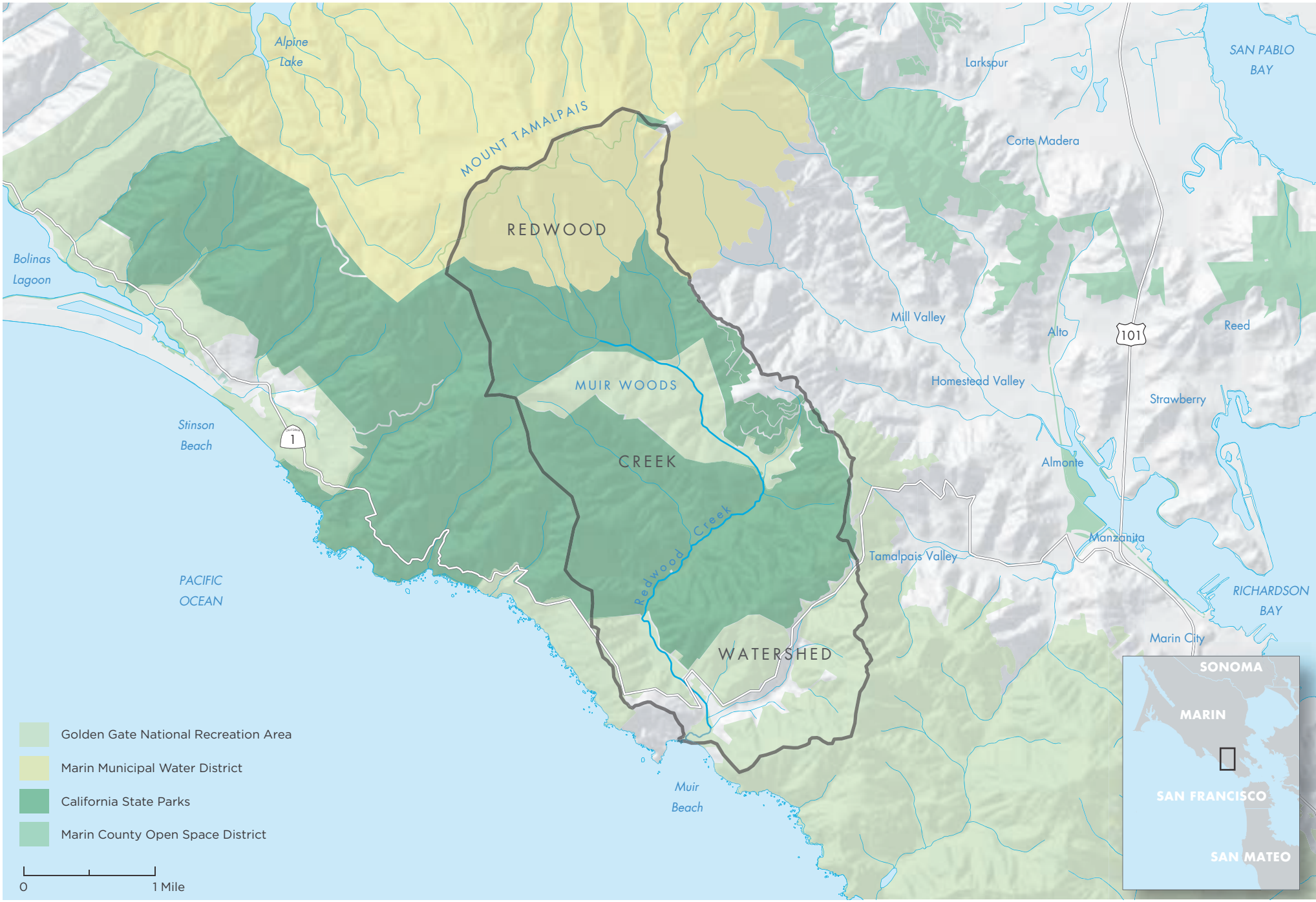
WORKING TOGETHER TOWARD OUR VISION FOR THE FUTURE

REDWOOD CREEK WATERSHED VISION

2003–2015 ACCOMPLISHMENTS REPORT


Alpine Lake
MOUNT TAMALPAIS
REDWOOD
CREEK
WATERSHED
MUIR WOODS
Redwood Creek
Bolinas Lagoon
Stinson Beach
PACIFIC OCEAN
Muir Beach
Larkspur
Corte Madera
SAN PABLO BAY
Mill Valley
Alto
Homestead Valley
Strawberry
Reed
Almonte
Manzanita
Tamalpais Valley
RICHARDSON BAY
Marin City
101
1
Golden Gate National Recreation Area
Marin Municipal Water District
California State Parks
Marin County Open Space District
0
1 Mile
SONOMA
MARIN
SAN FRANCISCO
SAN MATEO

REDWOOD CREEK WATERSHED VISION
2003–2015 ACCOMPLISHMENTS REPORT

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In 2002, agencies and landowners across the Redwood Creek Watershed in Marin County, California, came together in an unprecedented effort to identify shared goals and create a long-term vision to serve as a foundation for planning and decision-making. Almost a year later, after multiple reviews by the public and other stakeholders, the *Redwood Creek Watershed Vision for the Future* was completed.

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The *Vision,* stated simply is, *"the Redwood Creek Watershed exists as an intact natural ecosystem that offers opportunities for people to learn about, experience, and protect a rich blend of nature, rural character, and cultural history in an urbanized area."*

To achieve these goals, the *Vision* sets forth "Guiding Principles" for planning and management and "Desired Future Conditions" that describe our collective ideals for the watershed's natural and cultural resources, the state of its infrastructure, and the quality of the experiences for its residents and visitors.

The *Vision* described a place where the natural beauty and rustic character of the landscape are maintained, where diverse wildlife and their habitats are protected and restored, and where visitors and residents are active stewards and partners in the watershed's care. Now, 13 years on, this report highlights some of the key accomplishments that have been achieved to help meet those goals.

