0042

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Skyline Mines
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DIV. OF OIL, GAS & MINING

July 19, 2004

Coal Regulatory Program
Attn.: Priscilla Burton
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801

Incoming
C/007/0005

RE: Mt. Nebo Scientific Vegetation Study of Eccles and Mud Creeks, 2002 and 2003, Canyon Fuel Company, LLC Skyline Mine, C/007/005.

Dear Ms. Burton:

Please find enclosed with this letter a copy of the Mt. Nebo Scientific report concerning the vegetation monitoring at selected sites along Eccles and Mud Creeks. This study is being conducted to determine the impacts, if any, on the bank vegetation on the two creeks due to the increased mine water discharge from Skyline Mine that began in 2001. We received this report on July 19, 2004. Additional copies will be submitted to be included in the 2003 Annual Report.

If you have questions, please give me a call at (435) 448-2669.

Sincerely:

Chris D. Hansen

Chris D. Hansen
Environmental Coordinator
Canyon Fuel Company, LLC.

enclosures

File in:
☐ Confidential
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For additional information

BASELINE MONITORING
RIPARIAN PLANT COMMUNITIES
AT
ECCLES CREEK & MUD CREEK

2002-2003

PREPARED
FOR THE
SKYLINE MINES

Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
Springville, Utah 84663
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Patrick D. Collins, Ph.D.

for

CANYON FUEL COMPANY
Skyline Mines
EC 35 Box 380
Helper, Utah 84526

July 2004

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BASELINE MONITORING
RIPARIAN PLANT COMMUNITIES
AT
ECCLES CREEK & MUD CREEK

2002-2003

INTRODUCTION

Brief History

In 2001 an unexpected event happened during coal mining activities at the Skyline Mine, near Scofield, Utah. A large amount of subsurface water was intercepted. This caused a significant inflow of water to the mine which made it necessary for mine personnel to de-water it so that mining could be resumed safely. The excess water was first channeled to previously mined areas that functioned as temporary holding reservoirs. However, the available underground holding capacity for the excess water was depleted before all of the intercepted water could be contained. Therefore, it was necessary for the mine to begin releasing excess waters to the surface and direct it down through Eccles Canyon Creek.

It has not been an unusual practice for the Skyline Mine to release small amounts of excess mine water to the surface through Eccles Canyon Creek. Prior to January 2000, the mine water discharge and Eccles Creek flows combined was usually less that 1,000 gallons per minute. Between January 2000 and August 2001, the combined waters was approximately 4,000 gpm. In

early August 2001 when the unexpected water was intercepted, the flows increased dramatically and remained at relatively constant rates for specific periods of time. The mine was discharging water to Eccles Creek at rate of about 9,000 gpm (range varied from 4,500 to 9,200 gpm) for the remainder of the year. In 2002 the mine discharged excess water at the rates between 6,200 gpm and 10,200 gpm. Again, discharge rates were usually constant for specific periods of time. From January through July 2003, discharges from the mine were generally between 8,000 gpm and 9,000 gpm. In August 2003, a pump was activated in James Canyon that has been used to pump much of the excess water from the mine to Electric Lake on the other side of the mountain instead of discharging it to Eccles Creek. There have been several exceptions when greater discharge volumes were released since that time, but in 2004 discharges from the mine to Eccles Creek have generally decreased to between 200 gpm and 1,800 gpm.

Previous Studies

A preliminary riparian study was conducted in December 2001 (Collins 2001), or the same year that the water was intercepted by the mine and discharged to Eccles Creek. The study basically followed Level II protocol (USDA Forest Service 1992). The objectives of that study was to conduct preliminary research to determine what the potential impacts of increased flows discharged to Eccles Creek and Mud Creek could have on the riparian plant and animal communities of these creeks – with emphasis on the plant communities. Primary objectives of the study were to: 1) identify riparian complexes in the field, 2) assess current condition of the riparian plant communities, 3) assess preliminary impacts of increased flows on these

communities, 4) provide general estimates of existing status and condition of channel stability, 5) acquire the minimum level of information needed to address several riparian issues, 6) provide a database and structure for more intensive studies if needed in the future, and 7) provide channel geomorphological information for Eccles Creek and Mud Creek [methodologies from Rosgen (1996)]. Earthfax Engineering also conducted a study about the same time that evaluated the hydrologic and channel stability of Eccles and Mud Creek (Earthfax Engineering 2001).

Study Area

The Skyline Mine at the location where the water has been released to Eccles Creek is less than 6 miles southwest of the town of Scofield and is located on the Wasatch Plateau in central Utah. Eccles Creek generally flows east from the mine until its confluence with Mud Creek. Mud Creek flows north through the town of Scofield, and continues north where it enters Scofield Reservoir, located approximately 1.3 miles north of the town. Elevation of the study area ranged from 7,500 ft to 8,560 ft above sea level.

Study Objectives

A baseline monitoring study of the riparian plant communities was conducted in representative areas of Eccles and Mud Creeks between the Skyline Mine and Scofield Reservoir. In general, monitoring was conducted during the period of time when the increased flows were having the greatest impact in the stream channels. This study is meant to be a companion or follow-up to the

Level II study mentioned above (Collins 2001). The purpose of the study was to monitor the condition of the riparian plant communities in 2002 and 2003 and compare the data of the two years. To the author's knowledge, no similar baseline riparian community studies had been done in these areas prior to the unexpected release of excess water to the Eccles and Mud Creeks. Therefore, because interception of the excess mine water and the subsequent necessity for its discharge to Eccles Creek was unexpected, *no control data (or data from the same riparian communities prior to the increased flows) was available to compare with the data presented in this report* .

The study is an attempt to quantitatively and qualitatively describe the riparian plant communities of Eccles Canyon Creek and Mud Creek during the growing seasons of two years. Therefore, the primary study objectives were to: 1) describe the status of the riparian plant communities in the two years, 2) quantify riparian complexes, 3) assess current condition of the plant communities and stream banks, 4) assess potential impacts of increased flows on these communities, 5) provide photographic documentation of the plant communities and sample sites, and 6) provide a baseline database and structure for more study if needed in the future.

METHODS

A Level III investigation was conducted for the riparian plant communities in the areas by using the methods of the USDA Forest Service (1992) as the basic format for the study. The Level III study had more quantitative data than the Level II study done previously.

Fieldwork was conducted in the month of August for both sample years. Sample transect locations were placed in a regular-random fashion every 400 ft in the Eccles Canyon Creek drainage and 800 ft in the Mud Creek drainage. At these locations line transects were placed across (or perpendicular to) the stream channel. By design, the line transects varied in length based on several factors. Although sometimes limited by topographical features such as bedrock outcrops, the intent was to make the transects long enough to cover the entire stream and its riparian communities, plus an additional 10 ft on each side of the stream to record the existing adjacent upland communities. Monitoring the total extent of the riparian plant communities, including the upland communities, provided information about possible increases or decreases of the riparian communities relative to the adjacent upland communities. When a transect was placed, the line-intercept method was employed to measure the extent of each plant community. The plant communities were named by the dominant two plant species, or if only one species dominated the community by a wide margin, the plant community was named by this single species. In addition, and as an attempt to get an idea of the composition of the plant communities, estimates of the proportions of each of the named species were provided in the *General Notes* section for many of the riparian plant communities.

Qualitative and qualitative data were also recorded at each sample location including the dominant upland communities on each side of the stream and general notes about each sample location. Color photographs were taken at consistent stations at each sample location. The sample locations and extent of the line transects were *semi*-permanently marked using 12" metal stakes, 18" wooden stakes, flagging and marker paint.

RESULTS & DISCUSSION

Data of the two-year study are shown on the summary tables included in this report. In addition, color photographs of each sample site have been included following the quantitative and qualitative data tables.

By reviewing the quantitative data, one can get an idea of the species composition at each sample site as well as measurements of the extent of each community. Methods to collect the data were not designed to measure minor or subtle changes in community composition, but major changes could be ascertained. The transect lines were used to measure and quantify the plant communities named by the dominant one or two plant species. Although the exact same sample locations were used in 2002 and 2003, "exact" placement of these lines could vary, if only by a few inches. This would account for some of the variability between years. Furthermore, one may notice a difference when the quantitative data is compared to the *General Notes* about composition proportions. This is because these notes were made to increase the level of detail of the quantitative data. To further explain this concept, the transects quantified a specific location where a given transect was placed. The composition information provided in the *General Notes* considered the sample site as a whole, rather than one specific location, thus providing more information of the entire riparian community found in the sample area.

Results in the tables provide cover measurements for upland vegetation, riparian vegetation and water width. A total of these parameters has also been provided. In some instances, this total,

when the two years are compared, were not exactly the same. This is probably due to other variables not included in the measurements such as rock or bareground.

The study compared two years of riparian components. Both study years had high water flows that began before the study was initiated. As mentioned, the study was designed to be able to document *major* changes in community structure or composition. Nevertheless, with the fluctuating flows, some changes in species composition is suggested by reviewing the data. Moreover, the trend suggests that the width of the riparian corridor may have increased somewhat between those two years. For example, for the Eccles Creek area, 18 of the sample sites seemed to have expanded their riparian vegetation width, 7 decreased and 4 remained that same. A similar trend occurred in the Mud Creek drainage. Eleven sites showed an increase in riparian vegetation, 5 decreased and 4 remained the same. Many of these increases coincided with a decrease in the upland vegetation measured.

Considering the designed level of detail for this study as well as inherent potential for some predicted error, the changes and differences between years were probably not significant from an ecological perspective. Although there were some banks that were recorded as "unstable" or "less that stable", there were no major catastrophic changes to the banks or the riparian plant communities near them in the sample areas. One possible exception to this statement has been described and shown in the photographs at Sample Site M20 where the bank failed between sample periods.

As mentioned previously, this study was without a "control" year to compare the sample years of the riparian communities prior to the increased flows from the mine site, but studies *were* conducted in 2001 (Collins 2001), 2002 and 2003 (the time periods with the highest flows). Vegetation data have not collected after these years, but flows have been significantly reduced by pumping much of the excess water from the mine to Electric Lake through James Canyon instead of discharging it through Eccles and Mud Creeks to Scofield Reservoir .

LITERATURE CITED

Collins, P.D. 2001. The effect of increased flows on riparian communities at Eccles Creek & Mud Creek. Mt. Nebo Scientific, Inc., Springville, UT. 28pp.

Earthfax Engineering. December 21, 2001. Draft: Hydrologic and channel-stability evaluation of Eccles and Mud Creeks (a *final report followed at a later date*). Earthfax Engineering, Salt Lake City, UT.

Rosgen, D. 1996. Applied river morphology. Wildland Hydrology. Pagosa Springs, CO.

USDA Forest Service. March 1992. Integrated riparian evaluation guide. Intermountain Region. Ogden, UT.

