Santa Cruz Countywide
Partners in Restoration
Permit Coordination Program

2011 Annual Report

Prepared by the
Resource Conservation District of Santa Cruz County
Acknowledgements

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The following individuals played important roles in the Permit Coordination Program and the development of this report:

**RCDSCC:** Karen Christensen, Sharon Corkrean, Arianne Rettinger, Kelli Camara, Angie Stuart, John Morley, Alicia Moss, Nik Strong-Cvetich, Bryan Frueh, Lea Haratani, Karl Fieberling, Sooni Gillett, and Leah Healy and Carmen Tan (AmeriCorps Volunteers).

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Special thanks are also extended to those landowners whose cooperation and commitment to resource conservation made these projects possible, and to the partnering agencies which have been invaluable in making this program successful.
The conservation projects are relatively small in size, have demonstrated a net environmental benefit, and are usually performed for erosion control or restoration in and around waterways. The work authorized under the Program revolves around NRCS conservation practices, also known as best management practices (BMPs) or management measures. These practices, when applied in the appropriate setting, help landowners and land managers improve the productivity of their operations and protect and improve the natural functioning of adjacent and nearby natural areas. These standardized practices are selected from the NRCS’ California Field Office Technical Guide (FOTG) and mirror the BMPs promoted by the EPA to help meet CWA mandates and the BMPs included in Management Measures promoted by the California Coastal Commission and the State Water Resources Control Board in the Plan for California’s Nonpoint Source Pollution Control Program. The RCDSCC and NRCS have selected fifteen conservation practices from the NRCS’s Field Office Technical Guide (FOTG) that address local land use and resource problems in Santa Cruz County. The environmental protection measures and conditions associated with implementation of any of these practices, as negotiated with regulatory agencies, will be specific to the resource concerns present in Santa Cruz County.

Under the Program, regulatory agencies enter into programmatic agreements with the RCDSCC that cover the fifteen specific, standardized conservation practices. The Program requires that landowners follow NRCS designs and specifications for conservation work. This results in high quality work and ensures follow up and monitoring on each conservation project completed in association with the

### Representative Sampling of Agency Mandates That Can Affect One Conservation Project

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Program. By selecting those conservation practices suitable for coordinated review, the Program facilitates implementation of successful on-the-ground projects that will collectively contribute to a net environmental benefit for the watersheds in Santa Cruz County.

**Program Highlights**
We are very happy to report that we have just completed our 7th year of the Permit Coordination Program! To date, 70 environmentally beneficial conservation projects have been implemented.

Access Roads Improvements (in combination with Structures for Water Control) were installed in partnership with rural road associations using cash-match funding provided under the RCDSCC’s Rural Roads Program. The projects stopped more than 3,750 tons-per-year of sediment from impacting water quality, predominantly in the San Lorenzo River watershed. An additional 6,731 tons-per-year of sediment from erosion was saved through the implementation of sediment basins, grassed waterways, and streambank protection practices on agricultural land in the Pajaro Valley Watershed.

Almost 20 miles of salmonid habitat was improved throughout Santa Cruz County utilizing the Fish Stream Improvement and Obstruction Removal practices. More than 88 acres of habitat was restored with the Restoration and Management of Declining Habitats and Critical Area Planting practices, with 28 acres of habitat restored along the lower reaches of Soquel Creek, which provides habitat for the steelhead, coho, tidewater goby, and foothill yellow legged frog. Approximately 45 acres were restored along the lower reach of Watsonville Slough just upstream of the confluence with the Pajaro River, which provides habitat for a multitude of aquatic and avian species.

**Featured Project**
During first 5-years of the Program, the RCDSCC and NRCS learned more about the types of restoration work most needed in Santa Cruz County. To reflect this knowledge, wetland management was added as a practice to the 10-year renewed program.

In 2011, our first wetland restoration project was installed in the Middle Watsonville Slough system. This project was part of a larger enhancement effort to improve wetland
habitat in conjunction with existing farming operations on the Watsonville Slough Farm Property, recently acquired by the Land Trust of Santa Cruz County, and in the Watsonville Sloughs system.

Recognized as the largest and most significant wetland habitat between Pescadero Marsh (San Mateo County) and Elkhorn Slough (Monterey County), the Watsonville Slough system is a highly valued and unique ecological resource on the Central Coast. The overlap of wetlands, marsh, and grasslands create a diverse ecosystem that provides a rich food supply for a wide variety of declining wildlife species.

The project to restore approximately 1 acre of wetland habitat was a collaboration of eleven federal, state, and local organizations with the goal of conserving large areas to attain sustainable ecosystems, including the RCDSCC, NRCS, Watsonville Wetlands Watch, the Land Trust of Santa Cruz County, the California Department of Fish and Game, and the United States Fish and Wildlife Service.

The removal of a homogenous landscape will enhance wetland and wet meadow habitat to support California red-legged frog breeding recovery and wetland dependent bird species populations within the slough system. In addition, the retirement of agricultural land directly adjacent to the slough will improve water quality.
**2011 Projects**

**BeC-1**

**Practice/Extent:**
- Structure for Water Control (587)
- Sediment Basin (350), 0.41 acres

**Purpose/Goal of project:** The goal of this project is to repair the inlets of an existing sediment basin and improve sediment retention to decrease sediment transport to Bean Creek.

**Area affected:** 0.71 acres

**Conservation benefits:** Though the vertical quarry face is a significant source of sediment, treatment to eliminate and/or reduce erosion would be extremely labor intensive and very cost prohibitive. As such, the project focused on capturing the sediment to protect water quality. The project included upgrading an existing sediment basin to increase capacity and prevent a massive failure to the system.

**Natural biological enhancements:** The project will reduce sediment transport to Bean Creek, an important fisherys stream and tributary to the San Lorenzo River.

**Volume of soil moved:** 2,490 yd³

**Waters/Wetland loss:** No net loss of jurisdictional waters or wetlands occurred as a result of this project.

**Net gains in wetland and riparian areas:** No change.

**Final slope of project work (not to exceed 2:1):** 3:1

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a training on September 28, 2011, led by service-approved biologists, regarding the endangered species and the fragility of the habitat, and the protection measures to avoid and minimize impacts during the project. Additional measures taken include:

- **Mount Hermon June Beetle**
  - Ground disturbing activities were conducted between October 3 -15, outside of the flight season (May 1-Oct 1)
  - Justin Burks, a service approved biologist, was on site during all ground disturbing activities, and Jodi McGraw (recovery permit #TE118641-1) was on-call to relocate any larvae found. No larvae were observed or relocated.
  - Spoils were located in areas determined by Jodi McGraw to have degraded habitat for the Mount Hermon June beetle.
  - To avoid impacts to ponderosa pine, a fence was installed to protect a large ponderosa pine on the western edge of the limit of work. No impacts to the pine were detected.
  - No herbicides were used as part of this project.

- **Zayante band-winged grasshopper**
  - Justin Burks, a service approved biologist, was on site during all ground disturbing activities to keep Zayante band-winged grasshoppers out of harm’s way. The species’ habitat on the southwestern edge of the limits of work was fenced and patrolled by Justin Burks. Jodi McGraw was on-call to relocate any individuals that entered the limits of work, though none needed to be moved.
  - All silver bush lupine (*Lupinus albifrons var. albifrons*) and sessileflower false goldenaster (*Heterotheca sessiliflora ssp. echioides*) located within or within 30’ of the project area were flagged with bright colored flagging on September 27th and 28th, prior to initiation of ground-disturbing activities for the project. This measure was successful in greatly reducing impacts to the host plants, though some smaller individuals may have been trampled and killed by crews during necessary work on the southwestern portion of the perimeter.
  - Spoils were located in areas determined by Jodi McGraw to not be suitable habitat for Zayante band-winged grasshopper.
  - No non-native plant removal was conducted as part of this project.
  - No herbicides were used as part of this project.

**Reports submitted to County staff:** Not applicable.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** The project area supports coyote brush (*Baccharis pilularis*) with an understory dominated by non-native annual grasses and forbs including tocalote (*Centaurea melitensis*), Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), dog fennel (*Anthemis cotula*), mustard (*Brassica sp.*), rip gut brome (*Bromus diandrus*), rattlesnake grass (*Briza maxima*), wild oats (*Avena barbata*), and cheat grass (*Bromus tectorum*). Eradication or control of these non-natives was not within the scope of the project. Thus, the site will be monitored for three (3) to five (5) years to ensure no non-native invasive species colonize the site.

**Mitigation I. (D) Revegetation efforts:** As the excavated material from the sediment basin was disposed of onsite, the disposal area and all disturbed areas were hydroseeded with *Nassella pulchra* and *Elymus glaucus* at a rate of 200 lbs/acre each with compost mulch at a rate of 450 lbs/acre, Wood Fiber Mulch at a rate of 300 lbs/acre, and stabilizing emulsion at a rate of 100 lbs/acre.

**Mitigation I. (E) Monitoring:** The goal of this project is to trap sediment to improve quality of Bean Creek. The site will be monitored to ensure that the basin is functioning as designed, capturing 200 tons of sediment per year and preventing 70-90% of material from reaching the stream corridor. The site will be monitored to determine the frequency of maintenance, which is expected to be once every five (5) to ten (10) years. A minimum depth to sediment of
2.2 ft. (measured from the top of the stand pipe) should be maintained for the basin to function as designed. As the basin fills, additional baffles will be added to maintain the flow path length and design depth/efficiency.

The site will be returned to pre-construction conditions or better. The introduction of any invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site will be performed and removal of non-native invasive species will be completed as necessary. The site will be monitored for three (3) to five (5) years.

Mitigation II. Floodwater conveyance: The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

Photo point 2: The willow trees in the foreground indicate the sediment basin location.

Photo point 2: Inlet channels have been armored with rock riprap to safely convey flows into the basin. The riser pipe has been wrapped in fabric to prevent small particles from entering bean creek.

Photo point 1: Looking east. The eroding inlet is visible.

Photo point 1: Looking east. The inlet channel has been reshaped and armored.
**BCG-1**

*Practice/Extent:*

» Restoration and Management of Rare and Declining Habitats (643), 4 acres

*Wetland Management (644) and Structure for Water Control (587) practices are also part of this project. Due to early rains that encourage migration of amphibian species, these portions of the project have been postponed until fall 2012.*

**Purpose/Goal of project:** The goal of the project is to encourage the Seascape and the Valencia Santa Cruz long-toed salamander populations to interbreed through enhancement of wetland habitat and restoration of upland oak woodland habitat.

**Area affected:** 174,240 ft²

**Conservation Benefits:** Removal of invasive jubata grass from upland habitat will allow oaks to re-populate the project site, creating ideal estivation habitat for Santa Cruz long-toed salamander.

**Natural biological enhancements:** Removing the monoculture of jubata grass will allow native species to repopulate the area and return Willow Canyon to a level of biodiversity necessary for amphibian species like the Santa Cruz long-toed salamander and the California red-legged frog.

**Volume of Soil moved:** None

**Net Waters/Wetland Loss:** No change

**Net gains in wetlands and riparian areas:** No change

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** This project involved working in critical habitat for Santa Cruz long-toed salamander and California red-legged frog. While the frog is not known to exist in the area, the RCDSCC coordinated with a local biologist, DFG, and FWS to ensure activities would limit impacts to species. The use of herbicide for jubata grass removal was determined the best method for removal, as it does not disturb the soil where salamanders might be aestivating. The project was conducted during the dry season when amphibians would be unlikely to be migrating and the wetland habitat portion of the project was postponed due to October rains.

Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a training on California red-legged frog and Santa Cruz long-toed Salamander on September 19, 2011, led by a service-approved individual, regarding the life history of the species, protection afforded by State and federal regulations, and the protection measures to avoid and minimize impacts during the project. No individuals were observed during project activities.

**Reports submitted to County Staff:** Not applicable.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** The intent of the project was to eradicate Jubata grass from the project site using a glyphosate-based approved herbicide. The herbicide was applied directly to the invasive species to limit impact to native vegetation. This method of removal has been shown to be successful in limiting the recolonization of the species as well as other invasives and provides a niche for oaks and other woodland species to re-establish. In addition, the root mass will limit the potential for erosion. The project will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

**Mitigation I. (D) Revegetation efforts:** As described above, the slow decay of jubata grass will provide erosion control and allow native recruitment of oak woodland species. No revegetation was conducted on site.

**Mitigation I. (E) Monitoring:** The goal of this project is to eradicate jubata grass from the 64-acre property and restore oak woodland habitat. The introduction of any non-native invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site will be performed to ensure a 90% mortality rate of treated jubata grass. Visual monitoring of the site will be performed and re-application of herbicide will occur to ensure this rate is achieved. Removal of non-native invasive species will be completed as necessary. The site will be monitored for three (3) to five (5) years.

**Mitigation II. Floodwater conveyance:** Not applicable.
Photo point 1: View of northern upslope habitat which is nearly 100% jubata grass.

Photo point 1: The jubata grass is already showing signs of wilting on the northern slope.

