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# Guidelines for Monitoring the Establishment of Riparian Grazing Systems

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**T**his monitoring document outlines methods that will assess current riparian conditions and quantify changes in a riparian area under new management. The monitoring plan outlined here is fairly involved and requires some technical expertise, and for that reason this publication is intended for those with technical experience in rangeland management, specifically UC Cooperative Extension (UCCE) advisors, Natural Resources Conservation Service (NRCS), U.S. Forest Service, and Bureau of Land Management staff, and professional rangeland managers. A secondary audience of land owners and managers can benefit from this information if they are willing to invest time and effort into learning the necessary tools.

Appendixes C1 and C3 at the end of the publication are blank forms that you can copy and use for your own data collection. We have also provided filled-out samples of these and other useful forms to give you a better idea of how to use them.

# WHY MONITOR?

When establishing a new riparian grazing system, one would like to be able to compare the success of the new system with the old. Such a comparison can provide validation that the "new and improved" management system is positively affecting riparian health and is a successful project, or that more management changes need to be implemented in order to obtain desired goals, it is through the systematic monitoring of specific conditions that a land manager can assemble this kind of information. The decision left to the manager is, "What tools should I use to assess and monitor my riparian area?" There are a number of ways for managers to conduct their own monitoring, but up until now little guidance has been available as to which tools will best show the results of changes in riparian management. The paragraphs that follow provide an outline for monitoring that is based upon published methods that will provide feedback to changes in riparian grazing management.

# SHOULD I MONITOR THE SAME THINGS AS MY NEIGHBOR?

There are distinct benefits to using the same monitoring methods on your property as are used on neighboring properties. If a number of land managers were to implement changes to their riparian areas and each were to select a different set of monitoring tools, they would not be able to compare the relative changes in riparian health between their areas. If, on the other hand, they were to use a common set of monitor tools to observe and record changes in the same items at all sites, they would be able to share information and learn from one another's efforts.



### HOW SOON WILL I SEE RESULTS?

Some changes in riparian health can be documented in the short term (a few months to a year), depending on the status of the area at the time you implement management changes. Some changes in riparian health will be observed over the long term (2 years or more). For example, within a year there could be an increase in willow growth





Figure 1. Overview of design layout. Transects are established on one side of the creek with their starting points 72 feet apart, providing a total of 360 linear feet (*a*). Transects should not cross each other, but depending on the site they need not be parallel (*b*). Be sure to make accurate note of the location of both ends of each transect so you will be able to find them again at a later date. (short term), but a change in the tree canopy will not occur for many years (long term). Please see Appendix A for more information.

### **GETTING STARTED**

Before starting, please review all of the published protocols and make sure that you receive any necessary training. Appendix B of this publication is a sequential outline of the steps necessary to complete the monitoring described here. If you do require training, please contact a UCCE, NRCS, or Resource Conservation District (RCD) office for assistance, possibly including assistance in getting the necessary equipment. The methods do require time and effort, especially during the first year when you first establish the transects. The time required can range from a half day to a full day for two people. Two two-person teams can divide the work and complete the monitoring in less time. It is important that you allow adequate time to collect the necessary data.

### ESTABLISHING PERMANENT MONITORING TRAN-SECTS

To successfully document riparian health changes, you need to be able to examine the same geographical points repeatedly over time. This will ensure that apparent changes in riparian health are the actual results of management and not simply the unique conditions peculiar to different sites. You will need to select a representative section of the riparian area for monitoring; a total of 360 linear feet is required. Six transect lines going across the riparian area and spaced 72 feet apart are established perpendicular to the creek and can be marked using a variety of items such as existing fence posts, lengths of rebar, or wooden stakes painted a unique color (see Figures 1 and 2). When selecting the marker, give particular thought to the way the pasture is used, the marker's visibility, and its likely permanence over time. If

you relate the markers to a benchmark (a permanent fixture such as a tree or large rock), it will be easier for you to find the location of missing markers later on. Record the bearing and distance from the benchmark to each marker.

Transects should encompass upland vegetation on both sides of the creek in order to document whether the width of the riparian vegetation area is increasing or decreasing over time. Because of this, transect lengths will vary from site to site. For example, transects for a mountain meadow system may be 200 feet long, whereas for an intermittent creek in the San Joaquin Valley they may be only 50 feet long. Once you have established the transects, you are ready to begin gathering data.

### VEGETATION

To characterize the vegetation, use the USDA Forest Service's Greenline protocol. It is a standard system for classifying and characterizing vegetation and is well suited to



а



b

Figure 2. Examples of transects in the field at different sites (not drawn to scale): *a* has a limited riparian area and so requires shorter transects, while the transects in *b* cross the entire meadow.

the kind of work we are discussing. This protocol has been published, and you should make yourself familiar with its methods and seek out assistance and training if necessary. There is one change that you can make to the Greenline protocol to make it easier to use: key the vegetation according to functional groups instead of species to allow for ease of use while still providing documentation of trends in vegetation succession.

Greenline consists of three components. The first component, *vegetation cross-section composition*, provides information on the width of the riparian area. All six cross-sections are considered for this component. The second, *greenline composition*, was developed for perennial mountain meadows, but is useful for other systems. It documents changes in the permanent greenline along the stream. For example, annual systems may consist of oak trees as the permanent green vegetation. One would expect perennial grasses and other woody species to increase along the stream as management changes were implemented, thus providing a new greenline. The third component, *woody species regeneration*, accounts for any increases in willows, aspen, alders, or other woody plants that tend to provide more stability and canopy cover for the stream. The latter two components are conducted along the permanent vegetation areas of Transect 1 to 6 on both sides of the stream.

### **VISUAL ASSESSMENTS**



Figure 3. Team in the field measuring channel morphology cross-sections. To provide an accurate representation, measurements should be taken at every break in slope or every few feet.

Visual assessments are valuable for providing a quick examination of the habitat and hydrologic condition of a system. We recommend that you use two assessments: the U.S, Department of the Interior Bureau of Land Management's *Proper Functioning Condition* (PFC) and the University of California Cooperative Extension's *Riparian Health Assessment for Rangelands(RHAR)*. Published protocols and training opportunities are available for each method, and you should make sure to be familiar with the protocols and properly trained before you undertake these assessments.

The reason for using two assessments is that together they enable you to capture more information regarding the riparian system. There is some overlap between the two assessments, but when you use both you get a comprehensive picture.

It is important to note that not all streams have the same habitat potential. Ward et al. (2001) found that stream morphology affects the streams' habitat potential. For this reason, you should make comparisons only within the same morphology classification. Measurements to determine the *Rosgen classification* (a stream morphology classification system) (Rosgen 1996) should be recorded on the Riparian Grazing Case Study Data Sheet included in this packet.

#### PHYSICAL PARAMETERS

The Riparian Grazing Case Study Data Sheet outlines the physical parameters you will have to observe and record. Some equipment is necessary for completion of this data sheet, but if you work with NRCS, RCD, or UCCE offices, this should not be a problem. To begin, you will measure the channel morphology cross-section at both the downstream and upstream transects (transects 1 and 6). Please refer to MacDonald et al. (1991) for the detailed description that begins on page 109. The equipment you will need consists of a stadia rod and scope. Take a reading at every break in slope or every 2 feet (Figure 3). Input the raw data into a computer spreadsheet program and generate a graphical representation of the stream cross-section (see Figures 4 and 5).



# **Channel Morphology Cross-section**

Figure 4. Measurements taken in the field can be converted to a graphical representation of the channel morphology. Labeling the banks and thalweg (the deepest part of the channel) helps keep the graph in perspective.



Figure 5. Actual site described graphically in Figure 4. The tape can be seen stretched across the stream, and left and right banks as well as thalweg are highlighted for reference.



Figure 6. Spherical densiometers are used to measure canopy cover.

Take canopy readings along transects, using a densiometer (Figure 6). Again, for specialized equipment and training in its use please contact a local NRCS, RCD, or UCCE office. The densiometer readings will indicate whether canopy cover is increasing.

You also want to document current air and water temperatures, and it is best if you take your readings in the same spot each time. Just select an arbitrary point along one transect and record the location on the data sheet.

### HABITAT PARAMETERS

The habitat parameters include calculating the total linear feet of pools (water is deeper and slower moving), riffles (faster and shallower), and runs (sections where water depth and velocity remain more even) (Figure 7). This provides information on the three basic habitat features that are available to fish. In addition, you need to examine specific habitat features. A complete description of all of the parameters under the *Fish Shelter Ratings* section can be found in Flosi et al. (1998).

