 2021, and project construction will occur in summer 2023.The project was funded by CDFW FRGP and NOAA Restoration Center. TU worked with State Parks to replace a culvert in lower Big River near Dry Dock Gulch in 2020. (3) Completed 24 LWD/sediment reduction, instream habitat enhancement from 2008-2019 including Berry Gulch, Daugherty Cr and South Daugherty Cr, Gates Cr, Johnson Cr, North Fork, South Fork, Russell Brook, East Branch North Fork, Two Log Cr, Ramon Cr, James Cr, and Manly Gulch. FRGP funded North Fork Big River and East Branch North Fork Big River projects were completed in 2020 and 2021 and resulted in 168 pieces of LW installed within a total of 1.57 miles of stream. There are two FRGP funded LW projects to be implemented by CCC in EBNF Big River by summer 2025.
P7	Add wood to Big Salmon tributaries not yet treated, Mendocino Co.	**Partially implemented** In 2012, TCF coordinated the installation of 178 LWD structures in Big Salmon Creek and Hazel Gulch.

Task ID	Recommendation	Implementation Status
P8	Add wood to Little North Fork Noyo River and Hare Creek, Mendocino Co.	**Partially implemented** Between 2013 and 2018, TU coordinated the installation of 99 LWD structures in the Little North Fork of the Noyo River. From 2019 to 2022, FRGP funded MLT/CCC and TU/Blencowe Watershed Management projects which installed a total of 330 pieces of LW within 3.72 miles of Hare Creek and 74 pieces of LW within 0.94 miles if Bunker Gulch.
P9	(1) Complete N. Fork and S. Fork Usal creek wood project and (2) conduct feasibility analysis of Lower Usal sediment removal or scouring; (3) Complete LWD enhancement on N. Fork to S. Fork Cottaneva Creek, Mendocino Co.	**Partially implemented** TU completed projects: (1) South Fork Usal Creek Instream Coho Habitat Enhancement Project Phase 1 (FRGP grant 2015) and Phase 2 (two non-FRGP grants 2016 - South Fork and Julius Cr). A total of 104 LWD structures was installed. Ongoing projects: three FRGP grants imitated in 2019 and 2020 (Soldier Creek, Julias Creek, West Fork Julias Creek Instream Habitat Enhancements). This project is complete but needs assessment and retreatment with set targets, ensuring there is increased habitat and enough to make geomorphic changes. FRGP funded Q2010520 - Bear Creek Instream Habitat Enhancement Project is to be implemented 2023. (2) A feasibility analysis has not been completed and needs a technical advisory team to be developed. (3) Between 2007 and 2012, the CCC and ERWIG coordinated the installation of 271 LWD structures on Cottaneva Creek, North Fork Cottaneva Creek, Dunn Creek, and South Fork Cottaneva Creek. The Dunn Creek Habitat Enhancement Project was initiated in 2019 and is ongoing (see recovery strategy MC-HU-18).

Task ID	Recommendation	Implementation Status
P10	Develop LWD projects in Pudding Creek and fund Pudding-Caspar BACI Validation monitoring proposal, Mendocino Co.	**Completed** In 2015, 80% of the Pudding Creek watershed was treated with large wood (See PC-CCC-3.1.1.1). A BACI experiment was designed, funded, and implemented through a partnership with CDFW, Lyme Timber, and TU to determine if the addition of large wood to coastal California streams increased Coho Salmon smolt production by increasing the amount and complexity of rearing and overwintering habitat. The study monitored the response of Coho salmon abundance, survival, growth, and habitat relative to an untreated reference stream (Caspar Creek). The BACI study was completed in spring of 2021. Results indicated that there was not a fish response to the wood treatment compared to the control watershed.

Task ID	Recommendation	Implementation Status
MC-HU-18	Introduce instream wood to improve shelter value, pool frequency, and pool depth. Focus on key streams for Coho Salmon, Mendocino Co.	**Partially implemented** **Usal Creek**: An FRGP funded LW project to be completed in summer 2023. **Cottaneva Creek:** Between 2007 and 2012, the CCC and ERWIG coordinated the installation of 271 LWD structures on Cottaneva Creek, North Fork Cottaneva Creek, Dunn Creek, and South Fork Cottaneva Creek. The Dunn Creek Habitat Enhancement Project was completed in 2020 (See recovery strategy P6). FRGP funded a LW project on MFNF Cottaneva Creek to be implemented in 2023. **Big Salmon R**: In 2012 the Conservation Fund coordinated the installation of 178 LWD structures in Big Salmon Creek and Hazel Gulch. **Albion R**: Between 2005 and 2018, the CCC and CA State Parks coordinated the installation of 150 LW structures in the main stem Albion River, North Fork Albion River, Glenbrook Gulch, and the South Fork Albion River. (See MC-AR-O1). **Pudding Cr:** In 2015, TU coordinated the installation of 236 LW structures throughout Pudding Creek (80% of the watershed) (See PC-CCC-3.1.1.1 and PC10). **Caspar Cr:** Was not treated between 2006 and 2020 because it is the untreated reference in the Pudding Cr BACI experiment. **Ten Mile R:** Between 2005 and 2018, the CCC and TU, TNC, and Campbell Timber/Blencowe Inc. coordinated the installation of approximately 627 LW structures in the South Fork Ten Mile River, the North Fork Ten Mile River, Middle Fork Ten Mile River, Bald Hill Creek, Campbell Creek, Churchman Creek, Redwood Creek, Mill Creek, and Smith Creek. Implementation of the South Fork Ten Mile River Coho Salmon Restoration Project began in 2018 and is phased to continue for ten years (See P11). **NF Navarro R:** Completed 18 LW projects. (See NaR-CCC-3.1.1.1). **North Fork Big R**: Completed two projects (2012-13, 2017) and three projects on East Branch (2013, 2016, and Ongoing in 2020) **SF Garcia R:** Coho Habitat Enhancement Project completed by TU (2014). **NF Gualala River**: (See GuaR-CCC-6.1.1.1).

