

Balancing Conservation and Community: Steelhead Trout in the Carmel River Watershed

I. Introduction

The Carmel River drains 255 square miles of the central coast of California. Its headwaters originate in the Santa Lucia Mountains, then descend and merge with seven tributaries before emptying into Carmel Bay.¹ Once home to one of the most productive runs of steelhead trout south of San Francisco,² the River embodies the broader crisis of California's strained freshwater systems. Dams, groundwater pumping, and channel modification have degraded the River's habitat and reduced instream flow.³ Meanwhile, surrounding communities rely on the River and its alluvial aquifer as the primary source of fresh water in the region.⁴ Thus, the conflict between steelhead habitat restoration and meeting the water needs of 115,000⁵ people reflects a microcosm of California's water dilemma: how do we equitably distribute a finite and fluctuating resource, while safeguarding the ecosystems that depend on it?

The resulting tension has ecological, legal, and social implications. Environmentalists want to restore the River's ecological integrity and ensure compliance with the federal Endangered Species Act (ESA), under which the South-Central California Coast Distinct Population Segment steelhead (SCCCS) are listed as threatened.⁶ Water suppliers like the Monterey Peninsula Water Management District (MPWMD) and California-American Water (Cal-Am) face state mandates to reduce extractions from the River while still providing sufficient

¹ The Carmel River Watershed, Carmel River Watershed Conservancy <https://www.carmelriverwatershed.org/the-river> (last visited Oct. 26, 2025).

² Nat'l Marine Fisheries Serv. (NMFS) Southwest Region, Biological Opinion for the Carmel River Reroute and San Clemente Dam Removal Project at the San Clemente Dam on the Carmel River, Tracking Number 2012/02129, (2012).

³ Resource Conservation District of Monterey County, Carmel River Watershed Assessment and Action Plan (2016).

⁴ Fishbio, Steelhead and the Continually Changing Carmel River, <https://fishbio.com/steelhead-continually-changing-carmel-river/> (last visited October 24, 2025).

⁵ Carmel River Watershed Assessment and Action Plan, 2016, *supra*.

⁶ 50 C.F.R. § 223.102(e) (listing South-Central California Coast steelhead as threatened). Species are listed pursuant to section 4 of the ESA. 16 U.S.C. § 1533 (2024).

potable water for residents and businesses on and around the Monterey Peninsula.⁷ At the same time, riparian property owners have concerns regarding flood risk and rising costs from regulatory compliance and infrastructure projects that seek alternative water sources.⁸

This paper argues that a sustainable solution can and must address the competing interests of all stakeholders. Adaptive management strategies must balance local need for reliable water sources with the restoration of the watershed and the protection of public trust resources. At the same time, addressing the needs of riparian property owners and local ratepayers is essential to ensure durable and equitable management decisions. And, to have lasting legal effect, entities like MPWMD, the National Oceanic and Atmospheric Association (NOAA), and Cal-Am must be held accountable to administer their duties under federal and state law.

II. History of watershed management and impact on SCCCS in the Carmel River

Though limited in size, the Carmel River watershed's importance extends beyond its geographic boundaries. Water has been exported to the Monterey Peninsula from the Carmel River watershed since 1883, when the first dam was built, and more than sixty percent of all potable water used in and around the Monterey Peninsula region is presently drawn from the watershed by private wells owned and operated by Cal-Am.⁹ But the watershed is also critical habitat for the threatened SCCCS, supporting one of the most important populations of SCCCS in the region.¹⁰ The SCCCS population in the watershed is highly valuable because it serves as a

⁷ See Cal. Health and Safety Code, § 116555 (2024); see also Cal. Code Regs. Tit. 22, § 64554 (2023); see also Cal. State Water Res. Control Bd., Order WR 95-10 (July 5, 1995); *id.*, WR 2009-0060 (Oct. 20, 2009) (requiring extractions from the Carmel River to be curtailed); see also Cal. Pub. Utils. Comm'n, Order Denying Rehearing of Decision 22-12-001, at 1-2 (Mar. 30, 2023).