In determining the percent substrate exposed, you must carefully examine habitat substrates such as boulders, cobbles, woody debris, and the like. This information will vary from year to year with different flow regimes, artificial and natural, but it is important in determining how much habitat is potentially available to fish and macroinvertebrates.



Figure 7. A stretch of stream can contain riffles, runs, and pools, all important features for various habitats. Highlighted in this picture are examples of all three.

Collect specific information regarding three of the riffles in the reach. Consult the protocol for macroinvertebrate collections published by the California Department of Fish and Game (1999) for details. Even though you will not actually sample the macroinvertebrates, the information you collect can provide insight on potential habitat and should certainly be recorded. Length of the riffle as well as average width, depth, and velocity can all easily be recorded with the help of a tape measure, a stopwatch, and a float, such as an orange or a twig. Substrate complexity and embeddedness are examined for each riffle. Using RHAR, substrate complexity refers to question 5, Macroinvertebrate Habitat, and embeddedness

refers to the High Gradient form, question 9. You will also estimate the percentage of each substrate's size and the degree of its consolidation for each riffle. Finally, you will use a clinometer to determine the gradient of the riffle.

#### MANAGEMENT SURVEY

Last of all, you will complete a management questionnaire. The Riparian Grazing Case Study Management Survey (Appendix C1) will help you as the manager outline current (*new management*) and historic management (*previous management*) as well as the watershed's characteristics, your goals for the riparian area, and your monitoring practices. The survey should be completed in detail since it will provide a road map of what management practices have been implemented. When you know what management practices are implemented, you have a better idea of what practices may improve a riparian area. Without this information, you will have a hard time comparing management changes over time. Complete a new survey each time you change your management methods and you will build up a detailed, useful history.

### WHEN SHOULD I REVISIT THE SITE?

You should revisit the case study site on a regular basis, though you will not have to collect data every year. You can expect to repeat the assessments every couple of years, when you implement management changes, or when you notice drastic changes during regular visits to the area.

#### CONCLUSIONS

By standardizing the data that you collect when you modify riparian grazing management, you will be able to compare various management systems and share ideas with other managers on what management practices have been successful and which have not. This kind of shared experience is one of the best learning opportunities available to land managers. For this reason, it is important that you take the necessary time and care when you gather your data. If you collect good data at the beginning, you can put it to good use for years to come.

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Assessment	Short- or long-term trend	Parameter quantified
BLM Proper Functioning Condition	Long-term	Hydrologic function
UCCE Riparian Health Assessment for Rangelands	Long-term	Trout and macroinvertebrate habitat and hydrologic function
Greenline: Vegetation Cross-section Composition	Short- and long-term	Width of the riparian area
Greenline: Greenline Composition	Short- and long-term	Change in greenline vegetation
Greenline: Woody Species Regeneration	Short- and long-term	Change in woody species along the greenline
Channel Morphology Cross-section	Long-term	Change in width and depth of the channel
Densiometer	Long-term	Amount of canopy
Habitat Types	Short- and long-term	Three basic habitat types for fish
Physical Parameters	Short- and long-term	Variety of physical parameters

Appendix A Riparian Grazing Case Study Monitoring Tools

### Appendix B Check Sheet for Establishing Case Studies

- I. Ahead of time
  - a. Review protocols
  - b. Receive training if necessary
  - c. Gather required equipment
    - i. Stadia rod
    - ii. Hand lens
    - iii. Tape (300-ft if possible)
    - iv. Densiometer
    - v. Stakes, sledgehammer, and paint
    - vi. Compass
    - vii. Clinometer
    - viii. Make copies of necessary forms
      - 1. Six Vegetation Cross-section sheets
      - 2. One Greenline form
      - 3. One Woody Species Regeneration form
      - 4. One RHAR form
      - 5. One PFC form
      - 6. One Riparian Case Study Data Sheet
      - 7. One Riparian Grazing Case Study Management Survey
- II. At site
  - a. Select representative section within one Rosgen type
  - b. Establish transects (Figure 1)
    - i. Record distance and bearing from benchmark
  - c. Begin Greenline (three parts)
    - i. Vegetation cross-section transects
      - 1. Record canopy reading on densiometer at mid-channel for each transect
    - ii. Greenline composition transect
    - iii. Woody species regeneration belt transect
  - d. Complete visual assessments (RHAR and PFC)
  - e. Complete channel morphology cross-sections (Transects 1 and 6)
  - f. Complete Riparian Grazing Case Study Data Sheet
    - i. Air and water temperature
    - ii. Stream morphology data (widths and depths)
    - iii. Feet of riffles, pools, and runs
    - iv. Fish shelter ratings
    - v. Riffle data
  - g. Complete Management Survey

# Appendix C1 Riparian Grazing Case Study Management Survey page 1

General Information		-	If public-owned, are there	e standards in place?
Ranch:			Yes	🗌 No
Name:				
Address:			What are the standards?	
City, State, ZIP:			Utilization%	Stubble heightinches
Phone number:			Browse%	Irampling%
E-mail <sup>.</sup>				
1 man			Who monitors them?	
Ownership:			$\square$ Range Con	Rancher
Private	Private lease			
U.S. Forest Service	BLM		Size and number of pastu	ires in unit:
Other public			Acres:	
How long under current	ownership?		Number of pastures:	
			How many pastures conta	ain a section of creek?
If public-owned, is there	regular communicatio	on with USFS		
or BLM Range Con?				
Yes	🗌 No		Are there any written plan	ns for the unit?
			🗌 Ranch plan	🗌 Water quality plan
Type of operation:			Economic plan	EQIP
Cow-calf	Stocker	🗌 Sheep	AOI	EA/EIS; IS/EIR
Farming	Horses		Conservation agreeme	nt
Total size and number of	pastures:		Land use plan	Other
			Coals for riparian pasture	,.
Watershed Characterist	ics		Increase/maintain_pro	duction
Upstream watershed land	11565.		Increase/maintain pro	fit
	I Logging		Maintain/improve wat	er quality
Ranching	Farming			er quanty
Wildlands			Sustainability	
	Non-urban resi	dential	Justalilability	
		ucillai		
Predominant ownership	of watershed		Decrease weeds     Improve/maintain fish	070
	$\square \square $	rico		ery
	Dublic	lice	Have you areated a senar	ata vinanian nastuna anasifiasila ta
Past land disturbances in	the watershed:		Have you created a separa	
	Floods	- Fire	Obtain achieve your goals	
	🗌 Landslides		If you how long did you	INO
			hoforo grazing was rointro	allow the new pasture to rest
Management Unit of Co	ncern			
Name <sup>.</sup>	httin			Three years
County:			Eour or more years	
Ownershin <sup>.</sup>				
Private	🗌 Private lease		Are temporary exclosures	utilized to most your goals in the
US Forest Service			riparian area?	a unized to meet your goals in the
$\square \text{ Other public}$				
How long under current	ownershin?		Diparian concerns that we	
now long under current	ownersnip:		Fish habitat	Mildlife habitat

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# Appendix C1 (continued) Riparian Grazing Case Study Management Survey page 2

Biomass production	on		
Endangered Speci	es Act		
Use of pasture:		Livestock distribution	
☐ Holding area	□ Calving	☐ Herding	Drift fence
☐ Watering site	Grazing	Trails	Temporary exclosures
☐ Gathering	Bedding	Off-site  Feed or	Salt/minerals
Exclosure			
		If you use off-site feeding	g and/or salt/minerals:
Indicators used to me	ove livestock in and out of ripari-	How far is the off-site fee	ed/salt/minerals from the stream?
an area (unit of conc	ern):	(closest $1/2$ mile is fine)	
Dormant season o	f key plants		
Invasion of undes	irable plants/Shading of desirables	Do you observe evidence	e of livestock using off-site
🗌 Bank soil moisture	9	feed/salt/minerals?	
Presence and/or li	fe cycle of key wildlife species?	Yes	□No
Browse on key wo	ody vegetation		
Accumulation of l	iter layer	In your opinion/observat	ion has the off-site feed/salt/minerals
□ RDM level		reduced time livestock s	pend in the riparian area?
Likelihood of floo	ds/spring runoff	T Yes	□No
Utilization of herb	aceous vegetation		
☐ Time of year (cale	ndar dates)	Is off-site water available	:
☐ Rest period of oth	er pastures	T Yes	
Current Managemen	nt, Costs (days of labor/year),	If yes: 🗌 Natural	🗌 Human-made
and Possible Cost S	haring, (for the particular pas-	Type of human-made:	_
ture, not the entire	ranch)	□ Pipeline	Troughs
		Tanks	☐ Well
Type of operation and	d length of time under current		
operation.	0	How far is the off-site wa	ater from the stream? (closest 1/2 mile
$\Box$ Cow-calf	□ Stocker □ Sheen	is fine)	ter nom the stream: (closest 1/2 mile
Farming		13 11116)	
Breed/type of animal			
Number of animals (	range and average).	Do you obsorre avidance	of livestock using off site water?
ivaniser of animals (			
Season of use:		In your opinion/observat	ion has the off-site water reduced
Spring	Summer	time livestock spend in t	he riparian area?
□ Fall	☐ Winter	T Yes	□ No
Average in and out d	ates, or time between rotations:	 Brush Management	
		☐ Fire	Chemical     Mechanical
Grazing system:		Are you performing brus	h management practices to obtain/
5.7		achieve vour rinarian do	als?
		T Yes	□ No
			L * * *

