Campbell Valley Restoration
2011 Final Report

Implemented by

Wildlands Restoration Volunteers, in partnership with The Nature Conservancy, US Fish and Wildlife Service, and the Robert's Ranch.

July 1, 2010 – August 31, 2011

Note: This report covers one of multiple phases of the Campbell Valley Restoration Project. The continuation of the larger restoration effort affecting many miles of stream

and the larger watershed could be continued for 10 years assuming sufficient resources can be obtained.

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Thanks

On behalf of all of our partners and volunteers, Wildlands Restoration Volunteers extends a tremendous thank you to our funders and sponsors of this pilot project: U.S. Fish and Wildlife Service (Partners for Fish and Wildlife Program), The Nature Conservancy, Colorado Water Conservation Board (Watershed Restoration Program), Eco-Hydro Consulting, The Foundation for Sustainability and Innovation, Mugs Coffee Lounge, O'Dell Brewing Company, OtterCares, Colorado Lien CO, Pioneer Sand and Gravel Co, REI, and dozens of other private donors and sponsors. We also thank, from the bottom of our hearts, the 100's of volunteers who lifted and placed rock, planted plants, cut willows, cooked food, managed tools, and made technical preparations to see this work get done. Without all of your support, this project would not happen.

Campbell Valley Project Summary

In the early 1900's, the irrigation waters of the North Poudre Canal were released into Spring Gulch and Campbell Creek, the primary spring-fed stream systems in Campbell Valley, north of Fort Collins. The elevation of the creek was down cut by approximately 40 feet, causing the base level of the valley to drop commensurately. The process of stream rejuvenation has caused head-cutting and gullying of every tributary to Spring Gulch and Campbell Creek, resulting in the estimated loss of over 4.8 million cubic yards of sediment, as the system strives to meet a new hydrologic equilibrium. Gullies range from 5 to 35 feet deep (at the mouth). The riparian community is non-existent, and reference sites indicate that a structurally diverse riparian community would be supported by this site.

Watercourse: Natural base flow rates in Campbell Creek are estimated to range between 1-2 cfs in most years. However, leakage from the North Poudre Irrigation Ditch has increased the base flows to approximately 5-10 cfs during the irrigation season. What was once a heavily vegetated foothills pastoral valley is now a system of gullies and denuded riparian areas. Loose colluvial soils have allowed significant down-cutting of gullies (up to 35 feet deep at the mouth). Historically, this valley was grazed above its carrying capacity, though current grazing management practices have reduced the grazing intensity and duration to more sustainable levels.

This project was developed by partners to address severely degraded stream channels and erosion trenches and gullies throughout the 3,584-acre work area.

Project Goals: This project engages multiple partners to address the following goals: (a) Develop a long-term (10 years) project design and implementation strategy to address gully stabilization and valley-wide restoration; (b) restore the diverse riparian plant community; (c) reduce gully erosion in priority one sub-watersheds; and (d) maintain and improve the grazing resources.

Watershed Description: Spring Gulch flows into Campbell Creek (24,083 acres), the primary perennial spring-fed creek running through Campbell Valley. Campbell Creek flows into Dry Creek, which flows into the Cache La Poudre River. What was once a heavily vegetated foothills pastoral valley is now a system of gullies and denuded riparian areas. There is currently no data available that documents water quantity and/or quality. This project addresses this shortfall by implementing a comprehensive monitoring plan. Best grazing management practices were changed in 2009 to include a rotational grazing strategy that reduces grazing pressure in existing pastures and excludes grazing in restored riparian areas in the short term. There are no current efforts to address flood protection, restoration, or channel stability in a systematic way within the work area. The existing riparian area consists of a dense cover of herbaceous wetland species. Due to the dramatic down-cutting of the main channel, and the associated loss of woody riparian species followed by continual grazing, there is little

hope that a significant riparian woody species seed or root source exists.

Project Team & Partners

- Eco-Hydro Consulting (Jonathan Stauffer), Technical Consultant
- Gregg Campbell, Nate Boschmann, John Giordanengo, & Larry Lechner Technical Advisors
- Nate Boschmann, Restoration Projects Coordinator, Wildlands Restoration Volunteers
- Heather Knight, TNC Partner Liaison
- Tom Peden, Ranch Manager
- John Giordanengo, Project Manager, Wildlands Restoration Volunteers

Planning and Implementation Timeline

Upper Watershed Planning and Partnership Coordination.... August, 2009 – Aug 31, 2011
Project Planning and Project Team Coordinating ..... July 1, 2010 – Aug 31, 2011
Volunteer Leader Training ..... March, 2011 – June, 2011
Volunteer Recruitment..... July 1, 2010 – Aug 31, 2011
Technical Design .....July 1, 2010 – June 31, 2011
Materials Acquisition.....July 1, 2010 – June 01, 2011
Project Implementation.....July 1, 2010 – June 24, 2011
Monitoring ..... July 1, 2010 – July 1, 2011

Summary of Accomplishments

At the request of The Robert's Ranch and The Nature Conservancy, the primary easement holder on the ranch, a pilot project was initiated in 2010 to address the stated project goals above. This pilot project will be coming to an end in December of 2011, after which time further resources will be sought to undertake long-term restoration planning and implementation.

