

MARIN RESOURCE CONSERVATION DISTRICT NEWSLETTER

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Where Watercress Returned SIGNS OF A HEALTHY WATERWAY

BUBBLING WATER GURGLES PAST a lush patch of watercress beneath the riparian canopy at Marin Coast Ranch. The oval leaves bob in the current as the rushing water tugs gently at their hollow stems. Leaning carefully over the small stream, rancher Jody Brazil harvests a handful for her family's evening meal. Just over a decade ago, this waterway was a raw, eroding gully cutting deeper into the pasture with every storm. Today, it produces fresh greens—a peppery, nutrient-dense addition to many dishes—and stands as one of many vivid signs that the land is healing.

West Marin contains areas where soils are highly erodible. On Marin

Coast Ranch, several headcuts had formed and rapidly expanded into gullies that advanced across the pasture, threatening to send sediment downstream into the Walker Creek watershed. Sediment pollution can degrade fish habitat and affect water quality, and Walker Creek supports steelhead, coho salmon, and a diverse array of wildlife. Left unchecked, gully erosion accelerates after large storms, making timely action essential.

In 2012, the ranch reached out to Marin RCD and United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) for help in repairing an eroded

gully. To repair the gully, the banks needed protection from livestock pressure. Marin RCD provided funding and project management, oversaw engineering and permitting, and coordinated efforts across all partners. The project included wildlife-friendly livestock-exclusion fencing, bank-stabilization designs by Prunuske Chatham, Inc., and native tree plantings installed by Point Blue Conservation Science's Students and Teachers Restoring a Watershed program.

The project stabilized the gully, restored natural channel shape and flow, and re-established vegetated banks that now keep sediment in place and improve infiltration. Over time, the project restored hydrologic function and created clean, cool, shallow flows—



This waterway is a repaired gully that is now a thriving habitat corridor thanks to the cost-share support from the landowner, California's State Water Resources Control Board 319(h) Nonpoint Source Program, USDA NRCS's Environmental Quality Incentives Program, Marin County Measure A, and MALT's Stewardship Assistance Program.

WHY WATERCRESS MATTERS

Watercress (*Nasturtium officinale*) is more than a tasty green — it's a natural indicator of stream health.

SENSITIVE TO WATER QUALITY: Watercress grows only in clean, cool, well-oxygenated water. Excess sediment, nutrient pollution, or unstable flows prevent it from establishing.

REQUIRES STABLE BANKS: Because it roots in shallow margins, it thrives only where streambanks are stable and not sloughing sediment.

SIGNALS RESTORED HYDROLOGY: Its presence suggests that flows have returned to a natural pattern — not too flashy, not too stagnant.

SUPPORTS BIODIVERSITY: Watercress patches provide microhabitat and can contribute to overall food-web health in small streams.

Its return at Marin Coast Ranch is a living sign that the waterway is functioning again — offering clean water, stable banks, and a cool, steady flow.



ideal conditions for water-loving plants, including watercress, to return.

Watercress thrives only where water is clean, well-oxygenated, and stable. Its reappearance is more than botanical trivia—it's a living indicator that the stream is functioning again. The Brazil family sees the changes firsthand: clearer water, stable banks, and a thriving riparian corridor. Eating watercress from their own restored creek creates a joyful, personal connection to the project. It's a reminder that healthy waterways nourish both the land and the people who care for it.

Stabilizing this single gully also protects the broader Walker Creek watershed. Excluding livestock from using an eroding gully as a water source reduces potential pathogen inputs and prevents sediment from



Jody Brazil and her son Manny looking into the repaired gully years after installation. Marin RCD's work naturally disappears into the landscape.

moving downstream. Together, these improvements support better conditions for fish and other aquatic life. Small, site-specific restoration projects like this one add up—benefiting creeks, estuaries, and ultimately Tomales Bay. Restoration is incremental, but each repaired waterway tells a success story.

And here, one of the clearest signs of that success is simple, green, and edible.



WHAT IS A HEADCUT? HOW WE REPAIR ONE

A **headcut** is a vertical drop in a stream channel that forms when water erodes backward into the landscape. Even a small headcut can quickly grow after a single major storm, carving deep gullies and sending large amounts of sediment downstream. That sediment can cloud the water and harm fish habitat—especially in streams used by salmon for spawning.

Traditional engineering approaches often rely on rock walls or retaining structures, which can stop erosion but don't always blend into the natural environment.

Marin RCD and its partners prioritize biotechnical repairs, which use vegetation and natural materials to stabilize soil and heal the landscape over time.

One example is a **Fabric Reinforced Earth Fill (FREF)**—a biotechnical method made of compacted soil layered with twine matting and erosion-control blankets, all secured with metal pins. Between each layer, crews weave in **live willow cuttings**, which root and grow into a living structure that reinforces the banks.