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Road Management		If so, what was the obj	jective?	
Maintenance	Construction	Decrease erosion		
Culverts		🗌 Capture sedimentat	ion	
		🗌 Improve habitat		
Are you performing road	management practices to	Sustainability of the	e system	
obtain/ achieve your ripa	rian goals?			
🗌 Yes	🗌 No	What restoration pract	tices were utilized?	
		Stream corridor im	provement	
Fencing		Bank protection		
Type of fencing used:		Structural (such as	rock riprap)	
☐ Barbed wire	Electric, 5-strand	☐ Bioengineering(eith	er solely vegetation su	uch as willows, or a
Electric, 3-strand	Electric, 2-strand	combination of vegeta	tion and structural)	
Electric, 1-strand	Temp. electric	🗌 Stream channel stał	oilization	
		Grade stabilization		
Range seeding		🗌 Riparian planting fo	or wildlife habitat	
		🗌 Wildlife habitat in t	the upland	
Stream crossings (interim):		🗌 Critical area plantir	ng for erosion	
For livestock		☐ Landslide treatments		
☐ For roads (equipment, truck)		$\Box$ Do you purposely cull animals that "hug the stream" ("ripar		
If for livestock, are they hardened?		ian huggers")?		
□ Yes □ No		Does anyone stock fish?		
How often are they utiliz	ed?			
Have they reduced dama	ge to the stream banks in your	Historic Management	t <b>and Costs (for the</b> ) length of time under	<b>particular area)</b>
opinion?		$\Box$ Cow-calf	□ Stocker	
🗌 Yes	🗌 No	Farming		
If for roads, are they hard	lened?	Breed/type of animal:		
🗌 Yes	🗌 No	Number of animals (range and average):		
How often are they used?	2		inge and average).	
Are they	unty?			
		Season of use		
Prescribed burning for	r forage improvement	Spring	□ Summer	
Irrigation water manag	gement	□ Spinng □ Fall	☐ Winter	
Pasture clipping				
Sediment basins		Average in and out dat	tes or time between r	otations:
Grazingland mechanic	al treatments (renovating, con-	nveruge in und out du	is, of this between i	otations.
tour furrowing, pitting)		Grazing system descri		
$\hfill\square$ Length of time under	current management?	Gruzing system deseri		
Restoration Efforts				
Has there been any restor	ration in the unit?			
L Yes	L] INO			

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Livestock distribution		Did you performing road	management practices to obtain/
☐ Herding	Drift fence	achieve your riparian goal	s?
🗌 Trails	Temporary exclosures	🗌 Yes	🗌 No
Off-site	☐ Salt/minerals		
		Fencing (382)	
If you used off-site feeding	g and/or salt/minerals,	Type of fencing used:	
How far was the off-site fe	eed/salt/minerals from the stream?	Barbed wire	🗌 Electric, 5-strand
(closest 1/2 mile is fine) _		Electric, 3-strand	🗌 Electric, 2-strand
Did you observe evidence feed/salt/minerals?	of livestock using off-site	Electric, 1-strand	Temp. electric
Yes	□ No	Range Seeding	
In your opinion/observation	on did the off-site feed/salt/miner-	Stream crossings (interim)	:
als reduced time livestock	spend in the riparian area?	☐ For livestock	
Yes	□ No	☐ For roads (equipment,	truck)
		If for livestock, were they	hardened?
Was off-site water available	le:	Yes	□ No
Yes	🗋 No	How often were they utiliz	zed?
If yes: 🗌 Natural	l 🔲 Human-made	Did they reduced damage	to the stream banks in your opinion?
Type of human-made:		Yes	□ No
Pipeline	Troughs	If for roads, were they har	dened?
🗌 Tanks	Well	Yes	□ No
Pond			
How far was the off-site w	vater from the stream? (closest 1/2	How often are they used?	
mile is fine)		Are they County?	Private?
Did you observe evidence	of livestock using off-site water?	Prescribed burning for	forage improvement
Yes	□ No	Irrigation water manage	ement
		Pasture clipping	
In your opinion/observation	on did the off-site water reduced	Sediment basins	
time livestock spend in th	e riparian area?	🗌 Grazingland mechanica	l treatments (renovating, contour fur-
Yes	□No	rowing, pitting)	
		Length of time under h	istoric management?
Brush management (314)			
☐ Fire ☐ Chemic	al 🗌 Mechanical		
Did you performing brush	n management practices to obtain/	<b>Restoration Efforts</b>	
achieve your riparian goal	ls?	Was there any historic rest	toration in the unit?
Yes	□ No	Yes	□ No
Road management		If so, what was the objecti	ve?
☐ Maintenance	Construction	Decrease erosion	
Culverts		Capture sedimentation	
		Improve habitat	

# Appendix C1 (continued) Riparian Grazing Case Study Management Survey page 5

 $\Box$  Sustainability of the system

What restoration practices were utilized:

Stream corridor improvement

□ Bank protection

Structural (such as rock riprap)

Bioengineering(either solely vegetation such as willows,

or a combination of vegetation and structural)

 $\hfill\square$  Stream channel stabilization

 $\hfill \Box$  Grade stabilization

□ Riparian planting for wildlife habitat

 $\hfill \Box$  Wildlife habitat in the upland

 $\hfill\square$  Critical area planting for erosion

Landslide treatments

Did you purposely cull animals that "hug the stream"

(Riparian Huggers)?

Did anyone stock fish? \_\_\_\_\_

### **Current Monitoring**

Types of monitoring, number of points and how often:

	Frequency (per yr)	Location
🗌 Visual:		
Photo:		
Stream temp:		
□ Sediment		
🗌 Nutrient		
🗌 Habitat:		
Pathogens:		
□ Wildlife:		

Objectives of monitoring:

Establish base lines

Document management over time

Monitor wildlife/fisheries habitat

 $\hfill \square$  Monitor vegetation: weeds and desirable grasses

Protect ranching interests against environmental concerns

How are monitoring data used?

☐ To make management decisions

 $\hfill\square$  Stored for future use

 $\hfill\square$  Shared with agencies (Regional Board, NRCS, UCCE,

RCD, FS, BLM, F&G, etc.)

<b>General Information</b>			If public-owned, are there standards in place?		
Ranch: ULLE Eran	pleste		Yes	No No	
Name: Aaronomie Ro	mae Science				
Address One State	As Ave.		What are the standards?	Constant and the second s	
Cia Care Tim Dala	1 4 651.00		Utilization%	Stubble heightinches	
City, State, ZIP: LALVS	CA 43 GIG		Browse%	Trampling%	
Phone number (530)	752-4031		RDMlbs/acre	é.	
E-mail:					
			Who monitors them?		
Ownership:	322		Range Con	Rancher	
Private	Private lease				
U.S. Forest Service	D BLM		Size and number of pas	tures in unit:	
Other public			Acres: 248		
How long under current	ownership?		Number of pastures:	1	
984005			How many pastures cor	stain a section of creek?	
If public-owned, is there	regular communica	ation with USFS			
or BLM Range Con ?					
Yes	□ No		Are there any written pl	lans for the unit?	
			Ranch plan	Water quality plan	
Type of operation:			Economic plan	EQIP	
Cow-calf	Stocker	Sheep	AOI	EA/EIS; 15/EIR	
Farming	Horses		Conservation agreent	sent	
Total size and number of	pastures:		Land use plan	Other	
3425 acres	15 pastures	6			
			Goals for riparian pastu	re:	
Watershed Characterist	tics		Increase/maintain p	roduction	
Upstream watershed land	d uses:		Increase/maintain pr	ofit	
Urban	Logging		X Maintain/improve wa	ater quality	
X Ranching	Farming		Aesthetics		
Wildlands	Recreation		Sustainability		
Roads	Non-urban n	esidential	Increase biodiversity		
31355 (AUS)			Decrease weeds		
Predominant ownership	of watershed:		Improve/maintain fis	shery	
Private	U.S. Forest S	ervice	~ .		
BLM	Public		Have you created a sepa	arate riparian pasture specifically to	
Past land disturbances in	the watershed:		obtain achieve your goa	ds?	
Mining	Floods	K Fire	X Yes	□ No	
Logging	Landslides	0.000	If yes, how long did you	allow the new pasture to rest	
	14212		before grazing was reint	troduced?	
Management Unit of Co	oncern		Cone season	One year	
Name: ULE Examp	le Creek		Two years	Three years	
County: Yolo			Four or more years		
Ownership:	100		,		
Private	Private lease		Are temporary exclosure	es utilized to meet your goals in the	
U.S. Forest Service	BLM		rinarian area?	in manual to meet Join Bonts in the	
Other public			Yes	DCI No.	
How long under current	ownership?		Riparian concerns that a	win have:	
98 years	C		Fish habitat	Wildlife habitat	
			The second protocol and	- sometime transmith	