Eco-Hydro Consulting was hired to perform the primary design of erosion control measures and oversee implementation. Wildlands Restoration Volunteers was employed as the Project Management agency to plan and oversee short-, mid- and long-term restoration and monitoring efforts. However, this project would not be possible without the broad and enthusiastic support of a variety of partners: The Robert's Ranch, The Nature Conservancy, The U.S. Fish and Wildlife Service, The Colorado Water Conservation Board, Natural Resources Conservation Service, Colorado State University, and many others.

By August 31, 2011, after one and a half field seasons of work, the following accomplishments were attained:

1. Valley-wide assessment of erosion features in Campbell Valley.
2. Design and implementation of erosion control treatments on 3725 feet of gullies and deeper valley trenches with 56 rock structures.
3. Design and implementation of restoration treatments on 8,500 linear feet of banks along Spring and Campbell Creeks in the upper watershed.
4. Installation of 2,954 native shrubs and trees.
5. Regraded and seeded approximately 3,000 square feet of headcuts and high priority unstable valley trench walls.
6. Held two trainings in Crew Leadership for Ecological Restoration, one Willow Skills Training, and held over six tours for CSU students, international programs, and land management agencies.

7. Engaged volunteers and youth corps to accomplish 3,828 hours of labor. 2444 hours were completed in 2010 and 1,384 hours were completed in 2011. Addition hours are planned for September and October, 2011.
8. Engaged two corporate groups, OtterBox and O'dell Brewing, providing for a growing corporate presence in the restoration efforts.
9. Complete baseline monitoring and longitudinal profiles in Valley Trenches 1, 2, and 3.
10. Completed photo monitoring in all erosion and riparian restoration work areas.
11. Completed rapid assessment and PFC monitoring along Spring Creek in the main valley, on the ranch property.

Long-Term Restoration Needs: From its watershed assessment and analysis, Eco-Hydro Consulting quantified existing conditions and provided an estimation of restoration needs to address erosion issues in the project area:

- 95,250 feet (18 miles) of gullies, valley trenches, swales, and erosional features were documented. Of these, approximately 70% are moderate to high priority: 66,000 feet (12.5 miles).
- 578 assessment points were taken. About 400 are specific erosional features are in need of restoration, while others are simply watershed overview locations.
- An estimate of between 600 and 950 structures are required to treat existing gullies. However, a complete restoration design should be completed to verify this estimate more accurately.

In addition to the erosion control work in the uplands, approximately 3 miles of additional riparian and stream restoration work is possible. However, additional watershed-scale analysis is necessary to determine the most appropriate treatments. On-going partnership meetings are under way to address the concerns in the main stem of the project area.

Methodology

Erosion Control

For the purposes of this pilot project, erosion features were divided into five general categories:
1) Alluvial gullies/valley trenches (large, linear upland erosional scars formed in the alluvial portion of the valley flat (relic floodplain);
2) Upland gullies (generally smaller, linear upland erosion scars formed on the hillslopes and transition zones adjacent to the alluvial valley flat;
3) Hillslope scarps (abbreviated upland shelf-like erosional features on the hillslope contour, rarely associated with a channel feature and ranging between one and two feet deep);
4) Headcuts/knickpoints (larger scarps, usually associated with a channel feature, and ranging between two and eight feet deep);
5) Off-channel, linear erosional features (discontinuous, linear gullies, usually on the contour and often caused by cattle trailing);

A variety of structures were utilized in each of these erosion features, drawing from contemporary and conventional erosion control and in-stream restoration philosophies. The following is a list of structures employed, including temporary "working" names for structures developed for this project:
- Check Dam
- One-Rock Dam
- Rock Vane

- Vertical Tire Check Dam*
- Vertical Tire Toe Wall*
- Rock Toe Wall
- Zuni Bowl (in shallow headcuts)
- Rock Step-Pools (in deep headcuts)
- Check Riffle*
-Rock Ramp
-Media Luna
- Scarp Walls
* = working name.

Several of the above structures were drawn from works by Bill Zeedyk and Van Clothier, represented well in "Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels", promoted by the Quivira Coalition of New Mexico.

Photos of some of these structures are available in **Appendix C**.

General Implementation Approach: Once the geometry (i.e., grade, longitudinal profile, cross section, depth, length, and presence of unique erosion features within each valley trench) of each erosion feature was measured, a unique system of treatments was designed for three major valley trenches, several gullies, and a system of scarps and headcuts. Construction lay-out included survey staking and outlining feature dimensions on the ground with paint. All structures were built by hand by volunteers, supervised by staff, contractor, and volunteer leaders.

Materials: Type L and VL rock was used in most cases to construct structures. Due to the abundance of waste tires on site, and the desire to make good use of the tires if possible, additional designs were developed to experiment with this waste source.

Additional Design Methodology: The full Eco-Hydro methodology and report will be available in December, 2011. For additional questions, contact Jonathan Stauffer, Eco-Hydro Consulting at jws@eco-hydro-consulting.com or 970-817-0600.

Fencing and Water Gaps

A broad system of drift fencing and seven hardened-fenced water gaps were installed to protect work sites, especially restored riparian areas.