⁸ California Water Association, CPUC Approves Cal Am's Monterey Peninsula Water Supply Project, <https://calwaterassn.com/cpuc-approves-cal-ams-monterey-peninsula-water-supply-project/> (last visited October 23, 2025); see also AECOM, Los Padres Dam and Reservoir Alternatives and Sediment Management Study, 2023.

⁹ Carmel River Watershed Assessment and Action Plan, 2016, *supra*.

¹⁰ NMFS West Coast Region, Long Beach, CA, South-Central California Steelhead Recovery Plan, 2013.

source population for smaller coastal drainages.¹¹ Perennial flow in most years, suitable instream habitat conditions, and few physical barriers historically contributed to the success of the SCCCS before the early 20th century.¹²

Beginning in the mid-1850s, population growth and land development in the Monterey area resulted in the construction of the San Clemente Dam¹³ and Los Padres Dam (LPD), both owned and operated by Cal-Am's predecessors. These events began the process of water and habitat degradation that continues to the present. By the mid 1900s, groundwater extraction, dam blockage, and suburban expansion transformed the River, resulting in erosion, sedimentation, channel incision, and reduced recharge.¹⁴

Consequently, the number of returning steelhead adults has fallen by 50 to 75 percent since the 1970s.¹⁵ By the 1980s, the run had collapsed to the point that it was declared nearly extinct by California Department of Fish and Wildlife.¹⁶ In 1995, the State Water Resources Control Board (SWRCB) found that Cal-Am was diverting about 10,730 acre-feet annually from the Carmel River without a valid basis of right.¹⁷ To address the adverse effects Cal-Am's diversions had on the steelhead and other wildlife dependent on instream flows, the SWRCB issued Order 95-10, limiting Cal-Am to 14,106 acre-feet of annual diversions from the Carmel

¹¹ AECOM, Los Padres Dam and Reservoir Alternatives and Sediment Management Study, Effects to Steelhead Technical Memorandum, 2022

¹² NMFS Recovery Plan, 2013.

¹³ The San Clemente Dam was constructed in 1921 for the purpose of water supply only. Dam capacity declined from 1,425 acre-feet at its construction to only 70 acre-feet by the time of removal. Before the completion of its removal in 2018—the third largest in North America—the amount of sediment that accumulated behind the dam was 2.5 million cubic yards and the dam was considered seismically unsafe. *See* California American Water, <https://www.sanclementedamremoval.org/dam-removal> (last visited October 20, 2025).

¹⁴ Carmel River Watershed Assessment and Action Plan, 2016, *supra*.

¹⁵ Monterey Peninsula Water Management District, Environmental and Biological Assessment of Portions of the Carmel River Watershed, 2004.

¹⁶ McEwan, D. and T.A. Jackson, California Department of Fish and Game, Steelhead restoration and management plan for California, 1996.

¹⁷ State Water Res. Control Bd, Order WR 95-10 (July 5, 1995).

River and ordering Cal-Am to obtain appropriate permits.¹⁸ In 1997, the National Marine Fisheries Service listed the SCCCS population as threatened under the ESA, triggering federal involvement in River management.¹⁹ In 2009, SWRCB again found Cal-Am did not have a valid water right for its continued diversions and reaffirmed the limitations set under Order 95-10 through Order WR 2009-0060.²⁰ Despite these restrictions, the Carmel River aquifer has been over-pumped by roughly 11,000 acre-feet per year since 1995.²¹ Moreover, the LPD reservoir continues to block migration and limits access to approximately half of the watershed’s spawning and rearing habitat.²² Repeated operational failures by Cal-Am, like dewatering incidents in 2021 and 2024, have further harmed juvenile steelhead, compounding the fragility of an already struggling population.²³

III. Argument

A. Environmentalists should seek enforcement under the ESA and state law

For environmental advocates, the Carmel River represents both a tragedy and a rare opportunity. Under the ESA, it is unlawful to “take” a listed species—i.e., to harass, harm, or kill—or to modify critical habitat in a way that impairs essential behavior patterns.²⁴ The ESA also obliges federal agencies to ensure that actions they authorize, fund, or carry out do not

¹⁸ *Id.* 14,106 acre-feet was Cal-Am’s actual average annual diversion from the Carmel River at the time. Only 3,376 of that total was legally permitted, whereas 10,730 was the amount lacking a valid basis of right. Order 95-10 prohibited Cal-Am from exceeding the contemporary diversion level during its transition to pursue replacement supplies, obtain appropriate permits, and contract with other agencies having appropriate rights to divert and use water from the River.