Photo point 2: View of a path that runs alongside a future pond area. Individual jubata grass plants can be seen in both the foreground and background.

Photo point 2: Individual plants of jubata have wilted and will be monitored to ensure complete kill.

Photo point 3: A typical example of jubata grass’s ability to create a monoculture, excluding any new growth of native species.

Photo point 3: While a 90% success on jubata eradication is expected, the full effects of the treatment will not be evident until mid-spring.
**MWS-2**

**Practice/Extent:**
- Restoration and Management of Rare and Declining Habitats (643), 1.7 acres

**Purpose/Goal of project:** The goal of this project is to enhance the vegetative buffers between the Hanson Slough and agricultural land.

**Area affected:** 1.7 acres

**Conservation benefits:** This project is part of a larger enhancement effort to improve habitat in conjunction with an existing farming operation on this property and in the Watsonville Sloughs system.

**Natural biological enhancements:** This wildlife restoration project will support California red-legged frog breeding recovery and grassland-dependent bird species populations within the slough system, restore and enhance coastal prairie and associated marsh habitat, and improve water quality.

**Volume of soil moved:** 88 yd³ (estimate of ground preparation for seeding/planting)

**Waters/Wetland loss:** No net loss of jurisdictional waters or wetlands occurred as a result of this project.

**Net gains in wetland and riparian areas:** 0.6 acres of wetland gained

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a training on California red-legged frog on September 26, 2011, led by a service-approved individual, regarding the life history of the species, protection afforded by State and federal regulations, and the protection measures to avoid and minimize impacts during the project. No individuals were observed during project activities.

**Reports submitted to County staff:** Not applicable.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** The goal of the project is to restore 1.1 acres of native coastal prairie habitat through the retirement of agricultural production on an upland terrace above Hanson Slough and to enhance 0.6 acres of adjacent riparian/wet meadow habitat through the retirement of existing agricultural land and decommissioned farm roads. Existing poison hemlock populations were mowed and tilled into the soil. A thick woodchip mulch was applied to limit hemlock regrowth. The site will be monitored and maintained to allow the successful establishment of native vegetation.

**Mitigation I. (D) Revegetation efforts:** A total of approximately 1800 native plants were installed. The primary vegetation type was low stature herbaceous plantings, with some woody vegetation to increase habitat complexity and nesting sites for California red-legged frogs and other species, including migratory birds. Native plants were propagated from parent stock located within the Watsonville Slough system, and within a 15 mile radius when possible. In addition, native coastal prairie seed species that have been propagated onsite was broadcast at a rate of 30 lbs/acre. Species included native bunch grasses and both annual and perennial forbs. An irrigation system was installed and will be used for 1-2 years or until established.

**Mitigation I. (E) Monitoring:** In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented by ongoing maintenance and monitoring. Success criteria will be constituted by a 90% reduction in the percent of non-native invasive species removed and an 80% success rate of establishment of natives. The success criteria will be monitored for a period of three years to ensure successful establishment of native vegetation. Monitoring will be performed in the fall months and will occur on randomly selected sampling units (line transects) along permanent transect lines. The point intercept method will be used to establish percent cover of native and non-native species. Additionally, the site will be monitored and maintained for three (3) years to five (5) years.

**Mitigation II. Floodwater conveyance:** Not applicable.
2011 Projects

Photo point 1A: The knoll at the southern-most end of the farm field, where a strawberry crop is currently growing, will be retired and restored to native coastal prairie and riparian habitats.

Photo point 1A: Strawberries were removed and the field disked prior to seeding. Most of the field will be planted in a cover crop, but Hanson Slough upland enhancement area will be seeded with native seed.

Photo point 2B: The fields on the right of the farm road will be retired and restored to coastal prairie. The hemlock areas surrounding it, shown with a white flower, will be restored to a native riparian habitat.

Photo point 2B: Prepped for restoration work.

Photo point 5A: The strawberry field in view will be retired and restored to native coastal prairie.

Photo point 5A: The strawberry beds have been removed and the field is being prepared for seeding with native grass and wildflower seed.
MWS-3

Practice/Extent:
» Wetland Management (644), 0.95 acres

Purpose/Goal of project: The goal of the project is to expand existing riparian and wetland habitat to retired agricultural land, as well as to restore a variety of upland habitat types.

Area affected: 41,382 ft²

Conservation Benefits: This project is part of a larger enhancement effort to improve habitat in conjunction with existing farming operations on this property and in the Watsonville Sloughs system. Habitat was expanded and enhanced through the removal of agricultural debris and fill which had accumulated next to a riparian area and through revegetation to improve wet meadow habitat.

Natural biological enhancements: Regrading the site to re-establish pre-agricultural topography will enhance wetland and wet meadow habitat to support California red-legged frog breeding recovery and wetland dependent bird species populations within the slough system. The retirement of agricultural land adjacent to the slough and revegetation with native species will improve water quality.

Volume of Soil Moved: 945 yd³

Net Waters/Wetland Loss: No fill was placed in waters of the US.

Net Gains in Wetlands and Riparian Areas: .023 acres

Final Slope of Project Work: 3:1

Reports Submitted to County Staff: Not applicable.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: The special status species of concern on this property is the California red-legged frog. Prior to the onset of activities that resulted in the disturbance of the project area, all project workers including RCDSCC/NRCS staff and growers/landowners and/or their employees/representatives were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices. Exclusionary fencing was installed prior to project implementation to clearly delineate the construction area and a silt fence was installed at the south end of the project to minimize sediment impacts to existing wetland habitat. During fence installation, one California red-legged frog was observed adjacent to the project area. Relocation was unnecessary.

Mitigation I.(C) Efforts to control non-native invasive plant species: All areas of the project that will not be regularly inundated were mulched with wood chips to suppress agricultural weeds. This has proven successful on the property as a way to restore previously farmed areas. The remaining portion of the site will not be revegetated to allow for natural recruitment of native species. Monitoring on an adjacent parcel has shown adequate natural recruitment and an abundance of rare plant species which were thought to be extinct from the watershed. The project will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

Mitigation I.(D) Revegetation efforts: Native plant species were used to revegetate the riparian area and former agricultural field and were chosen based on the approved plant list developed for the program: Eleocharis macrostachya, Euthamia occidentalis, Juncus effusus, Leymus triticoides, Rosa californica and Rubus ursinus. Carex lanuginosa and Juncus effusus were not on this list but were used on the project site based on their current presence on-site or adjacent to the project site and were propagated from local stock.

Mitigation I.(E) Monitoring and Success Criteria: Revegetation of the riparian area and the area between the wetland and farm land was completed for habitat enhancement and water quality improvement. The success criterion has been set at 80% by the second growing season. The remaining portion of the site will not be revegetated. The success criterion for this area has been set at 65% by the second growing season with the idea that 35% bare ground will provide adequate habitat for ground-nesting bird species. If performance metrics are not met, areas will be reseeded and replanted to meet or exceed the criteria in the following growing season. Monitoring for previous restoration projects on this property has shown that success criteria can be met in 2-3 years. Monitoring on an adjacent parcel has shown adequate natural recruitment and an abundance of rare plant species which were thought to be extinct in the watershed. Monitoring will be completed through photo monitoring and visual observation for three (3) to five (5) years on this project.

Mitigation II. Floodwater conveyance: Not applicable.
Photo point 1: Looking south towards the railroad tracks. Sediment deposition has led to a lack of topographic diversity and weeds. Note the willow tree on the left.

Photo point 1: Looking east. Note the same willow tree at the back of the photo. Soil has been removed to create heterogeneity to improve wetland diversity.

Photo point 2: Looking west towards a weedy hemlock patch with agricultural debris and spoils.

Photo point 2: Looking west. Hemlock, debris, and sediment spoils have been removed. Wood chip mulch has been applied to address weeds and the site is being revegetated with natives.

Photo point 3: Looking east. Previously farmed ag land can be seen on the left side of the photo. The wetland enhancement project site is located on the right side of the photo.

Photo point 3: Agricultural land has been retired and the site regraded to enhance wetland habitat. Straw wattles have been placed to control erosion during natural plant recruitment.
**Practice/Extent:**

- Restoration and Management of Rare and Declining Habitats (643), 131 ft x 151 ft

**Purpose/Goal of project:** The goal of the project is to increase population levels of Santa Cruz long-toed salamander (SCLTS) (*Ambystoma macrodactylum croceum*) through the removal of Tasmanian bluegum (*Eucalyptus globulus*) in the immediate vicinity of Millsap pond.

**Area affected:** 19,781 ft²

**Conservation benefits:** The removal of the eucalyptus surrounding a known breeding pond for the CRLF and SCLTS allowed for a greater amount of sunlight and warmth to reach the pond, with the intent of creating warmer aquatic conditions to facilitate annual metamorphosis of each species. The removal of these invasive trees also serves to reduce fire danger.

**Natural biological enhancements:** Reducing the surrounding eucalyptus canopy cover is expected to increase the amount of sunlight reaching the pond, in turn increasing the ambient temperature and corresponding rate of larval development, which is critical for maintaining population levels. Additionally, the removal of eucalyptus will reduce the local fire hazard.

**Volume of soil moved:** 0 yd³

**Net waters/Wetland loss:** No change

**Net gains in wetlands and riparian areas:** No change

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** This project involved working adjacent to known populations of the Santa Cruz long-toed salamander and California red-legged frog. Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a training on California red-legged frog and Santa Cruz long-toed salamander led by a service-approved individual on September 6th regarding the life history of the species, protection afforded by State and federal regulations, and the protection measures to avoid and minimize impacts during the project. No individuals were observed during project activities. The project itself was conducted during a time when salamanders and frogs were least likely to be migrating to pond habitat. The additional falling of trees was postponed due to early rains that encouraged amphibians in the area to begin migration to pond habitat.

**Reports submitted to County staff:** Not applicable.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** The property currently hosts a number of invasive species, including eucalyptus, cape ivy and French broom. The intent of the project was to selectively remove eucalyptus trees from the project site utilizing the cut-stump method. A glyphosate-based approved herbicide was applied directly to the invasive species to prevent re-sprouting and limit impact to native vegetation. Full eradication was not deemed feasible at this time due to a number of reasons, including slope stability, financial resources, and discussions with local biologists, FWS, and DFG to limit site impacts during the first few years of management. French broom was hand pulled to allow the chipper to access the site. New eucalyptus seedlings will be hand pulled by volunteers, as will French broom and cape ivy, but full eradication of any of the species will not occur as part of this project. The colonization of new invasives is limited due to the remaining eucalyptus canopy and accumulation of leaf material on the soil surface. The project will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

**Mitigation I. (D) Revegetation efforts:** No revegetation was conducted on site, as the remaining eucalyptus trees and understory provide adequate erosion control and limit the restoration to native habitat at this time. Native tree species will be planted at a 3:1 ratio on future projects to mitigate for the removal of the 81 eucalyptus trees removed.

**Mitigation I. (E) Monitoring:** The goal of this project was the warming of an existing pond through clearing over invasive tree canopy cover. The site conditions were immediately improved upon clearing of the trees and a number of native species have begun to naturally recruit along the path where additional sunlight has fallen. No trees have re-sprouted at this time, but the RCDSCC will continue to monitor the area to assure that no cut eucalyptuses re-grow. The introduction of any invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site will be performed and removal of non-native invasive species will be completed as necessary. The site will be monitored for three (3) to five (5) years.

**Mitigation II. Floodwater conveyance:** Not applicable.
2011 Projects

Photo point 1: Looking towards White Road where French broom has completely overrun the entrance.

Photo point 1: Looking towards White Road, CCC crews removed French broom from the entrance.

Before

After

Photo point 2: A group of mixed age eucalyptus trees on the downslope bank.

Photo point 2: Eucalyptus trees were removed wherever CCC crews could assure that they would not fall directly into the pond.

Before

After

Photo point 4: Facing south, the walking path was lined with eucalyptus trees.

Photo point 4: Facing south, the walking path and pond receive much more sunlight, allowing the pond to sustain a greater capacity of life.
MWS-5

Practice/Extent:
» Restoration and Management of Rare and Declining Habitats (643), 50 ft x 200 ft
» Stream Channel Stabilization (584), 25 ft wide x 15 ft long

Purpose/Goal of project: The goal of the project is to remove accumulated sediment and nuisance plant material from the area immediately surrounding the existing Harkins Slough pumps.

Area affected: 1,000 ft²

Conservation benefits: Removal of plant matter and sediment will allow the Pajaro Valley Water Management Area (PVWMA) to put to beneficial use the full 2000 ac-ft/yr in their existing water rights permit (currently needing extension prior to 12/31/2011).

Natural biological enhancements: Beneficial use by PVWMA includes groundwater recharge and irrigation supply for the surrounding agricultural basin.

Volume of soil moved: 30 yd³

Net waters/Wetland loss: No net loss of jurisdictional waters or wetlands occurred as a result of this project.

Net gains in wetland and riparian areas: No change.