TABLE 1: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E1
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

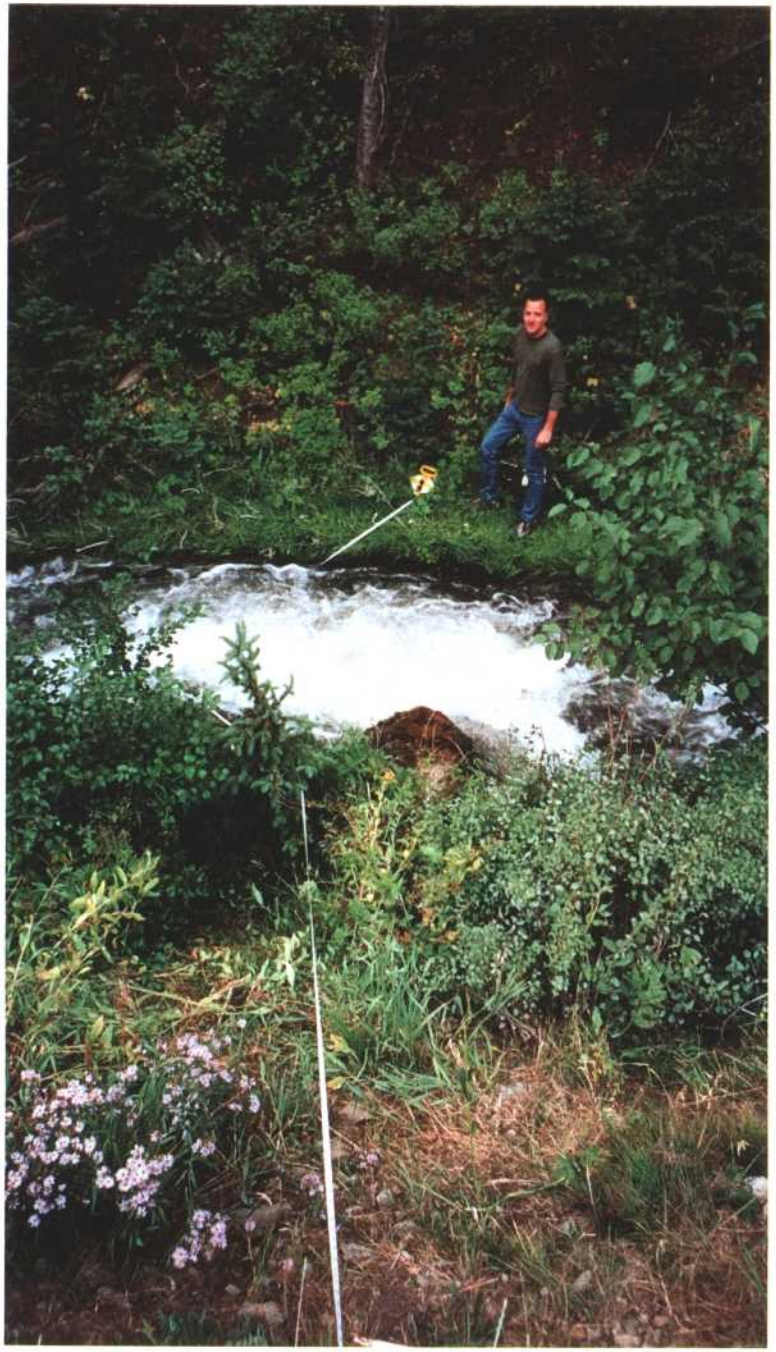
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E1

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus	10.0	8.0
Symphoricarpos oreophilus	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera/Urtica dioica	9.0	4.0
Equisetum arvense/Geranium richardsonii	2.0	15.0
Juncus ensifolius	4.0	
TOTAL COVER (Riparian Species)	15.0	19.0
TOTAL COVER (Upland Species)	20.0	18.0
STREAM (Water Width)	9.0	7.0
TOTAL COVER	44.0	44.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E1 T161 ½	2002	1. To begin study a random number for the first transect was generated. The first transect was place 355 ft downstream from the road culvert outlet near the mine's surface facilities. 2. The upland areas had some horsetail, but its existence was probably due to some influence from side-slope groundwater. 3. Bank was stable on both sides of stream.
	2003	1. Same methods and sample areas as 2002 were used in 2003. 2. Less upland area appeared this year (see quant. data). 3. Same comments about ground water above. 4. Both banks were stable.



Eccles Creek Riparian Sample Site E1 (2002)

Eccles Creek Riparian Sample Site E1 (2003)

TABLE 2: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E2
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

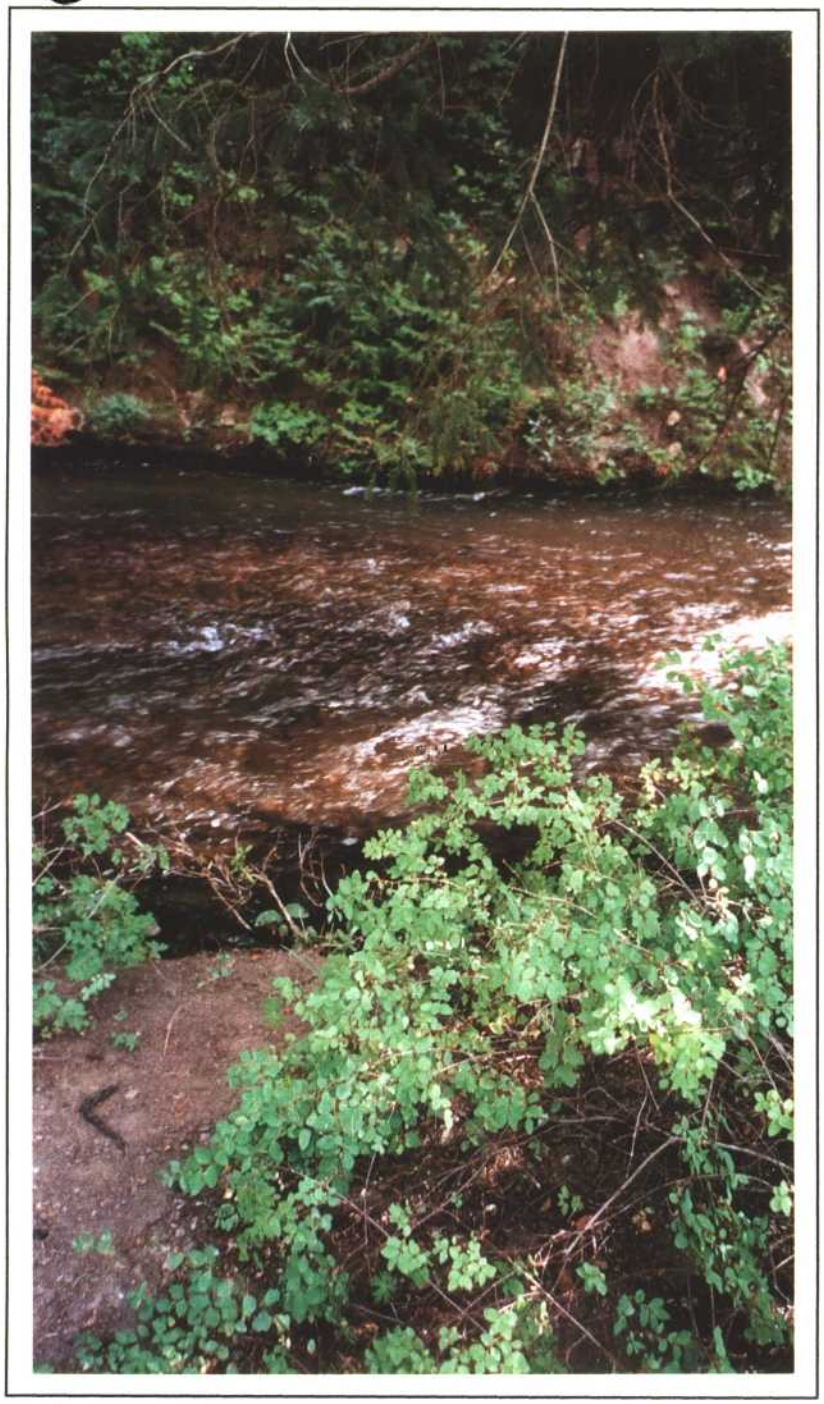
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E2

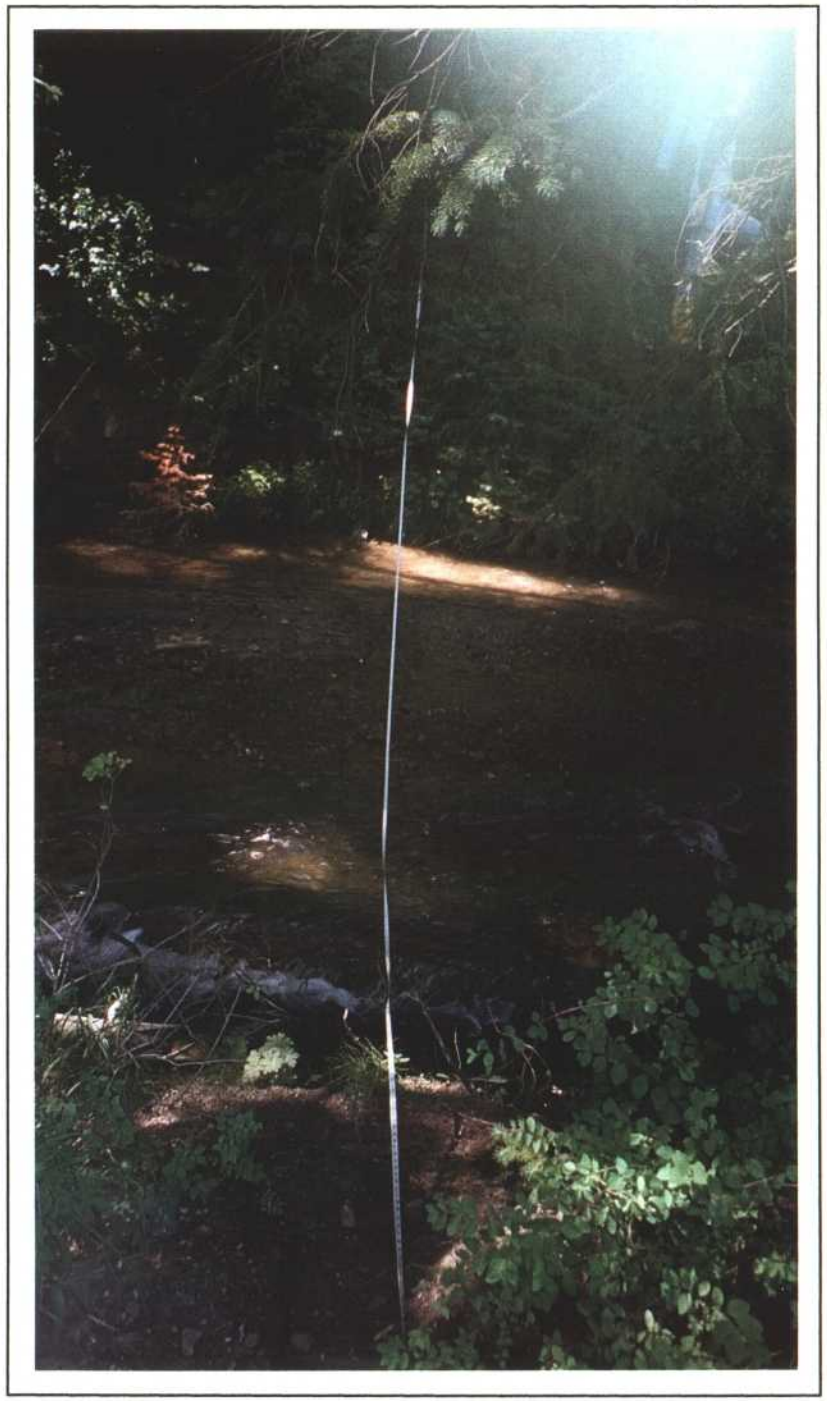
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Cornus sericea/(bareground)	10.0	10.0
Abies lasiocarpa	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Cornus sericea	1.0	
Dominant Herbaceous Species		
Equisetum arvense/Geranium richardsonii	1.5	3.0
TOTAL COVER (Riparian Species)	2.5	3.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	21.0	20.5
TOTAL COVER	43.5	43.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E2 T155	2002	1. River left upland area was mostly bareground. 2. River right had a steep bank with little riparian vegetation. 3. Bank was stable on both sides of stream.
	2003	1. Same notes as above. 2. The bank to the water was steep, but had vegetation.



