Joint Final Report

Little Last Chance Creek at Guidici Ranch Restoration Project

Funded by
Plumas County Resource Advisory Committee
(Secure Rural Schools and Community Self-Determination Act of 2000 Public Law 106-393)

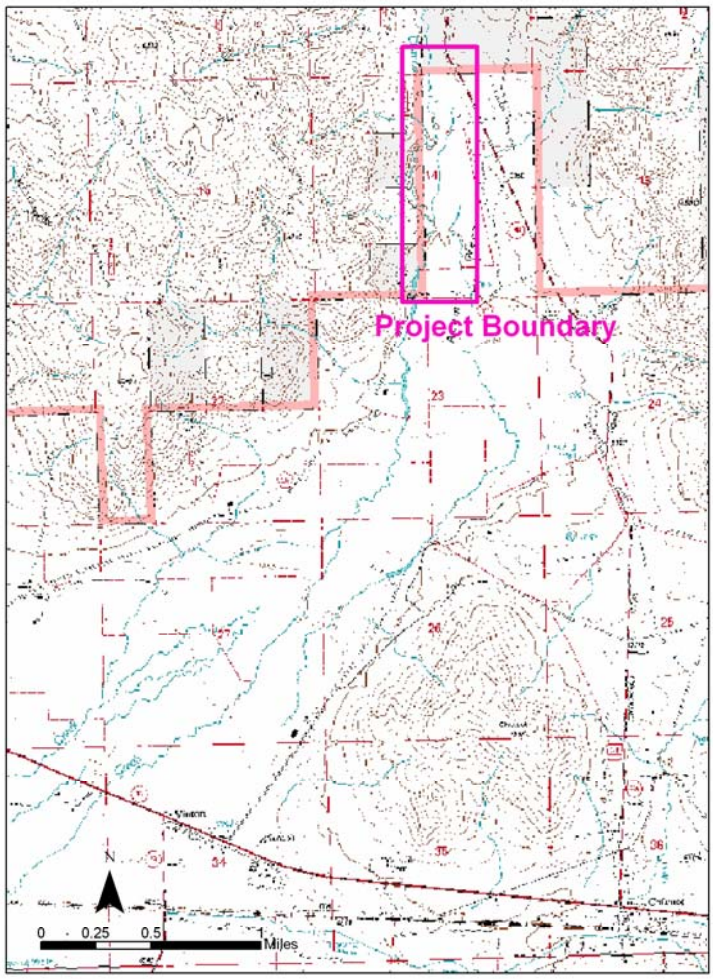
And With Project Development Funding from
Plumas Watershed Forum

Prepared by
Plumas Corporation
January 2009

Background
The Feather River Coordinated Resource Management Group (FR-CRM) was approached by the landowner, Don Guidici, in 2004 for assistance with bank erosion on his property. Jim Wilcox, FR-CRM Program Manager, and Jan Stine of the Sierra Valley Resource Conservation District, visited the site, and determined that FR-CRM expertise could be used to address his concerns. Plumas Corporation applied for, and received, funding from the Plumas Watershed Forum in 2004 for project development. In 2006, Plumas Corporation applied for, and received, implementation funding from the Plumas County Resource Advisory Committee.

Project Description
The goal of this project was to prevent further loss of meadow, and degradation of water quality and fish habitat by halting the on-going bank erosion. An associated goal was to increase fish populations within the project area.