Riparian Restoration

From a valley-wide rapid assessment of existing riparian conditions, restoration sites were chosen where little to no native shrub or tree cover existed. Knowledge of the native woody plant community in similar drainages across the northern Front Range of Colorado was used to determine the suitable plant material for this site. A combination of container stock (#1 and #5 pots) and cuttings (from local healthy stream corridors on the ranch) was acquired for this project. The following table lists the species and quantities of stock used to restore riparian areas in the upper reaches of the watershed.

	Container Stock								Cuttings	
Species (common name)	Golden Currant	Chokecherry	Dogwood	Wood's Rose	Snowberry	American Plum	Three-leaved Sumac	Narrowleaf Cottonwood	Coyote Willow	Plains & Narrowleaf Cottonwood
Quantity	123	129	54	151	15	9	45	26	2295	107

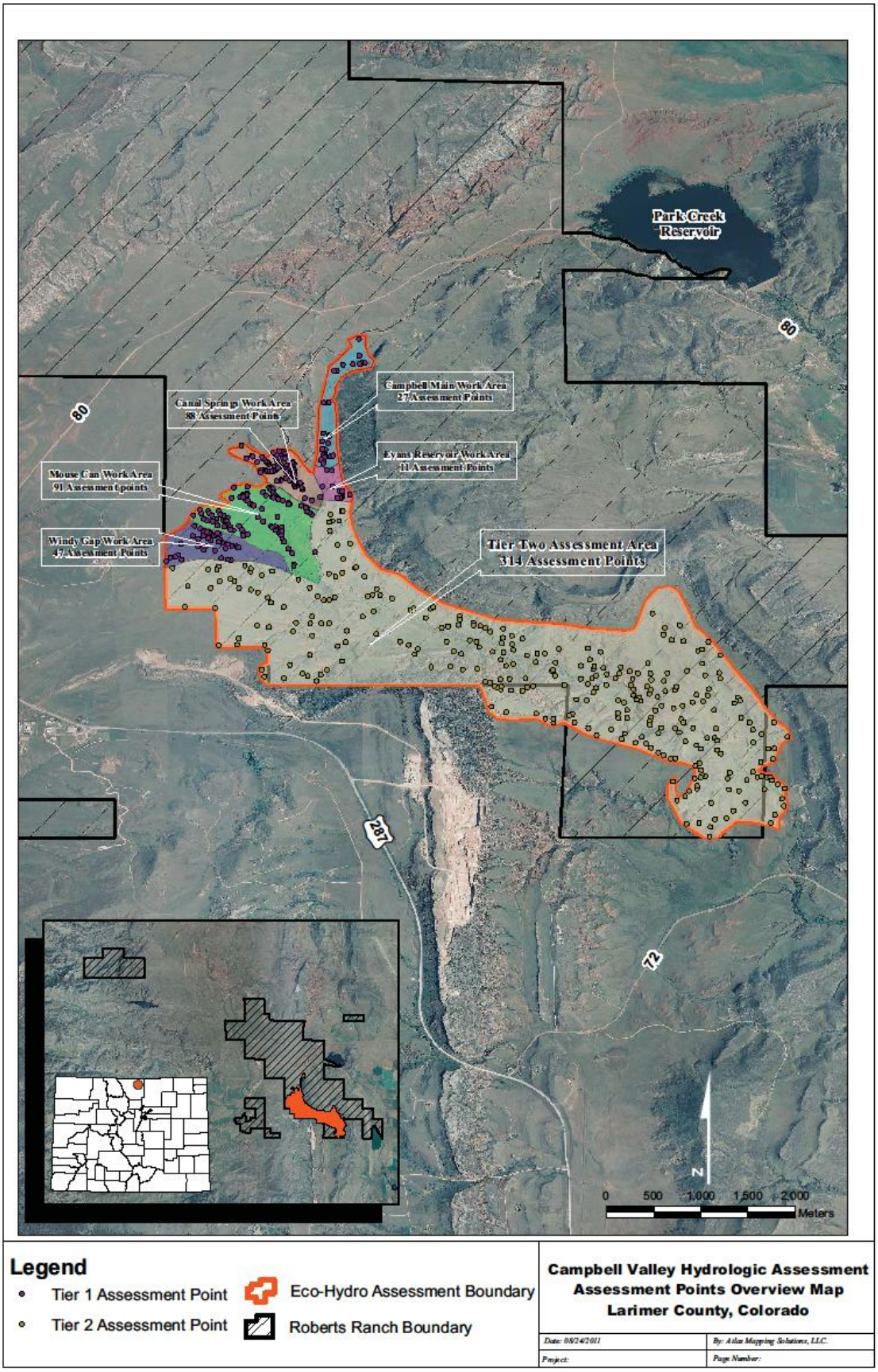
Total: 2954

Monitoring

A combination of objective and subjective monitoring was utilized to gather baseline and evaluation data for the erosion control and riparian restoration work carried out during this project. Treatment affects in erosion features are monitored by the establishment and monitoring of subordinate benchmarks referenced to a local benchmark. From these subordinate benchmarks, the linear distance to valley trench walls and headcuts was measured. In addition, photo points were taken of each structure in the treated areas. Several years will be required to adequately test these structures. In addition to the photo points, each structure will be measured in terms of structure stability, influence on sediment scouring and deposition, and slope protection. Adequate time has not lapsed to justify evaluation monitoring of these structures.