Final slope of project work (not to exceed 2:1): 2:1

Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance: Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a training on California red-legged frog on November 29, 2011, led by a service-approved individual, regarding the life history of the species, protection afforded by State and federal regulations, and the protection measures to avoid and minimize impacts during the project. No individuals were observed during project activities. A qualified individual was on-site during all construction activities, as required by agency staff.

Reports submitted to County staff: FEMA analysis

Mitigation I. (C) Efforts to control non-native invasive plant species: All project activities occurred on an existing access road and within the active slough channel. Invasive species near the project site include common agricultural weeds and control/eradication was not included within the scope of this project.

Mitigation I. (D) Revegetation efforts: All project activities occurred on an existing access road and within the active slough channel. As such, no revegetation occurred.

Mitigation I. (E) Monitoring: The goal of this project is to remove accumulated material from the active slough channel to allow PVWMA to take full allocation of their water rights. The site conditions will be improved in the short-term. However, the RCDSCC will collaborate with PVWMA on a long-term solution to address the effects of upstream erosion and nutrient inputs. The site will be monitored to document pump usage and water volume over time. The site will be returned to pre-construction conditions or better. The introduction of any invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site will be performed and removal of non-native invasive species will be completed as necessary. The site will be monitored for three (3) years.

Mitigation II. Floodwater conveyance: The project is located in a FEMA floodway. A Registered Civil Engineer (RCE) provided analysis that the project will not decrease floodwater storage, modify floodwater conveyance, increase base flood elevation, or otherwise create an adverse impact either on the site, or upstream or downstream of the site.
Photo point 1: Looking upstream. Pennywort has been removed, as has 30 yd³ of accumulated sediment that was affecting effective use of water allocation. The pump used to remove the sediment can be seen on the left side of the photo.

Before

After

Photo point 1: Looking upstream at Harkins Slough from the pump station. Pennywort is visible floating the slough channel.
PAJ-10 (final phase)

Practice/Extent:
» Critical Area Planting (342), 0.1 acre (north bank) and 0.7 acre (south bank) was implemented in 2011.
» Access Road Improvement (560), 20 ft (north bank) and 25 ft (south bank.)
» Streambank Protection (580), 140 ft of streambank protection will be implemented. Approximately 100 ft was completed in 2010. The remaining 40 ft was implemented in 2011.
» Obstruction Removal (500), the existing culvert crossing was removed in 2011.
» Fish Passage Improvement (396), ~100 ft of roughened channel was completed in 2009. The remaining 40 ft was implemented in 2011.

Purpose/Goal of project: The purpose of this project is to increase access to 1.3 miles of potential spawning and rearing habitat for endangered South-Central California Coast (SCCC) steelhead (Oncorhynus mykiss) through the removal of an undersized culvert and replacement with a bridge.

Area affected: 3500 ft² of in-stream and adjacent riparian habitat

Conservation benefits: Improved access during winter flows for salmonids and improved habitat with a roughened channel, designed to accommodate fish passage through the steep stream reach while conveying peak flows and associated debris. The roughened channel design contains rock cascades, boulder weirs, resting pools, and large wood structures, which form a complex flow pattern with variations in depth and velocity to provide numerous paths for migrating fish. Rock slope protection and revegetation will protect steep banks from erosion, while providing habitat for aquatic species.

Natural biological enhancements: Improved salmonid migration through the removal of a partial barrier allows steelhead to access the spawning grounds located upstream during all flow events.

Volume of soil moved: 895 yd³

Net waters/Wetland loss: 0.07 acres of non-wetlands to be filled

Net gains in wetlands and riparian areas: 1 acre of improved riparian habitat

Final slope of project work (not to exceed 2:1): The final slope will not exceed 1.5:1 to match surrounding conditions.

Reports submitted to County staff: A building permit was required for construction of the bridge. An application was submitted on 5/20/2009, including a geotechnical/soils report and engineered designs. The permit was issued on 9/10/2009.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: A biotic assessment was completed by Swanson Hydrology and Geomorphology for a site 0.2 miles downstream and 0.24 miles upstream of the project. Their findings documented the potential for the California red-legged frog to be utilizing Shingle Mill as a dispersal corridor, and the known presence of steelhead. Prior to project implementation, all project workers were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

In accordance with the National Marine Fisheries Service Biological Opinion, a Service-approved individual approved by NOAA Fisheries monitored construction activities and instream habitat and performance of sediment control activities. In 2009, the biological monitor did not have to exercise his authority to halt work activity nor recommend measures for avoiding adverse effects. The biologist and the biological monitor monitored placement and removal of the streamflow diversion structure. The fishery biologist captured and relocated listed salmonids prior to construction of the water diversion structures (e.g. cofferdams.) The biologist noted the number and species of salmonids relocated, and the date and time of collection and relocation. Pacific giant salamanders (Dicamptodon tenebrosus) were also captured and relocated. No foothill yellow-legged frogs (Rana boylii) were captured or observed during the fish relocations. In all, 140 steelhead and 8 Pacific giant salamanders were relocated from the exclusion area. With the exception of one young-of-the-year steelhead mortality (0.7% of all captured steelhead,) all fish and amphibians appeared in good condition upon release.
During the October 13, 2009 storm event, the coffer dam was destroyed. A simpler structure was installed so that an additional instream weir and the root wad could be completed. The biologist captured and relocated seven listed salmonids prior to the continuation of construction. No steelhead mortalities were observed.

In 2011, a biological monitor monitored the placement and removal of the stream diversion structure. The biologist captured and relocated salmonids prior to construction of the coffer dam. A total of three passes were made to relocate salmonids. 168 steelhead and 3 Pacific giant salamanders were relocated. A total of 7 YOY steelhead mortalities were observed.

In accordance with the Fish and Wildlife Service Biological Opinion, a Service-approved individual surveyed the project area for California red-legged frogs twice at night and twice during daylight hours within 3 days prior to any equipment staging, construction, or other ground-disturbing activities (2009.) In addition, a pre-construction survey was conducted the morning of equipment mobilization (2009.) In 2009, work continued into December. Monitoring for amphibian movement was continually conducted. No individuals were observed.

In 2010, only a pre-construction survey was conducted within 48 hours of the remobilization of equipment. No amphibians were observed. The site was not dewatered. Erosion control measures are in place for the winter season.

In 2011, a pre-construction survey was conducted within 48 hours of mobilization. No amphibians were observed.

All project workers including NRCS/RCDSCC staff, landowners and/or their employees/representatives, and contractors were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** Revegetation occurred in 2011 to ensure that the disturbed soil is protected and therefore recolonization by non-native plant species will be limited. Non-native species currently on-site include Himalayan blackberry.

**Mitigation I. (D) Revegetation efforts:** Revegetation of the riparian corridor occurred in 2011 with the goals of erosion control, bank stability, and habitat enhancement. Revegetation was limited to plantings from the lists of preferred plant species, with the exception of the following: coast redwood, Western sword fern, Pacific reedgrass, and bluegrass ‘Sandberge.’ These species were approved by the consulting biologist on the project as they are found in proximity to the project site. Plants were inspected for disease and pests prior to use.

**Mitigation I. (E) Monitoring:** Revegetation occurred over all disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. To further ensure this objective, the site will be maintained until project success criteria have been met and plants have become fully established.

The site will be monitored for a minimum of three (3) to five (5) years to ensure there is no new exotic species colonization and 60% revegetation criteria has been met. The biggest potential threat will be French broom from upstream and downstream sources.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.
Photo point 1: The culvert was impeding fish passage.

Photo point 1: Looking upstream towards the project site, the 2010 constructed bridge crossing replaced the road culvert crossing as seen in the background of the post-implementation photo.

Photo point 1: Looking upstream. The old crossing was removed allowing for an additional 1.3 miles of spawning and rearing habitat.
Photo point 2: The shallow and narrow pass of the culvert made fish passage difficult.

Photo point 2: The bridge allows for easier upstream access for migrating fish. The culvert removal will expose stream banks to provide additional habitat for riparian flora and fauna.

Before 2010

2010

2011

Photo point 1: The old crossing was removed allowing for fish passage upstream.
**PaR-1**

**Practice/Extent:**
» Structure for Water Control (587)

**Purpose/Goal of project:** The goal of the project is to restore the flow of stormwater onto an agriculture parcel, with the intention of increasing infiltration for groundwater recharge.

**Area affected:** 1,380 ft²

**Conservation benefits:** The installation of a culvert under Silliman Road re-directs surface runoff to increase percolation and help reverse current overdraft in the Pajaro River basin.

**Natural biological enhancements:** An increase in percolation will recharge the groundwater basin, supporting continued agricultural production and enhancing habitat. Reduction in sediment in the creek will benefit the local steelhead population by improving spawning habitat. Additionally, landowners and contractors are educated on these Best Management Practices and can continue to implement them on other areas of their property and throughout the watershed.

**Volume of soil moved:** 18 yd³

**Net waters/Wetland loss:** No net loss of jurisdictional waters or wetlands occurred as a result of this project.

**Net gains in wetland and riparian areas:** No change.

**Final slope of project work (not to exceed 2:1):** 2:1

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** There were no special status species in the project area.

**Reports submitted to County staff:** Designs (PaR1 Culvert) were submitted to the County of Santa Cruz Department of Public Works on June 14, 2011.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** The culvert was installed beneath Silliman Road. The inlet structure was located in an existing agricultural ditch, predominantly vegetated with non-native grass species commonly associated with agricultural production and bare soil. The outlet is located on an intensively farmed agricultural land, devoid of all vegetation. The project will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

**Mitigation I. (D) Revegetation efforts:** As described above, the project was implemented on an active, public road, with intensively farmed agricultural production on either side. The culvert inlet is protected from erosion by a concrete channel and the flow at the outlet is dissipated into rock riprap at the inlet of an existing agricultural sediment basin. As such, no revegetation occurred at this project site.

**Mitigation I. (E) Monitoring:** The goal of this project is to increase groundwater recharge of the Pajaro Basin. The site will be monitored to ensure that the culvert is functioning and groundwater recharge measurements will be taken by UC Santa Cruz and CSU Monterey Bay to determine success. The site will be returned to pre-construction conditions or better. The introduction of any non-native invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site will be performed and removal of non-native invasive species will be completed as necessary. The site will be monitored for three (3) to five (5) years.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.
**2011 Projects**

**Before**

Photo point 1: Looking south at the current agricultural field.

**After**

Photo point 1: Looking south. A plastic-lined agricultural ditch will be cut annually to convey flows from the installed culvert to the recharge basin.

**Before**

Photo point 2: Looking east. Stormwater and irrigation tailwater are currently conveyed in this inboard ditch along Silliman Road.

**After**

Photo point 2: Looking east. A concrete weir structure has been constructed to direct flows from the inboard ditch through a culvert under Silliman Road and to the agricultural ditch as shown above.

**Before**

Photo point 3: Looking west. Stormwater and irrigation tailwater are currently conveyed in this inboard ditch along Silliman Road.

**After**

Photo point 3: Looking east. The weir structure has been constructed to direct flows from the inboard ditch through a culvert under Silliman Road and to the agricultural ditch as shown above.
### Practice/Extent:
- Stream Channel Stabilization (584), 32 ft wide x 78.5 ft long
- Critical Area Planting- Erosion Control Seeding (342), 50 ft wide x 250 ft long
- Critical Area Planting- Willow Staking (342), 50 ft wide x 160 ft long

### Purpose/Goal of project:
The goal of the project is to protect and enhance salmonid habitat in the Laguna Creek by reducing chronic and episodic sediment input from stream and road bank erosion.

### Area affected: 14,097 ft²

### Conservation Benefits:
This project replaced a pair of failed culverts with a rock riprap armored ford and stabilized the roadbed to reduce bank erosion and sedimentation impacts in the Laguna Creek watershed. Habitat suitability for steelhead trout (*Oncorhyncus mykiss irideus*) has been improved by reducing erosion and sedimentation of Reggiardo Creek in the Bonny Doon Ecological Reserve. In addition, this improvement represents a significant partnership project between the RCDSCC and California Department of Fish and Game.

### Natural biological enhancements:
This project promotes healthier populations of steelhead in coastal Santa Cruz County by ensuring that critical spawning habitat is not impaired by fine sediment accumulation.

### Volume of Soil moved: 121 yd³

### Net Waters/Wetland Loss: 0.15 acres of non-wetland waters of the U.S. filled.

### Net gains in wetlands and riparian areas: 0.5 acres

### Final slope of project work (not to exceed 2:1): 2:1 except on the left bank of the rock chute next to the lower apron, between stations 1+24 and 1+40, where the rock riprap slope was graded to 1.5:1

### Reports submitted to County staff: Not applicable.

### Mitigation I.(B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:
Consultation with CNDDB, correspondence with a local botanist and field observations indicated construction activities would have no impact on the two special status species (Ben Lomond spineflower and Santa Cruz wallflower) found directly adjacent to the project area. Although the project area is within the range of these known species, the project area did not occur on Zayante sands. The designs minimized the project footprint with respect to riparian vegetation and included a number of steps to avoid impacts to the riparian habitat. Grading conformed to preserve and protect sensitive wetlands and mature oak trees.

