

## PROJECT HIGHLIGHTS, 2012-005



*80 linear feet of streambank restored*

*1,000 linear feet of fence*

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<b>Project:</b>	2012-005
<b>Watershed:</b>	Walker Creek, Subwatershed Chileno Creek
<b>Practices:</b>	<b>Fence, Road improvements, Culvert Replacement &amp; Repair (9 total)</b>
<b>Project Partners:</b>	<ul style="list-style-type: none"><li>▪ Marin Resource Conservation District (Marin RCD),</li><li>▪ 319(h) State Water Resources Control Board (SWRCB)</li><li>▪ United States Department of Agriculture Natural Resources Conservation Services (NRCS) Environmental Quality Incentives Program (EQIP)</li><li>▪ Prunuske Chatham Inc.</li><li>▪ Landowner</li></ul>

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## Project Overview

The **Rangeland Roads and Water Quality Improvement Project 2012-005** is part of an extensive regional effort, Conserving Our Watershed Program (COW), designed to promote and support the advancement of water quality improvements by targeting sediment load reduction. The intention of the project was to improve ranch roads and a stream crossing by installing a series of conservation practices on an unnamed tributary to Chileno Creek which overflows seasonally and degrades road surfaces and erodes adjacent stream banks. The road enhancements were intended to allow for proper surface drainage, dispersal of standing water and the reduction of runoff erosion, while the stream crossing repairs were corrected to adjust seasonal peak flow and passage of debris to eliminate stream bank erosion.

The ranch completed nine (9) practices: removal and replacement of three existing culverts in a crossing, which were not functioning properly; raising and resurfacing the road to fit the proper dimensions of the culverts; replacing another undersized culvert on a side road near the crossing; installing grassed waterways and berms along both sides of the road to channel sheet flow; stabilizing a streambank and planting willow stakes in a critical area planting, and building a livestock fencing around the stream.

### **Ranch Location:**

The ranch is located approximately four miles south-east of the town of Tomales in northwestern Marin County, California. It is accessible from Chileno Valley Road and approximately one mile north following the ranch road driveway from the address mailboxes (Fig. 1).

### **Project Location:**

The project is sited, southeast of the homestead, on an unnamed intermittent tributary to Chileno Creek thence to Walker Creek, a subwatershed of the Tomales Bay watershed (Fig. 1).

### **Environmental Conditions:**

The site is located on 623 acres of coastal rangeland in Marin County, elevations range from 150 - 650 feet. The ranch is an active grazed, supporting both sheep and heifers. The landowner leases 500 acres of his land for cattle grazing, keeping the remaining 123 acres for his flock of 40 Suffolk-cross ewes, primarily for meat production (See Table 1 for Project area dimensions).

Table 1. The ranch project 2012-005 area dimensions.

<b>Project Information</b>	<b>Area</b>	<b>Unit</b>
Ranch area	623	Acre
Watershed area	0.98	Square Mile
Project area	0.71	Acre
Total Length of Stream on Property	8,577	Linear Feet
Total Length of Stream Fenced	200	Linear Feet

The soil type throughout project location, along the creek, is dominantly Clear Lake Clay, 113, 0 - 2% slopes, very deep and poorly drained soils. Clear Lake Clay soils are typically formed in fine-textured alluvium derived from sandstone or shale and generally located in basins and swales of drainages. Vegetation consists of annual and perennial grasses and forbs with scattered oaks. The project takes place within a

riparian corridor composed of a few scattered riparian woodland trees, Himalaya blackberry thickets, and herbaceous wetland plants both up and downstream both the site.

**Historical Partnership and Commitment:**

The landowner has engaged in past conservation projects with the Marin RCD. The ranch is protected by a MALT agricultural conservation easement and has participated with the United States Department of Agriculture (USDA) NRCS programs in the past to improve and enhance the ecological value of the land. Historical documentation of past known partnership conservation improvements are listed below.