Proper functioning condition (PFC) and riparian rapid assessment surveys developed specifically for this project accompanied photo point monitoring in the primary stem of the valley. Refer to Appendix B for data forms and photo points.

The map on the following page indicates the sampling points at which erosion assessments were conducted in the primary project area. Data sheets for this assessment are not yet compiled, but will be available in December, 2011.


Park Creek Reservoir
80
80
Campbell Main Work Area
27 Assessment Points
Canal Springs Work Area
88 Assessment Points
Evans Reservoir Work Area
11 Assessment Points
Mouse Can Work Area
91 Assessment points
Windy Gap Work Area
47 Assessment Points
Tier Two Assessment Area
314 Assessment Points
287
72
N
0 500 1,000 1,500 2,000
Meters
Legend
Tier 1 Assessment Point
Tier 2 Assessment Point
Eco-Hydro Assessment Boundary
Roberts Ranch Boundary
Campbell Valley Hydrologic Assessment
Assessment Points Overview Map
Larimer County, Colorado
Date: 08/24/2011
By: Atlas Mapping Solutions, LLC.
Project:
Page Number:

Appendix B

- Monitoring Data, Rapid Assessment of Riparian Area Condition -

Campbell Valley Riparian Vegetation Survey: Rapid Assessment

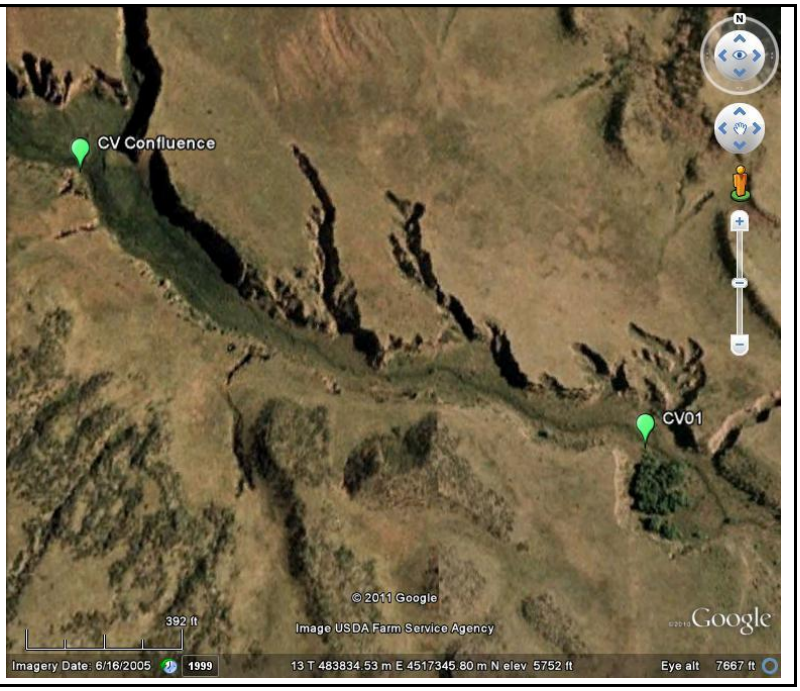
Date: 09/02/2010
Survey Type: Restoration potential
Location: Campbell Creek on Roberts Ranch
Area: 2.7 miles, 43 Acres
Tech: Nate Boschmann, Jared Heath
Description:

Sections were delineated and assessed for their restoration potential in the following classes:
A: Needs no active restoration. Riparian community present and vigorous. Maintain current management.
B: Needs passive restoration. Riparian community present but lacking vigor. Reduce grazing pressure and manage for invasive weeds.
C: Needs active Restoration. Riparian community missing or severely degraded. Reduce grazing pressure and re-establish native riparian shrubs and trees. Active channel restoration needed in some areas.

Totals by Class

	Restoration Class Based on Current Condition		
Unit	active	passive	none
- linear feet	11,136	2,888	928
- linear miles	2.1	0.5	0.2
- acres	34.5	6.3	1.8

Section:	1	
Zone 13T	**Northing**	**Easting**
Beginn	4517493	483559.5
End	4517251	484055.8
Length M	552	
Acres	4.56	



Assessment **C**

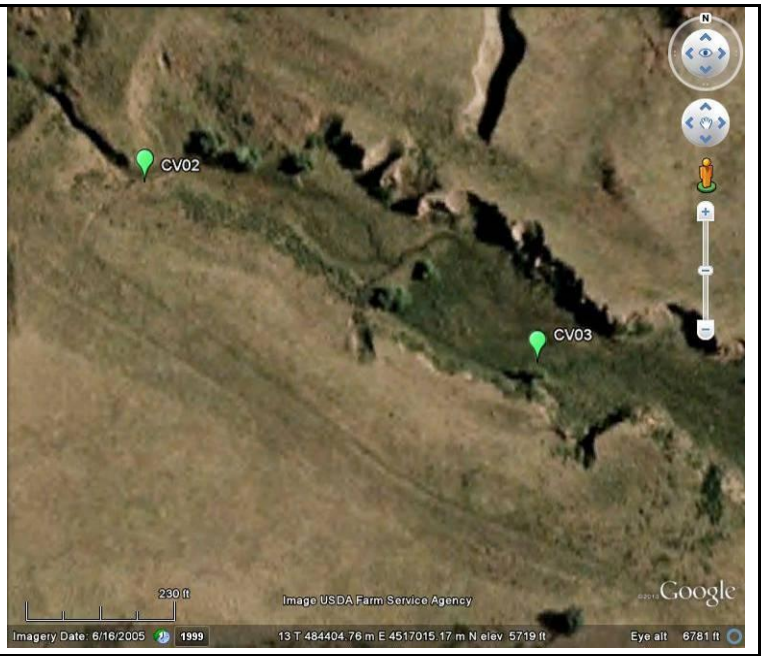
Extensive restoration already begun in this section.