While there has been substantial progress, our work is not done. Thankfully, the foundation built through the process of crafting the *Vision* all those years ago remains strong, and its tenets continue to guide our collective efforts throughout the watershed.

NATURAL RESOURCES

The 2003 *Redwood Creek Watershed Vision for the Future* described 10, wide-ranging objectives for natural resources. Since these goals were first laid out, an astounding array of studies, projects, and programs have been implemented to reduce sedimentation into streams, restore floodplains and waterways, expand tributary connections, and protect threatened and endangered species and native plant communities.

Desired Future Conditions from the 2003 *Redwood Creek Watershed Vision for the Future:*

1. The watershed is managed as an intact, continuous, and linked system, with all parts contributing to the health of the whole.
2. Ecosystem management in the watershed is founded on the restoration and protection of natural processes, such as fire and flooding.
3. Native plant communities are healthy and have diverse cover types, including native grasslands, chaparral, riparian woodland, hardwood and redwood forests, and wetlands.
4. Restoration and protection of a full range of natural functions (such as sediment transport, channel migration, and recruitment of large wood) in Redwood Creek support complex instream and floodplain structure that supports native aquatic and riparian-dependent species.
5. Aquatic ecosystem health is not impaired by water diversion or water quality degradation.
6. Invasion by and the adverse effects of non-native plant and animal species on the ecosystem are reduced or reversed, and imperiled habitats are restored.
7. Special status and locally rare plant and animal species are protected and, where appropriate, their populations are expanded.
8. Human-caused erosion on watershed lands does not impact fish and aquatic habitat.
9. Native wildlife populations are viable and diverse, and key habitats and habitat linkages (i.e., corridors) are protected and restored.
10. Potential negative impacts of surrounding land uses are minimized.

PROGRESS TOWARD THE *VISION:*

PLANT COMMUNITIES

- The Redwood Creek Nursery, in operation from 1992–2015, provided tens of thousands of plants to enhance the understory at Muir Woods, revegetate the new floodplain in lower Redwood Creek, establish native plants along the new Dias Ridge Trail, and restore the wetland at Muir Beach.
- The effects of Sudden Oak Death have been tracked by periodic updates to the 2004 Marin Municipal Water District vegetation map, which is also used for broader vegetation management and planning.
- The rare Mt. Tamalpais thistle (*Cirsium hydrophilum* var. *vaseyi*) has been reintroduced to two sites, one where the local population had been extirpated and the other where the local population will be bolstered with new seedlings.
- Ongoing, watershed-wide invasive species management has been performed, including:
  - Yellow star thistle (*Centaurea solstitialis*), and Scotch and French broom (*Cytisus scoparius* and *Genista monspessulana*) management and invasive pine tree removal on Marin Municipal Water District lands
  - Extensive cape ivy (*Delairea odorata*), pampas grass (*Cortaderia jubata*), licorice plant (*Helichrysum petiolare*), and French broom removal on national and state parks lands
  - Cape ivy management at Green Gulch Farm
  - Systematic mapping and management of priority infestations across jurisdictional boundaries through the Redwood Creek Watershed Collaborative (see page 32)

Volunteers of all ages have contributed to restoring native plant communities and removing non-native, invasive species throughout the watershed.

The Redwood Creek Native Plant Nursery was a model of partnership, a home base for volunteers, and a touchstone for community engagement and stewardship.

Highlights include:

- More than **95,000 plants** grown between 2003 and 2014
- **64 different species** propagated for the Muir Beach restoration project
- Over **48,000 hours** of volunteer time given to growing native plants

Ongoing monitoring at Muir Beach helps track progress towards natural resource goals.

AQUATIC ECOSYSTEMS

- Nutrients, bacteria, and sediment have been tracked through biennial or triennial water quality sampling since 2005, and initial testing for road-related pollutants was done in 2015.
- The potential discharge of many tons of sediment into a tributary of Redwood Creek was prevented by replacing a large culvert on Alice Eastwood Road that was poised to blow out.
- Implementation of the Marin Municipal Water District's 2005 *Mt. Tamalpais Watershed Road and Trail Management Plan* has had far-reaching benefits to the watershed's aquatic ecosystems, including:
  - Preventing an estimated 3,445 cubic yards of sediment from entering the stream through major road-related erosion control measures at 10 sites
  - Launching Project Restore, which has decommissioned approximately three miles of social trails through sensitive resource areas, better defined the official trail system through the old Mill Valley Air Force Station, and minimized erosion along these routes
  - Heading off erosion into Redwood Creek by decommissioning 500 feet of Old Muir Woods Road, and removing adjacent culverts and retaining walls on National Park Service lands
  - Improving run-off patterns and reducing erosion by regrading the Deer Park Fire Road on California State Parks land

WILDLIFE

- Threatened California red-legged frogs (*Rana draytonii*), near extirpation in 2003, are now thriving due to the creation of breeding habitats, and the relocation of egg masses and adult frogs to help bolster the population.
- A river otter (*Lontra canadensis*) monitoring and research program, jointly managed by the National Park Service and the River Otter Ecology Project, has begun in response to a recent resurgence of these once locally rare creatures.
- Decades of Point Blue Conservation Science landbird monitoring efforts at both Marin Municipal Water District and National Park Service sites indicate that most populations are stable, and provide support for continued landbird nesting-season habitat protections.
- Coordinated, multi-agency monitoring of threatened northern spotted owls (*Strix occidentalis caurina*) since 1999 has revealed high levels of breeding territory occupancy (80% average) and stable measures of long-term reproductive success.

The return or California red-legged frogs is a true watershed success story.

Visitors to Muir Woods spot spawning coho salmon.