Prior to the onset of activities that resulted in disturbance of the project area, all project workers were given information on the listed species in the project area including protection afforded by the Federal and California Endangered Species Acts and the specific protective measures to be followed during implementation of practices.

### Mitigation I.(C) Efforts to control non-native plant species:
Revegetation of the staging area and the project area occurred with the primary goal of erosion control. These areas were reseeded with annual barley which provided temporary erosion control and prevented the recolonization of these disturbed areas by non-native plant species during the first year until the site can be colonized by the surrounding native vegetation. Mulch comprised of native...
wood/vegetation mulch was also applied to exposed soils to inhibit the propagation of non-native vegetation in these disturbed areas. The site will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

Mitigation I.(D) Revegetation Efforts: Approximately 85 willow stakes collected from native stock were planted along the margins of the rock riprap armored ford and rock chute to stabilize the stream banks, enhance native habitat and provide sustainable, long-term erosion control. Willow staking was conducted per California Department of Fish and Game’s Salmonid Manual Guidelines. Project structures did not necessitate the removal or relocation of healthy oak trees.

Mitigation I.(E) Monitoring and Success Criteria: Revegetation and mulch occurred over all the disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. These areas will be monitored and maintained until project success criteria have been met and plants have become fully established. Success criteria will be constituted by a 60% success rate of willow stakes. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation by means of photo monitoring and visual observation.

Mitigation II. Floodwater conveyance: This project is not located in FEMA zones A, V or a FEMA floodway, thus an analysis was not required.
**SLR-1**

**Practice/Extent:**
- Access Roads Improvement (560), 16 ft wide x 100 ft long
- Critical Area Planting - Erosion Control Seeding (342), 55 ft wide x 55 ft long
- Critical Area Planting - Container Plants (342), 85 container plants on 0.7 acre
- Obstruction Removal (500), 39 ft wide x 10 ft long

**Purpose/Goal of project:** The goal of the project is to improve water quality and salmonid habitat in the San Lorenzo River by reducing chronic and episodic sediment input from stream and road bank erosion.

**Area affected:** 3,049 ft²

**Conservation Benefits:** This project replaced a failing culvert, stabilized the road structure (fill material prism) and restored the stream’s natural grade and alignment to reduce sedimentation impacts in the upper San Lorenzo River watershed. This effort benefits municipal water customers and listed fish species (steelhead) alike by reducing acute and chronic sedimentation impacts. In addition, this improvement represents a significant partnership project between the RCDSCC, State Parks and Sempervirens Fund.

**Natural biological enhancements:** This project improves water quality and spawning habitat for listed species (steelhead) and reduces sediment input in a watershed with a TMDL listing for sediment impairment which specifically calls for sediment reduction from roads.

**Volume of soil moved:** 215 yd³

**Net waters/Wetland loss:** 0.01 acres of Non-wetland waters of the U.S. filled

**Net gains in wetlands and riparian areas:** 0.09 acres

**Final slope of project work (not to exceed 2:1):** 2:1

**Reports submitted to County staff:** Not applicable.

**Mitigation I.(B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** This project was determined to be within the range of marbled murrelets, a special status species. As such, earth moving activities began after September 15 to avoid and/or minimize disturbance to the species. Further, this project was designed to minimize the project footprint with respect to riparian vegetation and included a number of steps to avoid impacts to the riparian habitat. Grading was conformed to preserve and protect mature redwood and maple trees.

Prior to the onset of activities that resulted in disturbance of the project area, all project workers were given information on the listed species in the project area including protection afforded by the Federal and California Endangered Species Acts and the specific protective measures to be followed during implementation of practices.

**Mitigation I.(C) Efforts to control non-native plant species:** Revegetation of the staging area and the project area occurred with the primary goal of erosion control. These areas were reseeded with annual barley which provided temporary erosion control and prevented the recolonization of these disturbed areas by non-native plant species during the first year until the site can be colonized by the surrounding native vegetation. Straw mulch also inhibited the propagation of non-native vegetation in these disturbed areas. Non-native species currently on-site include: forget-me-not and periwinkle. The site will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

**Mitigation I.(D) Revegetation efforts:** Eight-eight (88) container plants were planted within the project area with the goal of erosion control, bank stability and habitat enhancement. Selected because of their presence in the watershed, species included the following: *Equisetum arvense* (common horsetail), *Rubus parviflorus* (thimbleberry), *Symphoricarpos albus* (snowberry), *Acer macroporum* (bighorn maple), *Sequoia sempervirens* (coast redwood) and *Lithocarpus densiflorus* (tan oak). A qualified individual authorized the substitution of two of the intended plant species because these species were not available for revegetative efforts. *Polystichum munitum* (Western sword fern) and *Blechnum spicant* (deer fern) were planted to substitute for *Polypodium californicum* (California polypody) and *Polypodium scouleri* (leather fern), respectively. Project structures did not necessitate the removal or relocation of mature redwood or maple trees.

**Mitigation I.(E) Monitoring and Success Criteria:** Revegetation and mulch occurred over all the disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. These areas will be monitored and maintained until project success criteria have been met and plants have become fully established. Success criteria will be constituted by a 60% success rate of revegetative container plants. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation by means of photo monitoring and visual observation.

**Mitigation II: Floodwater conveyance:** This project was not located in FEMA zones A, V or a FEMA floodway, thus an analysis was not required.
Photo point 3: Culvert outlet. Note lack of hydrologic energy dissipation, oversteepening of stream banks and incision of channel bed.

Photo point 3: Culvert outlet. Hydrologic energy dissipated by rock riprap and the stream channel has been restored to natural grade and alignment.

Photo point 5: Overlooking culvert inlet and outlet basin. Concrete remnant retaining wall and footing from previously existing cabin. Culvert inlet is located just behind wall and to right of mature redwood tree.

Photo point 5: Overlooking culvert inlet and outlet basin. Note culvert inlet’s debris rack and rock slope protection at toe of road fill prism.
*Practice/Extent:*

- Stream Habitat Improvement and Management (395), 8 LWD Structures 25 ft x 475 ft
- Critical Area Planting (342), 10 ft x 500 ft

*The Restoration and Management of Declining Habitats (643) practice was also part of this project. Due to time constraints, this portion of the project was postponed until fall 2012.*

**Purpose/Goal of project:** The goal of this project is to enhance habitat conditions along a reach of San Vicente Creek by increasing cover, in-stream habitat complexity and channel diversity by installing Large Woody Debris (LWD) structures along the main channel of San Vicente Creek and removing cape ivy from the riparian corridor.

**Area affected:** 87,120 ft²

**Conservation benefits:** The installation of the LWD structures will result in additional pools and cover structures for steelhead and coho. The structures will also serve to activate adjacent floodplains during high flows, enhancing habitat for amphibians in the project site.

**Natural biological enhancements:** The additional pools and cover created by these eight (8) structures will provide critical habitat for steelhead and coho rearing. The structures themselves will enhance natural recruitment of woody debris, acting as catalysts for habitat variability for aquatic species.

**Volume of soil moved:** 30 yd³

**Net waters/Wetland loss:** No change

**Net gains in wetlands and riparian areas:** 1,440 ft²

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals and habitats, including avoidance:** This project involved working in critical habitat for steelhead, coho salmon, dusky-footed wood rat, and California red-legged frog. The reach in which in-stream work was performed was de-fished by NOAA Fisheries on September 7-8th and block netting was established above and below the project site. Of the 218 feet of stream de-fished NOAA electrofished and relocated 299 steelhead. Individuals were measured for fork-length (mm) and weight (g) and tagged before being released. Prior to initiation of the ground disturbing activities conducted as part of the project, work crews attended a species training on September 12th led by a service-approved individual, regarding the life history of the species, protection afforded by State and federal regulations, and the protection measures to avoid and minimize impacts during the project. Exclusion fencing was placed along the staging area and access routes to ensure no species entered an area where heavy equipment was running. Where exclusion fencing was not placed, a service-approved biologist was on site to perform construction monitoring to ensure that no species entered the construction area. Two immature dusky-footed wood rats were found during the excavation of the access route. The biologist was able to relocate them to a safe location where an adult wood rat retrieved them. No steelhead, coho, or California red-legged frogs were encountered during construction activities.

**Reports submitted to County staff:** A floodwater analysis was conducted by a Registered Civil Engineer and submitted to the County on May 15, 2011.

**Mitigation I. (C) Efforts to control non-native plant species:** The intent of the projects was to improve in-stream habitat for coho and steelhead via the introduction of large woody debris structures. The site is currently blanketed by cape ivy. Removal of this invasive species was not part of this phase of the project. Removal will begin in 2012.

**Mitigation I. (D) Revegetation efforts:** Staging area was seeded with native barley after construction activities were completed in order to deter immediate colonization of invasive species and to control erosion. The access routes to each structure were covered with slash that was cleared, most of which was willows which have begun to re-sprout. Over 30 willow stakes were placed in both the access routes and amidst the structures to mitigate for the ten willows that were removed. Twelve alder stakes were placed around the structures to mitigate for the two alders that were removed.

**Mitigation I. (E) Monitoring:** Monitoring will include documentation of formation and movement of pools and riffles as affected by the eight (8) structures for one year after project implementation. Biological effects of the project will be monitored by the Southwest Fisheries Science Center for the next three (3) to five (5) years. The site will be monitored for three (3) to five (5) years.

**Mitigation II. Floodwater conveyance:** The project is located in a FEMA identified flood hazard area A. The floodwater analysis showed that there would not be a significant increase in base flow above, below, or at the project site. Concerns of landowners adjacent to the project site were a large consideration during this project due to the consistent flooding of San Vicente Street. Two pre-construction forums were held where members of the Davenport community were invited to hear presentations from engineers and biologists and offer questions and concerns regarding the project. A post-project tour was offered and residents of San Vicente Street were given an open line of communication to the RCDSCC throughout the entire process.
2011 Projects

Photo point 1: Looking towards the proposed site for structure B from the opposite bank.

Photo point 1: View of structure B from the opposite bank. The two logs interact to create a deep pool where young steelhead can swim for cover.

Photo point 2: Looking downstream towards structure site D.

Photo point 2: From upstream, this structure is made of two root wads and will interact with structure C to create complexity within the creek.

Photo point 3: Looking across the creek towards site for structure G.

Photo point 3: From the opposite bank of the structure G. The structure will serve to form deep pools for steelhead and coho rearing.
Practice/Extent:
  » Structure for Water Control (587)
  » Critical Area Planting (342)

Purpose/Goal of project: The purpose of this project is to improve water quality by reducing erosion and sediment loads to the West Branch of Arana Gulch.

Area affected: 6,600 ft²/0.15 acres

Conservation benefits: The practices implemented are intended to reduce sediment to Arana Gulch. A reduction in sediment will benefit the local steelhead population by improving spawning habitat.

Natural biological enhancements: Two (2) undersized, failing culverts were removed from tributaries that flow to the West Branch of Arana Gulch. The failing culverts were resulting in sediment deposition on the roadway and severe undercutting of the access road. The project aims at preventing chronic erosion during larger flow events but primarily prevents a catastrophic failure at both road prisms. This was accomplished by re-grading and stabilizing the tributaries, installing erosion control and planting some native plants to help establish the vegetation to pre-construction conditions or better.

Volume of soil moved: 520 yd³

Net waters/Wetland loss: No net loss of jurisdictional waters or wetlands occurred as a result of this project.

Net gains in wetland and riparian areas: No change.

Final slope of project work (not to exceed 2:1): 2:1

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: Previous surveys for presence of California red-legged frogs in the project vicinity have been completed for other work in the area and no individuals were found. A pre-construction survey was completed on 9/15/10 to determine presence of California red-legged frogs within the project area, all project workers were given information on the listed species in the project area including protection afforded by the Federal and California Endangered Species Acts and the specific protective measures to be followed during implementation of practices.

Reports submitted to County staff: Not applicable.

Mitigation I. (C) Efforts to control non-native invasive plant species: The introduction of any invasive plant species which did not exist on or adjacent to the project site will be prevented during ongoing monitoring of the site. The RCDSCC will coordinate with the landowner on the maintenance and removal of invasive species as necessary.

Mitigation I. (D) Revegetation efforts: Revegetation of the work area consisted of planting Rubus parviflorus (thimbleberry), Symphoricarpos albus or S. mollis (snowberry), Polystichum munitum (Western sword fern), Rubus ursinus (California blackberry) and Salix sp. (willow.) Erosion control seed mix consisted of Bromus carinatus (California brome), Elymus glaucus (blue wild rye) and Hordeum brachyantherum (California barley.)