Biomass production	X TMDL		of th	e year.		
Endangered Species A	ct		820 - Mi	0		
Use of pasture:			Livestock	distribution		
□ Holding area	Calving		Herdin	g	Drift fence	
Watering site	Grazing		Trails	<i>w</i> .	Temporary e	xclosures
Gathering	Bedding		Off-site	□ Feed or	Salt/minerals	Idaulur
Exclosure	57 N				Here a state of the state of th	
			If you use	off-site feeding	and/or salt/miner	als:
Indicators used to move	livestock in and	out of ripari-	How far is	the off-site feet	l/salt/minerals fro	m the stream?
an area (unit of concern)		480-990 A.T 1994	(closest 1/	2 mile is fine)	3/4 mile	
Dormant season of ke	y plants		1102300000	T-0191967-44000 T	112210103755	
Invasion of undestrabl	e plants/Shading	of desirables	Do you of	serve evidence	of livestock using	off-site
Bank soil moisture			feed/salt/n	ninerals?		
Presence and/or life co	cle of key wildli	fe species?	KI Yes		D No	
Browse on key woody	vegetation	8 D. M. 1999 C. M. 1999	~		1	
Accumulation of liter	layer		In your or	vinion/observation	on has the off-site	feed/salt/minerals
RDM level	÷2);		neduced time livestock snend in the rinarian area?			n area?
Likelihood of floods/spring runoff		IV Yes		[] No		
Utilization of herbaced	ous vegetation					
Time of year (calendar dates)		is off-site water available:				
Rest period of other p	astures		X Yes		□ No	
			2000-0000 1982		and o	
Current Management, C	osts (days of la	bon/year),	If yes:	Natural	X Human-mad	e
and Possible Cost Shar	ing, (for the par	ticular pas-	Type of hu	iman-made:	No. 2717 (1999)	
ture, not the entire rand	:h)		🔀 Pipelin	e	🔯 Troughs	
8 6 6 M	12 220 37		Tanks		- well	
Type of operation and ler	igth of time unde	er current	Pond			
operation.		01-101-0111	How far is	the off-site wat	er from the stream	n? (closest 1/2 mil
Cow-calf	Stocker	□ Sheep	is fine)			
Farming	Horses			2 mile		
for 98 years	2020 C 41 C					
Breed/type of animal:	English					
Number of animals (rang	e and average):		Do you ol	serve evidence	of livestock using	off-site water?
50-100 Norma	114 72		Yes Yes		□ No	
Season of use:			In your of	oinion/observati	on has the off-site	water reduced
Spring	Summer		time lives	ock spend in th	e riparian area?	
🔁 Fall	U Winter		X Yes		D No	
Average in and out dates.	or time between	n rotations:	Brush Mar	nagement		
10/15- 11/1			Fire	0 4000 0 2015 N BC	Chemical	Mechanical
Grazing system:			Are you p	erforming brush	management pra	ctices to obtain/
Used in fall for	r two wee	ks	achieve yo	our riparian goal	57	
alter and Colle	· ···· / /	Aret	-			

Road Management		If so, what was the	objective?	
Maintenance	Construction	X Decrease erosion		
Culverts		Capture sedimentation		
		R Improve habitat		
Are you performing roa	d management practices to	K Sustainability of	the system	
obtain/ achieve your rir	arian goals?	-		
□ Yes	D No	What restoration pr	ractices were utilized?	
		Stream corridor	improvement	
Fencing		Bank protection		
Type of fencing used:		Structural (such	as rock riprap)	
Barbed wire	Electric, 5-strand	D Bioengineering(e	ither solely vegetation such a	s willows, or a
Electric, 3-strand	Electric, 2-strand	combination of yea	etation and structural) 3day	willow a
Electric, 1-strand	Temp. electric	□ Stream channel s	stabilization	plantings
	3 days /yr	Grade stabilizatio	an	
Range seeding	9.11	Riparian planting	e for wildlife habitat	
		Wildlife habitat i	in the unland	
Stream crossings (interi	m):	Critical area plan	uting for emsion	
For livestock		I andelide treatments		
For roads (equipment	nt, truck)	Do you numose	ly cull animals that "hug the	stream* (*ripar
If for livestock, are they	hardened?	ian buaner <sup>10</sup> 2	ly cuit annihilits that mug the	areant ( ripai
X Yes	□ No	an nuggers //		
How often are they util	ized?	Does anyone sco	CK IISIIY	
just when cattle	are in the pasture.	Illine of Management	and Constitution and	
Have they reduced dam	age to the stream banks in your	Tustoric stanagem	ent and Costs (for the part	cular area)
opinion?		type of operation at	nd length of time under histo	nc operation.
X Yes	No	Do Cow-can		1 Sneep
	1220000	L] Parming	L] Horses	
If for roads, are they ha	rdened?	Provide and a feature	Forcal	
Yes	D No	breed/type or anima	IL CHARGE	
How often are they use	d?	50 = 100	(range and average):	
Are they	ounty? Private?	50 700 7	cormany 12	
		Senson of use:		
Prescribed burning f	or forage improvement	NI Spring	IV Summer	
Irrigation water man	agement	NI Fall	D Winter	
Pasture clipping				
Sediment basins		Average in and out	dates, or time between rotati	ons
Grazingland mechan	ical treatments (renovating, con-	$V_{i} \rightarrow$	12/31	
tour furrowing, pitting)		Grazing system des	cription:	
Length of time unde	r current management?	Ontinuous a	razing sucher	
4 months		- UTITIKOUS 1	acting signam.	
Restoration Efforts		Occasionally S	some removed or a	none
Has there been any rest	oration in the unit?	added		14 1 3
I LILL LILL I LILL LILL I LILL				

Livestock dis	tribution		Did you performing road management practices to obtain/		
Herding		Drift fence	achieve your ripar	ian goals?	
Trails		Temporary exclosures	TYes No		No
Off-site	Feed or	I Salt/minerals 2 dawa	Easting (191)		
If you used a	H.cite feeding	and/or salt/minerals	Tencing (302)	edi	
How far use	the off-site fe	eddealt/minerale from the stream?	Type of tencing us	eu.	D Florence & mound
clorest 1/2	uile on-site te		D Electrice 2 eterm	1	D Electric, 3-Tand
Did you also	mie is mie/	of least of the	Electric, 5-strait	10	S Electric, 2-strand 1002
fond trak Imin	erve evidence	of investock using oil-site	Electric, 1-strar	ы	L temp. electric
X Yes	CLAIST	□ No	Range Seeding		
			D readle second		
In your opin	ion/observatio	n did the off-site feed/salt/miner-	Stream crossings (	interim):	
als reduced i	ime livestock	spend in the riparian area?	For livestock		
🗆 Yes		X No	For roads (equi	pment, tr	uck)
0.000			If for livestock, we	re they ha	ardened?
Was off-site	water available	E	T Yes	302	T No
🗆 Yes		No No	How often were th	ey utilize	d?
If yes:	□ Natural	□ Human-made	Did they reduced	damage to	the stream banks in your opinion
Type of hum	an-mide:	1100	T Yes	B	□ No
Pipeline		Troughs	If for roads, were t	bey harde	ened?
Tanks		T Well	TT Yes		□ No
□ Pond					
How far was	the off-site w	ater from the stream? (closest 1/2	How often are the	v used?	
mile is fine)		3	Are they	County?	Private?
Did you obs	erve evidence	of livestock using off-site water?	Prescribed burn	ning for fo	prage improvement
] Yes		□ No	Irrigation water	managen	nent
1779-125			Pasture clippin	e	
In your opin	ion/observatio	n did the off-site water reduced	Sediment basin	5	
time livestoc	k spend in the	e riparian area?	Grazingland me	echanical	treatments (renovating, contour fur
Ves		□ No	rowing, pitting)		
-		State State State	□ Length of time	under his	toric management?
Brush manas	ement (314)		97 year	rs t	
Fire F	Chemica	l 🔲 Mechanical	. 19	-	
Did you per	orming brush	management practices to obtain/	Restoration Effor	ts	
achieve your	riparian goals	2	Was there any hist	oric resto	ration in the unit?
□ Yes		D No	☐ Yes		K No
Road manag	ement		If so, what was the	e objective	e]
Maintena	nce	Construction	Decrease erosio	0	
Culverts			Capture sedime	ntation	