Learning to Help One of the Watershed's Most Imperiled Residents

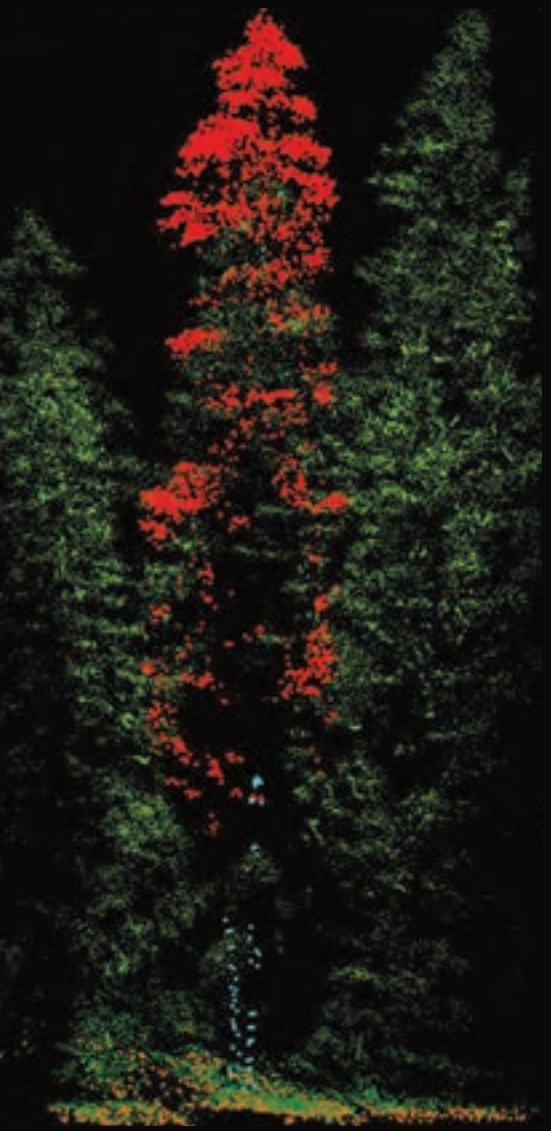
Dangerously close to extirpation in Redwood Creek, endangered coho salmon have been the focus of numerous restoration efforts and much study.

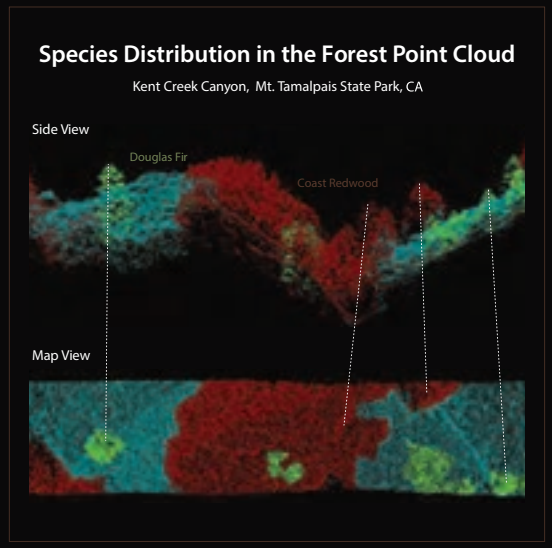
The National Park Service and its partners began monitoring coho salmon and steelhead trout (listed as threatened) in 1998. What they have learned has helped land managers better understand how to protect this species, including:

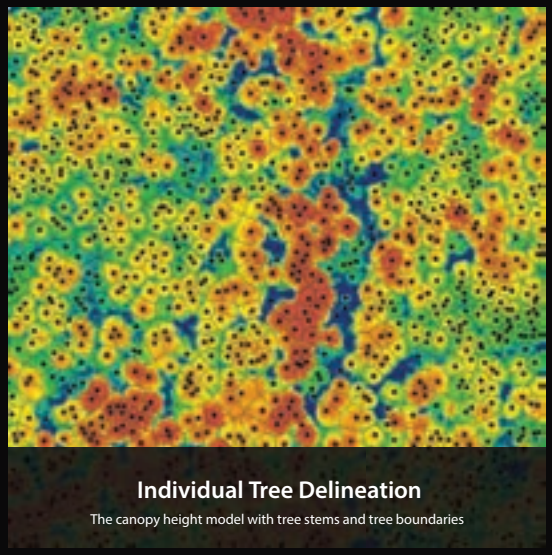
- Collecting basic population data that has revealed that steelhead trout numbers appear to be steady, but only one of three coho cohorts is stable
- Entering into a multi-agency partnership to "jumpstart" these coho cohorts through hatchery rearing and eventual release back to Redwood Creek starting in 2015
- Using size data on juvenile coho salmon to identify where young fish are thriving so similar habitat conditions can be replicated elsewhere
- Knowing at what point in their lifecycles coho and steelhead numbers decline to determine how the fish are affected by the factors that can be controlled (e.g. juvenile stream habitat) and the things that cannot (e.g. ocean conditions, climate change)

- Habitat for the endangered coho salmon (*Oncorhynchus kisutch*) and threatened steelhead trout (*Oncorhynchus mykiss*) has been significantly enhanced through creek and floodplain restoration throughout the watershed, including:
  - Removing berms, installing log structures, reconnecting the stream and floodplain, and improving the hydrology at the Banducci Site in lower Redwood Creek
  - Identifying high priority sites for barrier removal on Redwood Creek through the 2003 *Marin County Fish Passage Assessment,* which led to the installation of a new culvert connecting Kent Canyon and the mainstem of Redwood Creek and replacement of an undersized culvert under Muir Woods Road
  - Restoring the creek, wetlands, tidal lagoon, and floodplain function through the 46-acre landscape restoration project at Muir Beach (see page 38)
  - Re-creating the natural, meandering channel and the floodplains of Green Gulch Creek, a tributary of Redwood Creek near Muir Beach

A male spawning coho salmon.



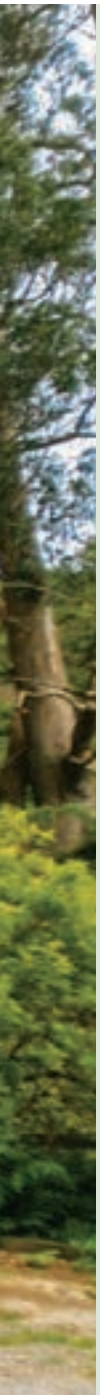




A number of important studies and plans have been completed to document current conditions, show change over time, or provide management and decision-making frameworks to help achieve the *Vision's* goals.