Eccles Creek Riparian Sample Site E2 (2002)



Eccles Creek Riparian Sample Site E2 (2003)

TABLE 3: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E3
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

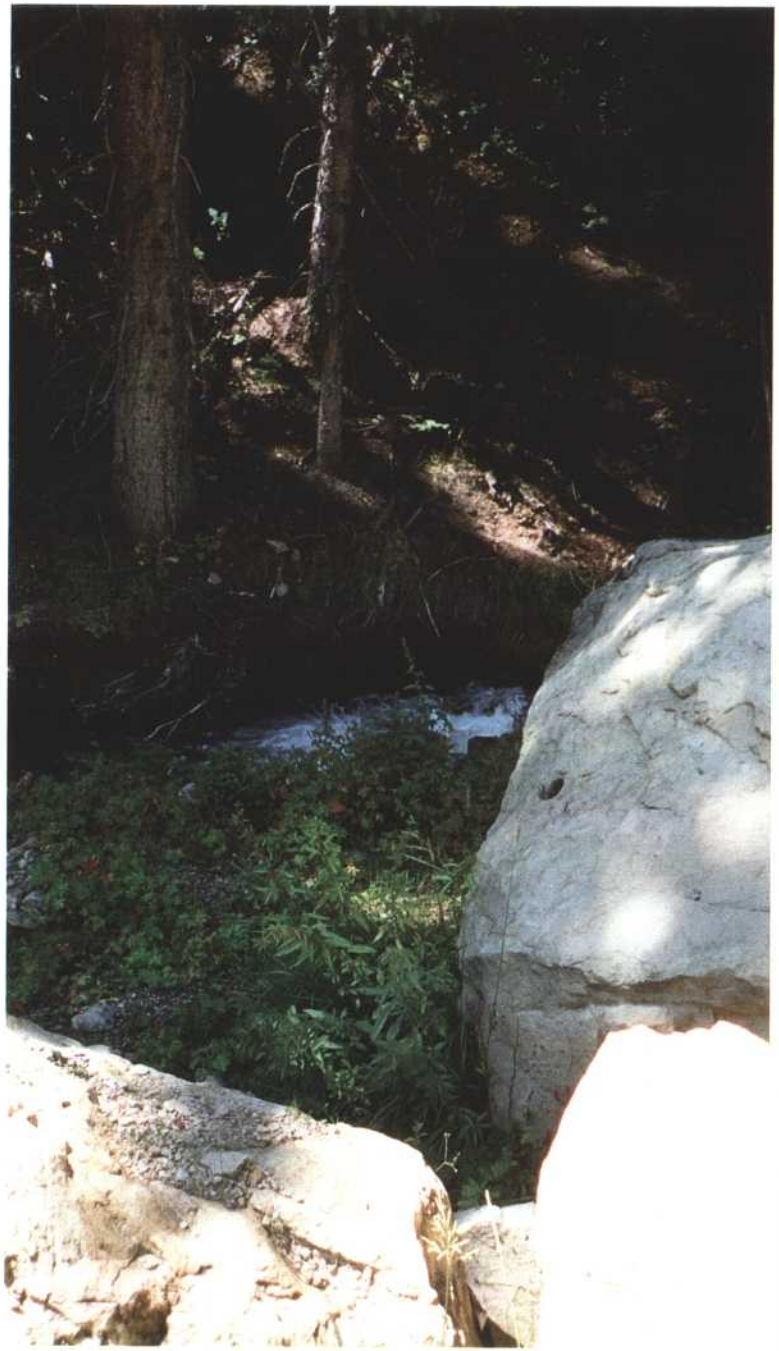
Eccles Creek: Cover by Community Types - E3

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
(Rock)	10.0	10.0
Picea engelmanii/(bareground)	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Geranium richardsonii/Carex microptera	12.5	13.0
TOTAL COVER (Riparian Species)	12.5	13.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	4.0	3.5
TOTAL COVER	36.5	36.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E3 T148	2002	1. Left side was about 99% rock cover. 2. There was some severe undercutting on right side bank (see photo). 3. Left bank was stable, right was unstable.
	2003	1. Riparian community on left was ~ geranium (80%); rushes (10%); wheatgrass (10%). 2. Bank was stable on left side. Right side was unstable.

Eccles Creek Riparian Sample Site E3 (2002)



Eccles Creek Riparian Sample Site E3 (2003)

TABLE 4: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E4
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

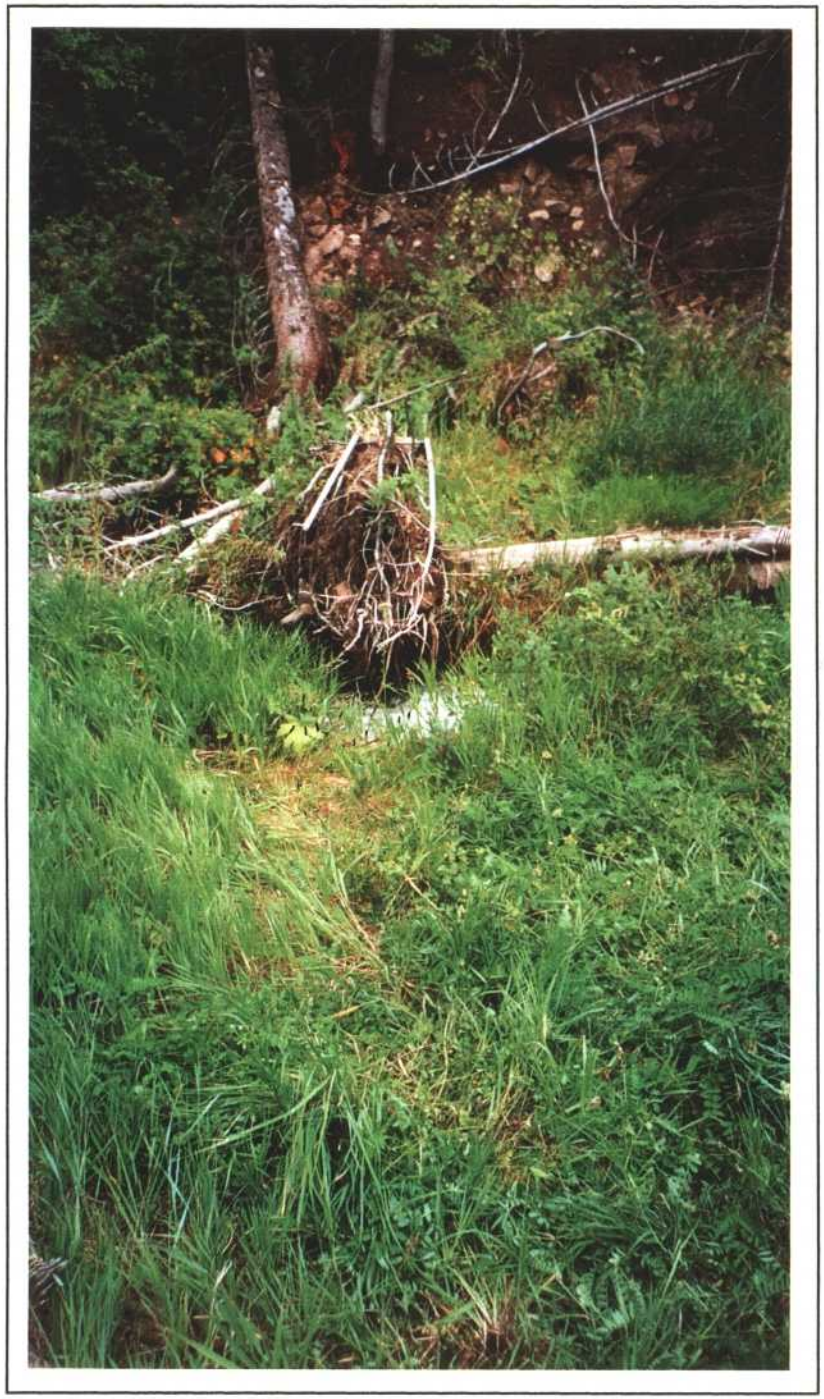
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E4

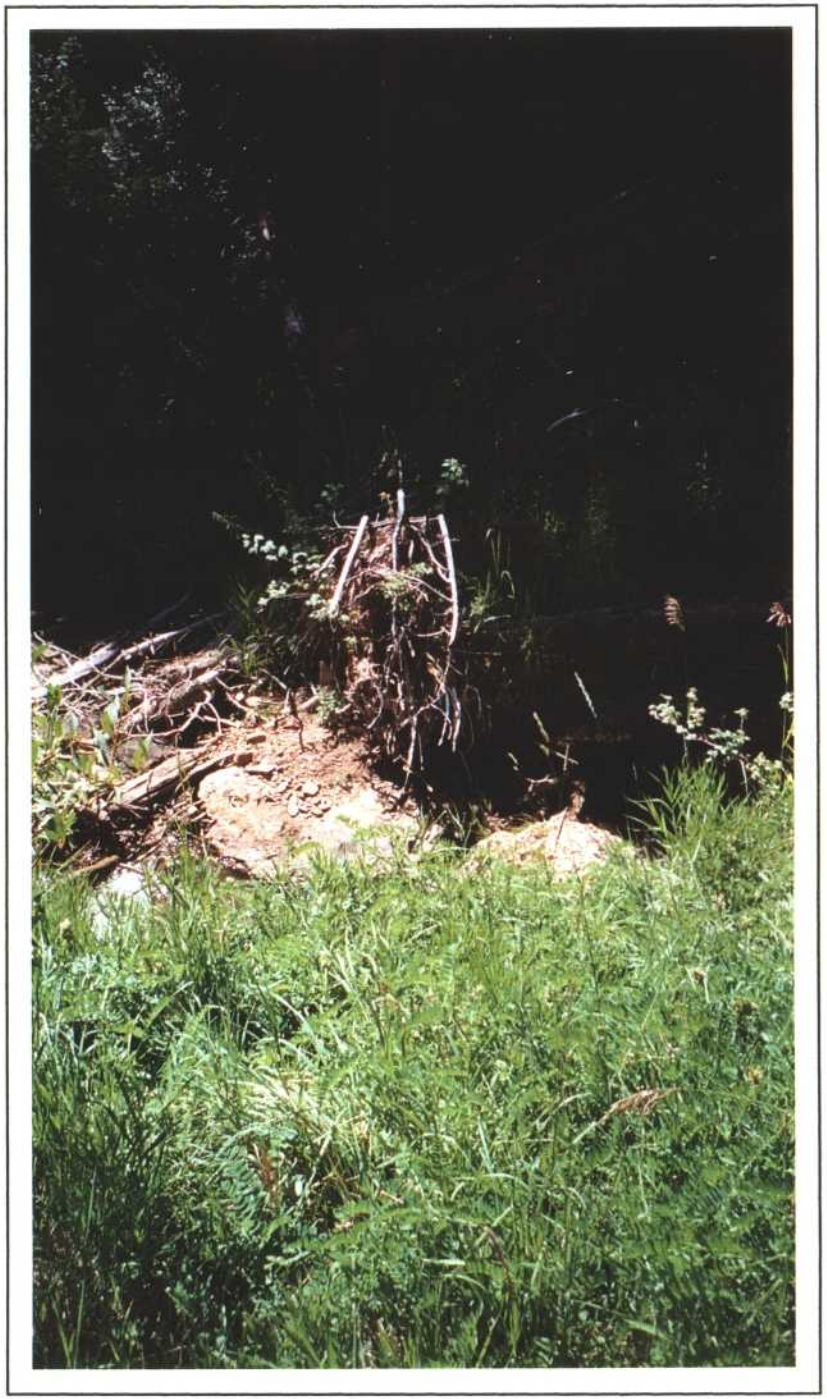
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Dactylis glomeratus/Astragalus cicer	10.0	10.0
Pinus engelmanii/(bareground)	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Equisetum arvense/Geranium richardsonii	3.25	
Geranium richardsonii/Phalaris arundinacea	14.0	18.0
TOTAL COVER (Riparian Species)	17.25	18.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	7.5	14.0
TOTAL COVER	44.75	52.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E4 T140	2002	1. On left side the cut bank was 3'2" from the water line. 2. The understory on the right side was bareground. 3. Left bank was unstable, right was stable.
	2003	1. The left bank was unstable and cut 4'7" from the waterline. 2. The right bank was armed with rocks and stable. 3. The right side riparian vegetation was ~ geranium (50%); canary reed grass (25%); timothy (25%).