¹⁹ Water Management Group, Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan, 2007.

²⁰ State Water Res. Control Bd, Order WR 2009-0060 (Oct. 20, 2009).

²¹ Carmel River Watershed Assessment and Action Plan, 2016, *supra*.

²² Carmel River Watershed Conservancy, *supra*; see also Technical Memorandum, 2022, *supra*.

²³ Technical Memorandum, 2022, *supra*; see also MPWMD, Carmel River Fishery Report for November 2024, Informational Item/Staff Report, Special & Regular Board Meeting (Dec. 16, 2024). In September 2021, a siphon failure at the 980 outlet resulted in a reduction of streamflow and long reaches of the lower river to go dry, killing at minimum observed 50 steelhead. In 2024, a mechanical failure of Cal-Am’s diesel pump suction pipe at LPD caused the reach immediately downstream to go dry, killing at minimum 73 observed steelhead and requiring emergency fish rescues.

²⁴ 16 U.S.C. §§ 1532(19), 1538(a).

“jeopardize the continued existence” of a listed species or destroy its critical habitat.²⁵ Since the SCCCS population is a listed Distinct Population Segment, Cal-Am’s continued groundwater diversions, dam operations, and dewatering events that result in instream flow reduction and fish mortality constitute unlawful take. Courts have repeatedly found similar conduct actionable where continuing diversions reduce streamflow or strand fish.²⁶ Citizen suits could seek injunctive relief requiring Cal-Am to modify its operations to maintain instream flows, relocate diversion points, or expedite removal or retrofitting of the LPD. Additionally, citizen suits could target enforcement of the recovery plan for steelhead trout by compelling NOAA Fisheries and local co-managers to perform overdue status reviews and plan updates.²⁷

California law offers complementary avenues of enforcement. Dam operators must allow sufficient water “at all times” to pass downstream “to keep in good condition any fish that may be planted or existed below the dam.”²⁸ In addition, an entity “shall not substantially divert or obstruct the natural flow” of any river.²⁹ These provisions could serve as a basis for a state action against Cal-Am, or compel MPWMD to enforce compliance through its regulatory authority.

Additionally, the California Environmental Quality Act (CEQA) requires agencies to evaluate

²⁵ 16 U.S.C. § 1536(a)(2).

²⁶ See *United States v. Glenn-Colusa Irrigation District*, 788 F. Supp. 1126, 1133–34 (E.D. Cal. 1992) (permanently enjoining irrigation pumping because it caused ESA “take” of winter-run Chinook salmon by impingement/entrainment at the pumps; court rejected argument that state water rights excused compliance); see also *San Luis & Delta-Mendota Water Authority v. Locke*, 776 F.3d 971, 1000–03 (9th Cir. 2014) (upholding NMFS Salmonid BiOp measures that limit exports and prescribe inflow-to-export ratios and flow conditions to protect listed salmonids—i.e., flow-related restrictions are a lawful response to jeopardy/adverse modification); see also *California Trout, Inc. v. Superior Court (DWP)*, 218 Cal. App. 3d 187, 195, 197–99, 218–19 (1990) (ordering immediate license conditions and interim flow releases; § 5946/§ 5937 require releases “to reestablish and maintain the fisheries” that existed before diversion); see also *California Trout, Inc. v. State Water Resources Control Board (CalTrout I)*, 207 Cal. App. 3d 585, 600–07 (1989) (SWRCB must condition post-1953 licenses to ensure § 5937 compliance; i.e., releases sufficient to keep fish in “good condition,” limiting diversions accordingly); see also *Environmental Law Foundation v. State Water Res. Control*, 26 Cal. App. 5th 844, 856–57 (2018) (public-trust doctrine applies to groundwater pumping that reduces connected surface flows of the Scott River and harms fishery trust uses—thus requiring state oversight/limits).