Task ID	Recommendation	Implementation Status
MC-AR-01	Place instream structures to improve gravel retention and habitat complexity in the Albion River, Mendocino Co.	**Partially implemented** Between 2005 and 2018, the CCC and CA State Parks coordinated the installation of 150 LWD structures in the main stem Albion River, North Fork Albion River, Glenbrook Gulch, and the South Fork Albion River. In 2020, the Albion Coho habitat enhancement-project was completed. FRGP funded Q1910512 - Albion River Coho Habitat Enhancement Project - Large Wood Installation was initiated with LW designs to be completed for high-risk locations on mainstem Albion and NF Albion in 2023.
TMR-CCC-11.1.1.1	Plant native vegetation to promote streamside shade where otherwise deficient in the Ten Mile River, Mendocino Co. (i.e., lower reaches of North Fork and South Fork).	**Partially implemented** From 2018-2021, TNC completed several major planting efforts on the lower South Fork Ten Mile and mainstem Ten Mile as part of the riparian restoration projects on the Smith and Parker Ranches. In addition, improvements in the Forest Practice Rules and the acquisition of two conservation easements by TNC in the lower watershed have resulted in improved recruitment of native vegetation along the lower North Fork and South Fork Ten Mile River.
GaR-CCC-8.1.1.2	Complete the remaining 25% of erosion control sites identified in the South Fork Garcia River by the Trout Unlimited North Coast Coho Project, Mendocino Co.	**Completed** In 2007, between 27 July 2007 and 3 November 2007, PWA supervised treatment along more than 6 mi of road and 40 individual erosion sites in 5 un-named sub-watersheds, and along the main stem of the South Fork Garcia River. Road upgrading totaled approximately 5.4 mi; decommissioning totaled approximately 0.7 mi. The completion of this Phase 2 implementation project signifies the completion of efforts to minimize the effects of controllable man-caused, road-related accelerated erosion and sediment delivery throughout a sub-watershed in the Garcia River basin, thereby meeting the sediment reduction targets established by the North Coast Regional Water Quality Control Board (NCRWQCB) in the Action Plan for the Garcia River Watershed Sediment TMDL Implementation Plan.

Task ID	Recommendation	Implementation Status
GR-CCC-23.1.1.4	Restoration projects that upgrade or decommission high risk roads in Core areas should be considered an extremely high priority for funding (e.g., PCSRF). Where no Core areas are designated, apply this action to Phase I areas.	**Partially implemented** Between 2007 and 2009, bank stabilization and erosion control treatments were implemented on more than 11 miles of road along Inman Creek to reduce sediment yields to the Garcia Watershed. Between July 2010 and October 2011, PWA supervised the completion of erosion control and erosion prevention treatments along approximately 7.9 mi of road and at 60 individual sediment delivery sites on TCF property in the Signal Creek basin. Road upgrading totaled approximately 5.02 mi, and road decommissioning totaled approximately 2.88 mi. Between June 16, 2012, and October 9, 2013, PWA supervised the upgrade and decommissioning of 12 targeted roads and road segments within the Inman Creek Watershed, as part of the Inman Creek Phase II Sediment Control and Instream Implementation Project, Mendocino County, California. Approximately 3.74 miles of road were treated with road upgrading treatments and approximately 5.52 miles of road were decommissioned. Between 3 August 2016 and 30 October 2017, PWA supervised the on-the-ground implementation of upgrading and decommissioning treatments to reduce road related sediment delivery to Grafite Creek through watercourses on roads totaling 7.1 mi in length. Between 29 July 2014 and 31 October 2017, PWA supervised the on-the-ground implementation of upgrading and decommissioning treatments to reduce road related sediment delivery to the mainstem Garcia River through watercourses on roads totaling 7.23 mi in length.

Task ID	Recommendation	Implementation Status
		In 2018, 3.87 miles of road were decommissioned, and 300 acres of upland habitat were treated along Blue Waterhole Creek to reduce sediment yields.
GR-CCC-9.1.1.6	Continue the implementation of the Garcia River TMDL and associated sediment reduction efforts, Mendocino Co.	**Completed** Between 27 July 2007 and 3 November 2007, PWA supervised treatment along more than 6 mi of road and 40 individual erosion sites in 5 unnamed sub-watersheds, and along the main stem of the South Fork Garcia River. Road upgrading totaled approximately 5.4 mi; decommissioning totaled approximately 0.7 mi. This project signified the completion of efforts to minimize the effects of controllable man-caused, road-related accelerated erosion and sediment delivery throughout a sub-watershed in the Garcia River basin, thereby meeting the sediment reduction targets established by the NCRWQCB in the Action Plan for the Garcia River Watershed Sediment TMDL Implementation Plan.
NaR-CCC-9.1.1.1	Address high and medium priority sediment delivery sites as identified by the Mendocino RCD, Mendocino Redwoods Company, or other credible assessments, Mendocino Co.	**Partially implemented** In 2015, TU coordinated the decommissioning of 4.4 miles of road, and the improvement of an additional one mile of active road to reduce sediment yields to the adjacent North Fork Navarro River.