Eccles Creek Riparian Sample Site E4 (2002)



Eccles Creek Riparian Sample Site E4 (2003)

TABLE 5: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E5
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

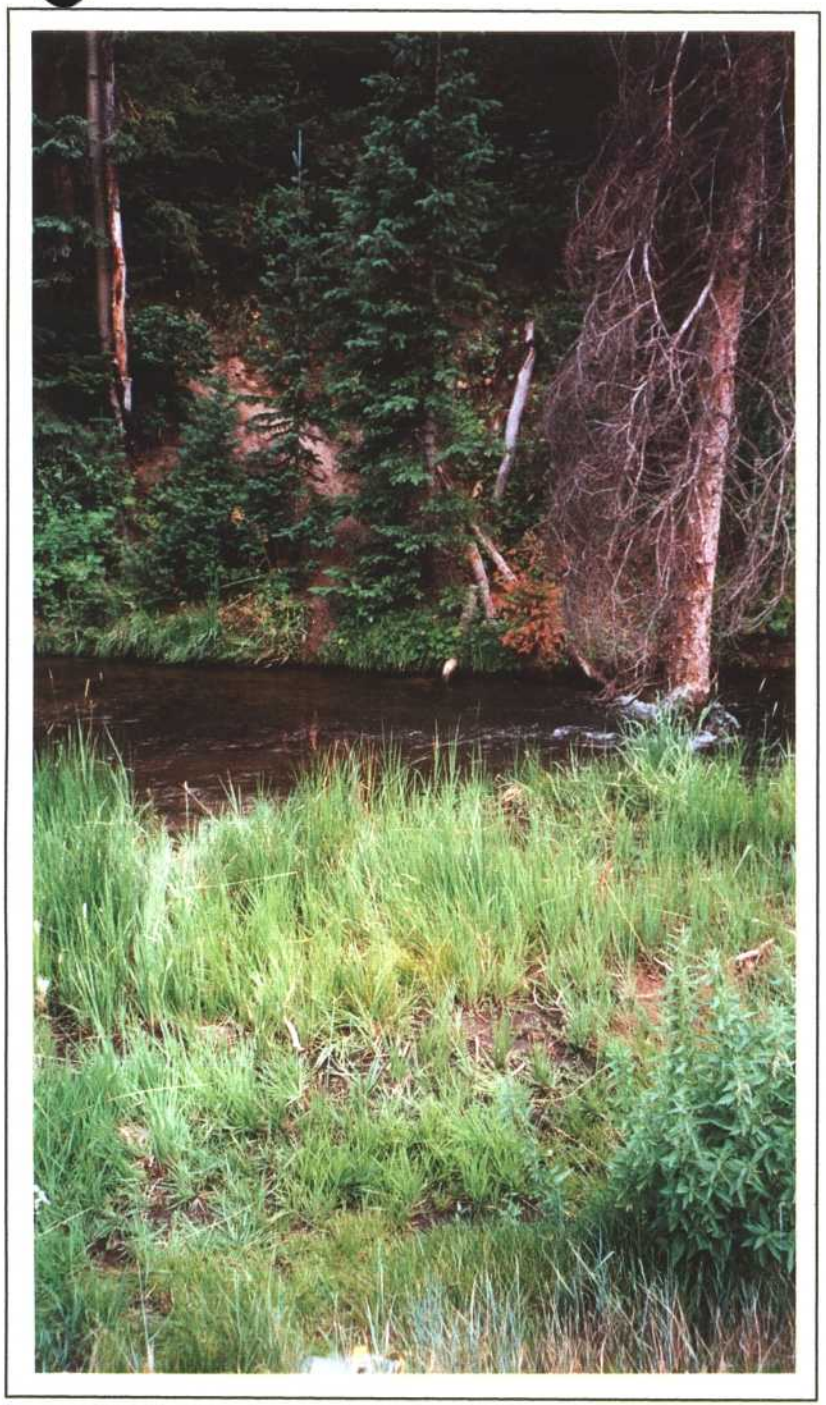
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E5

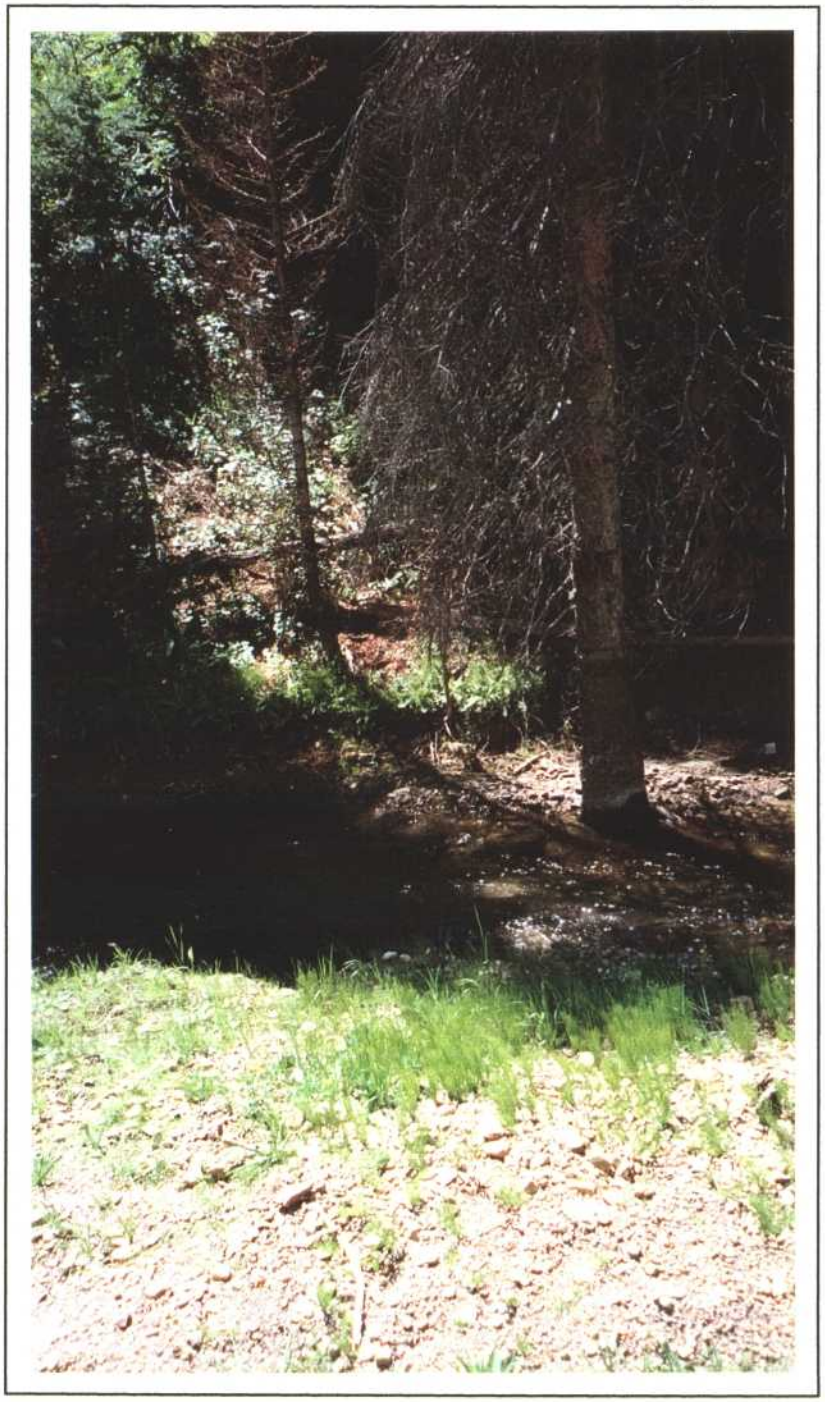
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Elymus smithii/(disturbed)	10.0	18.5
Abies concolor/Geranium richardsonii	10.0	12.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera/Geranium richardsonii	3.5	
Equisetum arvense/Hordeum jubatum		5.0
Equisetum arvense		4.0
Phleum pratense/Agrostis stolonifera	14.5	
TOTAL COVER (Riparian Species)	18.0	9.0
TOTAL COVER (Upland Species)	20.0	30.5
STREAM (Water Width)	14.5	13.0
TOTAL COVER	52.5	52.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E5 T134	2002	1. Both banks were stable. 2. This was an area where water could overflow banks with little damage. No water was present in the "overflow area".
	2003	1. The left bank was unstable and cut 18" by high water. 2. The left stake was removed by roadside erosion. 3. On the right side about ½ of the riparian zone was bareground due to higher water levels.



Eccles Creek Riparian Sample Site E5 (2002)



Eccles Creek Riparian Sample Site E5 (2003)

TABLE 6: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E6
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

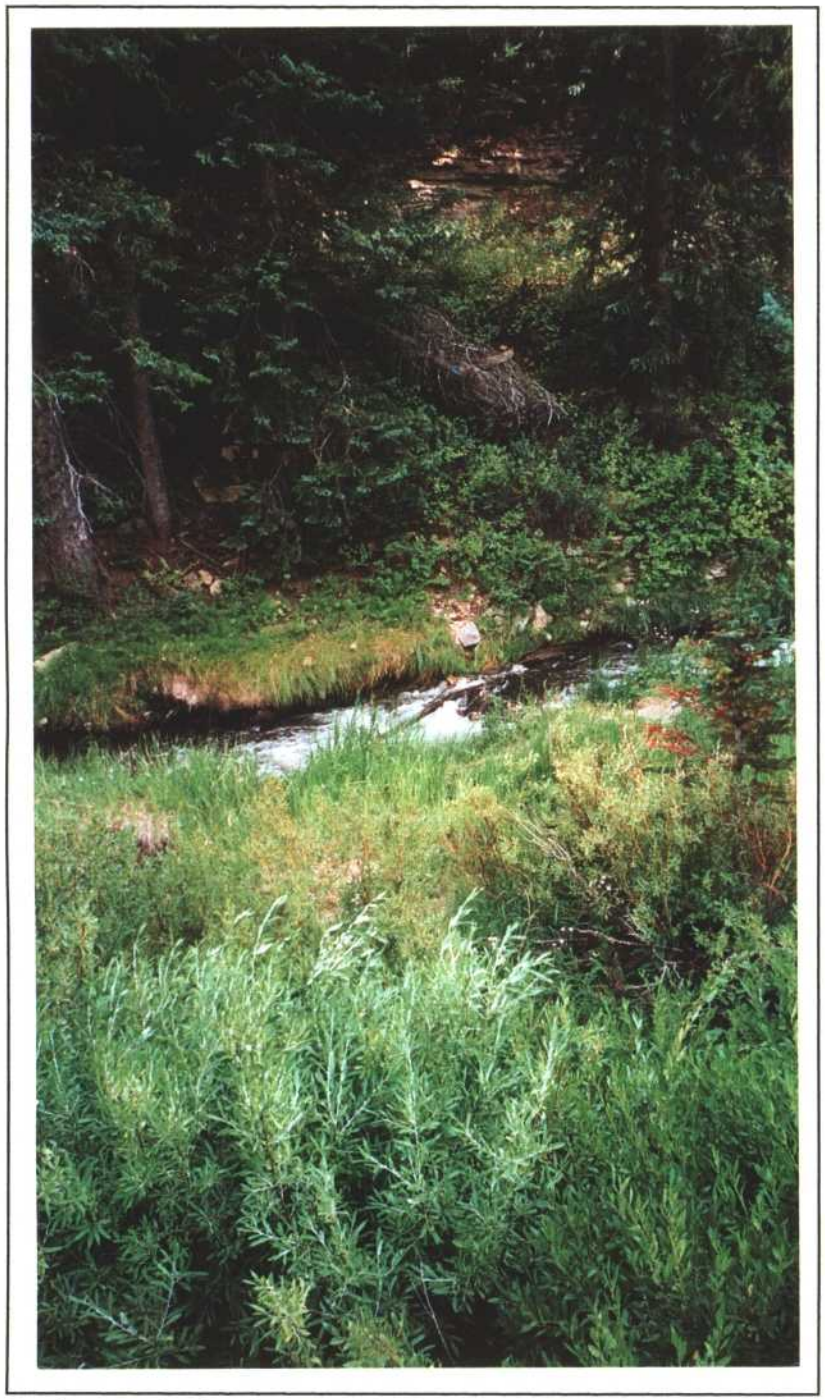
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E6