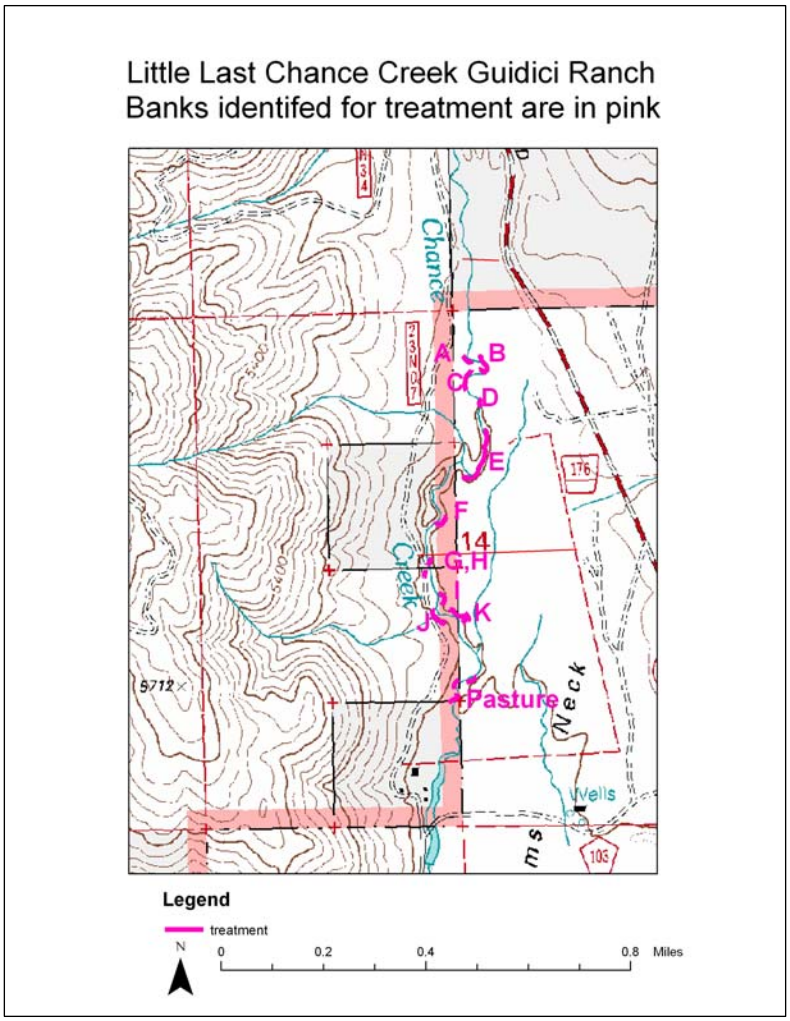
Figure 1. Project location.



The project is located on a one-mile segment of Little Last Chance Creek that winds in and out of the boundary between Plumas National Forest and the Guidici Ranch.

The channel was confined in a gully on the west side of the valley, with actively eroding gully walls. The restoration concept included laying back and vegetating banks, attenuating meander curvatures and directing flow away from the banks with boulder vanes.

Figure 2 shows the locations of bank treatment areas:



Approximately 1,135 cubic yards of 3-foot minus boulders from the Bar One Ranch pit in Sierra Valley were used to construct 71 boulder vanes in 12 treatment areas. Areas B & C were not treated because of a natural trend toward stability. Re-vegetation work consisted of:

- using heavy equipment to relocate large rooted plants from bars for use on the meander outcurve floodplain bench;
- planting willow slips and some wattles during construction and again in fall 2008;
- seeding with both commercial and locally collected native grass and sedge seed during construction and again in fall 2008
- transplanting 10,000 native plants from the Feather River College greenhouse including willow, cottonwood, bitter brush, monkeyflower, sedges, and meadow penstemmon.

Figure 3. Feather River College students assist with seeding and spreading straw. The California Conservation Corps and students from Jim Beckwourth High School also contributed revegetation labor.