Task ID	Recommendation	Implementation Status
PC-CCC-11.1.1.1	Develop a Road Sediment Reduction Plan that prioritizes sites and outlines implementation and a timeline of necessary actions. Include County of Mendocino in regard to inclusion of Sherwood Ridge Road.	**Partially implemented** PWA completed a road assessment within the Pudding Creek watershed in 2001. As a result, in 2005, PWA coordinated the remediation of 46 sites along 6.2 miles of roads within Hawthorne Timber Company, LLC, Road improvements within the Pudding Creek watershed remediated approximately 14,006 cubic yards of potential sediment delivery to streams inhabited by salmonids. Road treatments were implemented during timber harvest plans. No specific road sediment reduction plan has been developed.
GR-CCC-2.1.1.2	Work with landowners and encourage rehabilitation activities within the lower Hathaway Creek area in efforts to enhance backwater/off-channel and floodplain habitat for winter rearing salmonids in the Garcia River, Mendocino Co.	**Partially implemented** Planning and design work for restoring the Garcia Estuary Enhancement Project was completed by TNC in 2018. See MC-GA-06. Conceptual ideas concerning lower Hathaway Creek are included in the estuary enhancement plan. The Garcia Estuary Enhancement Project construction began in summer 2022 in the middle estuary, and potential future phases include Hathaway Creek.
GR-CCC-2.1.1.3	Identify, design, and implement rehabilitation projects that target winter rearing floodplain habitat within the lower reaches of the Garcia River, Mendocino Co.	**In planning phase** TNC is currently in the early phases of a project to develop a restoration plan for 12 miles of the mainstem Garcia River and the adjacent floodplains and tributary confluences for the reach between Highway 1 and the South Fork confluence. If funding is secured, this restoration plan is scheduled to be completed by mid-2026. Design and implementation of projects identified in the restoration plan will follow.

Task ID	Recommendation	Implementation Status
PC-CCC-1.1.2.1	Repair dam as appropriate to maintain over wintering habitat in the Pudding Creek estuary, Mendocino Co. (CDFG 2004).	**In planning phase** The dam was damaged in 2016 following a high flow event. Repair is not recommended. TNC and TU were coordinating preliminary stages of planning a dam removal effort and estuary restoration in fall 2020. Sediment upstream of the dam needs testing prior to removal.
PC-CCC-1.1.3.1	Improve dissolved oxygen concentrations in the Pudding Creek impoundment from installation of aeration devices (such as SolarBees), Mendocino Co.	**Partially implemented** In 2014, the Campbell Timberland Management undertook a nearly yearlong study of dissolved oxygen (DO) in Pudding Creek Pond and determined that DO levels were detrimental to salmonids throughout most of the non-rainy season) A dam removal is recommended to improve dissolved oxygen levels.
P11	(1) Create/restore lower river floodplain winter habitat in the Ten Mile River; (2) Add LWD to streams lacking cover and wood; (3) Get site control to secure landowner permission along Ten Mile River, Mendocino Co.	**Partially implemented** (1) TNC developed the lower Ten Mile River habitat enhancement plan focusing primarily on floodplain reconnection and winter habitat for Coho salmon in the lower mainstem and lower South Fork Ten Mile River. The enhancement plan includes 20 concept sites for the South Fork and 12 concept sites for the mainstem. As part of this multi-phase multi-year project, three phases of implementation were completed from 2018-2022, including construction of eight sites on the South Fork and two sites on the Mainstem. In total, approximately 1,500 linear feet of stream have been treated with the installation of engineered large wood structures and over 5 acres of off-channel and side-channel habitat has been created. In 2023, two projects, one on the South Fork and one on the Mainstem, are currently being designed and are scheduled for construction in 2024 and 2025. Future phases are expected to systematically implement all of the concept sites identified in the enhancement plan.

Task ID	Recommendation	Implementation Status
		(2) From 2005-2018, approximately 40 miles of river habitat was treated with LWD. See MC-HU-18 for specific tributaries. Many sites will need retreatment to meet desired wood loading goals. (3) TNC acquired conservation easements in the lower watershed in 2011. TNC also acquired fee title to 42 acres of floodplain along the South Fork Ten Mile in 2022.
PC-CCC-8.1.1.2	Promote the re-vegetation of the native riparian plant community within inset floodplains and riparian corridors to ameliorate instream temperature and provide a source of future large woody debris recruitment.	Fenced cattle from creek in 2010 in Little Valley, and cattle were subsequently removed. The result was some passive riparian corridor restoration.
RW-ES-02	Restore estuarine and associated wetland ecosystems in streams of the Santa Cruz Mountains Diversity Stratum.	**Partially implemented** Active management of the Pescadero Creek Lagoon prevented significant fish kills in 2017, 2018, 2019, and 2021. A sandbag dam was installed in August 2017 to prevent or reduce anoxic water and sediment from entering the main lagoon. In 2019, with funding from the NOAA RC and CA State Parks, the San Mateo RCD completed the Butano Creek Hydrologic Reconnection Project which dredged approximately 70,000 cubic yards of sediment from Butano Creek, improving fish passage to 8.3 miles of upstream habitat. The dredged sediment was beneficially reused to fill in channels contributing to leaching anoxic sediments. The sandbag dam was replaced with a more permanent structure.