<u></u>	Riparian Grazing Case Study Management Survey page 5
Sustainabilit	y of the system
What restoration	n practices were utilized:
Stream corri	dor improvement
Bank protect	tion
Structural (s	uch as rock riprap)
Bioengineeri	ng(either solely vegetation such as willows,
or a combination	in of vegetation and structural)
Stream chan	nel stabilization
□ Grade stabil	zation
🗌 Riparian pla	nting for wildlife habitat
□ Wildlife hab	itat in the upland
Critical area	planting for erosion
Landslide tr	satments
Did you put	posely cull animals that "hug the stream"
(Riparian Hugg	ers)?
Did anyone	stock fish?
Current Monie	oring
Types of monito	oring, number of points and how often:
	Frequency (per yr) Location
Visual: da	ily when cattle present, plus 4 times throughout year.
N Photo:	L 4 spots
Stream temp	x
☐ Sediment	
□ Nutrient	
N Habitat:	Drice cuery other water
Pathogens:	-1- 0-
V widtig	Webd logats
in which e.	
Objectives of n	ionitoring:
🕅 Establish ba	se lines
Document n	nanagement over time
Monitor wil	dlife/fisheries habitat
Monitor veg	etation: weeds and desirable grasses
Protect ranc	aing interests against environmental concerns
How are monit	oring data used?
I To make ma	nacement decisions
Stored for 6	dure use
Shared with	agencies (Regional Board NRCS LICCE
and the second se	and the first of the second state of the secon

### Appendix C3 Riparian Grazing Case Study Data Sheet page 1

Stream:				_	
Channel M Upstream	Iorphology	Cro	oss-Sections Downstrear	S n	
Ft.	Depth		Ft.	Depth	

Date/Time: \_\_\_\_\_ Completed by: \_\_\_\_\_

	Densiomet	ter Readings	
	u	d	upstream, downstream.
Tran1	1	r	left, right
	u	d	4
Tran2	1	r	-
	u	d	4
Tran3	1	r	-
	-	1	4
Tran4	u	a	
	1	r	
Turner	u	d	]
Irano	1	r	1
	u	d	1
Tran6	1	r	-
Air Temp: Water Temp: Description of Site: Bankfull Width: Bankfull Depth: Flood-prone Width: Flood-prone Depth: Slope:			- - - -
Habitat Type			
<u>ft/step:</u>			<u>Total:</u>
Pools:			
Riffles:			
Runs:			

AINR Publication 8094	Appendix C3 (continued) Riparian Grazing Case Study Data Sheet page 2	2
Transect Locations:	(Lat., Long., distance and bearing from Bench Mark, etc.)	
Tran. 1:		
Tran. 2:		
Tran. 3:		
Tran. 4:		
Tran. 5:		
Tran. 6:		

	Riffle 1	Riffle 2	Riffle 3	
Riffle Length				Fish Shelter Ratings
Avg. Riffle Length				% undercut bank
Avg. Riffle Depth				% swd
Riffle Velocity				% lwd
Substrate Complexity				% root mass
Embeddedness				
Substrate Composition				% terr. veg
% Fines				% aqua. veg
% Gravel				% boulder curtain
% Cobble				
% Boulder				% boulder
% Bedrock				% bedrock ledge
Substrate Consolidation				% Exposed Substrate
% Gradient				

# Appendix C4 (page 1) Filled-in Example of Appendix C3

Completed by: $Dor, Dord, 7 Aeresce         Completed by: Dor, Dord, 7 Aeresce         Downstream         Depth         2.61       0       1.81         2.62       0       1.81       Tran1       0       0       0       0         4.83       1.71       2.7.0       13.94       Tran3       Tran3       0       0       0   $	tream, enstrea
epth       Ft.       Depth         2.6/ $0$ $1.81$ 2.6/ $0$ $1.81$ 2.6/ $15.1$ $1.83$ 4.83 $22.0$ $13.34$ $1.71$ $27.0$ $13.94$	tream, enstrea , right
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	enstrad . right
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
4.83         22.0         13.34         Tran2         0         0           1.71         27.0         13.94         Tran3         0         0	
1.71 27.0 13.94 Tran3 0 0	
Iran3	
3.61 30.0 14.64 0 0	
3.93 33.0 13.81 Trant 0 0	
14.43 41.0 12.34 0 0	
14.31 48.0 11.53 Trans 0 0	
4.21 50.0 8.81 0 0	
3.51 55.0 6.05 Tran6 0 0	
5.72 65.0 1.91 0 0	
1.74 75.0 1.14 Air Temp: 71°F	
1.34 82.0 1.13 Water Temp: 58° F	
Description of Site: taken along Tran 1	
Bankfull Width: /D-ft	
Bankfull Depth: 2 ft	
Flood-prone Width: 30 ft	
Flood-prone Depth: 44	
Slope: 2 10	
Habitat Type	
ft/step: 2.5 Total	ul:
Pools: 2,3,1,5 11stops = 27.5	5'
Riffles: 4 4,7 8,1,7,5 4 40 stops + 100'	