*Past and current projects include:*

- 2012 – 2014, Rangeland Roads and Water Quality Improvement Project (Fig. 1, 2 &3)
  - Marin RCD and NRCS, EQIP funded project
- 2010, Water Development and Livestock exclusionary fencing
  - Marin RCD and NRCS, EQIP funded project
- 2006, Stream Stabilization and Critical Area Planting
  - Marin RCD, Tomales Bay Watershed Enhancement Program
- 1995, Landslide and Gully Repairs
  - Marin RCD, Walker Watershed Restoration Program

## Phase I. Planning

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- Improve water quality by reducing non-point source pollutants such as sediments, nutrients, and pathogens from discharging into the unnamed intermittent stream thence into Chileno Creek and onto Tomales Bay.
- Enhance habitat, aquatic and riparian, within the Chileno Creek Watershed.



- Road and stream crossing repairs will reduce road runoff and decrease sedimentation into creek.
- Improve fisheries habitat in Chileno creek indirectly by installing 1,000 linear feet of fence around the creek, thus decrease sedimentation into the watershed.



- Stream Crossing improvements will enhance stream habitat, allow for proper stream flow and reduce the accumulated debris deposits at the culvert crossings.
- Road repairs and vegetative buffers will allow for proper drainage, disperse standing water and reduce runoff erosion into the unnamed channel.
- Sidebank stream stabilization and critical planting will eliminate sidebank erosion, thus reducing sedimentation into the stream channel.
- Reduce non-point source pollution delivered to Chileno Creek, a designated priority watershed for salmonids.

## Phase II. Design and Implementation

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**Design:**

In the fall of 2012, a conservation design plan was developed by an NRCS Rangeland Specialist, NRCS Engineer and a contracted engineer from Prunuske Chatham, Inc. to meet the goals and objectives set by all partners and landowner. The design involved improving the ranch access road, replacing existing undersized culverts, restoring a stream crossing with active sidebank erosion and fencing around the restored stream in a 0.98 square mile watershed. The design consisted of a suite of USDA NRCS conservation practices and specifications prescribed to meet the matching funding requirements of NRCS's Environmental Quality Incentives Program (EQIP).

*The practice and associated practice objectives included:*

- 1) Access Road Improvements (560)  
*Objective 1: Improve existing fixed route for livestock operations through managing runoff to prevent erosion and maintaining or improving water quality by grading and out-sloping the roads.*
- 2) Critical Area Planting (342)  
*Objective 2: Stabilization of soil by planting willows and grasses, on highly erodible or critically eroding areas. This practice reduces damage from sediment and runoff to downstream areas and improves wildlife habitat and visual resources.*
- 3) Fencing ( 328)  
*Objective 3: Eliminate land impacts caused by livestock activity.*
- 4) Grassed Waterways/Berm (412)  
*Objective 4: Installation of the grassed waterways adjacent to the road and creek will establish vegetated drainage to concentrate runoff and reduce sediment delivery to the creek.*
- 5) Stream Crossing/Stream (578)  
*Objective 5: Convey water during high flow events and reduce the accumulated debris deposits contributing to upside bank erosion.*
- 6) Streambank Stabilization (580)  
*Objective 6: Stabilize and protect side bank of stream against erosion to reduce sediment loads causing downstream damage and pollution, improve the stream for fish and wildlife habitat, and protect adjacent land from erosion damage.*
- 7) Structure for Water Control (587)  
*Objective 7: A structure for water control will convey the water; control the rate of flow throughout the lined waterway.*

**Implementation:**

Completed- December 2013



The winter of 2013, NRCS staff, a Rangeland Specialist and an Engineer, inspected the construction of the ranch road and stream crossing, which involved the replacing two non- functioning 36” culverts with three 42” culverts that would be armored with rock and grout on both the up and downstream ends of the culverts for stabilization. To adjust for the resized culvert dimensions and mitigate for high seasonal flows the ranch road was elevated and the crossing was paved with a reinforced concrete slab. Nearly 430 linear feet of the ranch access road, leading up to the wet crossing and beyond, were resurfaced which involved grading and applying a top coat of 2” aggregate base rock to improve the conditions. The road improvements were installed to improve drainage, runoff and disperse standing water. In addition, approximately 0.6 acres of grassed waterways/ vegetative buffers were installed both above and below the access road and creek (Table 2, Fig. 1, 2 & 3).