²⁷ See *Final Recovery Plan for the South-Central California Coast Steelhead Distinct Population Segment* (Dec. 1, 2013), available at NOAA Fisheries; see also 16 U.S.C. § 1540(g) (2018) (authorizing citizen enforcement actions); see also 78 Fed. Reg. 78, 77283–84 (Dec. 23, 2013) (publishing notice of plan adoption and recovery objectives).

²⁸ Cal. Fish and Game Code, § 5937.

²⁹ *Id.*, § 1602.

and mitigate significant environmental impacts from water projects.³⁰ Citizens could use CEQA to challenge future water-supply projects that fail to incorporate enforceable protections for steelhead or the River's hydrology to prevent future dewatering incidents.

Litigation has often been a catalyst for cooperative restoration efforts. For instance, the 2015 removal of the San Clemente Dam was the result of a negotiated settlement among Cal-Am, federal and state agencies, and nonprofit organizations. That project was successful in restoring 25 miles of steelhead migration access and reduced sediment hazards downstream.³¹ Similar collaborative enforcement, if incentivized by actual or threatened litigation, could now focus on the LPD, floodplain reconnection, and adaptive groundwater management.

B. Cal-Am and MPWMD must adhere to state mandates and public trust duties

While the ESA protects steelhead directly, state law governs water rights and the public trust obligations of water agencies. The California Supreme Court has long recognized that navigable waterways and their tributaries are held in trust by the state for the benefit of the public.³² The state must balance water diversions against ecological needs and cannot abdicate this responsibility, even where prior appropriative rights exist.³³

MPWMD and the SWRCB thus have continuing duties to ensure that diversions from the Carmel River do not impair public trust resources such as fisheries, riparian habitat, and recreation.³⁴ Cal-Am, as a utility operating under state license, is likewise bound by these

³⁰ Cal. Pub. Res. Code §§ 21000-21189; *see also* Cal. Code Regs. tit. 14, §§ 15000-15387 (2024).

³¹ NOAA Fisheries, Benefits for Wildlife Flow from San Clemente Dam Removal (July 28, 2016), <https://www.fisheries.noaa.gov/feature-story/benefits-wildlife-flow-san-clemente-dam-removal>; *see also* U.S. Geological Survey, A Carmel River Approach to Dam Removal to Minimize Downstream Impacts (Aug. 19, 2015), <https://www.usgs.gov/centers/pcmssc/news/carmel-river-approach-dam-removal-minimize-downstream-impacts>.

³² *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 434.

³³ *Id.* at 437-38, 446-47.

³⁴ *See Id.* at 441-47 (1983) (holding California retains a continuing public-trust duty to protect navigable waters and related resources and must consider the trust when allocating water); *see also* Cal. Water Code app. ch. 118-1 to -901 (West) (Monterey Peninsula Water Mgmt. Dist. Law) (district created to manage/augment supply and protect Carmel River resources).

mandates.³⁵ Yet for decades, Cal-Am’s diversions have exceeded lawful limits and reduced flows to the detriment of both the steelhead and ratepayers.³⁶ The SWRCB’s Cease and Desist Order directed Cal-Am to phase down unauthorized diversions and to develop alternative water supplies by 2021.³⁷ Although progress has been made through projects like Pure Water Monterey (a wastewater recycling initiative)³⁸ and the Monterey Peninsula Water Supply Project (a desalination plant proposal), they have faced technical and regulatory challenges.³⁹ Meanwhile, the River continues to bear the cost of delay.

MPWMD is charged with conserving and augmenting the Peninsula’s water supply.⁴⁰ It has also been designated a co-lead with Monterey County, Monterey Peninsula Regional Park District, California Department of Parks and Recreation, and the Big Sur Land Trust in habitat restoration.⁴¹ MPWMD’s mandate under state law—and, arguably, its fiduciary duty under the public trust doctrine—requires it to prioritize the health of the Carmel River ecosystem as an integral component of sustainable water management. MPWMD should use its regulatory power to condition water permits on compliance with both the ESA and Fish and Game Code section 5937. Similarly, an effective governance framework would compel Cal-Am to internalize the

³⁵ See Cal. Pub. Utils. Code § 451 (West 2024) (requiring every public utility to provide “adequate, efficient, just, and reasonable” service and to maintain facilities necessary to protect the public’s safety, health, and comfort).