Because these treatments rely on plants to become the long-term stabilizing force, **Marin RCD's work naturally disappears into the landscape as the vegetation takes over—leaving behind a stable, functioning stream.**

PROJECT BY THE NUMBERS

A snapshot of the Marin Coast Ranch restoration

9 headcuts repaired

2,250 linear feet of stream protected and restored

500 linear feet of biotechnical repairs

~5,500 linear feet of wildlife-friendly livestock exclusion fencing installed

1,197 native plants (willows and Juncus plugs) installed

51 volunteers from four grades at Tomales High School

These project elements worked together to stabilize the gully, reshape the stream channel, re-vegetate the banks, and improve water quality — ultimately helping watercress and other riparian species return.



The Croaky Chorus of a Healthy Ecosystem

IF YOU'VE SPENT ANY TIME IN WEST MARIN AFTER DARK, you know the soundscape can be just as lively as the daytime views. For several farming families, the nighttime chorus has become impossible to ignore.

“Over the past few years, I’ve noticed the frogs at night have gotten noticeably louder. So much so that I actually looked into what might have changed. It turns out frogs are strong indicators of ecosystem health, since their skin is highly sensitive to environmental conditions. They are essentially mini bioindicators. Thinking about all the pieces on the land from a very holistic, cyclical perspective, it’s possible that higher-impact projects around the waterways, such as perennial grass seeding, erosion control, rotational grazing, and seasonal grazing within the waterways, are all playing a role. Together, these efforts may be creating healthier conditions that support a larger, more active frog population. And an unmistakably louder nighttime chorus!”

**— Mandy Schmidt,
The Haven at Tomales, Marin Coast Ranch**

Frogs don’t usually get top billing in discussions about land stewardship. But maybe they should.

The chorus most likely comes from Sierran Treefrogs (*Pseudacris sierra*), small but adaptable amphibians whose permeable skin makes them exceptionally responsive to local water quality, vegetation conditions, and moisture. When they’re active and vocal, it often means the habitat is offering what they need at exactly the right time of year. Despite their tiny size, treefrogs link multiple layers of the food web, grazing on algae as tadpoles, consuming insects as adults, and feeding birds, snakes, and mammals.

So, when agricultural families notice a louder nighttime chorus, that observation becomes more than a charming anecdote, it’s a meaningful signal about how the land is functioning. And across West Marin, increases in frog activity often align with years of thoughtful stewardship.

For more than sixty years, Marin RCD and local landowners have partnered on watershed restoration and grassland enhancement projects throughout the region. These practical efforts (repairing eroding banks, improving riparian habitat, and adjusting grazing timing) can have far-reaching ecological benefits.

Marin Coast Ranch, Mandy’s childhood home is one example. Well-managed grazing that distributes livestock impact and allows vegetation recovery helps maintain soil cover and reduce erosion. Seeding perennial grass species in pastures strengthens root systems, increases soil organic

matter, and creates cooler, moister ground conditions, which is exactly the microhabitat frogs prefer. Waterway restoration designed to arrest erosion, slow stormwater runoff, and improve water quality gives amphibians more places to travel, breed and hide (see *Where Watercress Returned: Signs of a Healthy Waterway* article on page 2).

A similar pattern emerged in Bolinas, where Fresh Run Farm experienced a boost in amphibian activity following the installation of the Pine Gulch Instream Enhancement Project. The farm, in partnership with Marin RCD and others, added an irrigation pond to store winter storm flows and relinquish summer water rights to protect endangered Coho salmon. Treefrogs quickly began taking advantage of the new habitat, and in the seasons that followed, the croaky chorus there grew louder and more persistent.

Aquatic ecologist Darren Fong shares how agricultural ponds benefit frogs.

“Making sure that ponding duration is long enough for eggs to hatch and tadpoles to transform into baby frogs and protection of the edges of ponds and wetlands to ensure that flooded vegetation is present for attachment of eggs during the winter-spring breeding season.”

**— Darren Fong, Aquatic Ecologist,
Golden Gate National Recreation Area**



Together, these land management choices create a landscape where life at all scales can gain a foothold. From soil microbes to perennial grasses to croaking amphibians, each layer supports the next. Rotational grazing isn't implemented for the sake of frogs—it's used to improve forage quality, distribute livestock impact more evenly, and strengthen plant communities. Yet the benefits ripple outward.

This is the heart of working lands: choices made for agricultural reasons can also improve wildlife habitat. And when landowners keep an eye (and ear) on what's happening around them, they often notice these changes long before formal monitoring does.

In this case, the frogs told the story first.

Not every ecological indicator is as charming—or as vocal—as a frog chorus. But tuning into patterns in wildlife activity, water clarity, plant vigor, and seasonal rhythms is one of the most powerful tools landowners have. These observations help guide adaptive management, shape future restoration efforts, and highlight where things are working well.