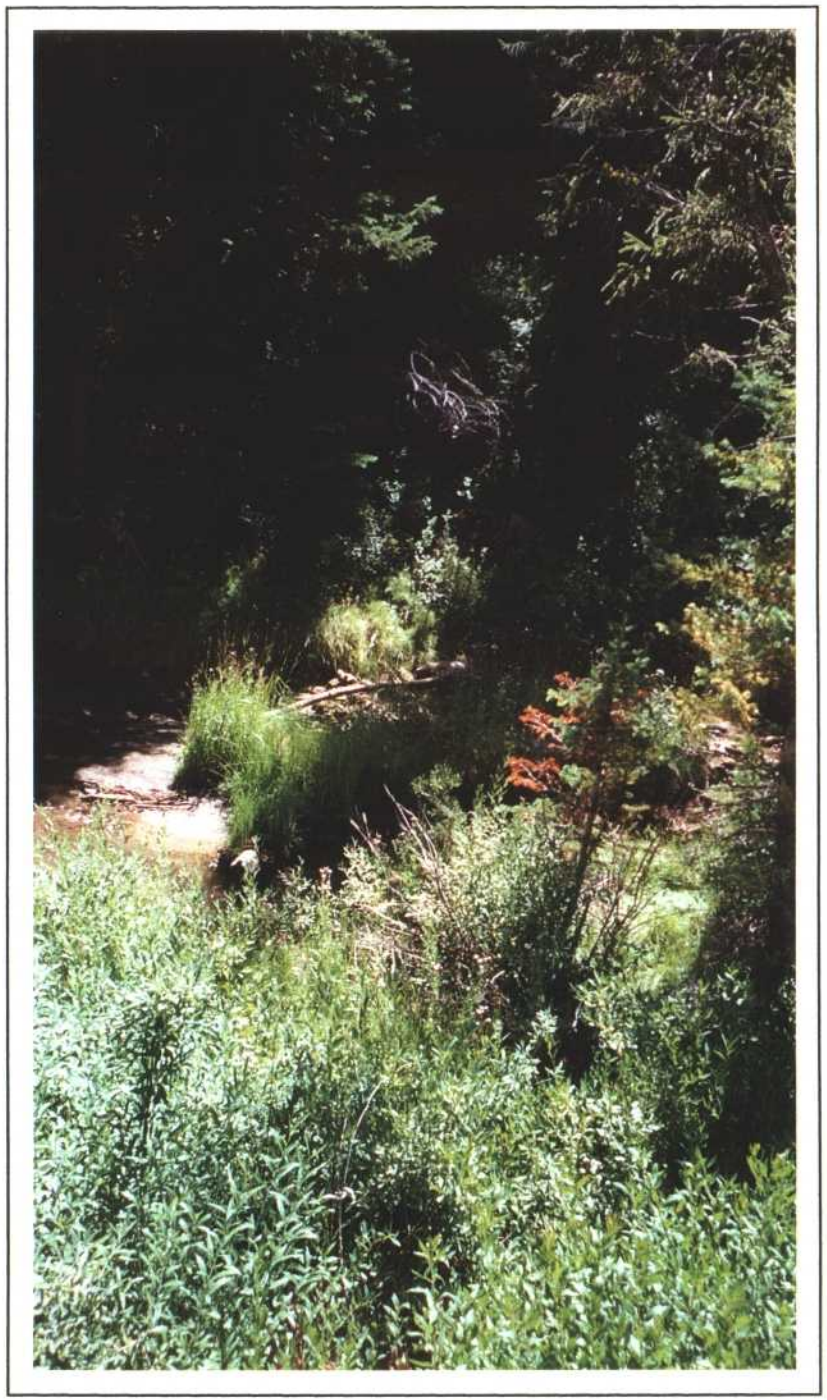
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
(Disturbed)	10.0	10.0
Ribes cereum	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Phleum pratense	36.0	
Salix boothii		10.0
Dominant Herbaceous Species		
Agrostis stolonifera		10.0
Equisetum arvense/Agrostis stolonifera	8.0	7.5
Phleum pratense/Agrostis stolonifera (mid-stream)		11.0
TOTAL COVER (Riparian Species)	44.0	38.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	15.5	21.0
TOTAL COVER	79.5	79.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E6 T128	2002	1. Left side upland area was about 90% road fill. Riparian community on left was ~ (approximately) willow (50%); timothy (30%); brome (20%). 2. Right side riparian vegetation was ~ horsetail (70%); redtop (30%). 3. Both banks were stable.
	2003	1. The left bank was unstable and cut 37". 2. Riparian community on left was ~ willow (50%); redtop (50%). 3. There was an island in the middle of the stream. 4. Riparian community on the right was ~ horsetail (80%); redtop (20%). 5. The right bank was less than entirely stable (a little unstable, but not bad). 6. Right side riparian vegetation was ~ horsetail (80%); redtop (20%).



Eccles Creek Riparian Sample Site E6 (2002)



Eccles Creek Riparian Sample Site E6 (2003)

TABLE 7: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E7
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

QUANTITATIVE DATA:

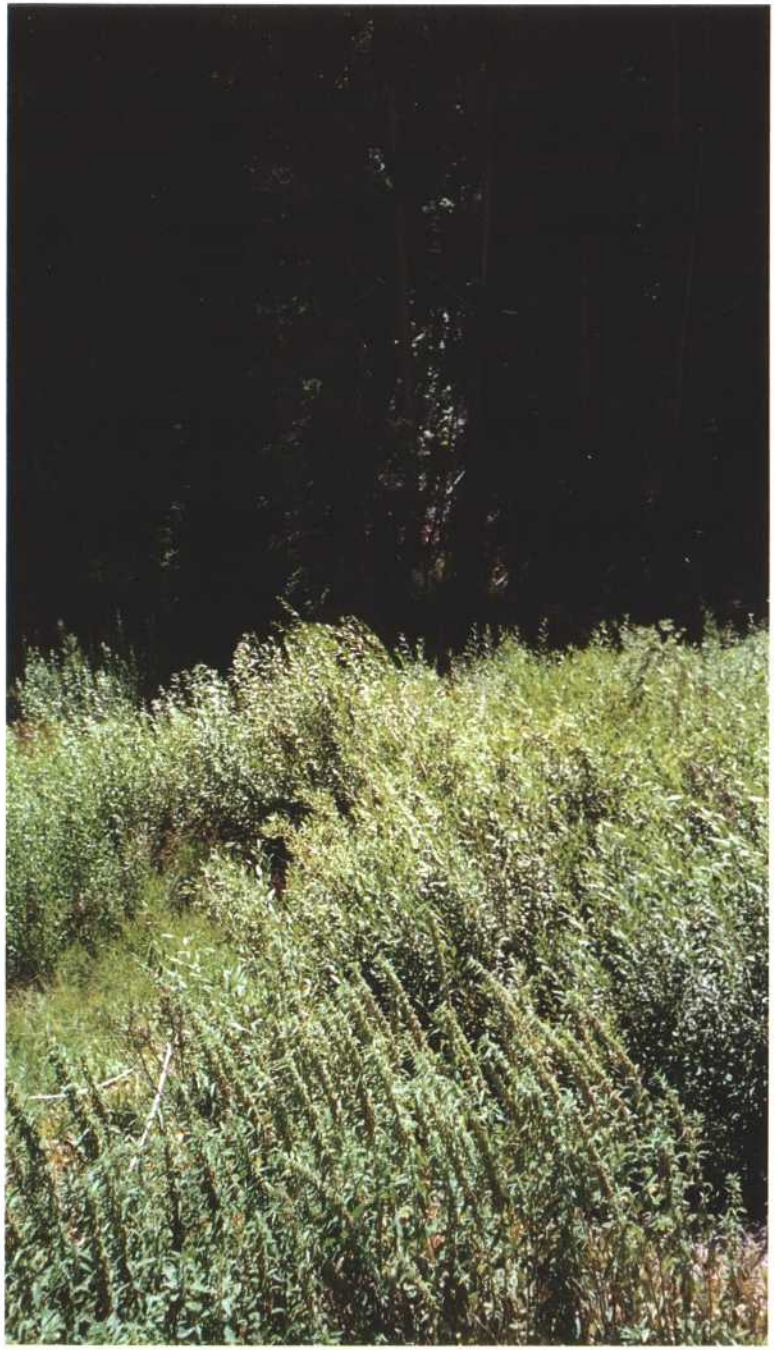
Eccles Creek: Cover by Community Types - E7

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
(Road fill)	10.0	8.0
Abies lasiocarpa/Symphoricarpos oreophilus	10.0	9.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Equisetum arvense		4.5
Salix boothii/Agrostis stolonifera	46.0	48.0
Dominant Herbaceous Species		
Equisetum arvense/Agrostis stolonifera	7.0	
TOTAL COVER (Riparian Species)	53.0	52.5
TOTAL COVER (Upland Species)	20.0	17.0
STREAM (Water Width)	11.0	14.5
TOTAL COVER	84.0	84.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E7 T122	2002	1. Left side riparian vegetation was ~ willow (65%); redtop (35%). 2. Right side was ~ horsetail (85%) and redtop (15%). 3. Both banks were stable.
	2003	1. The left bank was less than stable, or not as stable as most banks. 2. The left side riparian vegetation was ~ willow (60%); redtop (40%). 3. On the right side, sediment has been deposited and new riparian vegetation is beginning establishment (bank recovery taking place here).

Eccles Creek Riparian Sample Site E7 (2002)



Eccles Creek Riparian Sample Site E7 (2003)

TABLE 8: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E8
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E8

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
(Road fill)	10.0	10.0
Rosa woodsii/Equisetum arvensis	10.0	2.3
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	31.0	
Salix boothii/Cirsium sp.		26.0
Dominant Herbaceous Species		
Agrostis stolonifera		4.0
Equisetum arvensis/Geranium richardsonii		11.0
TOTAL COVER (Riparian Species)	31.0	41.0
TOTAL COVER (Upland Species)	20.0	12.3
STREAM (Water Width)	10.3	10.0
TOTAL COVER	61.3	63.3

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E8 T115	2002	1. Right side riparian vegetation was ~ willow (90%) and redtop near stream (10%). 2. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (35%); thistle (65%) and also redtop (near water). 2. Left and right banks had some undercutting that appeared to be more "normal" for this stream. The banks were quite stable. 3. Riparian plant species appeared to be moving in to the upland vegetation on the right side.

Eccles Creek Riparian Sample Site E8 (2002)

Eccles Creek Riparian Sample Site E8 (2003)

TABLE 9: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E9
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

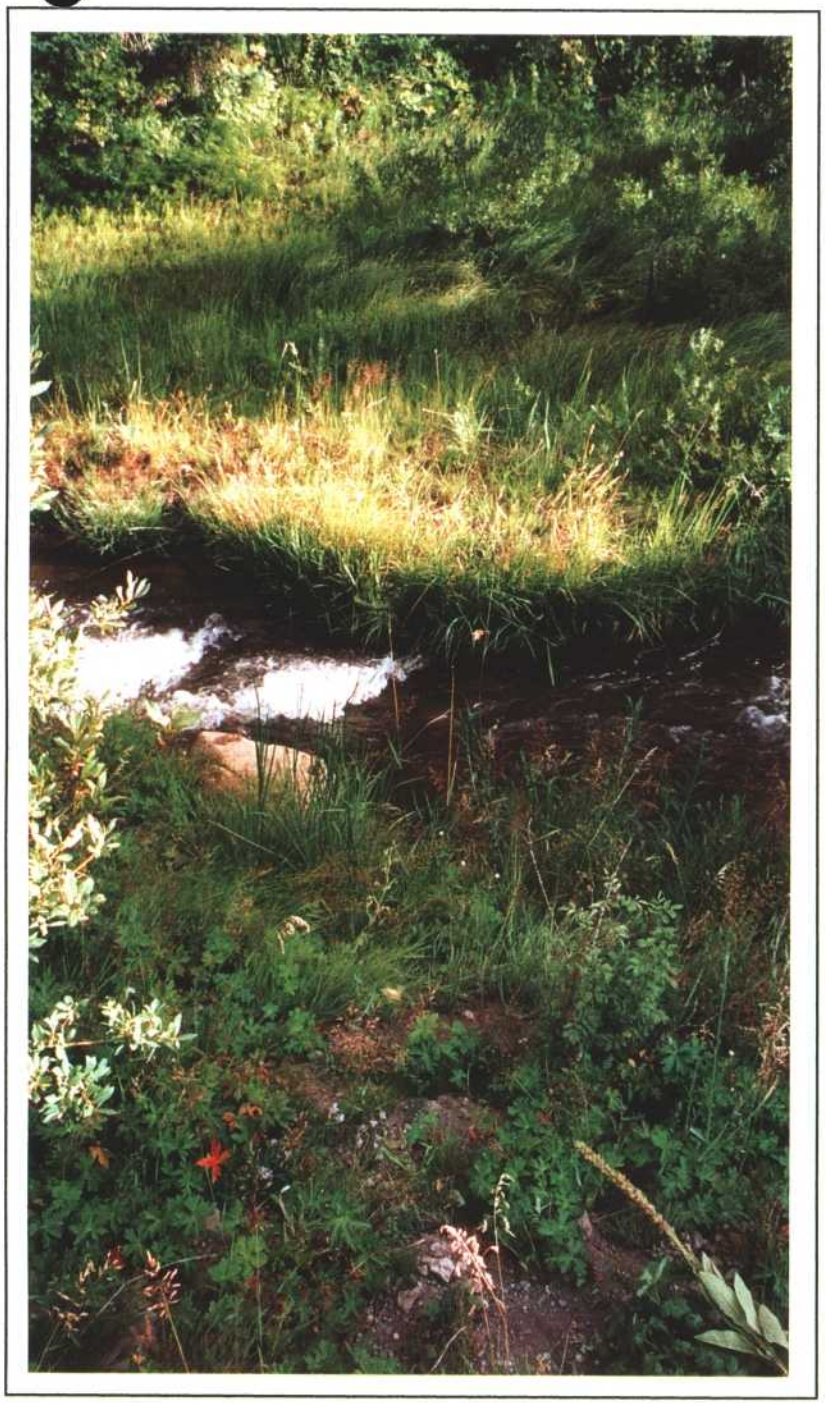
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E9