Funds provided for the project were as follows:

Plumas County Resource Advisory Committee	$155,000
Rock and transport from PNF Fisheries Program	$ 20,000
Fence management and reconstruction from landowner	$ 2,000
Environmental surveys (wildlife, botany, archeology) from downstream landowner, Rockridge LTD	$ 15,000
Fishery monitoring assistance from Dept Water Resources and Calif. Dept. Fish & Game	$ 600
Preliminary design work from Plumas Watershed Forum	$ 2,500

RAC funds for this project were also used to leverage state Proposition 40 funds for additional work on Little Last Chance Creek on private land downstream of this project area. In order to save costs, the construction bid was administered jointly for the Prop 40-funded project and this project. Out of six bidders, the construction bid was awarded to Hat Creek Construction for $318,297.50 for both projects. Project construction on the Guidici portion was begun on October 8 and completed on November 5, 2007. Costs for the heavy equipment phase of the Guidici project were approximately $112,367. The remaining funds were used for monitoring, revegetation, weed removal, project-related equipment, repairing fence for project protection, and completing contract administration.

Did the project meet the purposes of Public Law 106-393 legislation?

Implements stewardship objectives that enhance forest ecosystems: Fish habitat was the primary component of forest ecosystems that was addressed by the project. According to the monitoring plan for the project, habitat and bank stability protocols were used to assess project-related fish habitat changes. Pre-project data were collected by the Plumas National Forest Fisheries crew in August 2007. Post-project data were collected by Leslie Mink and Kara Rockett in October 2008. All attempts were made to reproduce the correct survey area, however, part of the pre-project survey area was subject to channel re-alignment, and so a new section of channel was incorporated into the post-project data collection (see report cover photo). The following table compares pre- and post-project habitat conditions.

Table 1. Pre- and post-project fish habitat parameters.

Habitat parameter	Pre-project 2007	Post-project 2008
Percent unstable banks	28	33
Percent vulnerable banks	34	34
Percent stable banks	38	33
Percent pooltail fines	8.3	6.2
Pool:Riffle ratio	0.49	0.53
Residual pool depth	2.6	1.9

The above table shows nearly no change in most parameters measured, except residual pool depth, where the quality of the habitat appears to have declined post-project with less depth in the pools. Bank stability also appears to show a slight decrease in habitat quality, with 5% more unstable banks in 2008 than 2007. The slight improvement in pooltail fines and pool:riffle ratio is within a reasonable margin of error, and so may be due more to observer bias, or different

sampling location than project effects. From a project standpoint, the habitat results are somewhat disappointing at this time. However, it should be noted that habitat typically requires three to five years to mature after projects of this type. Some of the increased bank instability is most likely due to the location of the post-project sample reach in a constructed segment of channel. Also, it was unfortunate that downstream water users requested bankfull flows in May 2008 before project revegetation had a chance to get established. The decrease in pool depth is also most likely due to the location of many pools in the newly constructed segment of channel. It is assumed that the pre-project sampling reach included the deep area in the exaggerated meander that was also an actively eroding area.

The response of fish populations at this time is not conclusive. No trout were captured in either the pre- project (July 2006) or the post-project (Sept 2008) single pass electroshock sampling of a 300-foot reach. Other observations, however, indicate a positive trout population response. The lack of difference in the comparable pre-and post-project sampling is not surprising, as brown trout are the primary trout species found in the project area, and fall spawning was disrupted during 2007 construction. Despite the lack of capture in the first pass, however, the 2008 effort continued a second and third pass, which resulted in the capture of seven young-of-the-year brown trout, that probably migrated into the project area from upstream.

In response to public comments during the NEPA process, the project area was also snorkel-sampled in summer 2007. No fish were observed. Because of the poor visibility, there was no attempt at snorkeling after the project.

Figure 4. Brown trout spawning in project area, October 2008.

Restore and improve land health: There was a total length through the project area of 2,144 feet of actively eroding bank. The project treated those banks so that they are now in a configuration that will allow vegetation to become established, leading to long term stability.

Figures 5 & 6. Pre- (left) and post-project (right) view of three treated banks in the pasture area.