	Riparian Gra	zing Case Stu	idy Data Sheet		
Transect Locations: (Lat.	, Long., distance a	ind bearing fro	m Bench Mark, e	tc.)	
Tran. 1: N41 06 01.8*	W120" 22' 1	1.3" 101	t from roc	k outcrop	bearing
210°			2621-00	100	
Iran. 2: N41° 05'02.	2" W120" 2	2' 10.1"	23.54 fi	im bench m	wK
bearing 195	<u> </u>		1 24.1 C.	с. <u>.</u>	1
Tran. 3: N91 05 04	.3" W120"	22. 8.8	31.9 17	trom bene	h mark
bearing 18	3"		C	10.45	
ran. 4: N 41° 04' 08.4	" W120° 2	2'07.9*	56.2tt tro	n.	
bond mark	bowing 179	1-	C1 0		
ran. 5: <u>N41' 04' 0</u>	17.9" WIZO	22'06	5 92.44	t tion be	nch
mark bear	ing 1630		STECTION ADDR		
iran. 6: <u>N41°04′0</u>	5.5" WIZ	D°22' D.	5.3" 121.	6ft from	ñ
bench man	rk bearing	167"			
		)			
	Riffle 1	Riffle 2	Riffle 3	Tab. C	- Jose Destines
tiffle Length	Riffle 1 17.2	Riffle 2	Riffle 3	Fish S	helter Ratings
tiffle Length wg. Riffle Length	Riffle 1 <u>17.2'</u> <u>5</u>	Riffle 2 	Riffle 3	Fish S % undercut bank	helter Ratings
tiffle Length wg, Riffle Length wg, Riffle Depth	Riffle 1 17.2' 5' 0.33'	Riffle 2 15' <u>1'</u> 0.33'	Riffle 3 8' 8' 0.5'	Fish S % undercut bank % swd	o 5
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity	Riffle 1 <u>17.2'</u> <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec	Riffle 2 15' 1' 0.33' 2.1ft/sec	Riffle 3 81 8' 0.5' 1.5ft/sec	Fish Si % undercut bank % swd % hwd	o 5 0
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity	Riffle 1 <u>17.2'</u> <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u>	Riffle 2 15' 	Riffle 3 8' 0.5' 1.5 ft/sec 17	Fish Si % undercut bank % swd % hwd % root mass	o 5 0
tiffle Length wg. Riffle Length wg. Riffle Depth taffle Velocity substrate Complexity imbeddedness	Riffle 1 <u>17.2'</u> <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 9</u>	Riffle 2 15' 0.33' 2.1 Afrec 16 40%	Riffle 3 <u>8'</u> <u>0.5'</u> <u>1.5 ft/sec</u> <u>17</u> <u>10%</u>	Fish Si % undercut bank % swd % hwd % root mass	o 5 0 0
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity imbeddedness substrate Composition	Riffle 1 <u>17.2'</u> <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 9</u>	Riffle 2 15' 0.33' 2.1 Afrec 16 40%	Riffle 3 <u>8'</u> <u>8'</u> <u>1.5 ft/sec</u> <u>17</u> <u>10%</u>	Fish Si % undercut bank % swd % bwd % root mass % terr. veg	o 5 0 50% »f bank
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity substrate Composition % Fines	Riffle 1 <u>17.2'</u> <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 9</u> 0	Riffle 2 <u>15'</u> <u>7'</u> <u>2.1 Afrec</u> <u>16</u> <u>40%</u>	Riffle 3 <u>8'</u> <u>8'</u> <u>1.5 ft/sec</u> <u>17</u> <u>10%</u>	Fish Si % undercut bank % swd % bwd % root mass % terr. veg % aqua. veg	o 5 0 50% »f bank 50%
tiffle Length wg. Riffle Length wg. Riffle Depth taffle Velocity substrate Complexity substrate Composition % Fines % Gravel	Riffle 1 17.2' <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 %</u> <u>15</u> <u>30</u>	Riffle 2 <u>15'</u> <u>7'</u> <u>2.1 Afrec</u> <u>16</u> <u>40%</u> <u>25</u> <u>35</u>	Riffle 3 8' 0.5' 1.5 ft/sec 17 10% 55	Fish Si % undercut bank % swd % hed % root mass % terr. veg % aqua. veg % boulder curtain	o 5 0 0 50% >f ban 50% >f ban
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity substrate Composition % Fines % Gravel % Cobble	Riffle 1 17.2' <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 %</u> <u>15</u> <u>30</u> <u>55</u>	Riffle 2 15' -1' 0.33' 2.1 Afrec 16 -40% 	Riffle 3 8' 0.5' 1.5 ft/sec 17 10% 55 15	Fish Si % undercut bank % swd % swd % hwd % root mass % terr. veg % aqua. veg % aqua. veg % boulder curtain	0 5 0 0 50% of back 50% 50%
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity substrate Composition % Fines % Gravel % Cobble % Boulder	Riffle 1 17.2' 5' 0.33' 2.8 ff/sec 16 20% 15 30 55 -	Riffle 2 <u>15'</u> <u>7'</u> <u>0.33'</u> <u>2.1 Affec</u> <u>16</u> <u>40%</u> <u>25</u> <u>35</u> <u>40</u> <u>-</u>	Riffle 3 <u>8'</u> <u>0.5'</u> <u>1.5 ft/sec</u> <u>17</u> <u>10</u> <u>55</u> <u>15</u> <u>20</u>	Fish S % undercut bank % swd % root mass % root mass % terr. veg % aqua. veg % boulder curtain % boulder	0 5 0 0 50% >f back 50% 50%
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity substrate Composition % Fines % Gravel % Gobble % Boulder % Bedrock	Riffle 1 17.2' 5' 0.33' 2.8 ff/sec 16 20% 55 -	Riffle 2 15' -1' 0.33' 2.1 Afrec 16 -40% - -	Riffle 3 8' 0.5' 1.5 ft/sec 17 10% 55 15 20 -	Fish S % undercut bank % swd % root mass % root mass % terr. veg % aqua. veg % boulder curtain % boulder s boulder % boulder % boulder	0 5 0 0 50% >f ban 50% 50% 0
tiffle Length wg. Riffle Length wg. Riffle Depth tiffle Velocity substrate Complexity substrate Composition % Fines % Gravel % Gobble % Boulder % Bedrock	Riffle 1 17.2' <u>5'</u> <u>0.33'</u> <u>2.8 ff</u> sec <u>16</u> <u>20 %</u> <u>15</u> <u>-</u> <u>100 sec</u>	Riffle 2 <u>151</u> <u>1'</u> <u>0.33'</u> <u>2.1 Affec</u> <u>16</u> <u>40%</u> <u>25</u> <u>35</u> <u>40</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u> <u>-</u>	Riffle 3 8' 0.5' 1.5 ft/sec 17 10% 10 55 15 20 	Fish S % undercut bank % swd % swd % hwd % root mass % terr. veg % aqua. veg % aqua. veg % boulder curtain % boulder curtain % boulder % bedrock ledge	0 5 0 0 50% >f back Cove 50% 50%

# Appendix C5 Riparian Greenline Transect Data Form

	12	1								Date _4	1-
runt	T	2	TECK					2525	0.2810.2	24 - 2 5	
xaminers Dowid, Wor, Therese								hote	o No's		
								_			
	_				F	eet/	Step.	-	3/1		
		s	TEPS Left)			s	TEP	rs (t)	TOTAL STEPS	% COMP.	
35	13	1	14		3	1	5	4	5	81	26.8
8	7				5	-		_		20	6.6
14	52	9		++	52	6	13	5	70		2014
F		É								201	66.6
-	-	-		++	-	-	$\left  \right $	-			
+											
1			+++	++	-			_		-	
+	-	-		++	-	-	-	-	$\vdash$	-	
+	+			++		-		-		-	
+					-						
-								_			
+	-	-			-	-		-			
F	-			++				-			
					-						
+	-	-		+	-	-		-		-	-
+	1	-		++	+	-		-			
+											
										-	
	L					L					
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  19       10         19       10         19       10         19       10         19       10         10       10         10       10</td> <td>STEPS         STEPS           STEPS         (Right)           35 13 1 14         3 1 5 4           37 3 5 3         1           14 5 9         3 1 5 4</td> <td>Imple Creek       Photo No's         Feet/Step_3/1       STEPS       STEPS         STEPS       STEPS       (Right)         35   3   14       3   5 4 5       7         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       24 / 15 5 70       1         14 52 9       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     30       7         30       7         30       7         30       7         30       7         30       7         30       7         30       7         30       7         30       7         30       7         30

Appendix C6 (page 1) Low-Gradient Riparian Health Assessment for Rangelands Form

			Sile	uc		an	PIE C	/ YER	-	Me: 1	140	<i>.</i>
I. Channel Condition	Naturi eviden cutting	al cham ice of d g	nel, no Iown	Evider channs down signific Adequa the flo	nce of elizatio cutting ant rece ale acce od pla	past on or , but wery. ss.to in.	Chan dowr exten plain	nelizatio cutting sive. Flo is restri	on or ood cted.	Cham down wider plain preve	nel acti cutting ting. Fl access nted.	ively g or lood
Score:	12	11	10	9	8	7	6	0	4	3	2	1
2. Access to Flood Plain	Floodi 1 1/2 t not inc	ing eve to 2 yea cised	ry irs	Floodi 3-5 ye incisie	ing eve ars — I m	imited	Floor 10 ye incise	ting eve ars – de ed	ry 6- seply	No fle Deepl	ooding ly incis	sed.
Score:	12	11	10	9	8	Y27)	.6	5	4	3	2	1
3. Bank stability (each bank separately -Looking downstream, Left bank - Right bank)	Banks Outsid protect	stable. le bend ted by	s roots,	Moder Infreq areas of mostly over.	rately s uent, s of eros / heale	table. mall ion, d	Mode Outsi active banke poten	entely ur de bends sly erodie s high; hi tial erosi	istable. ig: gh on.	Unsta Activ	ible. ely ero	ding.
Left Bank Score:	6	5.5	5	0	-4	3.5	3	2.5	2	1.5	1	0.5
Right Bank Score:	6	5.5	5	4.5	(4)	3.5	3	2.5	2	1.5	1	0.5
(score each hank separately)	extend active widths rushes alders, cotton sycam higher are re-v all age woody presen young.	ts at lea channe s (ex. se s, willov, aspen, woods, ores). 5 r if poin regetatin c classe y specie it (seed , mature 5, 5	Ist two el edges, ws, Score it hars g and s of ing, s, old)	Or Cover	is one is flood	t plain.	exten width Or Filter mode comp	ing func- rately romised	nion L	Or Lack regen Or Filten seven comp	ds less factive of eration ing fur ely romise	than totion d.
Left Bank Score:	6	5.5	5	4.5	4	(15)	3	2.5	2	1.5	1	0.5
Right Bank Score: 4a. Riparian Zone- Intermitingt Creek (score each tank separately)	6 Naturn extend channs ooks, 1 alders, cotion innual solice rushi higher are re-v all age woody presen	3.5 il veget is two i el widtl buckeyy woods, l grasse sedges i Scon cegettin e classe y specie it (seed	5 tation active hs (ex. es. and e t hars g and of s ling.	4.5 Natura extend chann Bare s comm Or Cover	4 il vege ls one : el widt pots on. s flood	active h.	Natur exten active spots Or Filter mode comp	2.5 ral veget ds 1/2 o e width, commo ing func ing func ing func	2 attion f Bare n. ction	1.5 Natur extent 1/2 of width Or Lack regen Or Filten seven comp	1 al vegs ds less f active of eration ing fur ely romise	0.5 ctation than than than than than
1.0.0.1.0	young.	mature	2, old)	4.5					*	1.4		
Left Bank Score:	0	5.5	5	4.5	4	3.5	3	2.5		1.5	1	0.5
tight Bank Score	6	5.5		4.5	4	3.5	3	2.5	2	1.5	1	0.5