The growing volume of nighttime frogs on this ranch doesn't offer scientific proof of ecological trends—but it does suggest that the land is functioning in ways that support native wildlife. It also highlights the value of the careful, long-view stewardship practiced by families across West Marin.

Healthy land tends to speak up.

Sometimes, it even sings.



Ranchers Supporting Salmon Science

Authored by Sarah Phillips, MRCD Urban Streams Program Manager, and CA Department of Fish & Wildlife

EVERY SPRING, THOUSANDS OF young Coho Salmon smolts begin their downstream journey through Walker Creek, a journey that reveals critical information about watershed health. Their movements, and the conditions they encounter, help guide Marin RCD and partner agencies as we work to improve habitat and support species recovery. The smolts' passage from quiet upstream pools to the Pacific Ocean is shaped by the people and habitat along the way, including the Brazil family's Marin Coast Ranch, where important monitoring at the ranch has become a key source of insights for this work.

We're grateful to the Brazil family for their long-standing partnership and for providing access to their ranch, which makes critical work in the Lower Walker Creek watershed possible.

Their support demonstrates how collaborative projects with ranchers can benefit both working lands and the recovery of endangered salmonids.

Marin RCD's Sarah Phillips, Fisheries Specialist, has worked on the Marin Coast Ranch through two complementary efforts. The first is a habitat assessment and design project funded by the California Department of Fish and Wildlife (CDFW). This project spans four landowners, including the Brazil family, and focuses on understanding how stream channels, floodplains, and salmonid habitat interact in the estuary-stream transition zone. The goal is to improve juvenile coho rearing habitat, increase survivorship, and reduce downstream flooding.

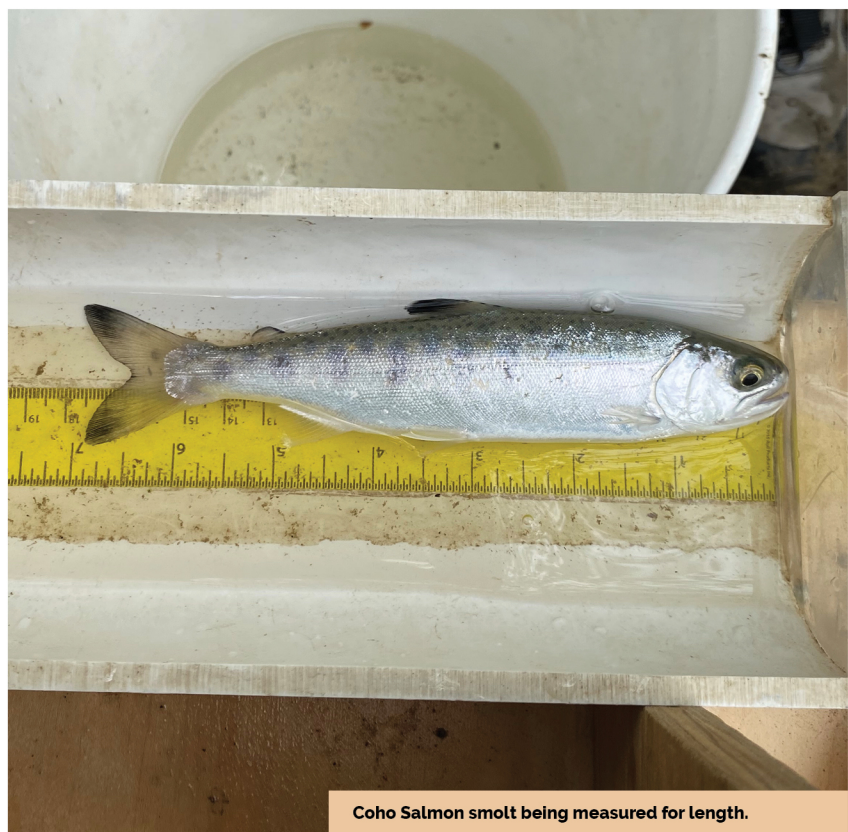
Floodplains provide refuge during high flows, capture fine sediment, and support diverse food sources—

benefits that help salmonids across all life stages. Through this effort, the project team is identifying site-specific opportunities to enhance off-channel habitat and increase in-stream complexity through a Habitat Enhancement Plan.

The second effort is led by CDFW and centers on monitoring salmon population trends to support recovery of Central California Coast Coho Salmon. Once abundant in Marin County, Coho Salmon disappeared from Walker Creek by the 1950s, according to CDFW records. To help re-establish the population, the Russian River Coho Salmon Captive Breeding Program began releasing fish into the watershed. Consistent monitoring of success was limited until 2022, when CDFW installed a downstream migrant trap.



Removing Coho Salmon smolts and other fishes from the trap.



Coho Salmon smolt being measured for length.



Counting and processing catch from the trap.