- Continued implementation of the 1994 *Mt. Tamalpais Area Vegetation Management Plan* for the Marin Municipal Water District and adjacent Marin County Parks and Open Space lands has helped reduce fire hazards and maintain and enhance biodiversity.
- A 2005 Redwood Creek sediment budget analysis provided a comprehensive study of sediment sources and long-term channel processes that has been used to inform numerous restoration projects.
- A 2011 invasive plant species monitoring and management plan identified priority areas and target non-native plant species, control methods, and guidance on staff support and public education.
- The *Redwood Creek Watersh ed Assessment* identified key issues, indicators, and priority actions throughout the entire watershed.
- Vegetation mapping and surveys at Mt. Tamalpais State Park, Muir Woods, Dias Ridge, Deer Park Fire Road, Redwood Creek Trail, and other locations have provided information for planning and habitat restoration.
- New LiDAR data have been used to create topographic, stream channel, and tree canopy maps of Muir Woods and Kent Canyon, which will help track changes to the forest over time.
- The 2015 *Golden Gate National Recreation Area and Muir Woods National Monument General Management Plan* set a long-term direction for the National Park Service that embraced the *Vision* and set goals that touch upon all of its Desired Future Conditions.

CULTURAL RESOURCES



From the beautiful craftsmanship of Civilian Conservation Corps-era stonework projects, to the rustic character of the buildings and trails of Muir Woods, to the coastal sites where Coast Miwok once lived—a human presence is woven throughout the fabric of this watershed. The 2003 *Redwood Creek Watershed Vision for the Future* recognized the importance of these cultural and historical resources and traditions, listing several goals to help ensure they remained an integral part of the area's future.

Desired Future Conditions from the 2003 *Redwood Creek Watershed Vision for the Future:*

1. Residents and visitors are connected to the human history of the Redwood Creek Watershed—its heritage as the ancestral homeland of the Coast Miwok, its role in agriculture in western Marin County, and its place in the history of recreation and the environmental conservation movement—through the preservation and interpretation of historically significant properties embodying this history.
2. Archaeological sites in the watershed are identified, preserved, and interpreted.
3. The Coast Miwok heritage in the watershed is maintained and enhanced through cooperation with the Federated Indians of the Graton Rancheria, the tribe descending from the Coast Miwok inhabitants of the watershed.
4. The public agency landowners in the watershed work cooperatively to identify, preserve, and interpret archaeological sites, artifacts, structures, and cultural landscapes of historic significance on public lands in the watershed.
5. Historically significant structures are preserved, rehabilitated, and reused, where opportunity allows and as appropriate.

PROGRESS TOWARD THE *VISION:*

- The 2006 *Muir Woods Historic Resource Study* defined the site's important historical and cultural features and laid the foundation for appropriate management and interpretation of these resources.
- The history of the Coast Miwok at Muir Beach has been shared through interpretive signs and programs.
- The Federated Indians of Graton Rancheria (which include the Coast Miwok) were engaged in renaming Kaashi Way, and in exploring archaeological sites at Muir Beach, and applying Traditional Knowledge to habitat restoration there.
- An annual "Welcome Back Salmon" event at Muir Beach, held in partnership with the Federated Indians of Graton Rancheria, invited the community to take part in a traditional gathering of song, storytelling, and prayer for spawning coho salmon returning from the sea.
- Preliminary documentation and analysis of historical resources in Druid Heights is ongoing.
- The Golden Gate Dairy Ranch House was rehabilitated.
- Cultural Resource Reports and Site Treatments for the Golden Gate Dairy were completed.

Right to left: Muir Woods, the Dipsea Trail, and the Mountain Theatre.

SEVERAL SITES IN THE WATERSHED HAVE BEEN ADDED TO THE NATIONAL REGISTER OF HISTORIC PLACES:

Muir Woods National Monument (2008) was included in honor of its contribution to the early national conservation movement and its rustic architectural style.

The Dipsea Trail (2010), host to the oldest trail race in America, was celebrated for its influence on the development of other footraces and an interest in fitness nationwide.

The West Point Inn (2011) was selected for its role as a hotel stop along the route of the Mount Tamalpais Scenic Railway (a.k.a. the Crookedest Railroad in the World).

The Mountain Theatre (2015) was recognized as a model Civilian Conservation Corps-era project that provided jobs while helping the state and national park system grow.

VISITOR EXPERIENCE

From its beginnings at East and West Peak, down through Mount Tamalpais State Park and Muir Woods, to Muir Beach where it meets the sea, the Redwood Creek Watershed is home to some of the Bay Area's most well-loved sites. These places have a long history of both public use and a legacy of stewardship by local groups and caring individuals. In recognition of the growing popularity of these places, land management agencies have invested in a deliberate and thoughtful approach to improving the experience of those who visit.

Desired Future Conditions from the 2003 *Redwood Creek Watershed Vision for the Future:*

1. Visitor experiences that are unique to this watershed are encouraged.
2. The watershed provides a range of visitor experiences from wild to structured and from solitary to shared.
3. Access to the watershed and recreational opportunities for a range of trail users are provided through a well-designed trail system.
4. Visitor uses and use levels are compatible with protection of natural and cultural resources of the watershed and visitor enjoyment.
5. Public education about watersheds, watershed management, and resource sustainability is provided through a range of programs both within and outside of the watershed.
6. Visitors to the watershed are active stewards of watershed resources as volunteers, educators, students, land managers, and citizen experts.
7. People visit the watershed in a manner that minimizes traffic and its related negative impacts to communities and watershed resources.
8. Visitor use rules and regulations for each land management agency in the watershed are readily available and understandable for park visitors.
9. Visitor services are adequate to support visitor experience but are kept minimal to protect the natural and cultural resources and rural character of the watershed.