Task ID	Recommendation	Implementation Status
SM-HU-08	Restore Coho Salmon passage in San Gregorio Creek, San Mateo Co.	**Partially implemented.** The San Mateo RCD received FRGP funds to remove the Alpine Creek fish ladder and provide full passage through the reach. Implementation of the project was completed in 2019 and designs are in progress for the next barrier upstream in Mindego Creek.
SGC-CCC-3.1.1.2	Increase habitat complexity and pool frequency in San Gregorio Creek, San Mateo Co.	**Partially implemented** The San Mateo RCD has implemented two phases of large woody debris (LWD) placement in San Gregorio Creek in 2016 and 2017, consisting of 27 LWD structures over 0.8 miles of stream.

Task ID	Recommendation	Implementation Status
RR-CCC-1.1.1.1	Restore estuarine habitat and the associated wetlands and sloughs in the Russian River, Sonoma Co.	**Partially implemented** In 2011, through grants to Stewards of the Coast and Redwoods, a new bridge was constructed over the thalweg of Willow Creek to remediate fish passage at that site. In 2012, two accelerated large wood projects were implemented in Willow Creek from Hunters Camp downstream to the Third Bridge location. In 2014, off-channel winter refugia habitat was constructed by Gold Ridge RCD along Green Valley Creek at the Thomas Creek Ranch. In 2019 Gold Ridge RCD started a grant to design off channel flood plain habitat along Green Valley Creek just below the Atascadero confluence on the Sweetwater property. These designs should be complete in the coming years. As of fall 2020, As of 2020, Gold Ridge RCD has designs and specifications for a construction ready instream habitat project to enhance off-channel winter refugia habitat along Green Valley Creek and Atascadero Creek near the Green Valley-Atascadero Creek confluence. This project is seeking funding to implement. As of fall 2020 construction ready plans and specifications are complete for an instream habitat project to create off-channel winter refugia habitat on Mark West Creek at the Mark West Creek Regional Park. This project, led by TU, needs funding to implement. Sonoma RCD has been seeking funds to start the planning process to design off channel flood plain habitat along Mark West Creek at the site of an old golf course. This project has the unique opportunity to improve instream habitat and off channel rearing in an urban setting. This planning project is looking for funding to further develop the concept and project designs. Preliminary discussions between NOAA RC, CDFW and California State Parks have taken place to further investigate the possibility of developing off channel flood plain habitat in the Willow Creek watershed along Pomo Creek and at third bridge.

Task ID	Recommendation	Implementation Status
RR-CCC-1.1.1.2	Utilize adaptive management to guide future estuary management in the Russian River, Sonoma Co.	**In planning phase** Sonoma Water is leading an Estuary Management Project whose purpose is to enhance summer habitat for young steelhead and Coho Salmon while minimizing flood risk in the estuary. This project is ongoing.
RR-CCC-6.1.2.4	Improve passage at existing County culvert barriers on Pole Mountain Creek, Kidd Creek and Kohute Gulch, Sonoma Co.	**In planning phase** In 2020, TU completed designs for a fish passage project at the first (downstream-most) ford on Kidd Creek. This project also developed conceptual upgrades to the second and third ford crossings on Kidd Creek. This project needs funding to implement. Kohute Gulch had its habitat assessed and was found to lack wetted habitat in the fall. Half of the 5800 feet surveyed in 2008 was dry. Additionally, Kohute Gulch lacks shelter and is heavily impacted by road-related sediment. Once new information is available that quantifies wetted habitat suitable for summer rearing of salmonids, the Department may reprioritize restoration actions on this stream. At this time, replacing the Austin Creek Road culvert at Kohute Gulch would only allow steelhead access to a severely impaired dry stream.

Task ID	Recommendation	Implementation Status
P12	Determine what high priority fish passage barriers still exist in the Russian River, Sonoma Co.	**Partially implemented** In 2017 a private culvert over Green Valley Creek was replaced. The weirs intended to take up the grade throughout the project have not performed as intended and need to be modified and repaired. Gold Ridge RCD tried to secure funding in 2019 and was unsuccessful. This important fish passage project needs funding to refine the plans and then funding to implement the modifications and repairs. There is a barrier on Mission Creek, tributary to Hulbert Creek, which blocks passage for Coho Salmon and steelhead. Sonoma RCD is assessing this situation.
P13	Resolve road flooding and investigate passage issues on Green Valley Creek, Sonoma Co.	**In planning phase** Sonoma County Board of Supervisors directed Sonoma Water to initiate this effort in 2016. Emergency channel excavation was completed by Sonoma Water in winter 2017. As of 2020 the County is continuing its commitment to alleviating flooding over the county road by seeking permits to implement project designs.
RR-CCC-6.1.2.12	Evaluate and implement passage improvement opportunities in the Maacama Creek sub-watershed and its tributaries, Sonoma Co.	**Partially implemented** One barrier on Yellowjacket Creek was removed by TU in 2018 with funding from an FRGP grant. A ford crossing barrier was removed from Redwood Creek in 2011, funded by FRGP. There are other barriers in the system related to water diversion dams on Redwood and Kellogg Creeks. These barriers require landowner support, a fiscal sponsor and funding to investigate, design and implement. The success of the Yellowjacket Creek project may influence other landowners and water rights holders to pursue future planning and passage remediation projects.