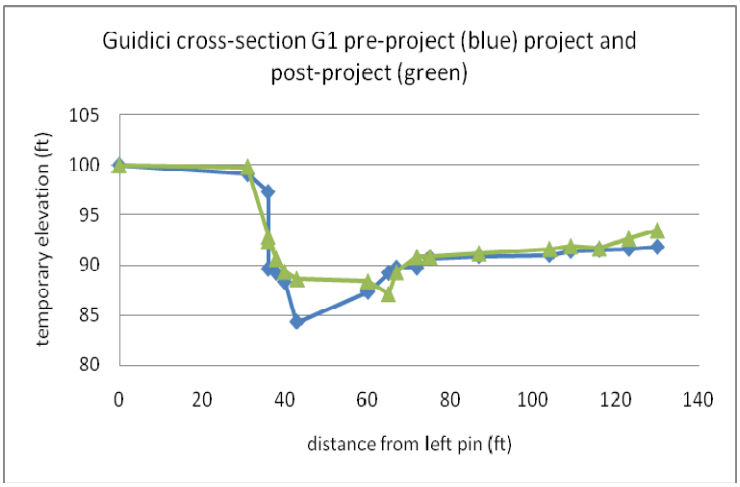
Banks were treated by laying them back, and installing boulder vanes and a floodplain bench with rooted vegetation. Other revegetation work included seeding with commercial native grass and sedge seed, covering slopes with straw, and planting seedlings from the Feather River College greenhouse (see project description for list of species).

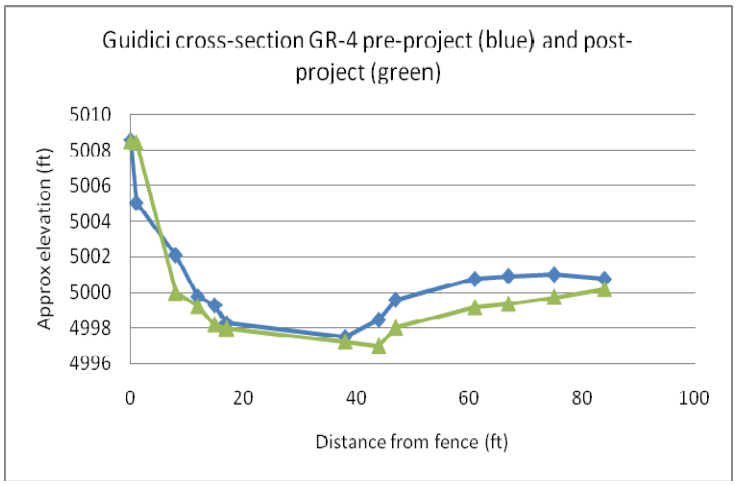
Figure 7. Treatment Area A in September 2005.

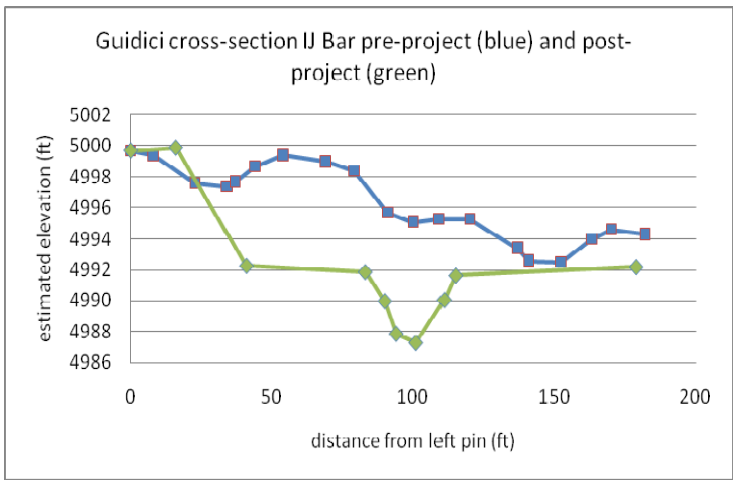
Figure 8. Treatment Area A in October 2008.

Figures 7 and 8 show another typical raw vertical bank that was treated. Here, as in most cases, rooted vegetation on the treated bank came from the opposite point bar. One of the objectives of the treatment was to equalize the vegetative resistance on both banks.