Mitigation I. (E) Monitoring: Due to the pre-implementation percent cover of non-natives in the project area, eradication of existing non-natives was not within the scope of the project or feasible, and thus they were not to be eradicated from the site. The goal of this project is to improve water quality. The site will be returned to pre-construction condition or better and overall native plant cover will be increased with success criteria of 70%. The introduction of any invasive plant species, which did not exist on or adjacent to the project site, will be prevented. Visual monitoring of the site and removal of species will be performed as necessary. The site will be monitored for three (3) to five (5) years.

Mitigation II. Floodwater conveyance: The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

2011 Observations for Mitigation Measures

Crossing 1: The rock structures are functioning to reduce erosion. There is very little sediment on the road surface. Sediment has filled in much of the rock structure on the upstream side where sediment covers the rocks and plants are growing in the deposited material. The boulder cascade is successfully stabilizing the outfall downstream of the crossing and preventing further erosion in that area. Most of the planted vegetation has survived, helping to stabilize the soil and improve wildlife habitat. Crossing 3: The road is in good condition with no sediment on it. Most of the planted vegetation has survived and is providing wildlife habitat.

The success criterion for revegetation at this site was 90%. Survival of plantings is 70% at Crossing 1, with blackberries and ferns achieving the greatest survival success. Survival of plantings was about 70% at Crossing 3, with near 100% success for the willow stakes. The blackberry, juncus, and ferns are doing well with some natural recruitment of natives.

It is recommended that the site continue to be observed to determine if native recruitment of ferns, juncus, blackberry, mugwort, poison oak, bee plant, and hedge nettle can achieve the desired success criteria.

2011 Observations for Project (BMPs)

Crossing 1:

2011 Observations for Project (BMPs)
tating with success criteria of 90% survival of plantings and 70% overall native plant cover. Currently 70% of the plantings at both crossings have survived, and native plant cover is 50% at Crossing 1 and 70% at Crossing 3. It is recom-
mended that the site continue to be observed to determine if native recruitment of ferns, juncus, blackberry, mugwort, poison oak, bee plant, and hedge nettle can achieve the desired success criteria.

Photo point 1: Facing downstream of Crossing #1.

Photo point 1: Culvert was removed, dissipation pool constructed downstream of road.

Photo point 1: 1st year after implementation: The structures are intact.
2010 Projects

Before

Photo point 2: Facing roadway of Crossing #1.

After

Photo point 2: Roadway improved, culvert removed, upstream channel graded, stabilized and re-aligned.

2011

Photo point 2: 1st Year After Implementation: Sediment catchment structure, with service road on the right.
2010 Projects

Photo point 3: Facing roadway of Crossing #3

Photo point 3: Roadway improved, culvert removed, upstream channel graded, stabilized, re-aligned and dissipation pools constructed.

Photo point 3: Downstream from crossing, next to service road. About 70% of the plantings are surviving with near 100% success for the willow stakes. The blackberry, ferns, and juncus are doing well with some natural recruitment of natives.
LVC-1

Practice/Extent:
» Critical Area Planting-willows staking (342), 10,000 ft²
» Grade Stabilization Structure (410), Seven (7) grade control structures, including rock protection at the beginning of the project, five rock chute structures and a rock weir in the center of the project site.

Purpose/Goal of project: The goal of the project was to reduce the negative impacts on Larkin Valley wetland habitat from sedimentation, to decrease the loss of upland habitat for the Santa Cruz long-toed salamander (SCLTS) and California red-legged frog (CRLF), and to improve safety for drivers on Larkin Valley Road.

Area affected: 32,670 ft² of a gully and rangeland for staging.

Conservation benefits: This project stabilized the very dynamic and steep gully by installing rock (grade stabilization structures) and native willows to create a bioengineered grade control structure at key points in the gully system. This effort reduces the amount of sediment entering Larkin Valley Creek, which provides critical habitat for SCLTS and CRLF.

Natural biological enhancements: This project promotes healthier populations of CRLF and SCLTS in coastal Santa Cruz County by improving riparian migration corridors through connection of upland habitat with existing breeding ponds.

Volume of soil moved: 900 yd³

Net waters/Wetland loss: No impact to waters of the state and no net loss of jurisdictional waters or wetlands.

Net gains in wetlands and riparian areas: No change.

Final slope of project work (not to exceed 2:1): 2:1

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: Although the project was within the range of the special status species, their presence at the project site was determined unlikely based on personal communication with biological consultants, visual observations, and the degraded quality of the habitat that was present.

In accordance with the US Fish and Wildlife Service (USFWS) Biological Opinion, a qualified individual approved by the USFWS conducted a 48 hour pre-construction survey in the project area for CRLF on September 20, 2010. In addition, wildlife biologist Mark Allaback surveyed the project area for SCLTS. No CRLF or SCLTS were observed during these surveys. In 2009, surveys for CRLF and SCLTS were conducted in the surrounding habitat of a nearby project. CRLF were found in this survey, but no SCLTS were found. All protocols outlined in the Santa Cruz County Partners in Restoration program’s Pre-Construction Notification (PCN) were then followed. The USFWS approved individual also surveyed the project area for CRLF twice at night and twice during daylight hours 3 days prior to equipment staging, construction, and other ground-disturbing activities.

Prior to project implementation, all project workers were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Mitigation I. (C) Efforts to control non-native invasive plant species: Revegetation of the haul roads, the staging area and the project area (gully and surrounding grassland) occurred with the primary goal of erosion control. These areas were reseeded with annual barley which provided temporary erosion control and has prevented the recolonization of these disturbed areas by non-native plant species during the first year until the site can be colonized by the surrounding native vegetation. Straw mulch also inhibited the propagation of non-native vegetation in these disturbed areas.

Mitigation I. (D) Revegetation efforts: Approximately 168 willow stakes were planted along the banks of the gully watercourse to stabilize the gully, enhance native habitat and provide sustainable, long-term erosion control. Project structures did not require the removal or relocation of mature willows and oak trees.

Mitigation I. (E) Monitoring: All disturbed areas were restored to pre-construction conditions or better and will be monitored and maintained for three (3) to five (5) years until project success criteria have been met and willows have become fully established.

Mitigation II. Floodwater conveyance: The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

2011 Observations for Project (BMPs)
Structures are intact and are functioning well overall to accumulate sediment and stabilize. There continues to be some erosion and undercutting between structures E13 and C12, with roots exposed. There is also some undercutting of the left bank alongside structure F14. Some willow stakes planted for the project have survived.

168 willow stakes were planted as part of a Critical Area Planting. About 65-70% of these willow stakes have survived. No further success criteria were available.

Further willow staking could replace some of the planted willows which did not survive.

2011 Observations for Mitigation Measures
Mitigation I. (B) Not applicable.

Mitigation I. (C) Seeding with annual barley succeeded in
controlling erosion around the site, and a mixture of native and invasive vegetation has recolonized the site. No invasive species not previously noted were observed.

**Mitigation I. (D)** About 65-70% of the willow stakes planted to revegetate the site and control erosion have survived. It is recommended that the site continue to be observed to determine if native recruitment can achieve the desired success criteria. If a qualified individual determines that a higher survival rate of willows would be optimal, then additional willow staking would be recommended.

**2010 Projects**

Photo point 2a: Facing downstream of Crossing # 1.

Photo point 2a: Culvert was removed, dissipation pool constructed downstream of road.

Photo point 2a: Structure A12 found 75 ft from the top of the hill is intact and functioning well for erosion control. Planted willows were observed growing.
2010 Projects

Photo point 2: Existing gully with severe erosion.

Photo point 2: Rock riprap installed to reduce gully erosion. Willow stakes planted for additional stability.

Photo point 2: Structure is intact though overgrown with vegetation. Planted willow tree growth was observed to be quite significant from this point onward till the lowest photo point in the gully.
Practice/Extent:
» Restoration and Management of Declining Habitats (643), 1.2 acres

Purpose/Goal of project: The goal of the project is to build on Phases I, II and III to further restore and enhance 2.5 acres of a previously disturbed portion of Watsonville Slough. Successful implementation of the project will increase both wetland and upland habitat value within the last mile of the slough ecosystem and improve water quality. The success of this project will be measured in acres of wetlands/slough restored.

Area affected: 1.2 acres of iceplant were removed and 0.4 acres of perennial pepperweed were treated in 2010.

Conservation benefits: Removing invasive species from the last mile of Watsonville Slough will provide plant diversity and critical habitat for a unique ecosystem.

Natural biological enhancements: Approximately 1.2 acres of iceplant were removed and 0.4 acres of perennial pepperweed were treated, which will benefit salt marsh and beach dune plant communities by restoring areas to their original vegetative cover, and by removing the threat of more areas being lost to invasive plants.

Volume of soil moved: 0 yd³

Net waters/Wetland loss: No net loss of jurisdictional waters or wetlands occurred as a result of this project.

Net gains in wetland and riparian areas: No change.

Final slope of project work (not to exceed 2:1): Not applicable.

Reports submitted to County staff: Not applicable.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: The special status species of concern on this property were Monterey spineflower and coast wallflower. A floristic survey was completed in previous phases and none of the aforementioned species were found. Prior to the onset of activities that resulted in disturbance of the project area, all project workers were given information on the listed species in the project area including protection afforded by the Federal and California Endangered Species Acts and the specific protective measures to be followed during implementation of practices.

Mitigation I. (C) Efforts to control non-native invasive plant species: In order to ensure the success of native plants, direct planting of some native species occurred on the project site to facilitate natural repopulation with native plant species.

Mitigation I. (D) Revegetation efforts: Originally revegetation and installation of erosion control materials were not part of the Phase IV scope. However, some of the northernmost slopes were relatively steep, and the project team determined revegetation and erosion control would minimize any potential erosion as a result of removing iceplant. Erosion control blankets were installed on the steeper slopes. Please refer to list of species planted below.

Mitigation I. (E) Monitoring: In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented by ongoing maintenance and monitoring. Success criteria will be constituted by a 90% reduction in the percent of non-native invasive species and an 80% success rate of establishment of natives. The success criteria will be monitored for a period of three years to ensure successful establishment of native vegetation.

Monitoring will be performed in the fall months and will occur on randomly selected sampling units (line transects) along permanent transect lines. The point intercept method will be used to establish percent cover of native and non-native species. Additionally, the site will be monitored and maintained for three (3) years to five (5) years.

Mitigation II. Floodwater conveyance: The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

2011 Observations for Projects (BMPs)
Wetland habitat has been restored along the slough through the removal of invasive iceplant and perennial pepperweed and the revegetation of the site with native plants. Success
criteria for the project were a 90% reduction in invasive species and 80% success rate of establishment of natives. Invasive species were reduced by 90% in early 2012, and native plants have achieved a 90% success rate of establishment.

**2011 Observations for Mitigation Measures**

**Mitigation I (C)** No new non-native plants have colonized the site.

**Mitigation I (D)** Erosion control blankets are still in place. Revegetation with native plants has achieved 90% success.

**Mitigation I (E)** Non-native invasive plant removal has achieved the 90% success criterion. Continued monitoring is recommended to ensure that recolonization does not occur and to maintain native plants.
Before

Photo point 2: The site was covered in iceplant.

After

Photo point 2: Iceplant removed and erosion control blankets in place.

2011

Photo point 2: Erosion control blanket is still in place. Native vegetation is thriving.
Practice/Extent:
» Critical Area Planting (342), 7,500 ft²
» Sediment Basin (350), 10,800 ft²
» Structure for Water Control (587), 15 ft x 90 ft
» Restoration and Management of Rare and Declining Habitats (643), 60,000 ft²

Purpose/Goal of project: The goal of the project is to enhance critical habitat for California red-legged frog (CRLF) and provide expanded habitat opportunities for a suite of native amphibians, reptiles, and birds, along with improving water quality in the middle Watsonville Sloughs system.

Area affected: Approximately 1.4 acres of upland area with a monoculture of hemlock, approximately 0.4 acres of wetland habitat was impacted, with approximately 0.06 acres of fill wetland to build up the berm of the sediment basin.

Conservation benefits: This project is part of a larger enhancement project to support CRLF breeding recovery on this property and in the Watsonville Sloughs system. The property hosts the only current known breeding pond for the California red-legged frog in the middle Watsonville Sloughs system. The project will enhance habitat by improving upland habitat (through hemlock removal and oak scrub planting,) improving breeding potential through sediment removal at the upper pond/basin, and by capturing agriculturally-derived sediment before it enters sensitive aquatic habitat.

Natural biological enhancements: Approximately 60,000 ft² of upland area with a 100% monoculture of hemlock was replaced with coastal scrub and oak woodland species. Tules, cattails and accumulated agriculturally-derived sediment were removed from the existing pond/sediment basin, which is directly upstream from the known CRLF breeding pond. Approximately 7,000 ft² of area was treated to increase the area of open water to encourage breeding. The area will be revegetated with emergent vegetation at the pond/basin edge to provide food, cover, and areas for attachment of egg masses. No native vegetation will be planted around the sediment basin, so as to reduce the use of this managed feature as habitat.

Volume of soil moved: 610 yd³

Net waters/Wetland loss: 0.06 acres of wetlands

Net gains in wetlands and riparian areas: No change.