Task ID	Recommendation	Implementation Status
RR-CCC-6.1.2.2	Remove or modify the flashboard dam on lower Mill Creek, Sonoma Co.	**Completed** This project was completed in 2016, and adult Coho Salmon were observed upstream of the dam site the first winter after removal of the dam.
RR-CCC-6.1.2.7	Improve passage at sites identified in Mill, Pena and Grape creeks, Sonoma Co.	**Partially implemented** In 2012, the upper Mill Creek cobble and cement plug was removed, and fish passage was restored at this site. A boulder placed by CDFW staff and the former landowner in the mid-2000s remains in place.
RR-CCC-3.1.3.2	Increase shelter ratings to optimal conditions (>80 pool shelter value) in all reaches of Green Valley, Purrington, Atascadero, Redwood, Jonive, Castellini and Sexton creeks, Sonoma Co.	**Partially implemented** Gold Ridge RCD collects basic water quality data for Atascadero to complement the Green Valley Creek watershed plan. The RCD is developing off-channel and floodplain habitat at the Green Valley Creek-Atascadero Creek confluence and farther downstream on Green Valley Creek. As of 2020, Gold Ridge RCD completed designs and specifications for instream habitat enhancements on a large upper Green Valley Creek property. This project needs funding to be implemented. In 2019 and 2020 Gold Ridge RCD sought funding to implement instream habitat on an upper Green Valley Creek property. These designs and plans need minor refinements and funding to implement. Gold Ridge RCD began assessing the upper watersheds of Atascadero Creek for fish passage and habitat enhancement opportunities in 2019.
RR-CCC-3.1.3.3	Increase shelter ratings to optimal conditions (>80 pool shelter value) in select reaches of Austin, Bearpen, Black Rock, Kidd, Kohute Gulch, Clear, Ward, Pole Mountain, Blue Jay, Tiny, and Ward creeks	**Partially implemented** Water quality (high temperatures) and physical access via roads to the creek have hampered conceptual planning efforts. O'Connor Environmental Inc. has completed conceptual designs for floodplain and habitat enhancement on East Austin that should be discussed and investigated for further development. The 2020 Walbridge fire has renewed

Task ID	Recommendation	Implementation Status
	and Holmes Canyon Creek, Sonoma Co.	interest in East Austin habitat projects. Preliminary discussions between TU, NOAA RC, CA State Parks have begun. This very preliminary effort will require funding to develop designs and funding to implement the designs when they are ready. Kidd Creek planning efforts have focused on remediating fish passage before developing habitat projects.
P15	Enhance lower Mill Creek over-summering juvenile habitat.	**In planning phase** Lower Mill Creek is a migration corridor through a deep alluvial reach that naturally dries each summer. In 2018, Sonoma RCD began developing a plan to model water availability in lower Mill Creek. The modeled and observed wetted summer rearing habitat will be used to prioritize restoration activities in this reach. In 2020 a grant to develop instream habitat designs for a portion of Mill Creek was funded. Designs from this project should be developed over the coming years. In 2020, the Walbridge fire burned over most of the Mill Creek watershed. Mill Creek will need large investments in project planning and design, then funding to begin reintroducing large wood for instream habitat throughout this watershed.

Task ID	Recommendation	Implementation Status
RR-CCC-18.2.3.5	Fence riparian areas within the Dry Creek watershed to exclude cattle, Sonoma Co.	**Partially implemented / In planning phase** Landowners on Pechaco Creek ceased grazing cattle, and riparian vegetation dramatically recovered. Returning to grazing remains a possibility. Efforts to fence Pena Creek were resisted by the landowner. Additionally, the steep terrain makes riparian fencing very difficult and expensive to plan and install. Currently, there is no landowner support to maintain fencing if it were installed. In 2020, the Walbridge fire burned over the Pena and Pechaco watersheds. Land use should be monitored to determine if livestock grazing and associated riparian impacts return to these watersheds.
P16	Use salmon carcasses or analogs to provide nutrients in Russian River tributaries, Sonoma Co.	**Partially implemented** NOAA Fisheries staff initiated a pilot project using salmon carcass analogs on Devil Creek. Comprehensive results of the pilot project have not yet been reported. Coho Salmon carcasses not treated with hormones from Don Clausen Fish Hatchery are placed annually in Green Valley Creek and other lower Russian River tributaries. The effectiveness of this treatment has not been studied scientifically.
RR-CCC-3.1.4.2	Increase riffle frequency in Green Valley Creek and other Russian River tributaries, Sonoma Co.	**In planning phase** As of 2020, Gold Ridge RCD completed designs and specifications for instream habitat enhancements on a large upper Green Valley Creek property. This project needs funding for implementation. In 2019 and 2020, Gold Ridge RCD sought funding to implement instream habitat on an upper

Task ID	Recommendation	Implementation Status
		Green Valley Creek property. These designs and plans need minor refinements and funding to implement.
RR-CCC-23.1.1.2	In the Russian River watershed, implement results of existing sediment source surveys, and assess remaining watershed road networks to eliminate high priority and high sediment yield sources. Upgrade and decommission sites and road networks where appropriate. These actions include outsloping roads, ditch relief culverts, and installing rolling dips.	**In planning phase** The 2017 Tubbs Fire, the 2020 Walbridge Fire and the 2020 Glass Fire burned over many of the Russian River Coho Salmon tributaries. Fire suppression, burn site cleanup, salvage logging and general increased traffic in these burned watersheds has revealed the vulnerability and fragility of the unpaved road networks. Renewed efforts to inventory, assess and implement road related sediment delivery reduction to local streams should be implemented in the following watersheds: East Austin Creek and all tributaries, Pena Creek and tributaries, Grape Creek and Wine Creek, Mill Creek and tributaries, Porter Creek and tributaries, Hulbert Creek and tributaries, and Mark West Creek and tributaries.