Section:	2	
Zone 13T	**Northing**	**Easting**
Beginn	4517251	484055.8
End	4517087	484288.1
Length M	284	
Acres	3.82	

Assessment **B**

Some restoration begun in this section.

Section:	3	
Zone 13T	**Northing**	**Easting**
Beginn	4517087	484288.1
End	4516996	484487.2
Length M	219	
Acres	2.04	



Assessment **C**

Highly incised stream. Minimal riparian community.

Section:	4	
Zone 13T	**Northing**	**Easting**
Beginn	4516996	484487.2
End	4516903	484796.5
Length M	323	
Acres	3.00	

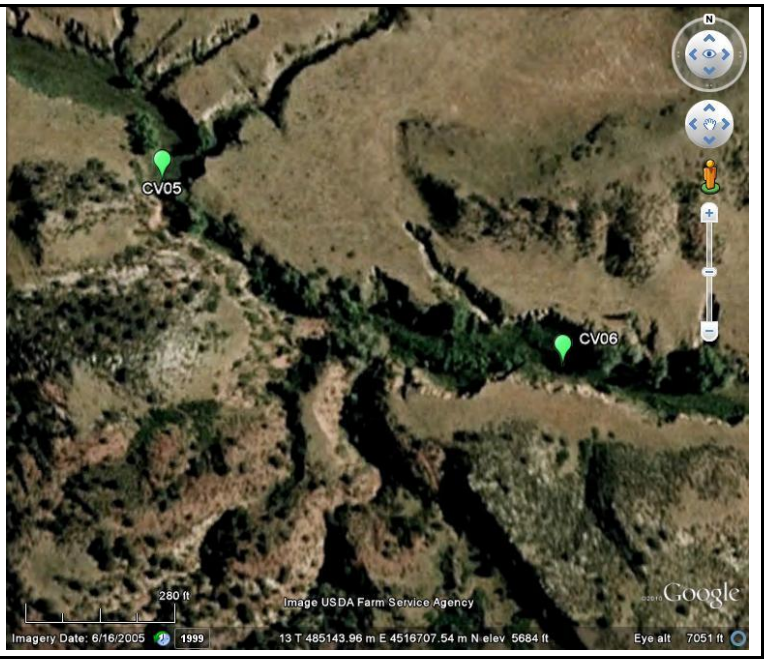
Assessment **B**

Healthy young willow population. Recommend introducing Cottonwood and addressing invasive.

Section:	5	
Zone 13T	**Northing**	**Easting**
Beginn	4516903	484796.5
End	4516799	485007.1
Length M	235	
Acres	1.46	

Assessment **C**

Section:	6	
Zone 13T	**Northing**	**Easting**
Beginn	4516799	485007.1
End	4516682	485265
Length M	283	
Acres	1.76	



Assessment **A**

Very active riparian community. Cattle excluded from this area by topography.

Section:	7	
Zone 13T	**Northing**	**Easting**
Beginn	4516682	485265
End	4516567	485528.3
Length M	287	
Acres	1.78	

Assessment **B**

Strong riparian representation. Needs invasive species mitigation.

Section:	8	
Zone 13T	Northing	Easting
Beginn	4516567	485528.3
End	4516440	485831.5
Length M	329	
Acres	2.38	

Assessment **C**

Some young willow establishment. Stream highly incised.

Section:	9	
Zone 13T	Northing	Easting
Beginn	4516440	485831.5
End	4515771	486815.8
Length M	1190	
Acres	15.98	

Assessment **C**

High historical grazing impact. Some willow beginning to re-establish.

Section:	10	
Zone 13T	**Northing**	**Easting**
Beginn	4515771	486815.8
End	4515086	487352
Length M	870	
Acres	6.29	

Assessment **C**

Highly impacted by active grazing.

Appendix C

- Erosion Control Structures -

Regrading soil pillars by hand to reduce snow-based saturation points near headcuts and the base of valley walls. Additional grading was completed by excavator.

Tire toe wall

Rock Vane

Vertical Tire Check Dam.

Construction of 4-step step pool with 6-foot headcut.

Medium-sized Zuni Bowl

Completion of 4-step step-pool.

Small Zuni Bowl.

Media Luna

Scarp Walls

Check Riffle

One-rock Dam

The tire problem at Campbell Valley (just a fraction of it).

NOTE: tires do not work well for stabilizing gullies, at least using this dump-n-run method.