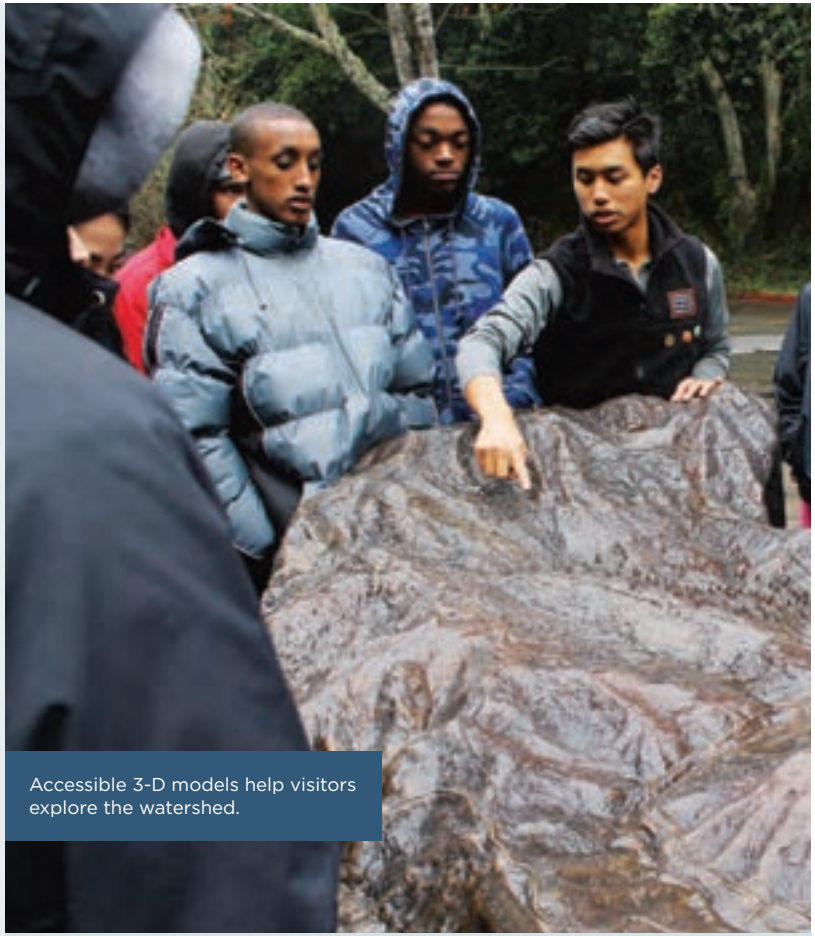
PROGRESS TOWARD THE *VISION:*

VISITORS AS STEWARDS

- Over 20,000 volunteers helped grow native plants for restoration projects, remove invasive weeds, plant native species, maintain trails, and monitor plants and wildlife throughout the watershed.
- The 2014 National Park Service and National Geographic BioBlitz engaged community members and youth groups in scientist-led species inventories at Muir Woods and Muir Beach.
- Experts and approximately 100 citizen scientists participated in a multi-year Botanical Bioblitz held by the Marin Municipal Water District and the California Academy of Sciences that will serve as the beginnings of a new baseline of Mt. Tamalpais' botanic diversity.
- The watershed has been used as a forum for students to study a wide range of topics, including landscape architecture, environmental management, water quality, geomorphology, ecology, and habitat restoration.
- Public participation in Point Blue Conservation Science's mistnetting at the Banducci Site over the past 15 years has helped gather valuable data on songbirds in the watershed.
- The annual International Migratory Bird Day celebration at Muir Woods builds upon Point Blue's songbird monitoring to give visitors an opportunity to learn about the watershed's role in global migration patterns.

IMPROVING THE VISITOR EXPERIENCE

- An entrance plaza has been created at Muir Woods by transforming a parking lot into a place where visitors can pause and reflect on the beauty around them, and learn from a number of new interpretive exhibits featuring redwood forest ecology, wildlife, and discoveries from the first-ever canopy inventory during the 2014 BioBlitz.
- The renovated Muir Woods concession is a national model for providing healthy and sustainable food in parks, getting over 70 percent of its food from within 80 miles, using over 75 percent organic produce and protein, and diverting more than three quarters of the food waste to local composting programs.
- Significant changes have been made to help ensure that visitors of all abilities can experience sites throughout the watershed, including increased beach access and improvements to trails, exhibits, parking lots and overlooks, and restroom facilities.
- Three fully accessible cast-bronze models—at Muir Beach, Muir Woods, and East Peak—detail every contour of the Redwood Creek Watershed from the top of Mt. Tamalpais down to where the creek meets the Pacific Ocean.
- Founders Grove at the Pinchot Tree in Muir Woods now has an extended, accessible boardwalk as well as classroom and event space so all visitors may learn and explore in the heart of the redwoods.
- Visitors can gaze into the world of an old-growth redwood forest canopy at four new “viewing balconies” along the the Canopy View Trail (formerly the Oceanview Trail).



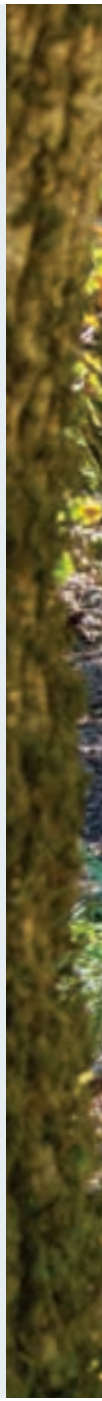
Accessible 3-D models help visitors explore the watershed.

A number of sites across the watershed have been made more accessible to visitors with disabilities.