Final slope of project work (not to exceed 2:1): The final slope on the upper pond/basin inlet was 5:1. The final slope for the sediment basins ranged from 2:1 to 3:1.

Reports submitted to County staff: Not applicable.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: Surveys for the California red-legged frog were conducted from the project site in 2009 as part of a separate project in the vicinity. In accordance with the Biological Opinion issued for that project (8-8-09-FW-53,) a Service-approved individual conducted a night survey on September 10, 2009. Visibility in the project area was severely limited due to the hemlock population in the upland area and the density of cattails in the pond. The individual consulted with Fish and Wildlife Service, and FWS determined that the individual could be on-site during vegetative disturbance in lieu of continuing surveys.

A Service-approved individual conducted a 48-hour pre-construction survey for the California red-legged frog on September 9, 2010. No frogs were observed. As the species is known to breed downstream, construction activities began after July 1 to avoid impacts.

On September 9, 2010, with approval from FWS, the Service-approved individual was on-site for removal of vegetation, and prior to the onset of activities that result in the disturbance of habitat or individuals of any listed/special status species, all project workers including NRCS/RCDSCC staff and growers/landowners and/or their employees/representatives were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Mitigation I. (C) Efforts to control non-native invasive plant species: One of the primary goals of the project was to eradicate hemlock from approximately 1.4 acres. As such, a 4-5 inch layer of chip mulch was applied to the soil surface. New sprouts will be hand removed with crews and volunteers to ensure a 90% reduction in hemlock.

Mitigation I. (D) Revegetation efforts: A diverse mix of native plants were used in order to create a complex and dynamic habitat feature surrounding the pond complex. Native grassland and wet meadow habitat was created with following species: Artemisia douglasii (mugwort,) Euthamia occidentalis (marsh goldenrod,) Elymus glaucus (blue wild rye,) Carex densa (dense sedge,) Hordeum brachyantherum (meadow barley,) Leymus triticoides (creeping wild rye,) Juncus patens (spreading rush,) and Ranunculus californicus (California buttercup.) Woodland and scrub comprised of the following species was intermixed with the grassland and wet meadow: Chironaghum pomeridianum (soap root,) Iris douglasii (Douglas iris,) Quercus agrifolia (coast live oak,) Rhamnus californica (coffeeberry,) Rubus ursinus (California blackberry,) and Sambucus mexicana (blue elderberry.)

Natural emergent vegetation was planted at the pond/basin edge, in order to facilitate successful use of the pond as a breeding habitat for California red-legged frogs. Revegetation included Alisma plantago-aquatica (water plantain,) Eleocharis macrostachya (spike rush,) Carex lasunigosa (woolly
sedge,) Epilobium densiflorum (dense flowered boisduvalia,) Juncus effusus (bog rush,) and Juncus phaeocephalus (brown headed rush.)

Exposed soils around the sediment basin were seeded with Hordeum vulgare (common barley) and mulched to provide erosion control through the winter season.

**Mitigation I. (E) Monitoring:** Revegetation and mulch occurred over all disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. To further ensure this objective, the site will be maintained until project success criteria have been met and plants have become fully established.

Criteria for successfully meeting project goals and objectives for habitat establishment include a 90% reduction in invasive vegetation on the project site, and the establishment of at least 70% native vegetation. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation. Project monitoring will occur on randomly selected temporary sampling units (line transects) along permanent transect lines. The point intercept method will be used to establish percent cover of native and non-native plant species.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

**2011 Observations for Projects (BMPs)**
The sediment basin is functioning adequately to remove sediment before it impacts sensitive aquatic habitat.
Removal of invasive poison hemlock and revegetation with native oak scrub has expanded habitat available to wildlife on the site.

**2011 Observations for Mitigation Measures**
**Mitigation I (B) Habitat for California red-legged frogs has been improved on the site, and individuals have been observed.**

**Mitigation I (C) The success criterion for removal of invasives was a 90% reduction in poison hemlock. Currently, 70% reduction has been achieved, and active efforts to remove hemlock with volunteers and crews are ongoing.**

**Mitigation I (D) Native plantings throughout the site are thriving. The success criterion for revegetation was 70% native plant cover. Currently, native plant cover is 65%.**

Continued removal of poison hemlock is recommended to meet the success criterion.

**Mitigation I (E) Continued monitoring is recommended to ensure successful removal of hemlock and revegetation with native oak scrub.**
Santa Cruz Countywide Partners in Restoration

2010 Projects

Photo point 1: Looking south. On the right side of the photo, the hillside is covered with invasive hemlock. This will be removed and replanted with scrub species. The site of the sediment basin is located in the foreground of the photo.

Photo point 1: Wood chip mulch has been spread throughout the slopes and throughout the complex. Barley was seeded around the sediment basin and straw mulch was laid on top of this. The barley can be seen beginning to grow around the sediment pond. The former hemlock slopes will be restored to oak woodland habitat.

Photo point 1: Native oak woodland has replaced poison hemlock on the slope above the sediment basin.
2010 Projects

Photo point 2: The hillside with invasive hemlock can be seen. This was removed and replanted with scrub species. The side of the sediment basin is near the engineer standing in the field.

Photo point 2: The invasive hemlock has been removed from the hillside. The area has been mulched and container plants have begun to be planted. The implemented sediment basin can be seen in the background.

Photo point 2: Native oak woodland has replaced poison hemlock on the slope above the sediment basin.
Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: Pre-construction surveys were completed for the foothill yellow-legged frog and California red-legged frog in 2007, 2008, 2009 and 2010. Neither species was identified. Prior to the onset of activities all project workers including NRCS/RCDSCC staff and growers/landowners and/or their employees/representatives were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Mitigation I. (C) Efforts to control non-native invasive plant species: In Phase 4 (2010,) native plantings were maintained by maintaining a buffer area around the plants. Continued invasive plant removal included removal of English and cape ivies, poison hemlock, mustard, and milk thistle.

Mitigation I. (D) Revegetation efforts: On December 10th, 2010, 16 native plants were planted with the help of students from Soquel Elementary School. The event was coordinated by Watershed Stewards Project AmeriCorps members. The aim of the revegetation effort is to establish a self-sustaining native flora population along the riparian corridor.

Mitigation I. (E) Monitoring: Because the goal of this project is to restore a riparian community, the success criteria will be 90% success of native plants. Any plants that need to be replaced will be unless it is determined by a qualified individual that the community is regenerating itself without any need for additional inputs. In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented. Success criteria will be constituted by a 90% reduction in the percent of targeted non-native invasive species removed. Revegetation efforts will be monitored for a period of five (5) years to ensure successful establishment of the native riparian vegetation. The presence and/or absence of native and non-native species at the site will continue to be monitored and any mitigation efforts will be undertaken to ensure project success. A 90% reduction of English ivy, cape ivy, periwinkle, morning glory, and poison hemlock was maintained in 2008. However, in 2010, interspersed patches of English Ivy, arum lilies and periwinkle are present at the project site. Because this phase of the project was primarily a maintenance year, the presence and/or absence of native and non-native species at the site will continue to be monitored on the schedule for the 2009 implementation. Mitigation efforts will be undertaken to ensure project success.

Mitigation II. Floodwater conveyance: Although the project area is located in Flood zone A (a FEMA Floodway,) an analysis is not required given the nature of the work.

2011 Observations for Mitigation Measures
Mitigation I. (B) Not applicable.

Mitigation I. (C) Non-native invasive plant cover has been reduced, but more maintenance is needed to achieve the success criterion of 90% reduction.

Mitigation I. (D) Revegetation is functioning successfully to improve habitat conditions in the riparian area. To prevent invasive species from outcompeting natives, continued action to remove invasives in the area is needed.
**2010 Projects**

Photo point 2: Periwinkle and English ivy were removed in 2009.

Photo point 2: Follow-up work was conducted in 2010 to remove resprouted patches of invasive ivy.

Photo point 2: Facing west, some native plantings are surviving. Cape ivy removal was successful, having observed none at the site.
**Practice/Extent:**

- Access Road Improvement (560), 12 ft wide x 780 ft long
- Structure for Water Control (587), A rock dissipater (not part of the original design) was added to protect side slope after early rains caused minor rilling prior to erosion control being put in place.

**Purpose/Goal of project:** The purpose of the project was to assist private landowners with reducing road erosion caused by poor drainage. Runoff from road bed surface at this location drains to Aptos Creek on one side and to Trout Gulch Creek on the other side via an adjacent private road. The goal was to reduce delivery of road-derived sediment to Aptos and Trout Creeks as a means of protecting and enhancing salmonid habitat.

**Area affected:** 9,360 ft² of disturbed road bed fill slope.

**Conservation benefits:** A reduction in sediment in the creek will benefit the local steelhead population by improving spawning habitat. Additionally, landowners and contractors are educated on these Best Management Practices and can continue to implement them on other areas of their property and throughout the watershed.

**Natural biological enhancements:** The practices implemented are intended to reduce sediment delivery into Aptos and Trout Gulch Creeks, providing improved habitat for salmonids.

**Volume of soil moved:** 164 yd³

**Net waters/Wetland loss:** No impact to waters of the state and no net loss of jurisdictional waters or wetlands.

**Net gains in wetlands and riparian areas:** No change.

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Reports submitted to County staff:** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance:** There were no special status species in the project area.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** Non-native species were already present on site. To protect soil and limit any new colonization of non-native invasive species, all disturbed areas were reseeded with *Hordeum vulgare* (common barley) and *Festuca rubra* (red fescue). The project will be monitored for three (3) to five (5) years to ensure no new non-native invasive species colonize the site.

**Mitigation I. (D) Revegetation efforts:** Revegetation for this project was for erosion control only. All disturbed areas were reseeded with *Hordeum vulgare* (common barley) and *Festuca rubra* (red fescue).

**Mitigation I. (E) Monitoring:** Revegetation occurred over all disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. Photo monitoring will occur for a period of three (3) to five (5) years to ensure the project is maintained and functioning as designed.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

**2011 Observation for Project (BMPs)**

- The rolling dips installed in the access road are functioning well to reduce sedimentation and improve water quality.
- The structure for water control is functioning to reduce erosion on the side slope.
- Road surface runoff has been successfully dispersed to prevent gullying in the area.
- Road surface erosion and runoff have been successfully reduced.

**2011 Observations for Mitigation Measures**

**Mitigation I. (B) Not applicable.**

**Mitigation I. (C) Non-native invasive plant species were controlled through reseeding of disturbed areas with common barley and fescue, which also improved erosion control. No new invasive species had colonized the site.**

**Mitigation I. (D) Revegetation consisted of seeding for erosion control. Most of the surrounding area had native plant cover, with some French broom upslope. One area near the rock structure had grasses and bare dirt, but did not appear to be colonized by invasives.**
Photo point 1: Runoff was concentrating on the road causing surface erosion.

Photo point 1: A rolling dip was installed to divert runoff to an infiltration area before it concentrated on the road. The landowners paved the road which eliminated surface erosion.

Photo point 1: Rolling dip appears to be functioning and road is in good condition. Vegetation is abundant and successful in preventing erosion.
Photo point 2 (before): Existing gully with severe erosion.

Photo point 3: An inslope and armored ditch reduce toe-cutting and keep flows off the hillside. The landowners paved the road which eliminated surface erosion.

Photo point 3: Concentrated flows were eroding the road surface and toe of the adjacent hillside contributing sediment downstream.

Photo point 3: The inslope and armored ditch are appear to be intact. The area is mostly covered with vegetation, assisting the prevention of erosion.
Photo point 2: Minor rilling occurred at the outlet of rolling dip #2 as the erosion control had not yet been put in place before the first storm.

Photo point 2: A rock dissipater added as a result of initial rilling after the first rain prior to erosion control being in place.

Photo point 2: Rock dissipator is in place and appears to be functioning properly. It is covered mostly with grasses.
ARA-3

Practice/Extent:
» Restoration and Management of Declining Habitats (643), 50 ft x 60 ft

Purpose/Goal of project: This was phase 2 of this project. The goal of the project is to restore a riparian community by eliminating the exotic plants on a portion of a 5.5 acre site along Leona Creek. English ivy has become pervasive at the site. Revegetation with native plants will improve wildlife habitat and riparian ecosystem functioning.

Area affected: 0.5 acres near Leona Creek, just north of Schwann Lagoon.

Conservation benefits: Improving native habitat/riparian ecosystem functioning through the removal of invasive plant species and revegetation with natives.

Natural biological enhancements: Approximately 3,000 ft² of Himalayan blackberry, English ivy, and cape ivy was removed from the riparian corridor and replaced with native woody plants.

Volume of soil moved: 0 yd³

Net waters/Wetland loss: No impact to waters of the state and no net loss of jurisdictional waters or wetlands.

Net Gains in Wetland and Riparian Areas: No change.

Final slope of project work (not to exceed 2:1): Not applicable.

Reports submitted to County staff: Not applicable.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: There were no special status species in the project area.