³⁶ See State Water Res. Control Bd., Order WR 95-10 (July 6, 1995) (finding Cal-Am’s Carmel River diversions unlawful in part and directing measures to end illegal diversions); see also State Water Res. Control Bd., Order WR 2009-0060 (Oct. 20, 2009) (cease and desist order; noting Cal-Am continued diverting thousands of acre-feet annually without a valid right and requiring termination of unlawful diversions).

³⁷ State Water Res. Control Bd., Order WR 2009-0060 (Oct. 20, 2009).

³⁸ Monterey One Water, Pure Water Monterey Overview, <https://www.montereyonewater.org/261/Pure-Water-Monterey-Overview> (last visited Oct. 26, 2025).

³⁹ Public Water Now, Historic Failure – Cal Am’s Sorry 50-year Performance, https://www.publicwater.org/cal_am_historic_failure (last visited October 26, 2025).

⁴⁰ See Cal. Water Code app. ch. 118-1 to -901 (West) (Monterey Peninsula Water Management District Law); see also Stats. 1977, ch. 527.

⁴¹ Monterey Peninsula Regional Park District, Board Report: Long Term Management Agreement for the Carmel River Floodplain Restoration and Environmental Enhancement Project 1–2 (Apr. 3, 2024) (listing MPWMD among the LTMA parties responsible for long-term management); Cal. State Coastal Conservancy, *Carmel River Floodplain Restoration & Environmental Enhancement (Carmel River FREE) – Construction Authorization Staff Rec. 2* (Feb. 3, 2022) (“The proposed project is a cooperative effort of the County, BSLT, CAWD and the Monterey Peninsula Water Management District (MPWMD)....”)

environmental costs of its operations. Rate structures could incorporate ecological externalities, with proceeds directed toward habitat restoration, fish passage at the LPD, and instream-flow maintenance. Only through strict accountability can recovery proceed alongside human use.

C. Floodplain restoration and alternative supply projects are vital to recovery

Another form of watershed recovery lies in physical restoration of the River's lower reach and diversification of the Peninsula's water portfolio. The Carmel River Floodplain Restoration and Environmental Enhancement Project (CRFREEP) demonstrates how restoration can yield both ecological and community benefits. The project reconnects 90 acres of historic floodplain south of the River, removes obsolete levees, and replaces part of the Highway 1 embankment with a causeway.⁴²

The project's upstream reach extends into Palo Corona Regional Park, where 50 acres of retired farmland and pastureland are being regraded to reconnect the River with its historic floodplain.⁴³ This integration with Palo Corona ensures floodwaters spread onto restored lands instead of backing up against Highway 1, protecting downstream residences while expanding habitat for steelhead and other species. From an ecological standpoint, the combined CRFREEP and Palo Corona work re-establishes processes vital for steelhead: seasonal inundation, sediment transport, and groundwater recharge.⁴⁴ These functions sustain cooler baseflows and create off-channel rearing areas for juvenile fish.⁴⁵

Complementing the restoration are alternative-supply projects that reduce dependence on the River. The Pure Water Monterey advanced-recycled-water project, operated by Monterey One Water and MPWMD, began in 2020, delivering roughly 3,500 acre-feet per year of

⁴² See County of Monterey & U.S. Army Corps of Eng'rs, Carmel River Floodplain Restoration and Environmental Enhancement Project, Final Environmental Impact Report / Environmental Assessment §§ 1.4–1.5, figs. 2.1.2-1 to -2 (certified Jan. 28, 2020).

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

drought-resilient supply.⁴⁶ And a proposed desalination plant at Marina—a city just north of Monterey—could add about 6,000 acre-feet annually if permitted.⁴⁷ While desalination raises energy and coastal impact concerns, an approach combining recycling and limited desalination offers a stable path toward reducing surface-water withdrawals by creating alternative water sources.

Local residents pay some of the highest water rates in California,⁴⁸ so cost equity must accompany ecological recovery. Agencies should connect future rate adjustments to measurable environmental outcomes—such as verified increases in instream flow or steelhead spawning success—to strengthen public confidence that every dollar invested yields tangible benefits.