Figures 9-11. Pre- and post project cross-sections.



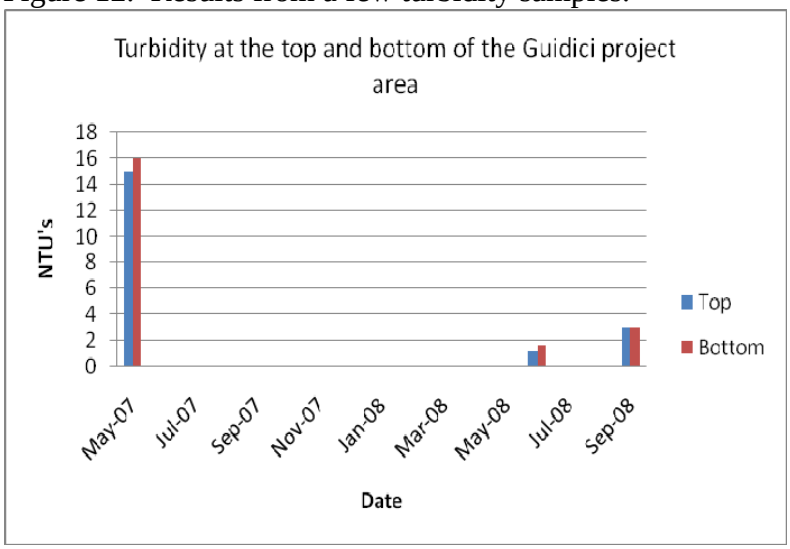




These three cross-sections show pre- and post-project bank lines. Cross-section G1 shows a floodplain bench replacing a deep pool at an actively eroding bank. GR4 shows a laid back bank and lowered floodplain opposite of the treated bank. IJ Bar shows a newly constructed avulsed channel through a relict terrace.

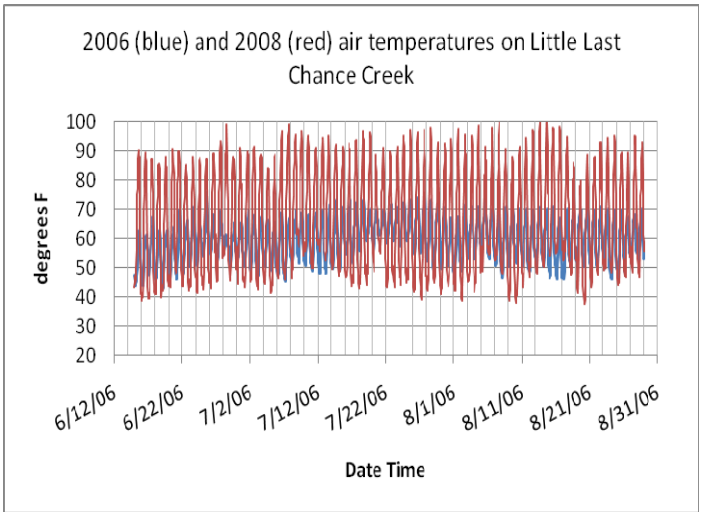
Restore water quality:
One turbidity sample was collected before the project in May 2007. Two samples were collected post-project in 2008. It appears that there is not a clear difference in turbidity between pre- and post-project conditions on the sample dates. Samples collected at the top of the project area were collected just above Guidici's upper diversion dam. Samples collected at the bottom were collected just above the diversion dam at the bridge by the Guidici Ranch house.