- **Muir Beach**
- **Muir Beach Overlook**
- **Verna Dunshee Trail at East Peak**
- **Old Mine Trail to Veterans Bench**
- **Redwood Creek Trail to Founders Grove**

IMPROVING THE VISITOR EXPERIENCE

- Uniform wayfinding signs, kiosks, and interpretive exhibits have been designed and installed watershed-wide to share the history, culture, and natural wonders of the watershed and to provide continuity and consistency to the information that visitors receive.
- The 2009 Dias Ridge Trail project created a new, multi-use trail with a safer and more sustainable alignment.
- Natural resources were protected and visitor access improved along the Hillside Trail by constructing retaining walls to raise the trail above the fragile redwood root system, and new bridges that provide safe passage while allowing unimpeded creek flow.
- After being closed for decades, the Bootjack Campground has been repaired, rehabilitated, and reopened, doubling the number of available campsites.
- Initiated in 2005 to provide car-free access to the woods, the Muir Woods Shuttle carries up to 25 percent of visitors seven days a week during peak season, and saw a tripling of its ridership between 2010 and 2016.
- A system of changeable message signs along Highway 101 informs visitors of parking conditions at Muir Woods and encourages the use of the shuttle.
- A Memorandum of Understanding between Marin County and the National Park Service has cleared the way for a Muir Woods parking/shuttle reservation system, which will help manage visitor demand, improve safety, and reduce congestion through a phased reduction of parking along Muir Woods/Frank's Valley Road in 2016–2017.
- The Hillside Trail and Canopy View Trail renovations at Muir Woods preserved and enhanced resources and breathtaking canopy views.



One of the campsites at the newly renovated Bootjack Campground.

RESIDENT COMMUNITY

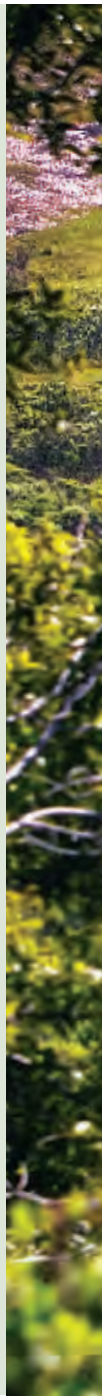
The residential and agricultural communities in the Redwood Creek Watershed play an essential role in its health and vitality. Since the *Redwood Creek Watershed Vision for the Future* was completed, a number of of steps have been taken to help ensure that the voices and values of communities in and around the watershed continue to shape the future of these lands.

Desired Future Conditions from the 2003 *Redwood Creek Watershed Vision for the Future:*

1. Resident communities are an integral part of the watershed and have minimal impacts on the natural environment.
2. Local residents are active stewards of the watershed and implement sustainable resource practices in their communities.
3. Watershed visitor traffic, parking, and recreation have minimal impacts on local communities.
4. Domestic water supply needs are met while minimizing impacts to natural resources.
5. Sustainable agriculture minimizes impacts on natural resources and provides visible connections to food production and our agricultural history.

PROGRESS TOWARD THE *VISION:*

- Green Gulch Farm at the San Francisco Zen Center, a working farm and Buddhist center, has been an essential partner in the watershed:
  - Continued to harmonize natural resource stewardship and habitat protection with sustainable agricultural practices
  - Built new residential facilities and modernized others, enhancing the quality of life for farm residents
  - Expanded floodplain and riparian habitat through the daylighting and realignment of a tributary to Redwood Creek that flows through the farm
  - Contributed more than 1,600 volunteer hours in the planting of over 1,200 plants, and volunteers and staff continue to steward the site
- The 2013 *Marin Equestrian Stables Plan* retains the area's rural character and historic Golden Gate Dairy, while also working with Ocean Riders to continue to provide equestrians recreational opportunities that are compatible with resource protection.
- Stream flow protection efforts, including water conservation and upgraded distribution systems, have been undertaken by the Muir Beach Community Services District and the local residential community.
- Residents and agency staff are working together to resolve concerns about the impacts of traffic, parking, and recreation on local communities.
- A dedicated National Park Service liaison has been assigned to Marin County to actively engage with community members and participate in local events to help build and maintain strong relationships.



Equestrians remain an important part of the watershed community.

INFRASTRUCTURE, FACILITIES, AND EMERGENCY SERVICES

Although the Redwood Creek Watershed may be best-known for its stunning natural beauty and sweeping vistas, infrastructure elements—trails, roads, parking lots, and buildings—are also an integral part of the landscape. Maintaining the watershed's infrastructure and ensuring visitor safety have been important parts of working toward the goals for a healthy and vibrant watershed set forth in the 2003 *Vision*.

Desired Future Conditions from the 2003 *Redwood Creek Watershed Vision for the Future:*

1. Water use throughout the watershed is monitored, and its effects on the watershed's creeks and aquatic resources are understood.
2. Infrastructure and its maintenance are appropriate to the anticipated use and public safety, while minimizing impacts on natural and cultural resources.
3. Infrastructure management is coordinated among responsible agencies, businesses, utilities, and residents.
4. Emergency services are provided throughout the watershed.

Conservation Corps North Bay crews improve trails within Muir Woods.

PROGRESS TOWARD THE *VISION:*

WATER RESOURCES

- Ongoing stream flow monitoring in Redwood Creek reveals when residential water conservation measures need to be implemented.
- Flooding on Pacific Way was reduced when the old parking lot at Muir Beach was reconfigured so that it no longer impedes high stream flows.

BUILDINGS, ROADS, AND TRAILS

- Significant improvements to the West Point Inn over the last decade have included earthquake retrofitting, solar panels, interior fire sprinklers, wildfire buffers, and a renovation of the adjacent picnic area.
- The rebuilt Throckmorton Fire Station has won awards for architecture and energy efficiency, with features such as photovoltaic electricity generation, geothermal heating and cooling, and the use of "green" materials in all aspects of design and construction.
- Decommissioning the former military radar installation at West Peak has included removing old buildings and restoring public trail access.
- Marin County has worked with agency partners on a number of important infrastructure improvements, including repaving a portion of Pacific Way, repairing and repaving part of upper Muir Woods Road, and helping California State Parks repair and reopen a long-failed segment of the Dipsea Trail.
- Projects along the Bootjack Trail have installed or improved bridges, walls, stream crossings, trail surfaces, and erosion control.