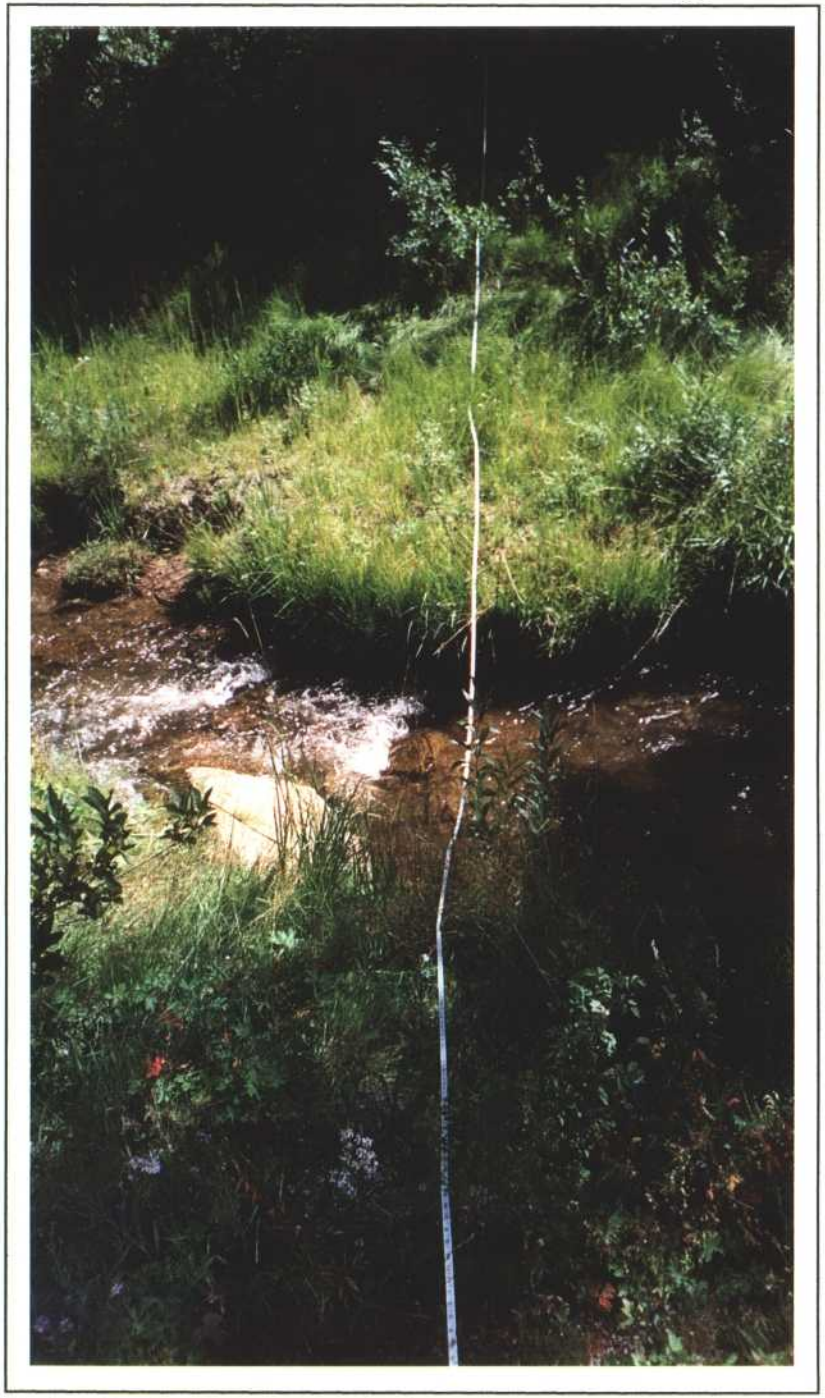
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Road Fill/Elymus smithii/Urtica dioica	10.0	2.0
Symphoricarpos oreophilus/Equisetum arvense	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera/Geranium richardsonii	3.5	12.0
Phleum pratense/Salix boothii	36.0	35.0
TOTAL COVER (Riparian Species)	39.5	47.0
TOTAL COVER (Upland Species)	20.0	12.0
STREAM (Water Width)	7.5	8.0
TOTAL COVER	67.0	67.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E9 T109	2002	1. Right side riparian vegetation was ~ redtop (80%); willow (20%). 2. Both banks were stable
	2003	1. Left side riparian vegetation was ~ geranium (80%); redtop (20%). 2. Right side riparian vegetation was ~ timothy (85%); willow (15%). 3. Both banks were stable



Eccles Creek Riparian Sample Site E9 (2002)



Eccles Creek Riparian Sample Site E9 (2003)

TABLE 10: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E10
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

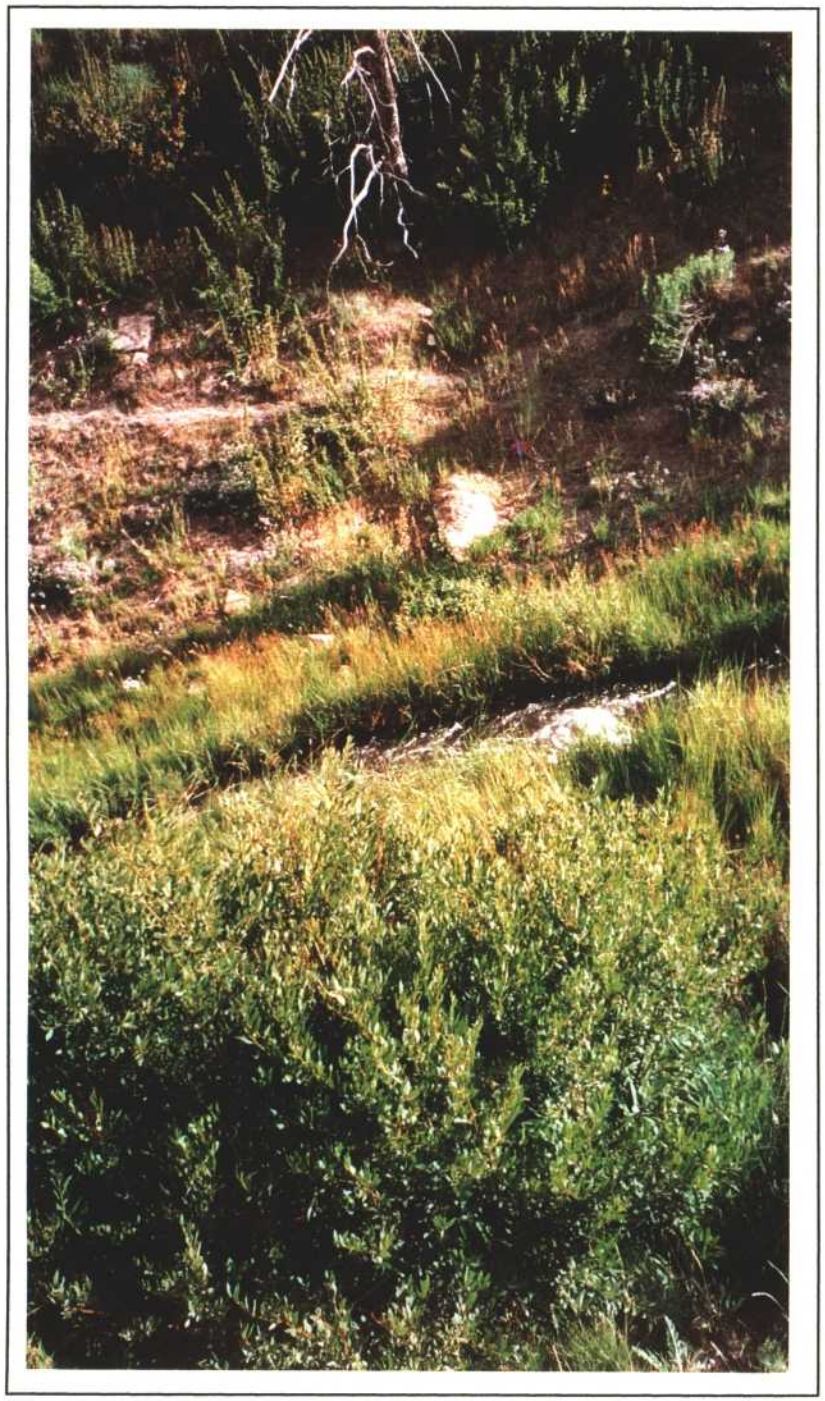
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E10

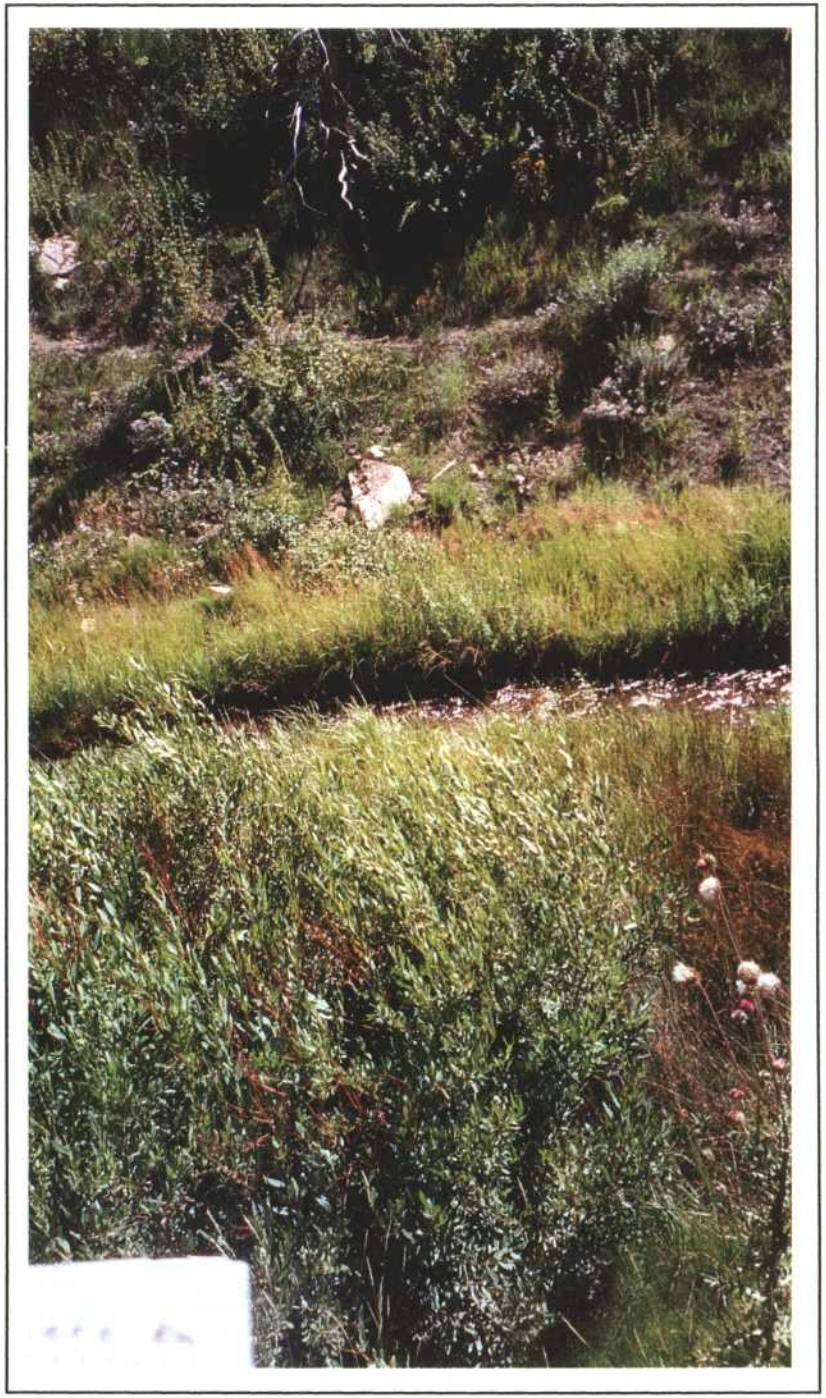
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Road Fill/Elymus smithii	10.0	9.0
Road Fill/Elymus smithii	10.0	7.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	5.0	7.0
Salix boothii/Juncus arcticus		21.0
Dominant Herbaceous Species		
Agrostis stolonifera/Salix boothii	19.0	
TOTAL COVER (Riparian Species)	24.0	28.0
TOTAL COVER (Upland Species)	20.0	16.0
STREAM (Water Width)	7.0	7.0
TOTAL COVER	51.0	51.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-10 T102	2002	1. Left side riparian vegetation was ~ willow (40%); redtop (60%). 2. Right side riparian vegetation was ~ rushes (70%) and sedges (30%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (50%); rush/sedge (50%). 2. The left bank was cut to 12" but still appeared quite stable. 3. Right side riparian vegetation was ~ willow (50%) and redtop (50%). 4. Both banks were somewhat less than perfectly stable. 5. Riparian plant species appeared to be moving in to the upland vegetation on both sides.