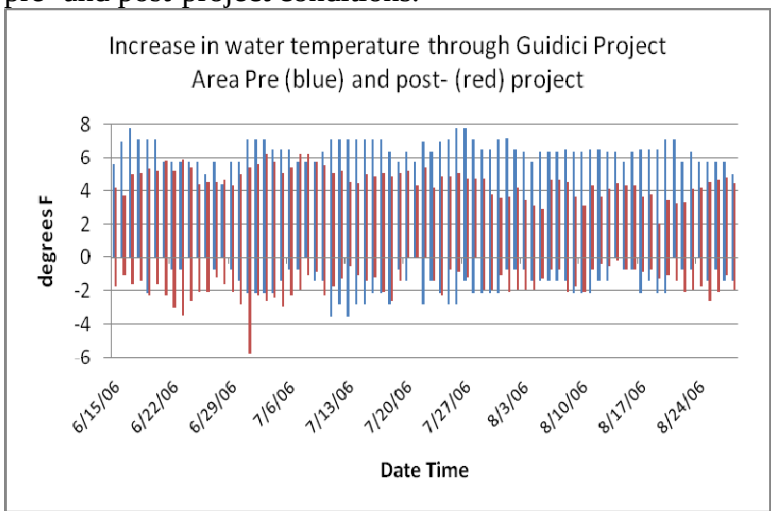
Figure 12. Results from a few turbidity samples.



Water temperature was measured both above and below the project area, before the project in 2006, and the first year after the project in 2008. One would expect that cold water from Frenchman Dam would warm as it moves through the project area in the summer months. This was the case in both 2006 and 2008. Although, the smaller increase in 2008, is most likely due to the location of the hobotemp, which was in the dam pool in 2008, but just above the dam pool in 2006. In both years, the data also show an interesting periodic decrease in water temperatures through the project area in both years, indicated by negative numbers in Figure 14. This decrease tended to occur in the late afternoon, and is likely due to cooler subsurface irrigation return flows from the terraced meadow entering the channel through the gully walls.

Figures 13 & 14. Comparison of hourly air and water temperatures through the project area in pre- and post-project conditions.





Improves maintenance of existing infrastructure: One of the treatment areas, using one boulder vane, protected Forest Service road 23N70 from being washed out due to erosion of the road slope toe.

Figures 15 & 16. October 2008 photos. Boulder vane protecting road slope toe.

The left photo was taken from the opposite bank. The road is on the terrace at the top of the raw bank. The single boulder vane, which directs flows away from the 23N70 road toe, is in the foreground in the photo on the right. The exaggerated meander on the opposite bank was also treated (five vanes visible in the photo background), which should also help decrease the outcurve migration toward the road.

Lessons Learned

When cutting off a meander following an avulsion overflow channel, do not build a channel that necessarily follows the existing overflow channel alignment. Create meanders in the channel that help to mimic the existing slope. Straight avulsion channels increase the slope too much. Also, by building in meanders to the new channel, boulder vanes can be employed. The cross-vanes in the two straightened sections of channel are not working as well as the vanes on meanders. In both straight areas (E and I), the channel is eating around some of the vanes, appearing to develop meanders.

Water rights in Little Last Chance Creek are judicially decreed. Water rights considerations played a major role in project design. Working early and often with downstream users, and addressing their concerns, was necessary to completing this project.

When working in irrigation delivery channels, such as Little Last Chance Creek, it should be assumed that there will be a bankfull flow before the first growing season. Working with downstream users may help alleviate that problem.

Continued Monitoring

Vegetation development should remain approximately equal between the new floodplains on outcurves, and the opposite point bars. Further revegetation may be required to balance the vegetation on both sides of the channel until the treated areas are well vegetated.

Cattle normally graze in the project area for three weeks in June. This was reduced to one week in 2008. It should remain at only one week in 2009 as well. Three weeks of grazing may be allowable in 2010, based on vegetative recovery.

Meander development in areas E and I should be monitored for excessive erosion or other undesirable developments.

Noxious weed monitoring and hand removal was conducted in 2008, and will continue through 2010. Some bull thistle were removed. Mullein, a non-native, is abundant in the project area. Some, but not all, were removed. Mullein is not considered noxious. Poverty weed was observed above the project area in 2006, and should also be removed during weed removal efforts.