Mitigation I. (C) Efforts to control non-native invasive plant species: Phase 2 (2009) consisted of the cutting and removal of invasive plant species including Himalayan blackberry, English ivy, and cape ivy. The site was also heavily seeded with common barley and erosion control blankets to help temporarily control non-native species and for erosion control.

Mitigation I. (D) Revegetation efforts: Following the removal of non-native invasive species at the site, a combination of native trees, shrubs and forbs (approved by NRCS biologist) were planted at the project site in an effort to re-establish a native riparian habitat. The planting palette was developed based on native species found on site, and plants were propagated from seed collected within the watershed. The plants were inspected for pests and diseases prior to planting. The aim of the revegetation effort is to assist in the establishment of a self-sustaining native flora population along the riparian corridor. It is expected the existing vegetation, predominantly California blackberry, will re-vegetate the site.

Mitigation I. (E) Monitoring: Because the goal of this project is to restore a riparian community, the success criteria will be 90% success of native plants. In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented. Success criteria will be constituted by a 90% reduction in the percent of targeted non-native invasive species removed. Revegetation efforts will be monitored for a period of three (3) to five (5) years to ensure successful establishment of the native riparian vegetation.

Upon inspection in 2010, there has been an increase in cover of the existing non-native species across the property and patches of English ivy have established adjacent to the treated area which has shown that a 90% reduction in English ivy and Himalayan blackberry will not be feasible to achieve. While interested in complete removal of non-natives from the site, the landowners are not financially capable, nor does the RCDSCC have long-term cost share funds available to assist in achieving this goal. The RCDSCC will work with the homeowners to develop a volunteer program to continue to eradicate the cape ivy, and control the English ivy and Himalayan blackberry. No new invasive species have colonized the site. The site will be monitored.

Mitigation II. Floodwater conveyance: Although the project area is located in Flood zone A (a FEMA Floodway), an analysis is not required given the nature of the work.

2011 Observation for Projects (BMPs)
Native plant populations are healthy and thriving; however the appearance of English ivy is of concern.

The success criterion for this project is the eradication of English ivy and cape ivy from the site and the 90% success of native plants. The success criterion was partially met – no cape ivy was observed on the site; however English ivy was observed.

It is recommended that the RCDSCC coordinate with the landowners to remove the English ivy that has come up. Maintenance by homeowners or a gardening crew is possible through hand-pulling the ivy.

2011 Observations for Mitigation Measures
Mitigation I (B) Not applicable.

Mitigation I (C) Non-native invasive species of Himalayan blackberry, English ivy and Cape ivy were removed from the project site though hand-pulling method. Erosion control methods were also installed. Of the 3 invasive species removed, cape ivy was not observed at the site. Himalayan blackberry and English ivy were observed starting to grow back covering approximately 15-20% of the treated area. Erosion was not observed at the site. It is recommended that for future projects involving the removal of invasive species,
a second year of intensive invasive vegetation removal be included in the project’s mitigation methods to ensure a greater chance of success.

**Mitigation I (D)** A combination of native shrubs and trees were planted to re-establish native riparian habitat. California blackberry was observed at the site growing in clumps. Other native species were observed include dogwood and elderberry. It is recommended that the site continues to be observed to determine if native recruitment can achieve the desired success criteria.

**Mitigation I (E)** Upon inspection in 2011, a 90% reduction in English ivy and Himalayan blackberry is not feasible to achieve due to the establishment of the invasive species in the treated area and in the property itself. No new invasive species have colonized the site and if the hand-pulling method is used to maintain the treated area it is highly likely that these species can be eradicated from the area. Working with the community is recommended.

**Mitigation II.** Floodwater Conveyance: Not applicable.

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**Photo point 1:** Many ferns and California blackberry plantings are surviving. The oaks, willows and ferns are thriving and functioning for erosion control. English ivy and Himalayan blackberry are reestablishing in clumps. RCDSCC will work with the homeowners to establish a volunteer program to continue eradicate English ivy and Himalayan blackberry.
**PAJ-4 (2009)**

**Practice/Extent:**
> Restoration and Management of Declining Habitats (643): 0.73 acres

**Purpose/Goal of project:** The purpose/goal of the project is to build on Phase I and II to further restore and enhance 2.5 acres of a previously disturbed portion of Watsonville Slough. Successful implementation of the project will increase both wetland and upland habitat value within the last mile of the slough ecosystem and improve water quality. The success of this project will be measured in acres of wetlands/slough restored.

**Area affected:** 0.73 acres

**Conservation benefits:** Removing invasive species from the last mile of Watsonville Slough will provide plant diversity and critical habitat for a unique ecosystem.

**Natural biological enhancements:** In this phase of the project, 0.33 acres of iceplant and 0.4 acres of perennial pepperweed were removed from the lower Watsonville Slough. Given the high density of native species, such as pickleweed and saltgrass, no revegetation occurred.

**Volume of soil moved:** 0 yd³

**Net waters/Wetland loss:** No net loss of jurisdictional waters or wetlands occurred as a result of this project.

**Net Gains in wetland and riparian areas:** No change.

**Final slope of project work (not to exceed 2:1):** Not applicable.

**Reports submitted to County staff:** Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance:** The special status species of concern on this property were Monterey spineflower and coast wallflower. Floristic surveys were completed by NRCS and RCDSCC in June 2007, April 2008, and May 2009, and none of the aforementioned species were found. Prior to the onset of activities, all project workers including NRCS/RCDSCC staff and growers/landowners and/or their employees/representatives were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** Iceplant (Carpobrotus edulis) removal was conducted with a backhoe operator in 2009. A Watsonville Wetlands Watch staff person was on site at all times in order to ensure proper removal techniques were used, as well as to remove additional iceplant by hand that the backhoe could not reach. Iceplant was hauled off site to the County landfill. A total of 0.33 acres of iceplant was removed, totaling approximately 100 cubic yards. Perennial pepperweed (Lepidium latifolium) was treated with an herbicide spray twice through the plant’s growing cycle in 2009. Perennial pepperweed is a highly invasive species which can grow rapidly and displace native vegetation. It is considered an invasive species of high priority in salt marshes throughout the San Francisco bay area. 0.4 acres of this species were treated during 2009.

**Mitigation I. (D) Revegetation efforts:** Because of the existing native plant cover, a more passive approach was utilized, which entailed removal of iceplant as a means to allow for regeneration and recruitment of native salt marsh plant species. On this site, no native plants were installed.

**Mitigation I. (E) Monitoring:** In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented. Success criteria will be constituted by a 90% reduction in the percent of non-native invasive species and an 80% success rate of establishment of natives. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation.

Plant populations in areas where iceplant was removed were monitored for total species presence and composition. A permanent baseline transect was set-up and transect lines were randomly selected along the permanent line to provide temporary sampling units for the study. Each year, new transect lines are selected randomly across the permanent baseline. Site 2 consisted of approximately 60% cover of iceplant, with the remaining cover of native vegetation.

In 2009, iceplant removal methods reduced the percent cover of iceplant to 0%.

In 2010, the native species showed a high degree of increase, with a 51.2% increase in total percent native plant species cover and a 2.53% reduction in iceplant. This trend is expected to continue over the next year as the existing native rhizomatous species continue to spread (Distichlis spicata, Lupinus triticioides) and the native seed bearing plants self propagate (Lupinus arborescens.)

**Mitigation II. Floodwater conveyance:** Although the project area is located in Flood zone A (a FEMA Floodway,) an analysis is not required given the nature of the work.

**2011 Observations for Projects (BMPs)**

Iceplant and perennial pepperweed have been removed from the site in order to restore the native habitat. Plant diversity at the site is increasing with the removal of invasive plants.

**2011 Observations for Mitigation Measures Mitigation I (C) (The success criterion of 90% reduction of non-native invasive plants has been achieved.)**
Mitigation I (D) Due to the existing native plant cover, no revegetation was implemented for the project.

Mitigation I (E) Continued monitoring is recommended to ensure successful natural regeneration of native plants and the continued absence of invasives.

Photo point 2: Iceplant and perennial pepperweed have been removed from the site, and native vegetation is thriving.
PAJ-11

Practice/Extent:
» Critical Area Planting (342), 400 ft x 165 ft
» Grassed Waterway (412), 42 ft wide x 90 ft long
» Two (2) Sediment Basins (350), Sediment Basin #1: 85 ft wide x 180 ft long, Sediment Basin #2: 6 ft wide x 83 ft long
» Two (2) Structure for Water Control (587), one riser pipe with rock dissipater per sediment basin,) SWC #1: 12 ft wide x 57 ft long, SWC #2: 12 ft wide x 74 ft long
» Restoration and Management of Declining Habitats (643), 400 ft x 165 ft

Purpose/Goal of project: The purpose/goal of the project is to capture highly erosive surface runoff from adjacent hillside strawberry fields and roads, thereby reducing sediment entering an existing gully and downstream Larkin Valley Creek, which provides habitat for Santa Cruz long-toed salamander (SCLTS) and California red-legged frog (CRLF.)

Area affected: Approximately 2 acres.

Conservation benefits: This project will promote healthier populations of the Santa Cruz long-toed salamander (SCLTS) and California red-legged frog (CRLF) by controlling highly erosive surface run-off and creating critical habitat through the construction of two sediment detention basins and a grassed waterway that have the potential to function as breeding ponds, and by improving migration corridors through connection of upland habitat with existing breeding ponds.

Natural biological enhancements: Native plants were planted over 1.52 acres to create a habitat corridor to improve migration potential between upland habitat and existing breeding ponds. A grassed waterway encompassing 0.09 acres and two sediment basins totaling 0.47 acres were constructed and have the potential to serve as suitable breeding ponds for SCLTS and CRLF populations as well as capture sediment that would otherwise degrade riparian habitat.

Volume of soil moved: 2150 yd³

Net waters/Wetland loss: No impact to waters of the state and no net loss of jurisdictional waters or wetlands.

Net Gains in Wetland and Riparian Areas: No change.

Final slope of project work (not to exceed 2:1): Side slopes of sediment basins ranged from 4:1 to 2:1; grassed waterway, 2:1

Reports submitted to County staff: Not applicable.

Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance: On 9/21/09, a reconnaissance level survey was completed. No amphibians were observed. Based on conversations with DFG, it was determined that the salamanders would not be present in the agricultural fields. Prior to project implementation, all project workers were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Mitigation I. (C) Efforts to control non-native invasive plant species: The primary goal of the project was to reduce erosion and sediment inputs into nearby water bodies. Non-native species on-site were exclusively agricultural-related weeds, including black mustard, wild radish, common mallow, and poison hemlock. These species were not addressed in the project scope.

Upon inspection in 2010, no new non-native invasive plants have colonized the area.

Mitigation I. (D) Revegetation efforts: Revegetation of the access roads, staging areas, and basins occurred using non-reseeding annual barley. This helped with erosion control and bank stability. It also provides filtration and retention of some sediment and associated nutrients and pesticides and improves the oak woodland corridor for terrestrial species. Species for revegetation of the oak woodland corridor were selected based on species present (approved by NRCS biologist) and propagated from seed within the watershed. The grassed waterway was seeded with native red fescue ‘molate’ (Festuca rubra molate) for long-term stability. Where feasible, existing native species on site, including wild rose, California blackberry, sedges, and juncus species were excavated prior to construction and reincorporated as habitat on the edges of the grassed waterway after grading occurred. All materials were inspected for pests and diseases prior to planting.

Mitigation I. (E) Monitoring: Revegetation of the access roads, staging areas, basins, and grassed waterway occurred, using a combination of native trees, shrubs and grasses, with the goals of erosion control, bank stability, to provide filtration and retention of some sediment and associated nutrients and pesticides and to improve the oak woodland corridor for terrestrial species. Success criteria will be 80%.

Revegetation occurred over all disturbed soil areas to ensure that disturbed areas are restored to pre-construction condition or better. To further ensure this objective, the site will be maintained until project success criteria have been met and plants have become fully established. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation.
In 2010, a success criteria of 90% for survival of native plants had been achieved for the oak woodland corridor. In particular, the coast live oaks, toyon, coffee berry, and ceanothus were thriving. A 60% cover of the red fescue had been achieved.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

**2011 Observations for Projects (BMPs)**

Critical area planting and restoration and management of rare and declining habitats was achieved by planting native species such as willows, red fescue, oak and barley. These plants appear to be thriving well. The grassed waterway is functioning properly and is heavily populated with native species, in particular the Red fescue and Barley were observed respectively in and along the waterway. Juncus species were also observed. The two sediment basins are functioning well to trap sediment.

The project appears to be capturing highly erosive surface runoff from the adjacent hillside and roads and reducing the sediment entering the existing gully and downstream Larkin Valley Creek, thereby improving habitat for Santa Cruz long-toed salamander and California red-legged frog.

The RCDSCC will coordinate with the landowner to ascertain the purpose of the recently installed plastic chute and make appropriate changes or none depending on the situation.