FISH TRAP

THE MIGRANT TRAP CAPTURES

Coho Salmon smolts as they swim downstream to Tomales Bay and ultimately the Pacific Ocean. The Walker Creek migrant trap is located far enough downstream to capture fish from all the major tributaries of Walker Creek, yet it is above the tidal influence of Tomales Bay, and it is accessible to staff during the Spring season. CDFW staff found an ideal site and a supportive partner at the Marin Coast Ranch.

Trap activities are designed to work alongside ranching activities. For the two to three months in Spring that the trap is running, biologists visit the site daily to process fish, taking care to avoid livestock and leave gates as they are found to ensure ranching and fisheries science remain great partners.

Each day, all fish are identified and counted. Salmonids are weighed, measured, and scanned for tags before being released downstream. The first 3 years of data show that thousands of smolts are leaving the watershed each year which is good news. CDFW also collects small fin clips for DNA analysis, which indicate that fish from combinations of natural-origin and hatchery-origin parents are successfully spawning in Walker Creek.



Walker Creek downstream migrant trap in 2023. E. Ruiz, CDFW

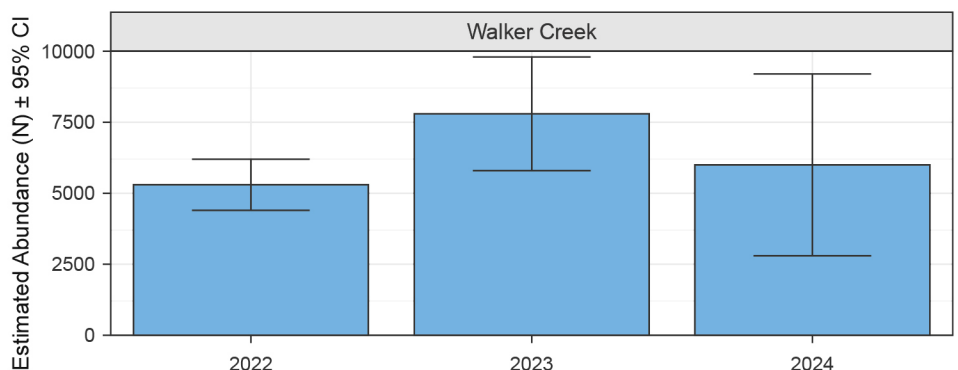
FASTRAK-ING FISH

LOCATED JUST UPSTREAM OF THE

migrant trap is a Passive Integrated Transponder (PIT) tag antenna which is buried in the bottom of the stream channel. PIT tags, just like those used to identify your favorite pet, are also attached to fish. The tags respond to Low Frequency radio waves from the antennas. When tagged fish swim over these antennas, the detection is recorded. The ratio of fish detected on the antennas compared to the fish captured in the trap is used in a model to extrapolate annual abundance estimates. Recapturing or detecting PIT tagged fish also allows biologists to calculate a fish's growth and seasonal survival rate. This information is used to track changes in the population over time.

Since 2023 the PIT antennas have operated year-round, providing a first glimpse into salmon returns to Walker Creek from the ocean. CDFW staff are investigating additional monitoring techniques for detecting salmon migrations from the Pacific Ocean back to Walker Creek for spawning.

Long-term datasets of adult returns and smolt production in coastal watersheds, such as Walker Creek, provide critical information on the status and trends of Pacific salmonids, which in turn supports continued science-based management of California's natural resources. This science would not be known without the assistance of ranches in key parts of our coastal watersheds.



Annual estimated Coho Salmon smolt abundance and 95% confidence intervals in Walker Creek in 2022-2024 shows thousands of Coho. In the 1950's, it was thought that Coho Salmon were wiped out.

MARIN RESOURCE



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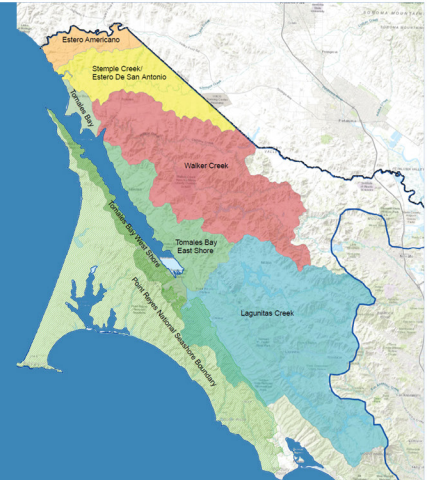
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WHERE WE WORK

Our projects are located primarily on farms across Marin County, from the Point Reyes National Seashore to the rolling rangelands of Chileno Valley. We provide assistance with stream protection, riparian restoration, erosion control, and sustainable land management.



The mission of the Marin Resource Conservation District is to conserve and enhance Marin County's natural resources, including its soil, water, vegetation and wildlife, through community-based conservation and restoration