Upstream, from the wet crossing approximately 80 linear feet of the left bank was stabilized using a fabric-reinforced earthen fill (FREF) structure, mulched and seeded with native grasses to aid in stabilization. Additional planting included a total of 27 willow sprigs both up and down stream of the crossing to promote riparian vegetation establishment within the restored creek. In effort to protect two mature trees adjacent to the creek within the work area, the tree was protected by building up the ground level around them to match the berm and protect the roots.

Another culvert was replaced on the side access ranch road to the lambing barn, downslope of the main crossing. A 12” plastic culvert was removed and was intended to be replaced with an 18” culvert which would dissipate into a newly constructed grassed waterway/vegetated buffer. During construction of the culvert, the contractor discovered a flaw in the design plans. To mitigate the error a new design was prepared. The revised design was prepared to accommodate the needs of the ranching operations by allowing a hay truck sufficient access to the lambing barn. The new design widened the shoulders of the ranch road and barn access road to the lambing barn allowing for adequate turning radius onto the side road for the hay truck. Due to the road enhancements, the planned 18” culvert was replaced with 8’ x 6’ rocked water lined wet crossing to convey access runoff into the waterway. The 18” culvert was then installed approximately 150 linear feet north, up the main ranch road, below the grassed waterway/ vegetated waterway to redirect and dissipate road runoff (Table 2).

A 1,000 linear feet regular terrain fence was installed along the perimeter of the of the project starting downstream from the stream crossing at the existing fence along the tributary, crossing over the creek crossing, traveling upstream and adjoining to an existing fence above the stream channel (Table 2. Fig. 1, 2 & 3).

Table 2. Project 2012-005, completed project dimensions.

**Project 2012-005****Rangeland Roads and Water Quality Improvement Project**

<b>Project Information</b>	<b>Area</b>	<b>Unit</b>
<i>Stream Crossing</i>	80	Linear feet
<i>Structure for Water Control (1 culvert)</i>	18	inch
<i>Structure for Water Control (rocked waterway)</i>	60	Linear feet
<i>Streambank Stabilization</i>	80	Linear feet
<i>Critical Area Planting</i>	27	Willows
<i>Grassed Waterway and Berms</i>	.6	acre
<i>Road Improvements</i>	430	Linear feet
<i>Fence length</i>	1000	Linear feet

**The following permits were obtained for this project:**

This project, #2012-005, went through MRCD's Permit Coordination Program for CEQA compliance. The following permits were obtained:

- ☐ No Permit Required
- ☒ §1600 CA Department of Fish and Wildlife
- ☐ §401 Water Quality Certification
- ☐ §404 US Army Corps Wetland
- ☐ County of Marin

**Phase III. Monitoring**

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**Landowner Questionnaire:**

Overall the Landowner was very pleased with the outcome of the Ranch Road Improvement and Stream Crossing Project. On September, 30 2014, nearly one year post implementation, the landowner confirmed that the project has been functioning as planned and anticipated, although it has been a drought year there have not been any heavy flows. The landowner also stated is that he is looking forward to seeing how the repairs will hold up in a normal to rainy season. The project has met the landowners intended goals of increasing ecosystem benefits by enhancing water quality, increasing wildlife and riparian habitat; as well as operational costs related to annual road and crossing repairs. As a conservation advocate the landowner will continue to work with the MRCD. As a suggestion for future projects he has recommended increased communication during the design process.