Eccles Creek Riparian Sample Site E10 (2002)



Eccles Creek Riparian Sample Site E10 (2003)

TABLE 11: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E11
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

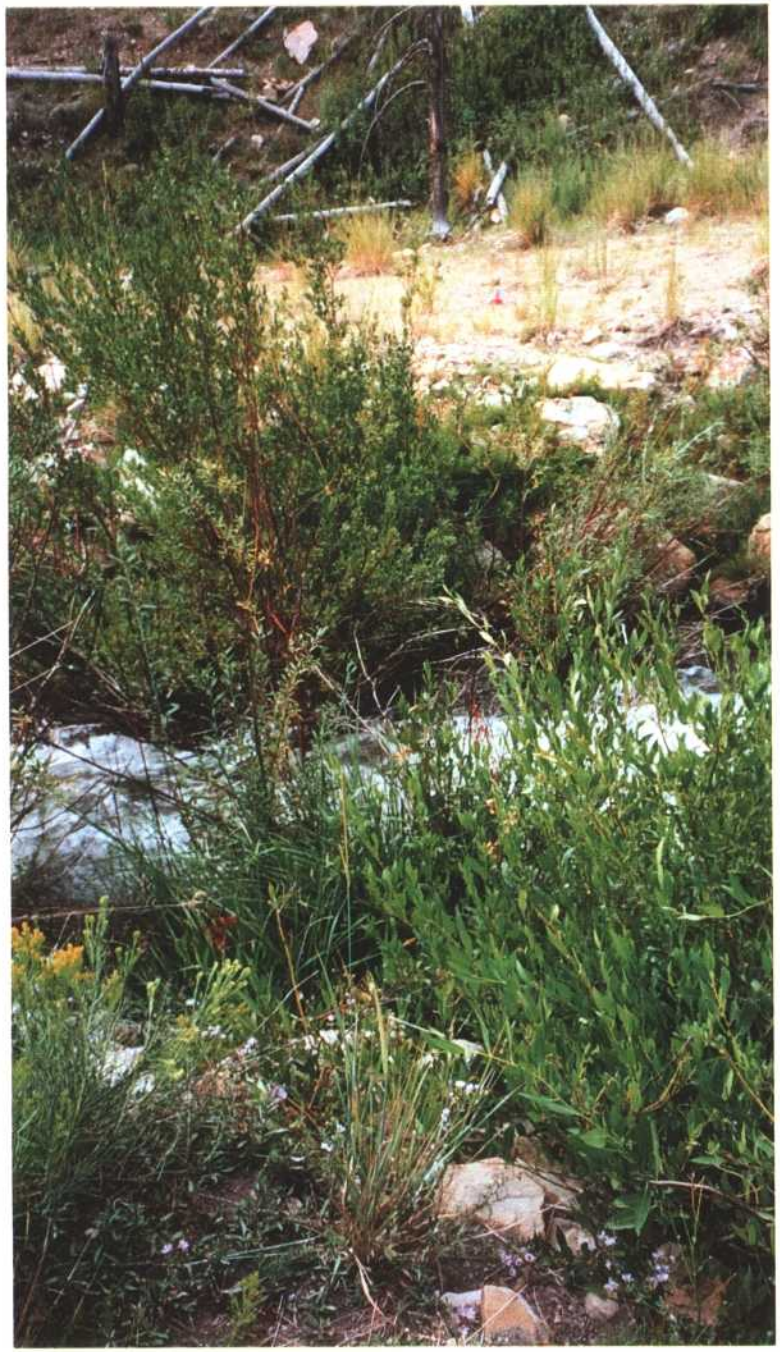
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E11

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Road Fill/Elymus cinereus	10.0	5.0
Disturbed/Elymus smithii	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii		16.5
Salix boothii/Phleum pratense	2.5	
Salix boothii/Equisetum arvense	6.0	
Dominant Herbaceous Species		
TOTAL COVER (Riparian Species)	8.5	16.5
TOTAL COVER (Upland Species)	20.0	15.0
STREAM (Water Width)	10.0	7.0
TOTAL COVER	38.5	38.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-11 T95	2002	1. Left side riparian vegetation was ~ willow (70%) and timothy (30%). 2. Right side riparian vegetation was ~ willow (50%) and horsetail (50%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (100%). 2. Right side riparian vegetation was ~ willow (100%). 3. Both banks were stable due to boulder armoring. 4. Riparian vegetation appeared to be increasing.



Eccles Creek Riparian Sample Site E11 (2002)

Eccles Creek Riparian Sample Site E11 (2003)

TABLE 12: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E12
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E12

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Road Fill/Elymus smithii/Urtica dioica	10.0	10.0
Abies lasiocarpa/Symphoricarpos oreophilus	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera		18.0
Dominant Herbaceous Species		
Agrostis stolonifera/Juncus longistylis	21.0	19.5
Equisetum arvense/Agrostis stolonifera	17.0	
TOTAL COVER (Riparian Species)	38.0	37.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	9.5	10.0
TOTAL COVER	67.5	67.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-12 T89	2002	1. Left side riparian vegetation was ~ rushes (50%) and redtop (50%). 2. Right side riparian vegetation was ~ redtop (80%); geranium (10%) and canary reed grass (10%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ rushes (25%) and redtop (75%). 2. Right side riparian vegetation was ~ willow (10%); redtop (90%). 3. Both banks were stable.

Eccles Creek Riparian Sample Site E12 (2002)

Eccles Creek Riparian Sample Site E12 (2003)

TABLE 13: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E13
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Curecanti family-Pathead complex* (30% Curecanti family loam; 25% Pathead extremely bouldery fine sandy loam; 25% Pathead extremely stony loam; 20% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E13

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Road Fill/Bromus carinatus	10.0	10.0
Abies lasiocarpa/Symphoricarpos oreophilus	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	32.0	30.5
Dominant Herbaceous Species		
Agrostis stolonifera/Urtica dioica	14.0	
Agrostis stolonifera		14.5
TOTAL COVER (Riparian Species)	46.0	45.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	6.5	7.5
TOTAL COVER	72.5	72.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-13 T83	2002	1. Left side riparian vegetation was ~ willow (60%); redtop (40%). 2. Right side riparian vegetation was ~ horsetail (65%)and geranium (35%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (35%); redtop (35%); Wood's Rose (30%). 2. Left and right banks had 9" cuts, but appeared quite stable. 3. Right side riparian vegetation was ~ redtop (100%).

Eccles Creek Riparian Sample Site E13 (2002)

Eccles Creek Riparian Sample Site E13 (2003)

TABLE 14: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E14
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

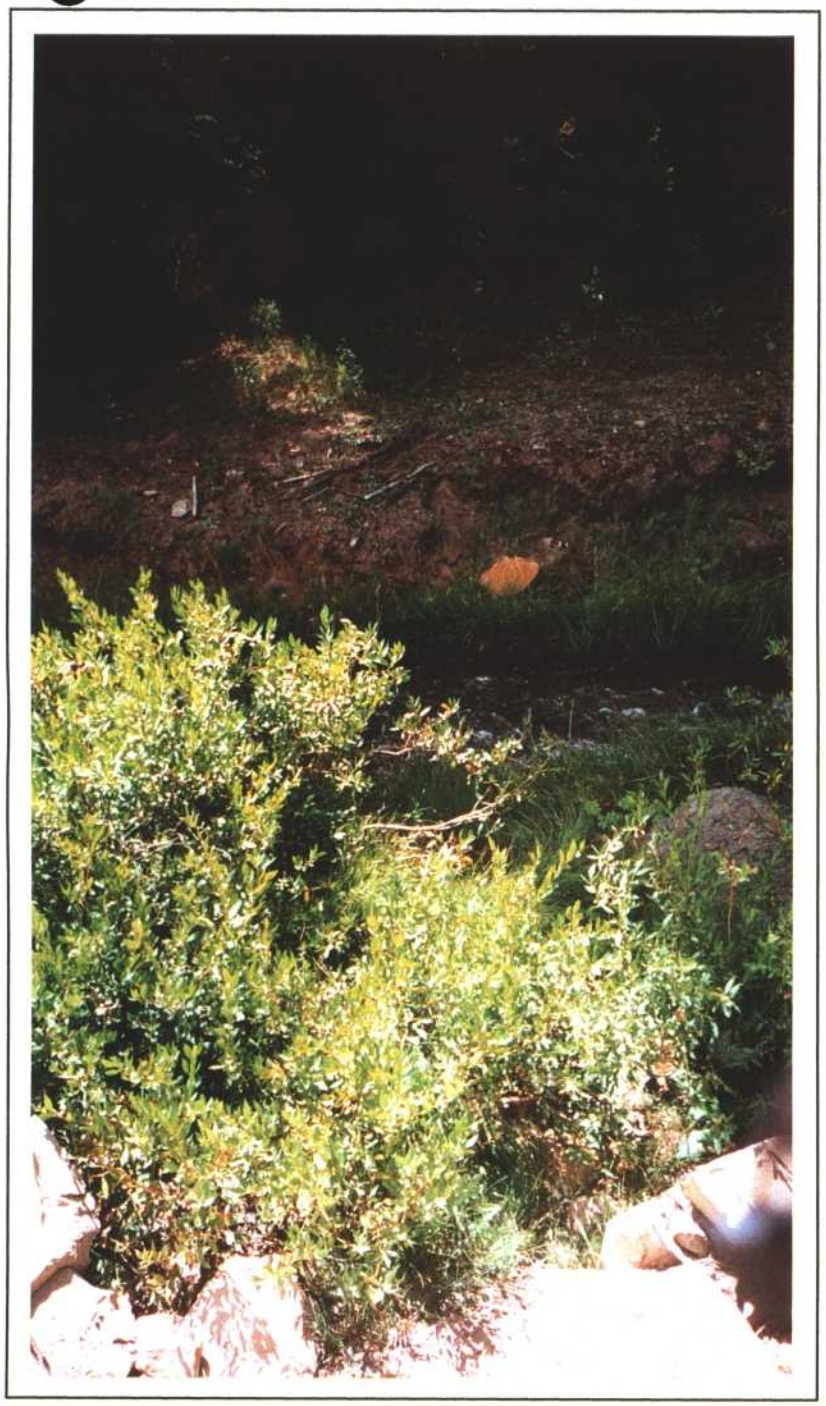
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E14