Table 2. Recommendations from the Captive Rearing and Rescue Technical Work Group and implementation status. A complete description of each recommendation can be found in the Captive Rearing and Rescue section of the PACT report (CDFW 2019. Source of recommendations are listed by their original task identifiers from State and Federal recovery plans, except those denoted by "P" which indicates partner organization supported recommendation developed during the TWG proceedings. The implementation status of these recommendations is reported here as: Completed; Partially implemented; or In planning phase. Some actions reflect the implementation status of work preceding commencement of the PACT Initiative in 2011.

Task ID	Recommendation	Implementation Status
ESU-2	Continue to develop and implement the Coastal Salmonid Monitoring Program (CMP) in the CCC Coho Salmon ESU.	**Partially implemented** The California Monitoring Plan (formerly California Coastal Monitoring Plan) is being implemented in various watersheds within the CCC ESU, including the coastal Mendocino County watersheds, Russian River basin (Sonoma Co.), Lagunitas Creek watershed, and Scott Creek (Santa Cruz Co.).. This work is primarily funded through the Pacific Coastal Salmon Recovery Fund.
SSF-1	Build a new regional Coho Salmon conservation hatchery in the CCC Coho Salmon ESU south of San Francisco.	**In planning phase** A collaborative effort between NOAA Fisheries and CDFW currently in progress has identified several potential locations for a regional conservation hatchery, determined relevant hatchery specifications, and secured adequate funding for a feasibility study to develop generic hatchery designs and evaluate some potential locations regarding their suitability. The new conservation hatchery would primarily serve to restore Coho Salmon populations south of San Francisco Bay. In 2020, NOAA provided $300,000 in grant funding for a conservation hatchery feasibility study. A technical work group with members from NOAA NMFS, USACE and CDFW has developed a Statement of Qualification (SOQ) for the feasibility study. The SOQ was advertised publicly to prospective applicants in April 2023, and CDFW is currently in the process of evaluating applications and selecting a contractor to develop the feasibility analysis.

Task ID	Recommendation	Implementation Status
SSF-2	Provide logistical and financial support and resolve all outstanding permitting issues at the Kingfisher Flat Hatchery facility, to ensure maximum productivity and effectiveness of the MBSTP/NOAA Coho Salmon recovery hatchery program on Scott Creek until a new regional Coho Salmon recovery facility is operational.	**Partially implemented** Operation of the Southern Coho Salmon Captive Broodstock Program at Kingfisher Flat Hatchery is funded primarily through grants provided by CDFW via FRGP and drought funds. A new 3-year contract was signed in 2022. A Hatchery and Genetic Management Plan has been prepared for the Program, and the issuance of an ESA Section 10 (a)(1)(A) enhancement permit is expected to occur in 2023. The CZU Lightning Complex Fire of 2020 destroyed significant parts of Kingfisher Flat Hatchery. Efforts to secure sufficient repair funding and to fully repair the facility are ongoing. In 2020, NOAA provided $132,000 in grant funding (with an additional $65,000 in 2022) to replace circular tanks destroyed in the fire. Tanks were delivered and installed in 2022. The remaining grant funds will be used to pay for Big Creek bank stabilization work and instream biological monitoring during the bridge replacement in 2023 and 2024.
RR-1 (a)	Develop a Don Clausen Fish Hatchery Expansion Plan to provide for: a) a production capacity increase to 800 spawners, 1 million eggs and 500,000 juvenile Coho Salmon annually (as described in the DCFH Coho Salmon HGMP)	**Partially implemented** The Don Clausen Fish Hatchery Coho Salmon Hatchery and Genetic Management Plan has been approved by NOAA Fisheries and a Section 10(a)(1)(A) permit has been issued. The permit includes an annual production capacity of 1,500 spawners, 1,000,000 eggs, and 500,000 juveniles. Facility expansion is under discussion among the resource agencies.

Task ID	Recommendation	Implementation Status
RR-2	Fund and implement projects identified through PACT that address factors currently limiting Coho Salmon production in all current RRCSCBP program streams and other Russian River tributaries and regional watersheds where Coho Salmon are likely to be released through the recovery hatchery program.	**In planning phase** Discussions to link Fisheries Restoration Grants Program funds to recommendations of the PACT report are ongoing.
MSC-1	Continue to capture juvenile Lagunitas/Olema Creek Coho Salmon for use in the Russian River Coho Salmon Captive Broodstock Program, while also monitoring wild Coho Salmon populations (and the captive Coho Salmon) for genetic integrity.	**Partially implemented** This recommendation has been implemented annually since 2009. Continued spread of New Zealand Mud Snail in Lagunitas Creek has limited collection of juvenile Coho broodstock to Olema Creek in recent years.
MSC-3	For Redwood Creek (Marin Co.), develop a rescue rearing program to re-stock rescued fish as adults (or other captive rearing program, if appropriate).	**Completed** The Redwood Creek Coho Salmon Captive Rearing Program was initiated in 2014 and involves the capture of juvenile Coho Salmon from Redwood Creek for three consecutive summers (2014-16), followed by release of the adult Coho Salmon back in Redwood Creek (winter 2016-18) and concomitant analysis of genetic identity of the resulting F_1 generations following each adult release. Genetic monitoring was supported by a grant from the FRGP. The grant was closed in 2020. In 2022, the RRCSCBP TAC recommended to include Redwood Creek Coho Salmon in the RRCSCBP for out-of-basin broodstock collections and potential rescue rearing of Redwood Creek Coho.