# Appendix C6 (page 2) Low-Gradient Riparian Health Assessment for Rangelands Form

5. Macroinvertebrate Habitat	Greater than 5 habitat types. Score higher if good diversity.	3-4 types	1-2 types	0-1 type	
Cover types:	Boulders, cohhles, qu overhanging vegetati	on, macrophytes (aqua	s. fine woody debris, su tric vegetation)	bmerged logs,	
Score:	12 11 (10)	9 8 7	6 5 4	3 2 1	
6. Macroinvertebrates Observed	Class I dominate. Score higher if good diversity and number.	Class II dominate.	Class III dominate.	No macroinvertebrates present.	
Score:	12 D 10	9 8 7	6 5 4	3 2 1	
7. Fish Habitat (if applicable)	Greater than 7 habitat type. Score higher if good diversity.	6-4 habitats present.	3-2 habitats present.	1-0 habitat present.	
Cover types:	Logs/large woody de thick root mats, isola	ted/backwater pools, sveri ted/backwater pools, s	hanging vegetation, tiffl lense macrophyte beds.	es, boulders/cobbles, undercut banks	
Score:	12 11 10	9 8 7	6 3 4	3 2 1	
8. Pool Variability	Even mix large- shallow, large- deep, small- shallow, small- deep pools present.	Majority of pools large-deep.	Shallow pools more prevalent that deep pools.	Majority of pools small-shallow or pools absent.	
Score:	12 11 10	9 8 7	6 5 4	3 2 1	
9. Pool Substrate	Mix of substrate (gravel, firm sand, etc.), Roots, submerged vegetation common.	Mix of soft sand, mud, and clay. Some submerged vegetation.	All mud, clay, or sand. Little to no root mats or submerged vegetation.	Hard-pan clay or bedrock. No roots or submerged vegetation.	
Score:	12 11 100	29 8 7	6 5 4	3 2 1	
10. Channel Flow	Water reaches base of both lower banks, minimal substrate exposed.	Water fills >75% of the channel, <25% of substrate exposed.	Water fills 25-75% of the channel, riffle substrate mostly exposed.	Very little water in channel and mostly present in standing pools.	
Score:	12(1/211) 10	9 8 7	6 5 4	3 2 1	
Uitness Point Photopoint 1 Photopoint 2 Photopoint 3	cation Description	Photopoint Monit	Heading	Landmarks	
Date time Photogra	Photo- point #	Camera/lens/ Roll film speed fram	#/ e # Observations		
	total scor	e: 7.75			

# Appendix C7 (page 1) PFC Standard Checklist Form

lame ate: _	of Ripar 9/2	ian-Wetla	nd Area: UCCE Example Creek Segment/Reach ID:
D Tea	im Obse	rvers:	
Yes	No	N/A	HYDROLOGIC
/			1) Active floodplain inundated in "relatively frequent" events (1-3 years) current floodplain is.
		1	2) Active/stable beaver dams beaver activity but no dams.
1			<ol> <li>Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform geology, and bioclimatic region)</li> </ol>
V			4) Riparian area is widening or has achieved potential extent is starting to widen.
1			5) Upland watershed is not contributing to riparian degradation

Yes	No	N/A	VEGETATION
	1		<ul> <li>Diverse age-class distribution (recruitment for maintenance/recovery)</li> <li>no mature/old class</li> </ul>
/			<ol> <li>Diverse composition of vegetation (for maintenance/recovery)</li> </ol>
1			8) Species present indicate maintenance of riparian soil moisture characteristics
/			<ol> <li>Streambank vegetation is made up of those plants or plant communities that have root masses capable of withstanding high streamflow events</li> </ol>
>	ĸ		10) Riparian plants exhibit high vigor beaver activity on the willows
	$\checkmark$		<ol> <li>Adequate vegetative cover present to protect banks and dissipate energy during high flows</li> </ol>
1			12) Plant communities in the riparian area are an adequate source of coarse and/or large woody debris

Yes	No	N/A	EROSION DEPOSITION
	J		<ol> <li>Floodplain and channel characteristics (i.e., rocks, coarse and/or large woody debris) adequate to dissipate energy</li> </ol>
1			14) Point bars are revegetating
/			15) Lateral stream movement is associated with natural sinuosity
/			16) System is vertically stable
1			<ol> <li>Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)</li> </ol>

### **Remarks** (Rationale for Rating)

# vegetation still not at level it should be.

### **Summary Determination**

Functional Rating:	Are factors contributing to unacceptable conditions outside the					
Proper Functioning Condition	control of the manager?					
Functional - At Risk	Yes					
Nonfunctional	No 🔽					
Unknown	If yes, what are those factors?					
	Flow regulations					
Trend for Functional - At Risk:	Mining activities					
Upward	Upstream channel conditions					
Downward	Channelization					
Not Apparent	Road encroachment					
	Oil field water discharge					
	Augmented flows					
	Other (specify)					

(Revised 1998)

# Appendix C8 (page 1) Six Cross Section Composition Forms and One Cross Section Summary Sheet

Forest / District					1-	1.					D	ute <u>71</u> 2	401
Drainage VCCE EX	am	PR	2 (	-	**	K							
Examiners <b>David</b> , T	Photo No's												
Complex													~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
ocation													
Transect No.		_						Feet/	Step		¥١		
					NU	МВ	ER ST	EPS				TOTAL	FEET
Community Type	-	~	-	_	_		-				_	STEPS	Optional
Wass Brush Sedge mix	1	5	-	1			-					12	36
yound avass brush	5	-	-		-		+					5	15
Fass Sedge   Rush / Forb	4	-	-	-	F		+				-	4	12
reck	2	-	-	-	-		-					2	6
rass   Rush / Forb	1	_	-	-	F		-		_		-	- 1	3
Bare ground	2	-	+	F	F		+				+	2	6
,												-	
	$\square$	-	+	-	-	$\mid$	+	-	-	$\square$	-	-	
		_	_				_				_	_	
		-	+	t	-		+				-	1	
		_	-	-								1	
	$\vdash$	-	+	+	-	$\square$	+			$\vdash$		-	
		-	-	-		$\left  \right $	-				-	-	
		-	-	-	-		-				_	-	
					-								
ESTIMATED AVERAGE HT.	Spr	rout	Y	oung		Ma	ture	De	cadent	De	ad	-	
										-		-	

# Appendix C8 (page2) Six Cross Section Composition Forms and One Cross Section Summary Sheet

Forest / District				1	Date 9/2/	Date 9/2/01						
Drainage ULCE Exo	mp	le C	ree	K							-17	
Examiners David, Dor	1,	the	res	a				P	hot	o No's_		
Complex		3.01						- 22		201		
Location												
Transect No. 2							Fee	t/Step_		3/1	();	
	1	- 2		N	UMB	ER ST	EPS				TOTAL	FFFT
Community Type											STEPS	Optiona
Barc Rebbit ground Brash	12										- 12	36
Per / Rabbit Grass / Brush	7	6	+		-		+	+	+	+	13	39
grass Rush / Farb	3										- 3	9
Creek	2		-		-		+	$\square$			2	6
barc ground	3		-		-		-	$\square$	-		- 3	9
J						- 5						
	-		+		-		+			++		
	-		-		-	_	-	$\square$	-			-
	-					_	+	+	+		-	
i.	_		-		-		-		-		_	
			t				t	Ħ	1			
	-		+				+	+		+		
	_		-		-	_	-	$\square$	-			-
												-
	-		+		+	-	+	+	+			
ESTIMATED AVERAGE HT.	Sp	rout	Ye	ung	M	sture	D	ecaden	1	Dead	7	
			1		-		1		-			