**Project Assessment Checklist:**

In September 2014, approximately nine months post project implementation the project was evaluated by filling out the Project Assessment Checklist. At the time of evaluation the fences were in excellent condition, all H-braces were sturdy, wire was tight, no missing or broken post. There was no evidence of livestock pressure on the infrastructure. One gate was open allowing livestock access into the upstream enclosure; there was no evidence of livestock or damage to the sidebank stabilization or plantings. The landowner was notified and asked to close the gate.

The road improvements, culvert crossing, culvert and rocked water waterway were all functioning as planned and in excellent condition. No visible erosion surrounding the new structures or debris obstructions surrounding the culverts. The constructed grassed waterways and berms appeared to be in fair condition. Due to the drought the grasses have not established although the reinforced fabric is still in place stabilizing the surface area.

Erosion control repairs, upstream, from the wet crossing approximately 80 linear feet of the left bank was stabilized using a fabric-reinforced earthen fill (FREF), was showing no evidence of erosion. Although, the FREF was visible, but appeared secure only lacking established vegetation most likely due to the dry season. Just upstream from sidebank repairs there is historical cattle trailing, existing pre- project and will continued to be monitored as a part of the fence enclosure.

Additionally plantings included a total of 27 willow sprigs both up and down stream of the crossing, there was a 99% survival willows (Table 3). As a means to protect two matures trees along the sidebank / creek side, the tree base was protected by elevating the ground level surrounding each to aid in protecting the root system. At the time of the evaluation there was evidence of erosion around the base of the far most upstream tree. This was noted and will be monitored again during the rainy season. The landowner was notified and will keep an eye on the condition of the tree.

### ***Revegetation Survival:***

Point Blue Conservation Science's Students and Teacher Restoring a Watershed Program planted 27 trees. Nearly one year post implementation the survival rate was 99%. Due to the drought year a few of the willow spring were showing signs of water stress, while others were maintaining normal growth.

Table 3. Willow planting, re-vegetation survival and vigor.

<b>Plant Species</b>	<b># Planted</b>	<b>Year: Planted/ Inspected</b>	<b>&lt; 3ft, Low Vigor</b>	<b>&lt; 3ft, High Vigor</b>	<b>&gt; 3ft, Low Vigor</b>	<b>&gt; 3ft, High Vigor</b>	<b>Mortality</b>	<b>Comments:</b>
Willow	27	2013	N/A	27	N/A	N/A	0	Plantings up and downstream
		2014	2	24			1	Stressed for water, drought year.