Appendix D

- Upland and Riparian Revegetation -

Ranch Manager Tom Peden delivering Ranch History to Volunteers at Campbell Valley

Jonathan Stauffer of Eco-Hydro describing erosional processes to volunteers at Campbell Valley.

Hauling Willows to work sites.

Installing willow cuttings with willow probes.

Installing native riparian shrubs and trees.

Installing native shrubs and trees.

Odell Brewing staff spread seed and install erosion matting.

Finished erosion matting along regarded valley trench wall.

Staff of Odell Brewing and OtterBox harvest several thousand willows and cottonwood poles in 2010 and 2011.

Willows soaking in trash cans in back of John's truck, ready for transport to Campbell Valley.

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Appendix A

- Riparian & Upland Photo-Point Monitoring Data -

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**1**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)***:***	1020
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panisonic Lumix (wrv camera)		

view #1:		Looking up east stem
camera height: 5ft on rebar **approx. camera angle:** -15 **photo bearing:** 0 **intraday photo #: 1**		
view #2:		Looking up main stem
camera height: 5ft on rebar **approx. camera angle:** -15 **photo bearing:** 280 **intraday photo #: 2**		
view #3:		Looking at confluence - More 3 ft @ 250 degrees from stake
camera height: 5ft on rebar **approx. camera angle:** -15 **photo bearing:** 250 **intraday photo #: 3**		

notes	View # 3 is 3 ft away from stake at a bearing of 250 degrees.

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**2**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)***:***	1035
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panisonic Lumix (wrv camera)		

view #1:		Looking up main stem from confluence
camera height: 5ft on rebar **approx. camera angle:** 0 **photo bearing:** 290 **intraday photo #: 4**		
view #2:		Looking down main stem from confluence
camera height: 5ft on rebar **approx. camera angle:** 0 **photo bearing:** 140 **intraday photo #: 5**		
view #3:		Looking up east fork from confluence
camera height: 5ft on rebar **approx. camera angle:** 0 **photo bearing:** 050 **intraday photo #: 6**		

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**3**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)***:***	1035
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panisonic Lumix (wrv camera)		

view #1:		Looking down east stem toward confluence @ canyon mouth
camera height: 5ft on rebar		
approx. camera angle: 0		
photo bearing: 230		
intraday photo #: 7		
view #2:		Looking up east stem @ canyon mouth
camera height: 5ft on rebar		
approx. camera angle: 0		
photo bearing: 005		
intraday photo #: 8		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**4**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1035
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panisonic Lumix (wrv camera)		

view #1:		Downstream @ toe riparian replanting
camera height: 5ft on rebar **approx. camera angle:** 0 **photo bearing:** 185 **intraday photo #: 9**		
view #2:		Upstream @ riparian
camera height: 5ft on rebar **approx. camera angle:** 0 **photo bearing:** 000 **intraday photo #: 10**		
view #3:		
camera height: 0 **approx. camera angle:** 0 **photo bearing:** 0 **intraday photo #:**		

project name:	campbell valley (riparian planting)		**photo point #**	**crwa #**
landowner/property name:	roberts ranch			
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv			**5**
grant project #:				
eco-hydro project #:	09-002			
work area/subproject:	(crwa)			
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1130	
weather/sky/light conditions:	Sunny/No clouds			
camera make and model:	Panisonic Lumix (wrv camera)			
view #1:				
camera height: 5ft on rebar				
approx. camera angle: 0				
photo bearing: 200				
intraday photo #: 11				Downstream @ riparian
view #2:				
camera height: 5ft on rebar				
approx. camera angle: 0				
photo bearing: 330				
intraday photo #: 12				Upstream @ riparian
view #3:				
camera height: 0				
approx. camera angle: 0				
photo bearing: 0				
intraday photo #:				

project name:	campbell valley	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**6**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area (crwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1140
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panasonic Lumix (WRV)		

view #1:		
camera height: 5 ft on rebar		
approx. camera angle: 0		
photo bearing: 190		
intraday photo #: 13		Downstream @ riparian
view #2:		
camera height: 5 ft on rebar		
approx. camera angle: 0		
photo bearing: 080		
intraday photo #: 14		Across east fork @ river left planting
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**7**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area (crwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1150
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panasonic Lumix (WRV)		

view #1:		
camera height: 5 ft on rebar		
approx. camera angle: 0		
photo bearing: 160		Downstream @ left and right bank riparian
intraday photo #: 15		
view #2:		
camera height: 5 ft on rebar		
approx. camera angle: 0		
photo bearing: 005		Upstream @ baseline/ current conditions un-restored
intraday photo #: 16		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley	**photo point #**	**erwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**8**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Evans Reservoir Work Area (erwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1205
weather/sky/light conditions:	Sunny/No clouds		
camera make and model:	Panasonic Lumix (WRV)		

view #1:		
camera height: 5 ft on rebar		
approx. camera angle: -15		
photo bearing: 175		
intraday photo #: 17		Downstream from trench top
view #2:		
camera height: 5 ft on rebar		
approx. camera angle: -15		
photo bearing: 040		
intraday photo #: 18		Across @ peach leaf willow
view #3:		
camera height: 5 ft on rebar		
approx. camera angle: 0		
photo bearing: 005		
intraday photo #: 19		Upstream @ trench