**2011 Observations for Mitigation measures**

**Mitigation I (C)** No new non-native invasive plants have colonized the area.

**Mitigation I (D)** Native plants are doing well.

**Mitigation I (E)** In 2011 a success criteria of 90% survival of native plants had been achieved for the oak woodland corridor unchanged from 2010. Red fescue was observed still at 60%.

Photo point 3: The sediment basin is functioning and trapping sediment. Native vegetation has achieved 80-90% survival. The larger rock structure has some sediment and plants along the center and the smaller rock structure is mostly covered with sediment and plants. A new structure, installed after the project’s completion and consisting of a plastic-covered chute held down by sandbags, drains directly into the sediment basin. The RCDSCC and the landowner will collaborate to assess the structure’s functionality and other possible improvements to the sediment basin.
**SLO-17**

**Practice/Extent:**
- Streambank and Shoreline Protection (580), 12 ft (from toe to top of bank) x 40 ft long.

**Purpose/Goal of project:** The goal of the project is to improve steelhead habitat by reducing the delivery of sediment to Branciforte Creek due to streambank erosion and bank failure. This will be accomplished through the implementation of vegetation and structures to stabilize and protect the banks.

**Area affected:** Approximately 480 ft² of eroding bank on Branciforte Creek that borders a private road.

**Conservation benefits:** The installed practices will enhance wildlife habitat, reduce erosion, and improve water quality.

**Natural biological enhancements:** Improved steelhead habitat through the reduction of sediment entering the stream. The native revegetation on the restored stream bank will improve habitat for riparian flora and fauna. Improved access during winter flows for salmonids and improved habitat with a roughened channel, designed to accommodate fish passage through the steep stream reach while conveying peak flows and associated debris. The roughened channel design contains rock cascades, boulder weirs, resting pools, and large wood structures, which form a complex flow pattern with variations in depth and velocity to provide numerous paths for migrating fish. Rock slope protection and revegetation will protect steep banks from erosion, while providing habitat for aquatic species.

**Volume of soil moved:** 119 yd³

**Net waters/Wetland loss:** 0.002 acres of non-wetland waters of the US filled.

**Net Gains in Wetland and Riparian Areas:** No change.

**Final slope of project work (not to exceed 2:1):** In order to match the surrounding bank, a combination of vegetated geogrids and compacted engineered fill were used to achieve a 1.5:1 slope.

**Reports submitted to County staff:** A flood analysis completed by NRCS was submitted with the Pre-Construction Notification on 5/20/09.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance:** On September 4, 2009, a Service-approved individual conducted a pre-construction survey for California red-legged frogs. None were found.

**Mitigation I. (C) Efforts to control non-native invasive plant species:** Due to the current percent cover of non-natives in the project area, eradication of existing non-natives is not within the scope of the project or feasible, and thus will not be completed as part of this project. The site will be returned to pre-construction condition or better and overall native plant cover will be increased. Upon inspection in 2010, no new non-native plant species had colonized the area.

**Mitigation I. (D) Revegetation efforts:** In order to ensure the success of native plants, willows were planted 1 to 2 feet apart over the 480 ft² of disturbed area. Prior to construction, every effort was made to collect native species and hold them for replanting after construction. Hordeum vulgare (barley) was broadcast at a rate of 180 lbs/acre and covered in straw and erosion control blankets.

**Mitigation I. (E) Monitoring:** Management practices will be employed to prevent any species from establishing that would compromise the performance of the stream bank protection measures. Success criteria will be constituted by a 60% success rate of establishment of willows. The success criteria will be monitored for a period of three (3) to five (5) years to ensure successful establishment of native vegetation. Upon inspection in late 2009, the barley had covered approximately 70% of the disturbed area. In winter 2010 the willows covered approximately 50% of the area, and the barley was still in place as residual dry matter.

**Mitigation II. Floodwater conveyance:** The project is located in FEMA zone A, a FEMA floodway, thus an analysis was conducted by NRCS. It was determined that the project would not significantly affect the flood elevation.

**2011 Observations for Project (BMPs)**
Vegetation and rock structures have successfully stabilized
the stream bank, preventing further erosion into the creek. The structure appears in good condition and sediment delivery to the creek has been reduced.

Rock slope protection and vegetation have protected the banks from continued erosion.

2011 Observations for Mitigation Measures

Mitigation I. (B) Not applicable.

Mitigation I. (C) Eradication of non-native invasive species was not within the scope of the project. No new non-native species have colonized the site.

Mitigation I. (D) Willow stakes were planted to revegetate the area with a success criterion of 60% survival. The willows have achieved an 80% rate of establishment.

*This photo is from a different location and looks down at the project site from above. The pre-photo location was inaccessible at the time of the visit.

Photo point 1: The structure is still in place and controlling erosion. The willows have achieved an 80% success rate of establishment.
**SLO-18**

**Practice/Extent:**
» Obstruction Removal (500), concrete apron 5.5 ft x 7.5 ft, concrete lip 2 ft x 2 ft, concrete piece 1.5 ft x 2 ft

**Purpose/Goal of project:** The goal of the project is to improve out-migration for steelhead smolts during late spring and early summer.

**Area affected:** 15 ft²

**Conservation benefits:** Removing the concrete will enhance steelhead migration.

**Natural biological enhancements:** Removing the concrete (approximately 2 yd³) allowed the sandy, porous material which has built up behind the structure to flush out and allow un-constricted stream flow, thus improving out-going steelhead smolt migration through that point in the stream.

**Volume of soil moved:** 0 yd³

**Net waters/Wetland loss:** No change.

**Net Gains in Wetland and Riparian Areas:**
No change.

**Final slope of project work (not to exceed 2:1):**
Not applicable.

**Mitigation I. (B) Methods to lessen “take” of protected plants, animals, and habitats, including avoidance:** California red-legged frog, Western pond turtle, and steelhead were species of concern at the site. No surveys were completed. However, it was determined by FWS that the CRLF and the pond turtle were unlikely to be on site.

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![Before](image1.png)
![After](image2.png)
![2010](image3.png)

Photo point 1: Adequate stream flow for fish passage was observed at the concrete lip.
and the DFG determined that activities were not likely to harm salmonids. The site was not dewatered. Prior to project implementation, all project workers were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

**Mitigation I. (C) Efforts to Control Non-Native Invasive Plant Species:** Not applicable.

**Mitigation I. (D) Revegetation efforts:** Not applicable.

**Mitigation I. (E) Monitoring:** The project will be monitored for three (3) to five (5) years on an annual basis. In 2010, adequate stream flow (6”-1 ft) was observed at the point where the concrete was removed.

**Mitigation II. Floodwater conveyance:** The project is not located in FEMA zones A, V, or a FEMA floodway, thus an analysis was not required.

**2011 Observations for Projects (BMPs)**

Obstruction removal of concrete apron, lip, and piece is unchanged (meaning they have been removed and continue to do so).

The project has improved the out-migration for steelhead smolts during late spring and early summer.

No recommendations.

**2011 Observations for Mitigation measure**

Not applicable.
SOQ-6 (phase 3)

Practice/Extent:
» Restoration and Management of Declining Habitats (643), 30 ft x 2000 ft

Purpose/Goal of project: This is phase 3 of SOQ-6. The goal of this project is to restore a riparian community through the elimination of exotic ground cover on 1.5 acres where English and cape ivy, hemlock, mustard, and Himalayan blackberry have infested, followed by revegetation with native plants.

Area affected: Approximately 1.5 acres along Soquel Creek.

Conservation benefits: Habitat restoration of the riparian corridor along Soquel Creek improves available habitat for federally listed steelhead trout and species of concern foothill yellow-legged frog and California red-legged frog in 2007, 2008, and 2009. Neither species was identified prior to the onset of activities all project workers and/or their employees/representatives were given information on the listed species in the project area, a brief overview of the species’ natural history, the protection afforded the species by the Federal and California Endangered Species Acts, and the specific protective measures to be followed during implementation of the practices.

Mitigation I. (D) Revegetation efforts: Following the removal of non-native invasive species at the site, a combination of native trees, shrubs, grasses and forbs (approved by NRCS biologist) were planted in cleared areas by volunteers and students from Soquel Elementary School. The planting palette was developed based on native species found on site and plants were propagated from seed collected within the watershed. The plants were inspected for pests and diseases prior to planting. The aim of the revegetation effort is to assist in the establishment of a self-sustaining native flora population along the riparian corridor.

Mitigation I. (E) Monitoring: Because the goal of this project is to restore a riparian community, the success criteria will be 90% success of native plants. In order to ensure the success of native plants, the introduction of any invasive plant species which currently do not exist on or adjacent to the project site will be prevented. Success criteria will be constituted by a 90% reduction in the percent of targeted non-native invasive species removed. Revegetation efforts will be monitored for a period of three (3) to five (5) years to ensure successful establishment of the native riparian vegetation.

A 90% reduction of English ivy, cape ivy, periwinkle, morning glory, and poison hemlock was maintained in 2008. Upon inspection in 2010, there has been an increase in cover of the existing non-native species across the property. Patches of English ivy, periwinkle, and arum lilies are present on site. The arum lilies, which were dormant beneath the soil’s surface when the site was infested with low growing, aggressive groundcover, are flourishing at the site. The RCDSCC is working on methods to control this “new” invasive species and developing a volunteer program to perform regular hand maintenance to remove patches of ivy and periwinkle. No new invasive species have colonized the site.

The site will continue to be monitored and success criteria re-evaluated given unforeseen factors.

Mitigation II. Floodwater conveyance: Although the project area is located in Flood zone A (a FEMA Floodway), an analysis is not required given the nature of the work.

2011 Observations for Project (BMPs)
Restoration has improved local riparian habitat. Some native plantings have survived, and the buffers around them have been maintained. No new invasive species have colonized the site, but they are still present.

The success criteria for the restoration efforts were 90% survival of plantings and 90% reduction in targeted non-native invasive species. About 90% of the plantings have survived.
English ivy, periwinkle, and arum lilies are somewhat abundant. Cape ivy appears to have been eradicated. Continued maintenance is recommended to reduce the prevalence of invasive species.

**2011 Observations for Mitigation Measures**

Mitigation I. (B) Not applicable.

Mitigation I. (C) Non-native invasive plant cover has been reduced, but more maintenance is needed to achieve the success criterion of 90% reduction.

Mitigation I. (D) Revegetation is functioning successfully to improve habitat conditions in the riparian area. To prevent invasive species from outcompeting natives, continued action to remove invasives in the area is needed.

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Photo point 1: Right bank of Soquel creek, some native plantings are surviving. Cape ivy removal was successful, having observed none at the site.
**PAJ-9**

**Practice/Extent:**
- Streambank Stabilization (580), 30 ft wide x 100 ft long
- Critical Area Planting (342), 0.1 acre
- Grade Stabilization Structure (410), 13 ft wide x 50 ft long

**Purpose/Goal of project:** The goal of this project is to stabilize the unstable, vertical streambank, thereby reducing erosion and sediment deposition to the stream, improving stream and habitat quality, and facilitating recruitment of native plant species within the site to prevent further degradation of the bank, stream, and landowner’s property. In addition, Green Valley Creek is habitat for steelhead (*Oncorhynchus mykiss*) according to NOAA, and by decreasing sediment loading to the creek and improving riparian vegetation, this project will improve that critical habitat for this species.

To maintain the project, the landowner will keep invasive species from encroaching on the site (by hand weeding or spraying as a last resort.) The very small amount (1-2 plants) of periwinkle (*Vinca major*) onsite was removed by hand during planting and taken offsite.

In 2009 the site had become predominantly revegetated with erosion control grasses, including red fescue and creeping wild rye. A 75% revegetative cover had been achieved and no new invasives had colonized the site. Observation in 2010 showed the site was still predominantly vegetated with grasses. The structure appeared to be functioning properly to reduce erosion.

**2011 Observation for Projects (BMPs)**
Stream bank protection through the installation of native willow trees was evident at the site. Critical area planting through the use of two or more native grasses was not observed. Vegetation on the site has been taken over by poison hemlock. Grade stabilization through a rock riprap grade control structure was observed and erosion at the site appears to be minimal.

The vertical stream bank appears to be stable and no erosion and sediment deposition was observed.

It is recommended the RCDSCC coordinate with the landowner to weed and remove poison hemlock from the site thereby allowing native vegetation to recover and provide long-term erosion control.

**This will be the last update for this project.**
Photo point 2: Vegetation was primarily poison hemlock and thistles. Some natives continue to survive including bee plant, willows and oaks. The RCDSCC will coordinate with the landowner to keep invasives spreading by hand weeding or spraying as a last resort.

Photo point 3: Vegetation was primarily poison hemlock and thistles. Some natives continue to survive including bee plant, willows and oaks. The RCDSCC will coordinate with the landowner to keep invasives spreading by hand weeding or spraying as a last resort.
2011 Project Photo Point Maps

BeC-1

BGC-1
2010 Project Photo Point Maps

AGC-1, Crossing #1

AGC-1, Crossing #3
Local Solutions.

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