\*Low Vigor= systemic stress, High Vigor= healthy new growth

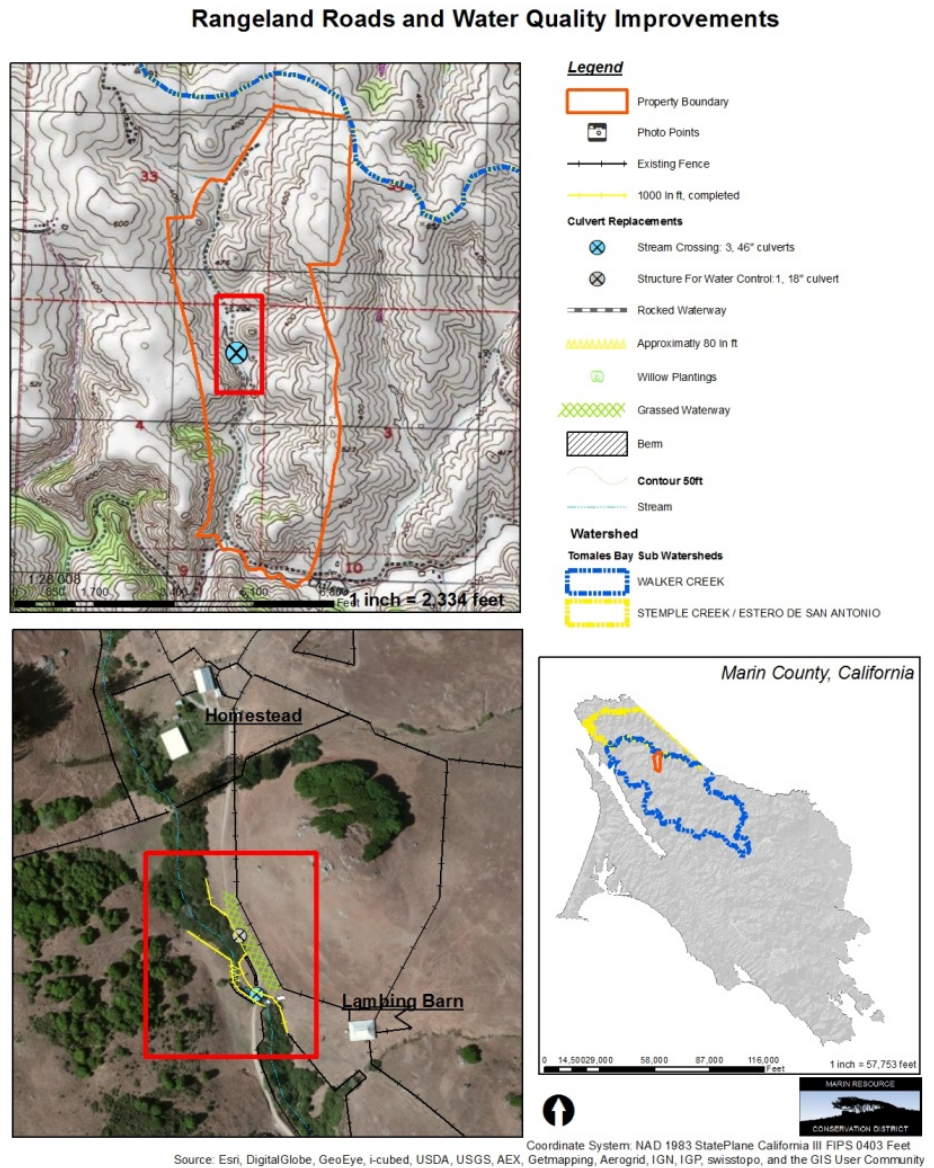


Figure 1. Maps of Project 2012-005. Left: Map shows location of the photo points and completed conservation practices (implemented fall, 2013). Top right: USGS topography map with the property boundary highlighted in orange, the project location boxed in red and general location of the project within Walker Creek Watershed in Marin County.



**Project 2012-005**  
**Rangeland Roads and Water Quality Improvements**

**Photo monitoring:**

**Pre-construction Photos 03/2012**

Pre-construction photo of project site area taken from Photo Point #5.

Project site area prior to ranch road enhancements, implementation of the stream crossing and fencing.



Pre-construction photo taken from Photo Point #1.

The image displays a downstream view of 2 culverts to be replaced and sidebank of stream



**Post-construction Photos 09/2014**

Post-construction photo of project site area from Photo Point #5.

This image shows the ranch road enhancements and the fence line constructed along the project site.



Post-construction photo taken from Photo Point #1.

Photo displays the stream crossing and restored sidebank.



Figure 2. Photo- monitoring documentation of installed conservation practice.



**Project 2012-005**  
**Rangeland Roads and Water Quality Improvements**

**Pre-construction Photos 03/2012**

*Pre-construction photo of landscape from Photo Point #4.*  
Project site area prior to construction photo viewing upstream.



*Pre-construction photo taken Photo Point #3.*  
Project site area prior to road improvements and construction.



**Post-construction Photos 09/2014**

*Post-construction photo taken from Photo Point #4.*  
The image displays the fence and stream crossing repairs looking upstream.



*Post-construction photo taken Photo Point #3.*  
Photo displaying ranch road enhancements, fencing, and the grassed waterway.



Figure 3. Photo- monitoring documentation of installed conservation practice.