- The Golden Gate National Parks Conservancy, California State Parks, and National Park Service have partnered with local Conservation Corps and youth crews to complete priority trail projects; install fences, walls, stairs, and decking; remove downed trees; erect signs; and rehabilitate social trails.
- The Redwood Creek Watershed Collaborative (see page 32) added staff capacity and increased efficiencies in planning, compliance, and design to address deferred maintenance and infrastructure improvements for the Miwok, Heather Cutoff, Redwood Creek, Dias Extension, Lost, Fern Creek, and Canopy View trails.

SAFETY AND EMERGENCY SERVICES

- The Redwood Creek Watershed Collaborative also helped Muir Woods visitors find safe parking and pedestrian access, provided directions and information about the park and the watershed, picked up trash along Muir Woods Road and in parking lots, and maintained vegetation along the roadway and trails.
- Volunteer emergency services have responded to many calls each year to help both residents and visitors with fires, floods, accidents, and medical issues.
- A new emergency access route from Muir Beach to the coastal hills accommodates emergency vehicles via Kaashi Way and the improved Coastal Trail.
- Partnerships developed through the Redwood Creek Watershed Collaborative have decreased the number of emergency calls and reduced energy response costs.
- The National Park Service added a dedicated law enforcement and emergency management service team for Muir Woods and Muir Beach.

Several studies and plans related to managing the watershed's infrastructure have been completed.

- A 2005 Marin Municipal Water District watershed-wide roads assessment evaluated how to reduce the impact of roads and trails on natural resources.
- A Comprehensive Transportation Management planning process that ended in 2005 led to studies on Muir Woods visitation, the Muir Woods shuttle, and improvements to the Dias Ridge Trail.
- The 2006 *Golden Gate National Recreatiozn Area Fire Management Plan* describes approaches to manage fire on National Park Service lands so as to retain its beneficial ecosystem services while protecting resources, property, and lives.

THREE CASE STUDIES

Large-scale, multi-faceted programs and projects will likely achieve many goals at once. The following pages describe three examples of accomplishments that have transcended multiple Desired Future Conditions from the original *Redwood Creek Watershed Vision for the Future.*

CASE STUDY #1

COMING TOGETHER TO CARE FOR THE WATERSHED

The *Redwood Creek Watershed Vision for the Future* represented a new way of thinking about the future of these watershed lands by considering them as a whole—as an inherently connected place—rather than along jurisdictional lines or individual project scopes.

Since it was published in 2003, the *Vision* has been used to guide the remarkable range of work described in this report. These accomplishments would be significant on their own; however, the process of creating the *Vision*, and the new ways of thinking that it inspired, have rippled out beyond what its creators might have imagined. In particular, two remarkable initiatives can trace their lineage back to this process.

THE REDWOOD CREEK WATERSHED COLLABORATIVE

Spurred by the 2011 California State Parks closure crisis, the National Park Service, California State Parks, and the Golden Gate National Parks Conservancy came together under the **Redwood Creek Watershed Collaborative.** Supported by a portion of the entrance fee paid by Muir Woods visitors, this partnership enabled the agencies to work across boundaries on critical deferred trail maintenance projects, invasive species management, consistent wayfinding signage, and interpretive programs and materials, and to keep Marin State Parks open.

The Redwood Creek Watershed Collaborative was a model of what a successful partnership among federal and state agencies and a nonprofit can be, and helped lay the foundation for another innovative new partnership, the **Tamalpais Lands Collaborative.**

THE TAMALPAIS LANDS COLLABORATIVE (TLC)

The TLC is a partnership of the four land management agencies on Mt. Tamalpais—the National Park Service, California State Parks, Marin Municipal Water District, and Marin County Parks—and the nonprofit Parks Conservancy.

Founded in 2014, this collaborative combines the expertise and resources of its partners to support priority projects, sustain conservation and restoration programs, coordinate education and stewardship across Mt. Tamalpais, and increase the size and capacity of the volunteer corps caring for these lands. It also provides a vehicle for coordinated philanthropic support and community engagement.

Now in its second year, the TLC has:

- Created One Tam, the community initiative of the TLC and a portal for philanthropy, volunteer programs, and public engagement
- Hired three One Tam staff members and two interns to support the environmental stewardship, resource conservation, and youth and community programs of all the agency partners
- Held five One Tam volunteer events, which engaged over 700 volunteers
- Launched the Linking Individuals to their Natural Community (LINC) program on Mt. Tamalpais, which enabled 17 local youth to learn resource conservation and engage in hands-on field research, while increasing their team-building, career, and personal development skills
- Supported the Wildlife Picture Index, Forest Resiliency, and Redwood Creek Trail Realignment Projects

CASE STUDY #2

TRAILS: THE WATERSHED'S COMMON THREADS

The Redwood Creek Watershed's extensive trail network has been the focus of numerous projects since the *Vision* was completed in 2003. These projects have often provided an opportunity to address multiple goals, including erosion control and water quality protection, habitat restoration, invasive species management, cultural resource preservation, public safety and visitor experience improvements, interpretation and wayfinding feature expansion, community partnership development, and volunteer engagement.

The trail realignment and restoration at Dias Ridge in 2009 included three miles of trail improvements and 6.9 acres of habitat restoration. This project represents just one example of how a trail project achieved many different goals, including:

National Park Service Trail Crew install resource protection measures along trail.

NATURAL RESOURCE PROTECTION

- Staff and volunteers conducted five years of invasive plant species management and planted tens of thousands of native species, protecting and enhancing coastal scrub and sensitive grassland habitats.
- Pre-construction invasive plant management reduced the spread of weeds later during the project.
- The project's design ensured the construction footprint was as narrow and discrete as possible, used soil from within the watershed to fill erosion gullies, replanted salvaged plants, and used downed trees to slow runoff along the old road.
- Downgrading the old farm road to a smaller and more sustainably aligned trail, and removing some parts of the road as well as an eroding social trail, helped protect water quality and local flora and fauna.
- Fences discouraging off-trail use allowed planted vegetation to establish so quickly that the barriers were removed within a few years.