Task ID	Recommendation	Implementation Status
MSC-4	In Salmon Creek (Sonoma Co.), continue the adult Coho Salmon release program until captive rearing targets or other specified management targets are achieved.	**Partially implemented** This recommendation has been implemented annually since 2008. No specific management objective has been formulated besides the abundance target set in the PACT Report.
MSC-5	In Walker Creek (Marin Co.), continue to release Coho Salmon not used for outbreeding purposes at DCFH until captive rearing targets or other specified management targets are achieved.	**Partially implemented** In Walker Creek, juvenile Coho Salmon have been released annually since 2008, and adult Coho Salmon were released in 2003-05. In addition, surplus adult Coho Salmon from the RRCSCBP have been released annually in Walker Creek since winter 2017. No specific management objective has been formulated besides the abundance target set in the PACT Report. Release of adult Coho in Walker Creek is expected to continue in winter 2024 and beyond. Evaluation of the success of the adult Coho releases and the extent of natural production in Walker Creek will be evaluated through genetic parentage analysis of unmarked (i.e., natural origin) juvenile Coho tissue samples collected during outmigrant trapping in spring 2023 and 2024.
MSC-6	Provide financial support for a robust monitoring and evaluation program to determine the effectiveness of different release sites and strategies.	**Partially implemented** The Russian River Coho Salmon Monitoring Program is funded by USACE. In addition, life cycle monitoring for Coho Salmon is funded through USACE and the 2008 Russian River Biological Opinion (RRBiOp). A new RRBiOp is currently under development. Basinwide CMP monitoring for Coho Salmon is funded through an annual grant from the Pacific Coastal Salmon Recovery Fund (PCSRF). Salmonid population monitoring in Lagunitas Creek watershed (including Olema Creek) is implemented by Marin Water and National Park Service. Population monitoring in Walker Creek and Redwood Creek is primarily implemented by Marin Water and National Park Service, respectively. CDFW has operated a downstream

Task ID	Recommendation	Implementation Status
		migrant trap on Walker Creek in 2022 and 2023 and will continue that effort in 2024. No systematic monitoring is done in Salmon Creek (Sonoma Co.).
CMC-1	Focus evaluation of captive rearing projects on Historically Independent Populations (Ten Mile, Noyo, Big, Albion, Navarro, Garcia, and Gualala Rivers) with adult abundance status near or below the NOAA 2012 high risk depensation thresholds.	**Partially implemented** NOAA Fisheries and CDFW initiated the Mendocino Coho Salmon Supplementation Project in 2018, which involved the capture of juvenile Coho Salmon from the Garcia River and Navarro River for captive rearing at DCFH, and subsequent release as adults in the rivers of origin. Juvenile Coho Salmon were collected annually in summer 2018, 2019, and 2020, reared at DCFH, and released as adults in December 2020, 2021, and 2022. As of early 2023, evaluation of the project and options for a full recovery program are being completed. Preliminary monitoring by spawning surveys and juvenile genetic analysis has shown some evidence of successful spawning of project fish. Other Independent Population watersheds were not below high depensation thresholds.
CMC-2	Due to low population status of Coho Salmon and extirpation of year classes, give highest priority to the evaluation of captive rearing for Coho Salmon in the Navarro Point-Gualala Point Diversity Stratum.	**Partially implemented** A pilot captive rearing project was initiated within the Garcia River and Navarro River (CMC-1) due to low population estimates. The Gualala River population is extirpated.
CMC-3	Conduct summer juvenile salmonid population spatial structure surveys in the Navarro-Gualala Point Diversity Strata to locate and evaluate the potential and suitability for broodstock collection.	**Partially implemented** Surveys were conducted to determine juvenile Coho Salmon distribution and relative abundance as a component of Mendocino Coho Salmon Supplementation Project. Any future supplementation project would require juvenile monitoring.

Task ID	Recommendation	Implementation Status
CMC-4	Evaluate the feasibility of expanding the Russian River Coho Salmon Captive Broodstock Program (RRCSCBP) to facilitate and support captive rearing projects in coastal Mendocino County streams.	**Partially implemented** The DCFH HGMP was completed in 2017 and includes federal take coverage for Mendocino County streams. Formal discussions regarding a potential expansion of the RRCSCBP have not been initiated; however, informal discussions regarding the allocation of circular holding tanks at DCFH for the purpose of rearing out-of-basin Coho Salmon (e.g., Mendocino County Coho populations) are currently ongoing.

Table 3. Region-wide recommendations from the Instream Flow and Conservation Technical Work Group and implementation status. A complete description of each recommendation can be found in Table 6 of the PACT report (CDFW 2019). Source of recommendations are listed by their original task identifiers from State and Federal recovery plans, except those denoted by "P" which indicates partner organization supported recommendation developed during the TWG proceedings. The implementation status of these recommendations is reported here as: Completed; Partially implemented; or In planning phase. Some actions reflect the implementation status of work preceding commencement of the PACT Initiative in 2011. Additional watershed-specific priority recommendations can be found in the Instream Flow and Conservation section of the PACT report (2019), however the implementation status of these is not available at this time (PACT 2019).