	Appendix C8 (page3)		
Six Cross Section Com	position Forms and One Cro	oss Section Summar	y Sheet

orest / District			202								D	ate 1/2/	01
Drainage UCCE EXON	mp	le	Cr	ee	K								
xaminers David, Dor	١,	1	ner	es	a								
omplex													
ocation													
ransect No. 3			-					Feet	Step	3	5/1		
	-				N	UME	ER ST	EPS				TOTAL	FEET
Community Type			-			<u></u>		1	-		-	STEPS	Optional
yound gross Brush	8	6										14	42
ush/Sedge/Pergross	4	1	3									8	24
Willow	1	1										2	6
Creek	2					-					+	2	6
bare ground	3										+	3	9
5	-	-	-		-	+		$\vdash$		$\vdash$	+		
		-	-		-	+				$\vdash$	+	<u> </u>	
												1	
		-	-			+		$\vdash$		$\vdash$	-	-	
	_											-	
	7	-	-		-	+			-		+		
	_											1	
		-	-			+		$\vdash$			+	1	
											-	-	
	-	-	-		-	+			-		+		
ESTIMATED	Sp	rout	Í	Ye	ung	M	ature	De	cadent	Dead	ł	1	
AVERAGE HT.	_			13	41		1996225			100-20		]	
ESTIMATED AVERAGE HT.	Sp	rout		Ye	ung 4'	M	ature	De	cadent	Dear	1	]	

Forest / District					_/						Da	te <u>9/2/</u>	DI
Drainage UCCE EXO	mp	le	Cr	ee	K							001	
Examiners David, Dor	۰, ۰	th	er	65	L				Pho	to No	's		
Complex													
Location													
Transect No4		1						Feet	Step	3	<i>\</i> 1		-
C					N	UMB	ER ST	EPS			-	TOTAL	FEET
Barc Per Rabbit	9	4	6		-		-	F			-	(9	57
Rush/ Per Bare around	1	1		_	-	H	+	F	-		-	1	3
Creek	3		_		_							3	9
Rush	+											1	3
Willow	2		_				+					2	6
Brass Sedge (Rush	4	1	_				+		+		+	4	12
							-						
				_			+						
	H	1				$\square$	+	Ħ	-	-			
		-	_				-		_				
	H	-			_		-				_		
ESTIMATED AVERAGE HT.	Spr	out		You	ing	Ma	ture	De	cadent	Dea	đ		
				9	6	_		-			1		

# Appendix C8 (page 5) Six Cross Section Composition Forms and One Cross Section Summary Sheet

Forest / District				1						D	hate 9/2/	01
Drainage UCCE EXO	mp	e C	ree	·K						- 60	~ 1 7	
Examiners David, Dor	1	the	res	a				Pho	to N	o's		
Complex		0.24										
Location												
Transect No5							Feet	/Step		3/1		
160.00 - 160.00 - 00 - 00 - 00 - 00 - 00 - 00 - 00				N	UM	BER ST	EPS	8			TOTAL	FEET
Community Type	a	1	-	<b>—</b>	-	<b>T T</b>	-				STEPS	Optional
ground Bresh	Ľ	3					t				13	36
Frass/Sage Grass/Brash	2	4									6	18
grass / Rush	1	1					-				2	6
Creek	3		-				-				3	9
Willow	2		-		-		-	-	-	_	- 2	6
Sedge/grass/Rush	3						-				3	9
					-		-					
			+	++			+					
			-		-		-					
			+	++	-	+	+				-	
							-				_	
			+				+					
ESTIMATED AVERAGE HT.	Sp	rout	Y	oung	M	lature 5 '	De	cadent	De	ad	-	

# Appendix C8 (page 6) Six Cross Section Composition Forms and One Cross Section Summary Sheet

Forest / District		_										Nate 9/2/	01
Drainage UCCE EXO	mp	le	Cr	ee	·K	5							
Examiners David, Dor	١,	-11	ner	es	a				Ph	oto 1	No's		
Complex	0.5	0.0	-										
Location													
Transect No		_	_					Feet	/Step_		3/1		
Committee Trans	F	_			1	NUM	BER ST	EPS				TOTAL	FEET
Per Sedge/Sage	5	2	-	-		+	H	F	-	F		- 7	21
Bare Sage ground Brush	5					-		-				- 5	15
Willow	2											2	6
Creek	2			-		+	++	+		+		2	6
ocdge/Forb/Rush/Per	4					-		-		-		- 4	12
Bareground	2	1	3			-						- 6	18
Rosebush	1											1	3
			-			+	++	+		+			
		_				-		-		-		_	
								t				_	
		-		-		+	++	+		+		-	
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		_		_		-	+	F		-		-	
DOTING TOO	0-			v	aller of	1.	Anteres		undert.	0		1	
AVERAGE HT.		rout		10	Jung	1	14'		cadent		cad	1	

# Appendix C8 (page 7) Six Cross Section Composition Forms and One Cross Section Summary Sheet

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		÷				x
T,	T <sub>1</sub>	Т,	T,	Т,	7.	PCT
Steps	Steps	Steps	Steps	Steps	TOLET	COMPOSITION
12						7.5
5		14	19		· · · · · · · · · · · · · · · · · · ·	23.8
4					4	5
				13	5	11.3
1	3					2.5
2	3	3	1		6	8.8
	12					7.5
	13					8.1
		8	4	3		9.4
		2	2	2	z	5
			1			0.4
			1			0.6
				2		1.2
				6		3.8
					1	0.6
					7	4.4
			Grand	Fotal	160	100
тот	AL UNI	DISTUR	BED T	YPES (F	PERCENT)	15
			1	e.	ntur (aheale)	
C	1		VI	5	0 – 15 = very ea	irly seral
Composit	ion			1	6-40 = early s	eral
	T, Steps 12 5 4 1 2 7 TOT	T,       T,         Steps       Steps         12       -         5       -         4       -         1       3         2       3         12       13         -       - <tr< td=""><td>Ti       Ti       Ti         Steps       Steps       Steps         12       -       -         5       14       -         4       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       -         13       -       -         2       -       -         3       -       -         13       -       -         2       -       -       -         3       -       -       -         4       -       -       -         5       -       -       -         13       -       -       -         4       -       -       -         5       -       -       -</td><td>T,       T,       T,       T,         Steps       Steps       Steps       Steps         12       - 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        1       3       -       -       1/3       -<td><math display="block"> \frac{T_{1}}{Steps} \frac{T_{3}}{Steps} \frac{T_{4}}{Steps} \frac{T_{5}}{Steps} \frac{T_{7}}{Steps} \frac{T_{7}}{Status} T_{</math></td></td></td></tr<>	Ti       Ti       Ti         Steps       Steps       Steps         12       -       -         5       14       -         4       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       3         12       -       -         1       3       -         2       3       -         13       -       -         2       -       -         3       -       -         13       -       -         2       -       -       -         3       -       -       -         4       -       -       -         5       -       -       -         13       -       -       -         4       -       -       -         5       -       -       -	T,       T,       T,       T,         Steps       Steps       Steps       Steps         12       -       -         5       1/4       /9         4       -       -         1       3       -         2       3       3         12       -       -         1       3       -         1       3       -         12       -       -         13       -       -         13       -       -         13       -       -         13       -       -         14       -       -         15       -       1         12       -       -         13       -       -         14       -       -         15       -       -         16       -       -         17       -       -         18       -       -         19       -       -         10       -       -         11       -       -         12       -       - <td>T<sub>1</sub>       T<sub>2</sub>       T<sub>3</sub>       T<sub>4</sub>       T<sub>5</sub>         Steps       Steps       Steps       Steps       Steps         12       -       -       -       -         5       1/4       /9       -       -       -         5       1/4       /9       -       -       -       -         1       3       -       -       1/3       -<td><math display="block"> \frac{T_{1}}{Steps} \frac{T_{3}}{Steps} \frac{T_{4}}{Steps} \frac{T_{5}}{Steps} \frac{T_{7}}{Steps} \frac{T_{7}}{Status} T_{</math></td></td>	T <sub>1</sub> T <sub>2</sub> T <sub>3</sub> T <sub>4</sub> T <sub>5</sub> Steps       Steps       Steps       Steps       Steps         12       -       -       -       -         5       1/4       /9       -       -       -         5       1/4       /9       -       -       -       -         1       3       -       -       1/3       - <td><math display="block"> \frac{T_{1}}{Steps} \frac{T_{3}}{Steps} \frac{T_{4}}{Steps} \frac{T_{5}}{Steps} \frac{T_{7}}{Steps} \frac{T_{7}}{Status} T_{</math></td>	$ \frac{T_{1}}{Steps} \frac{T_{3}}{Steps} \frac{T_{4}}{Steps} \frac{T_{5}}{Steps} \frac{T_{7}}{Steps} \frac{T_{7}}{Status} T_{$

Appendix C9 Woody Species Regeneration Form

Date 9/2/6	/
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