CULTURAL & HISTORICAL RESOURCE CONNECTIONS

- The trail offers visitors the opportunity to see the historic Golden Gate Dairy and encounter a remnant of the watershed's agricultural roots.
- Historic fence posts were reset in their original alignments using historically-appropriate fencing material, and the bridge near the dairy was installed to reduce impacts to the site's historic character and resources.
- The new, multi-use trail helps preserve equestrian access within the watershed.

VISITOR EXPERIENCE IMPROVEMENTS

- Numerous community volunteers helped remove posts and railings, clear drains, maintain the trail, pull invasive plants, and plant native species before and after the project was complete.
- New trailhead kiosks and wayfinding signs help visitors navigate the site and learn about its natural and cultural treasures.
- The new trail provides a way for bicyclists to get from Panoramic Highway to Muir Beach without riding along the roadway.
- The new, much less steep trail alignment provides a safer and more pleasant experience for hikers, bikers, and equestrians, and also provides a clear line of sight, offset fencing, and wide turns so users can safely pass.

COMMUNITY COLLABORATIONS

- The project represents one of the most significant trail partnership projects between the National Park Service and California State Parks in the watershed.
- Local Conservation Corps North Bay youth were heavily involved in trail construction, fence installation, planting, and weeding.
- Diverse recreational organizations including the Marin County Bicycle Coalition, Marin Horse Council, Ocean Riders, and REI were instrumental in project planning, and continue to be important partners today.
- The project provided an important link in the Bay Area Ridge Trail network, and was supported by a wide range of partners, including the Bay Area Ridge Trail Council, Coastal Conservancy, and Golden Gate National Parks Conservancy members.

CASE STUDY #3

THE RESTORATION OF REDWOOD CREEK AT MUIR BEACH

The most far-reaching accomplishment of the *Vision* to date is the 46-acre landscape restoration at Muir Beach, where Redwood Creek meets the Pacific Ocean. Once home to thriving riparian, lagoon, and dune ecosystems, the site had been dramatically altered over the years and its natural hydrological functions and vital habitats lost. The National Park Service and Parks Conservancy launched a multi-phase restoration project in 2009, completing the bulk of the work in 2013.

Staff and volunteers plant thousands of seedlings into new habitat.

Today, dense stands of willows and alders line a restored meandering stream channel. Dunes are rebuilding naturally after a beach access trail was relocated and improved. Numbers of California red-legged frogs (a threatened species) are booming, and better floodplain connectivity reduces flooding on local roads, while also providing essential winter habitat for endangered coho salmon and threatened steelhead trout.

The new landscape allows long-term natural creek, wetland, and coastal processes to occur, while still fully accommodating park visitors. It was designed to allow these ecosystems to adjust and develop over the coming decades, providing resiliency in the face of an uncertain future. The process of planning for the restoration of Muir Beach also instigated a wide range of work in the watershed extending beyond the limits of this project.

The restoration of Redwood Creek at Muir Beach touched upon all the different categories of Desired Future Conditions described in the 2003 *Redwood Creek Watershed Vision for the Future.* Highlights include:

NATURAL RESOURCES

- The landscape now functions as a whole, with integrated creek, floodplain, wetland, lagoon, dune, and coastal processes.
- Natural hydraulic, geomorphic, sediment, wood recruitment, and coastal processes have been restored and have created habitat used by special status species such as coho salmon and steelhead trout.

- The Green Gulch Tributary has been partially restored and is connected to Redwood Creek for the first time in many decades, providing valuable off-channel habitat for coho salmon.
- A diverse cover of native riparian and wetland plants is well-established along the channel banks and floodplains.
- Broad areas of the site previously occupied by invasive, non-native plants—such as kikuyu grass (*Pennisetum clandestinum*), cape ivy, and Harding grass (*Phalaris aquatica*)—have been replaced by healthy native plant communities, including dune, riparian, wetland, and coastal scrub species.
- California red-legged frog numbers have soared thanks to restored breeding habitat.

CULTURAL RESOURCES

- Archaeological sites at Muir Beach were identified, characterized, and protected.
- The Coast Miwok heritage was maintained and enhanced through years of cooperation and on-site involvement by the Federated Indians of Graton Rancheria.
- A body of information was developed through archaeological digs on-site to identify, preserve, and interpret historical Coast Miwok use of the site.

VISITOR EXPERIENCE

- Visitors now arrive at a better-designed parking lot, with a view of the ocean and without the dust and potholes of the old gravel lot.
- Visitors may now picnic within view of the ocean, which was formerly obscured by stands of non-native trees.
- Access to the watershed and recreational opportunities are enhanced by improved trail conditions on the Coastal Trail and Kaashi Way.
- An accessible route was created from the parking lot to the beach, and beach wheelchairs are available for check-out.
- Dune fencing and a new trail are allowing passive restoration of a natural foredune system while maintaining full visitor access.
- The new Coastal Trail alignment and replanted native wetland species restore natural drainage patterns and help reduce sediment from an old ranch road.
- Thousands of people have been active stewards at this site, studying ecosystem changes, counting juvenile coho salmon, searching for frog egg masses, planting native species, removing weeds, tracking river otters, and more.

RESIDENT COMMUNITY

- Improved water conveyance has reduced flooding on Pacific Way and improved access to and from homes during moderate winter rain events.
- An emergency access route to Coyote Ridge was improved on Kaashi Way and the Coastal Trail.
- The installation of vault toilets eliminates the use of water resources, and reduces demand on upstream water sources.
- The layout of the new visitor parking lot and the long pedestrian bridge to the beach now allow the floodplain to convey high flows during winter storms.
- The National Park Service and Marin County coordinated efforts to pave Pacific Way, improve drainage near residents' homes, and reduce flooding on the road.

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