Task ID	Recommendation	Implementation Status
IFC-1	Instream Gauging	**Partially implemented** In 2018, TNC completed a statewide inventory of stream flow gauging that included rankings of "adequacy". This product, called Gage Gap, includes all the PACT priority watersheds and is available online at https://gagegap.codefornature.org/. The City of Santa Cruz supports some gauging in the anadromous reaches of Laguna Creek, Liddell Creek, Majors Creek, Newell Creek, and the San Lorenzo River as part of its Habitat Conservation Plan. UCSC/Cal Poly San Luis Obispo is actively investigating flow issues in Scott Creek. The San Lorenzo Valley Water District has seasonal gauges in Bean and Zayante creeks (San Lorenzo River). The Santa Cruz Mid-County Groundwater Sustainability Plan includes gauging at multiple locations on Soquel Creek. Additional instream flow gauges procured by CDFW with 2021 drought funding were installed in Russian River tributaries in 2022, and more flow gauges may be installed in 2023. Bay Delta

Task ID	Recommendation	Implementation Status
		Region Drought Stressor Monitoring staff are in discussions with Trout Unlimited on how to potentially expand TU's flow gauge network and collaborate on the installation and maintenance of the gauges.
IFC-2	Instream Flow Studies	**Partially implemented** To address the California Water Action Plan, CDFW has conducted several studies in the Mark West Creek watershed. Watershed-wide flow criteria were determined using a combination of site-specific methods and analyses based on functional flows to support salmonid life stages, maintain natural flow patterns, and support the riverine ecosystem throughout the watershed. Gallo Wines has partnered with University of California Sea Grant (CA Sea Grant) and UC Berkeley to research flow/habitat and survival relationships in Porter Creek (tributary to the Russian River). This effort involves the relationship between flow and foraging behavior. CA Sea Grant is continuing its research in Russian River tributaries on the survival of hatchery Coho Salmon related to multiple habitat features, including flow metrics. CDFW is partnering with the NCRWQCB and UC Sea Grant to research the relationship between flow and dissolved oxygen with the goal of establishing flow objectives for Basin Plan Amendments. CDFW staff have been participating in the California Environmental Flows Workgroup. The mission of the workgroup is to advance the science of ecological flows assessment and its application for supporting management decisions aimed at balancing natural resource needs with consumptive water uses to establish environmental flows. The workgroup provides a forum for coordination and technical exchanges among government agencies, academic institutions, tribes, and non-governmental organizations in California focused on understanding environmental flow needs and establishing ecological flow criteria grounded in science.

Task ID	Recommendation	Implementation Status
IFC-3	Develop Water Storage	**Partially implemented** Multiple storage and diversion forbearance projects are under development, supported by FRGP or Proposition 1 grants, including Dutch Bill Creek, San Gregorio Creek, and Pescadero Creek.
IFC-4	Compliance for Permitted Diverters and Dischargers	**In planning phase** CDFW is planning a Coho Flow Initiative (CFI) aimed at creating a watershed-level approach to Coho Salmon recovery, which will include coordinated outreach, restoration, permit compliance, enforcement, and agency coordination in one or more priority watersheds.
IFC-5	Minimize Illegal Diversions and Discharges	**In planning phase** See IFC-4 above.
IFC-6	Regulatory Streamlining	**In planning phase** NOAA Fisheries is developing a Safe Harbor Agreement process to promote future voluntary flow releases. An interagency working group made up of representatives from CDFW, NMFS, the Water Board and TU started meeting in Spring 2020 to discuss ways in which agencies can coordinate to streamline the regulatory process for flow enhancement projects. Additional permit streamlining will be provided through the CDFW Cutting-the-Green-Tape Program.
IFC-7	Enhance Summer Base Flow	**Partially implemented** Trout Unlimited (TU) and CDFW assisted Camp Meeker Recreation and Park District in filing a Change Petition with the State Water Resources Control Board to modify their water rights to enable future flow releases in Dutch Bill Creek (tributary to the Russian River). CDFW has partnered with TNC, TU and CalTrout to apply the Modified Percent of Flow (mPOF) method to the Pescadero Creek watershed. This will establish the technical foundation for a comprehensive

Task ID	Recommendation	Implementation Status
		stream flow re-allocation strategy to benefit Coho Salmon (see CFI above). CDFW is working with TU and the San Mateo County RCD on two SAAs for projects in the San Gregorio Watershed where landowners are voluntarily modifying their riparian water rights to obtain an appropriative right to store water which allows them to limit their season of diversion and enhance dry season stream flows in San Gregorio Creek for the benefit of Coho. The San Mateo RCD, TU and other local partners have initiated the 100 Ponds Project on agricultural properties in San Mateo County. The goal of the project is to establish farm ponds, and other storage facilities, on agricultural properties that are filled from regional streams during higher winter flows. The pond water is then used to reduce reliance on dry season diversions. Completed projects include the Repetto Farms Farm Project, the Harley Farms Reservoir, the Blue House Farm Pond, Carpy Ranch Pond, and Butano Farms Pond. In 2022, CDFW and partner organizations collaborated on a stream flow augmentation project in Dutch Bill Creek that increased summer base flow and presumably helped juvenile Coho Salmon survive in the creek during the critical dry season. Data interpretation from this project are currently being evaluated.
IFC-8	Public Outreach	**In planning phase** In summer of 2020 CDFW, NMFS and the Water Board developed, and distributed, water conservation outreach materials targeted at residents in the Russian River tributary watersheds with the goal of raising awareness about the crucially low flows this year and providing information water conservation efforts that could be implemented to maintain as much of the instream flow in these streams as possible until the rain starts in order to protect Coho Salmon. See IFC-4 above.

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