project name:	campbell valley (riparian planting)			**photo point #**	**crwa #**
landowner/property name:	roberts ranch				
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv				**9**
grant project #:					
eco-hydro project #:	09-002				
work area/subproject:	(crwa)				
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1140		
weather/sky/light conditions:	Sunny				
camera make and model:	Panasonic Lumix (wrv camera)				

view #1:		
camera height: 5'		Downstream view of west fork and confluence from above. Tree and potted shrub plantings
approx. camera angle: 0		
photo bearing: 120		
intraday photo #: 20		
view #2:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**10**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area (crwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1240
weather/sky/light conditions:	Sunny		
camera make and model:	Panasonic Lumix (WRV)		

view #1:		
camera height: 5 ft		
approx. camera angle: 0		
photo bearing: 115		
intraday photo #: 21		Downstream view sections A & F on west fork
view #2:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**11**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1255
weather/sky/light conditions:	Sunny		
camera make and model:	Panasonic Lumex		

view #1:		
camera height: 5'		
approx. camera angle: 0		
photo bearing: 120		
intraday photo #: 22		Downstream shot of most of sections B & G in west fork
view #2:		
camera height: 5'		
approx. camera angle: 0		
photo bearing: 255		
intraday photo #: 23		Upstream of small portion of sections B & G in west fork
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**12**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area (crwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1305
weather/sky/light conditions:	Sunny		
camera make and model:	Panasonic Lumix (WRV)		

view #1:		Sections D E & I J in west fork downstream shot
camera height: 5 ft		
approx. camera angle: 0		
photo bearing: 115		
intraday photo #: 24		
view #2:		Sections C & H upstream shot
camera height: 5 ft		
approx. camera angle: 0		
photo bearing: 310		
intraday photo #: 25		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**13**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		
subject or purpose of photo monitoring at this point	Upstream sections A, B & F, G in west fork from above & downstream section D E & I J		
photo point description and location (type of monument, access, vicinity, distance from references - attach sketch if necessary)	Above RHS of west fork section H mature cottonwood		

legal description: (i.e. - T42N-R63W-S17-NWNW)								
usgs quad map name:								
utm coordinates:	***easting:***	0483389						
	northing:	4517579						
gps datum used for collection:	WGS84	X	NAD83		NAD27		Other	
utm zone:	13N							
gps brand and model:	garmin e-trex							
gps accuracy at collection:	10 ft							

planned frequency of photo monitoring:	1yr			***initial photo date:***		07/09/10	
photo monitoring anniversary dates:							
dates of follow-up photo monitoring:							
view #1: 26	camera height:	5'		camera angle:	-20	photo bearing:	290
view #2: 27	camera height:	5'		camera angle:	-20	photo bearing:	115
view #3:	camera height:			camera angle:		photo bearing:	
file naming convention:	project-work area-photo point #-view#-date (photo for campbell valley in evans reservoir work area at photo point #4, view1 on 7/2/11 would be named cv-erwa-pp4-v1-070211)						

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**14**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1325
weather/sky/light conditions:	Sunny		
camera make and model:	Panasonic Lumix		

view #1:		
camera height: 5'		
approx. camera angle: 0		
photo bearing: 115		
intraday photo #: 28		Downstream main stem from above section B --> E & G --> J
view #2:		
camera height: 5'		
approx. camera angle: 0		
photo bearing: 040		
intraday photo #: 29		Main access point at confluence erosion mat & seeded 5-16-10
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (riparian planting)			**photo point #**	**crwa #**
landowner/property name:	roberts ranch				
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv				**15**
grant project #:					
eco-hydro project #:	09-002				
work area/subproject:	(crwa)				
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1420		
weather/sky/light conditions:	Sunny with building storms to the N				
camera make and model:	Panasonic Lumix				
view #1:				Downstream main stem riparian planting sections C & D, H & I	
camera height: 5'					
approx. camera angle: 0					
photo bearing: 220					
intraday photo #: 30					
view #2:				Upstream main stem riparian planting sections A & B, F & G	
camera height: 5'					
approx. camera angle: 0					
photo bearing: 330					
intraday photo #: 31					
view #3:					
camera height: 0					
approx. camera angle: 0					
photo bearing: 0					
intraday photo #:					

project name:	campbell valley (riparian planting)			**photo point #**	**crwa #**
landowner/property name:	roberts ranch				
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv				**16**
grant project #:					
eco-hydro project #:	09-002				
work area/subproject:	(crwa)				
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1430		
weather/sky/light conditions:	Sunny & T storm to N				
camera make and model:	Panasonic Lumix				
view #1:					
camera height: 5'					
approx. camera angle: 0					
photo bearing: 110					
intraday photo #: 32				Downstream main fork sec. E & J	
view #2:					
camera height: 5'					
approx. camera angle: 0					
photo bearing: 305					
intraday photo #: 33				Upstream main for sec. C & D, H & I	
view #3:					
camera height: 0					
approx. camera angle: 0					
photo bearing: 0					
intraday photo #:					

project name:	campbell valley (riparian planting)	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**17**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	(crwa)		

initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1440
weather/sky/light conditions:	Overcast T storm to N		
camera make and model:	Panasonic Lumix		

view #1:		Downstream from 5-26 riparian planting
camera height: 5'		
approx. camera angle: 0		
photo bearing: 090		
intraday photo #: 34		
view #2:		Upstream 5-26-10 sec D & E, I & J
camera height: 5'		
approx. camera angle: 0		
photo bearing: 310		
intraday photo #: 35		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley	**photo point #**	**crwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**18**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Confluence Riparian Work Area (crwa)		
initial/baseline photo date:	07/09/10	***time of day*** (24-hour)**:**	1445
weather/sky/light conditions:	Cloudy T Storm to N		
camera make and model:	Panasonic		

view #1:	
camera height:	
5 ft	
approx. camera angle:	
0	
photo bearing:	
310	
intraday photo #: 36	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**1**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	930
weather/sky/light conditions:	Sunny		
camera make and model:	Kodak AF 3x (Easy Share M753)		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
0	
photo bearing:	
110	
intraday photo #: 1	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (riparian planting)			**photo point #**	**krwa #**
landowner/property name:	roberts ranch				
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv				**2**
grant project #:					
eco-hydro project #:	09-002				
work area/subproject:	Kitchen Riparian Work Area (krwa)				
initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	0941		
weather/sky/light conditions:	Sunny/Clear				
camera make and model:	Kodak Easy Share M753				
view #1:					
camera height:					
5ft on rebar					
approx. camera angle:					
0					
photo bearing:					
100					
intraday photo #: 2					
view #2:					
camera height:					
0					
approx. camera angle:					
0					
photo bearing:					
0					
intraday photo #:					
view #3:					
camera height:					
0					
approx. camera angle:					
0					
photo bearing:					
0					
intraday photo #:					

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**3**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)***:***	0950
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height: 5ft on rebar	
approx. camera angle: 0	
photo bearing: 095	
intraday photo #: 3	

view #2:	
camera height: 0	
approx. camera angle: 0	
photo bearing: 0	
intraday photo #:	

view #3:	
camera height: 0	
approx. camera angle: 0	
photo bearing: 0	
intraday photo #:	

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**4**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	0954
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
0	
photo bearing:	
110	
intraday photo #: 4	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**5**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1004
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:		
camera height: 5ft on rebar		
approx. camera angle: 0		
photo bearing: 110		
intraday photo #: 5		Looking downstream
view #2:		
camera height: 5ft on rebar		
approx. camera angle: 0		
photo bearing: 280		
intraday photo #: 6		Looking upstream
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**7**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1041
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
-5	
photo bearing:	
100	
intraday photo #: 8	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #: 6	Looking upstream

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (riparian planting)	**photo point #**	**krwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**8**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Kitchen Riparian Work Area (krwa)		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1113
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
-5	
photo bearing:	
115	
intraday photo #: 9	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #: 6	Looking upstream

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (upland)			**photo point #**	**uwwa #**
landowner/property name:	roberts ranch				
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv				**1**
grant project #:					
eco-hydro project #:	09-002				
work area/subproject:	Upland Headcut Area				
initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1140		
weather/sky/light conditions:	Sunny/Clear				
camera make and model:	Kodak Easy Share M753				
view #1:					
camera height: 5ft on rebar					
approx. camera angle: -5					
photo bearing: 355					
intraday photo #: 10					Left headcut
view #2:					
camera height: 5ft on rebar					
approx. camera angle: -5					
photo bearing: 050					
intraday photo #: 11					Right headcut
view #3:					
camera height: 0					
approx. camera angle: 0					
photo bearing: 0					
intraday photo #:					

project name:	campbell valley (upland bank stabilization structures)	**photo point #**	**uwwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**2**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Upland Headcuts		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1150
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:		Down trench @ head cut structures zuni bowl and one rock dam
camera height: 5ft on rebar		
approx. camera angle: -10		
photo bearing: 195		
intraday photo #: 12		
view #2:		Up trench @ gully erosion
camera height: 5ft on rebar		
approx. camera angle: 5		
photo bearing: 0		
intraday photo #: 13		
view #3:		
camera height: 0		
approx. camera angle: 0		
photo bearing: 0		
intraday photo #:		

project name:	campbell valley (stabilization structures)	**photo point #**	**uww a**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**3**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Gully Erosion West of Road		
initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
-10	
photo bearing:	
330	
intraday photo #: 14	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

project name:	campbell valley (gully stabilization structures)	**photo point #**	**uwwa #**
landowner/property name:	roberts ranch		
grantors/partners:	roberts ranch, usfws, nrcs, tnc, cwcb, wrv		**4**
grant project #:			
eco-hydro project #:	09-002		
work area/subproject:	Gully Erosion West of Road		

initial/baseline photo date:	08/26/10	***time of day*** (24-hour)**:**	1202
weather/sky/light conditions:	Sunny/Clear		
camera make and model:	Kodak Easy Share M753		

view #1:	
camera height:	
5ft on rebar	
approx. camera angle:	
-10	
photo bearing:	
150	
intraday photo #: 15	

view #2:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	

view #3:	
camera height:	
0	
approx. camera angle:	
0	
photo bearing:	
0	
intraday photo #:	