D. Integrating stakeholders is essential to implementing adaptive management

The watershed’s resilience depends on collaborative governance and adaptive management—an approach that treats policy decisions as hypotheses to be tested and adjusted through monitoring and feedback. For steelhead restoration, adaptive management means setting measurable biological targets—such as juvenile survival rates, adult return counts, and passage efficiency at LPD—and adjusting flow releases or habitat interventions accordingly.⁴⁹ Recovery

⁴⁶ See Monterey One Water, Pure Water Monterey Overview, <https://www.montereyonewater.org/261/Pure-Water-Monterey-Overview> (last visited Oct. 26, 2025) (describing the advanced-recycled-water project operated jointly with MPWMD).

⁴⁷ See Cal. Am. Water Co., Monterey Peninsula Water Supply Project Overview, <https://www.watersupplyproject.org/overview> (last visited Oct. 26, 2025).

⁴⁸ See Cal. Pub. Utils. Comm’n, Decision Authorizing California-American Water Company’s General Rate Case Application (A.21-05-001), Decision (D.) 23-03-008, at 18–20 (Mar. 16, 2023) (finding Cal-Am’s Monterey District has among the highest per-unit water rates in California and approving tiered-rate adjustments to address affordability concerns); see also Monterey Peninsula Water Mgmt. Dist., Water Rate Comparison and Financial Impact Analysis 1 (MPWMD 2022), <https://www.mpwmd.net/wp-content/uploads/Rate-Comparison-Report-2022.pdf> (last visited Oct. 26, 2025) (showing Monterey Peninsula residents pay the highest average residential water bills in the state and discussing ratepayer equity considerations tied to environmental compliance and supply-project costs).

⁴⁹ See NMFS, Five-Year Review: Summary and Evaluation of South-Central California Coast Steelhead Distinct Population Segment 63 (Apr. 2023), <https://media.fisheries.noaa.gov/2023-05/5-year-status-review-sccc-steelhead.pdf>; See also Monterey Peninsula Water Mgmt. Dist., Carmel River Steelhead Monitoring Report 1–3 (2022), <https://www.mpwmd.net/environmental-science/steelhead-monitoring-program> (last visited Oct. 26, 2025) (documenting local adaptive management of flow releases and habitat projects based on steelhead life-stage monitoring results).

of the SCCCS population requires maintaining at least 20 percent of historic habitat in functioning condition and re-establishing connectivity across fragmented reaches.⁵⁰

Implementing those goals locally will require the joint participation of MPWMD, Cal-Am, the County, and community groups.⁵¹

Public participation is equally critical. Local residents often view restoration projects through the lens of personal risk—flooding, property value, or rate increases. Outreach that communicates how projects like the Floodplain Restoration Plan actually reduce flood risk and improve water security can convert skepticism into support, and linking steelhead recovery to local culture and recreation can strengthen public stewardship.

IV. Conclusion

A sustainable path forward requires commitment to a combination of enforcement and collaboration. First, strict adherence to federal and state law must govern all water and habitat decisions. Second, accountability for Cal-Am and MPWMD should ensure that mandated reductions and habitat protections are achieved independently. Third, integration of ecological restoration with community protection will lower flood risk for residents while expanding critical habitat for steelhead. Fourth, ending over-reliance on the River can be accomplished by diversification of water supply through recycled water, conservation, and cautious desalination. And finally, inclusive governance builds public trust by incorporating feedback from property owners, ratepayers, and environmental advocates alike.

⁵⁰ See NMFS, Five-Year Review: Summary and Evaluation of South-Central California Coast Steelhead Distinct Population Segment 41–42 (Apr. 2023), <https://media.fisheries.noaa.gov/2023-05/5-year-status-review-sccc-steelhead.pdf>.

⁵¹ See Monterey Peninsula Water Mgmt. Dist., Carmel River Steelhead Monitoring Report 2 (2022), <https://www.mpwmd.net/environmental-science/steelhead-monitoring-program> (last visited Oct. 26, 2025) (noting collaborative efforts among MPWMD, Cal-Am, the County of Monterey, and community organizations to meet recovery and monitoring objectives for Carmel River steelhead).