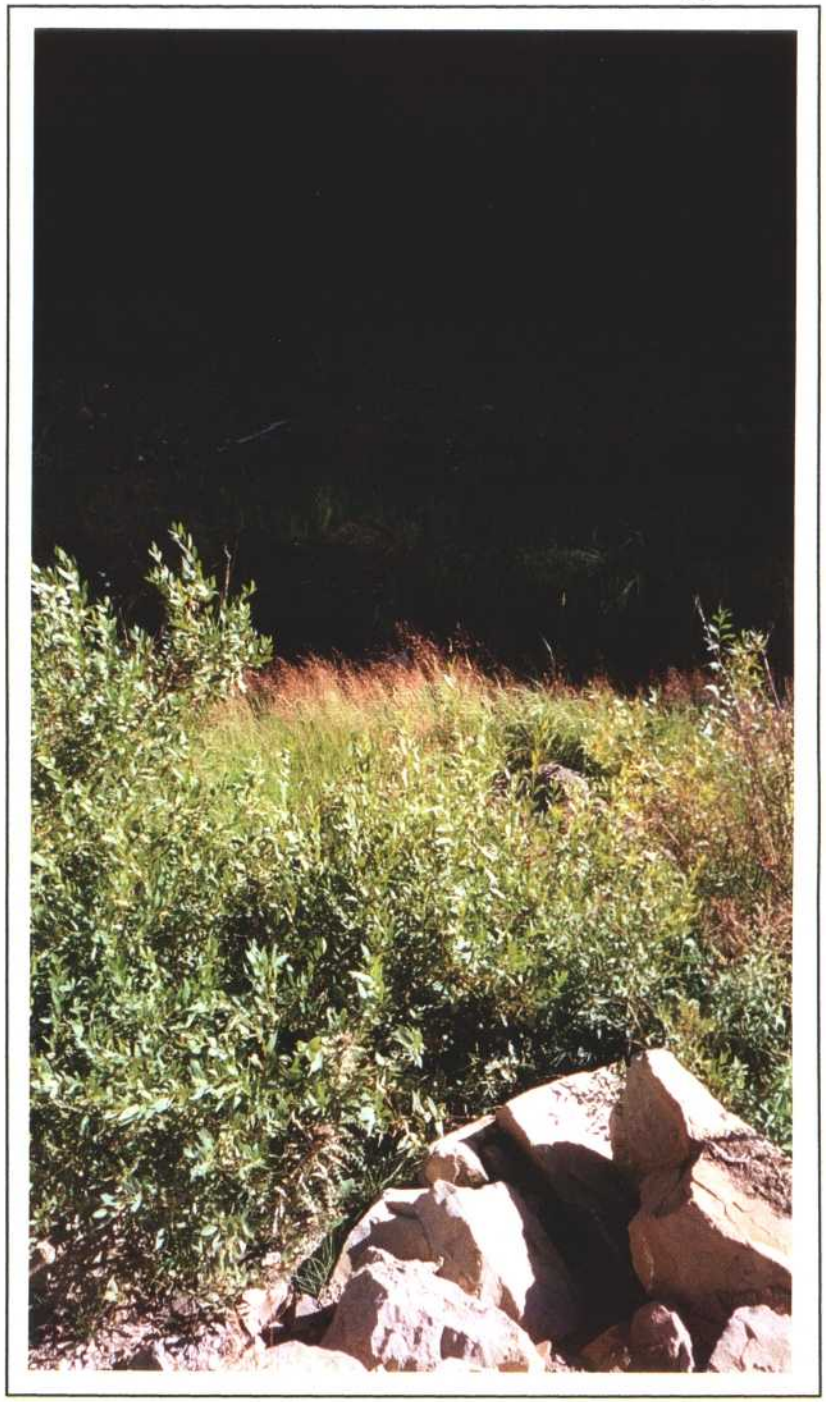
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Road Fill/Elymus smithii	10.0	8.0
Abies lasiocarpa/Equisetum arvense	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	11.0	12.5
Dominant Herbaceous Species		
Agrostis stolonifera		6.0
Equisetum arvense/Agrostis stolonifera	5.0	
TOTAL COVER (Riparian Species)	16.0	18.5
TOTAL COVER (Upland Species)	20.0	18.0
STREAM (Water Width)	8.0	7.5
TOTAL COVER	44.0	44.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-14 T76	2002	1. Left side riparian vegetation was ~ willow (50%) and redtop (50%). 2. Right side riparian vegetation was ~ horsetail (75%)and redtop (25%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (30%) and redtop (70%). 2. Right side riparian vegetation was ~redtop (100%). 3. Both banks were stable.



Eccles Creek Riparian Sample Site E14 (2002)



Eccles Creek Riparian Sample Site E14 (2003)

TABLE 15: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E15
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E15

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
(Road Fill)/Bromus carinatus	10.0	9.0
Urtica dioica	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	12.0	14.0
Dominant Herbaceous Species		
Agrostis stolonifera		1.5
Phleum pratense/Agrostis stolonifera	1.5	
TOTAL COVER (Riparian Species)	13.5	15.5
TOTAL COVER (Upland Species)	20.0	19.0
STREAM (Water Width)	8.0	7.0
TOTAL COVER	41.5	41.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-15 T70	2002	1. Left side riparian vegetation was ~ timothy (70%) and redtop (30%). 2. Right side riparian vegetation was ~ willow (30%)and redtop (70%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (75%); redtop (25%). 2. Right side riparian vegetation was ~redtop (100%). 3. Both banks were stable.

Eccles Creek Riparian Sample Site E15 (2002)

Eccles Creek Riparian Sample Site E15 (2003)

TABLE 16: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E16
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

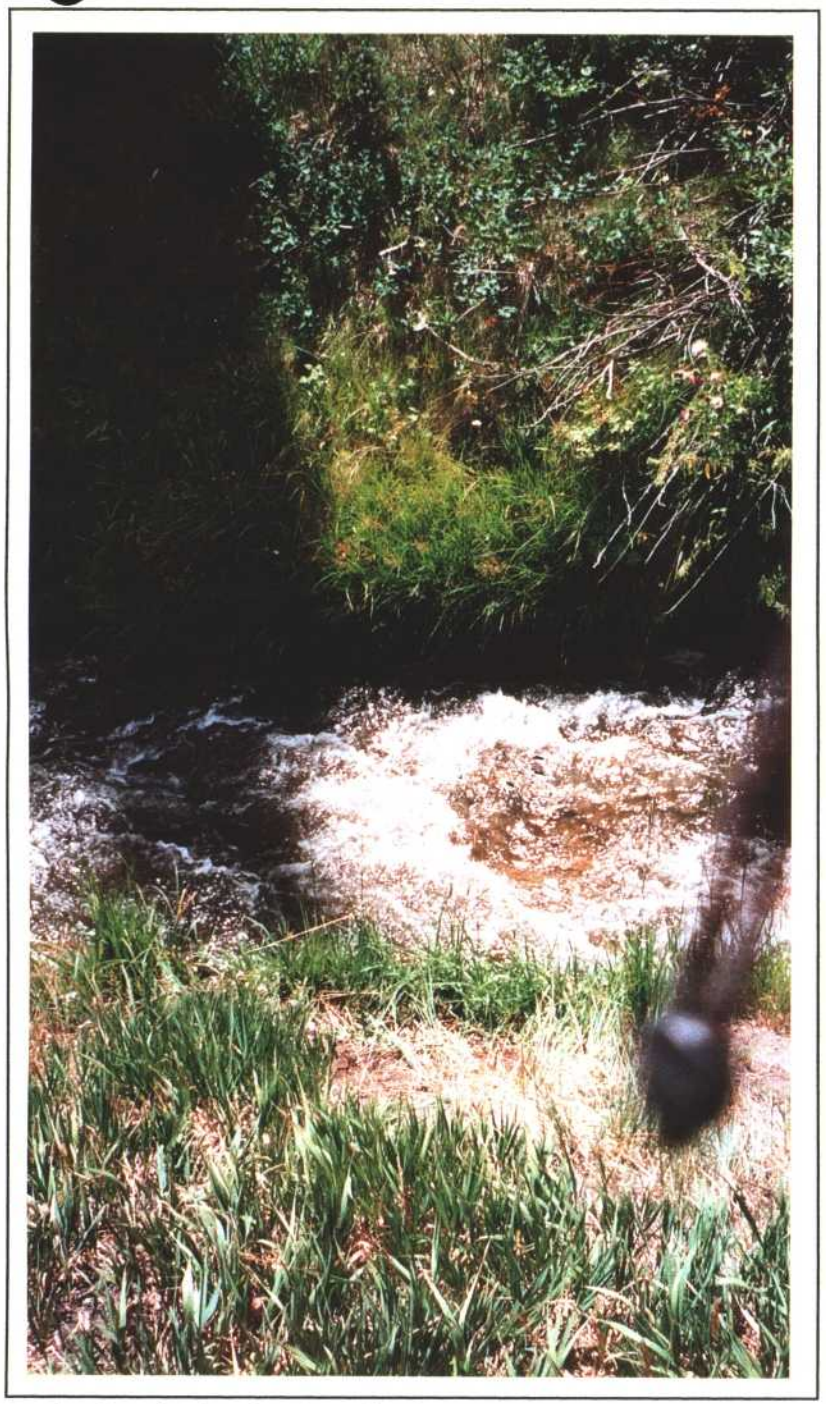
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E16

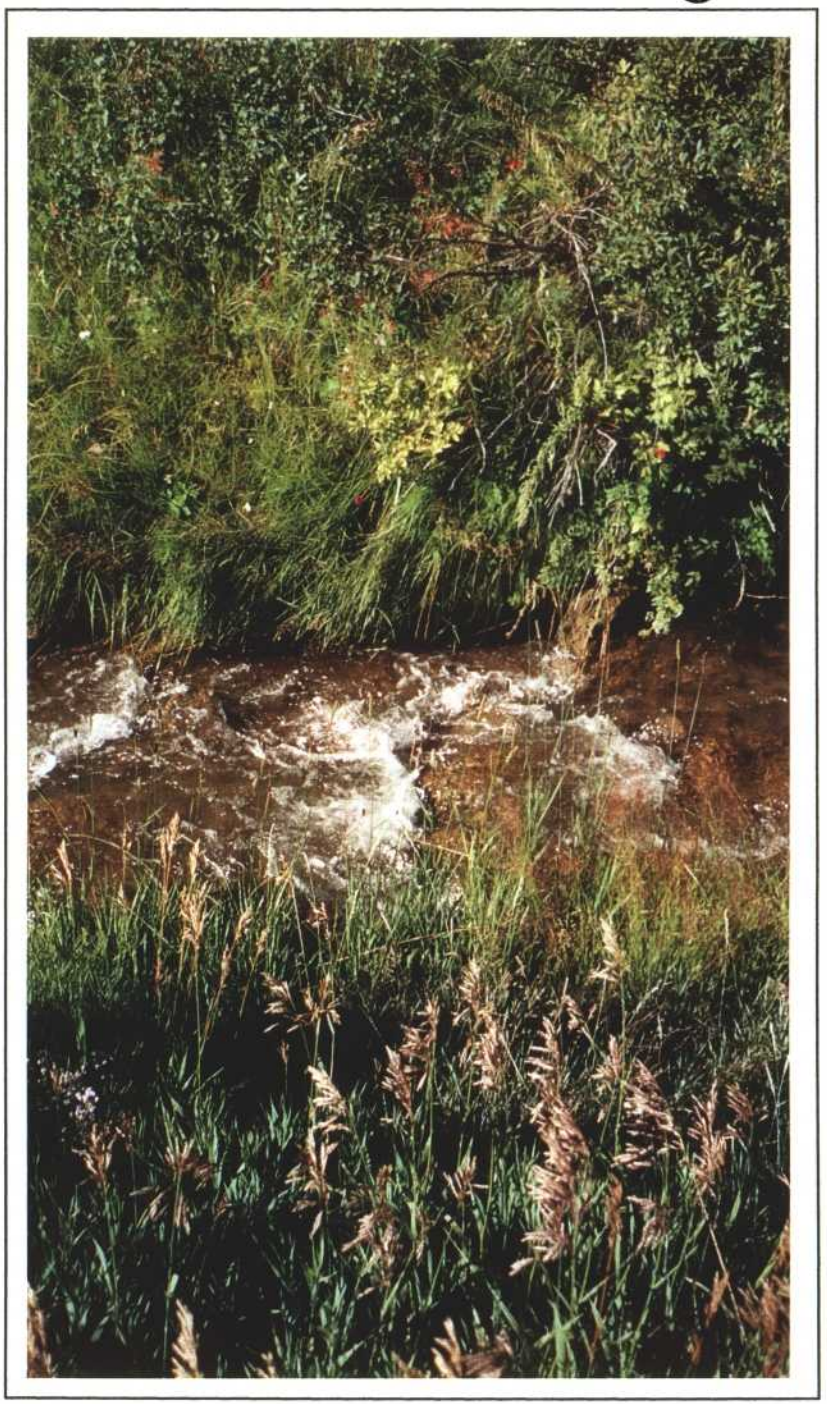
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus	10.0	10.0
Abies lasiocarpa	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	38.0	26.5
Dominant Herbaceous Species		
Agrostis stolonifera		13.0
Phleum pratense/Agrostis stolonifera	1.5	1.5
TOTAL COVER (Riparian Species)	39.5	41.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	8.0	6.5
TOTAL COVER	67.5	67.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-16 T63	2002	1. Wetland/riparian vegetation was supported on flat areas 10 ft above the river level. This may be due to influence of the stream or other water sources. 2. The upper area was ~ willow (90%) and redtop (10%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ timothy (60%) and redtop (40%). 2. See notes above about upper flat areas. 3. The upper area was ~ willow (90%) and redtop (10%). 4. Both banks were stable.



Eccles Creek Riparian Sample Site E16 (2002)



Eccles Creek Riparian Sample Site E16 (2003)

TABLE 17: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E17
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

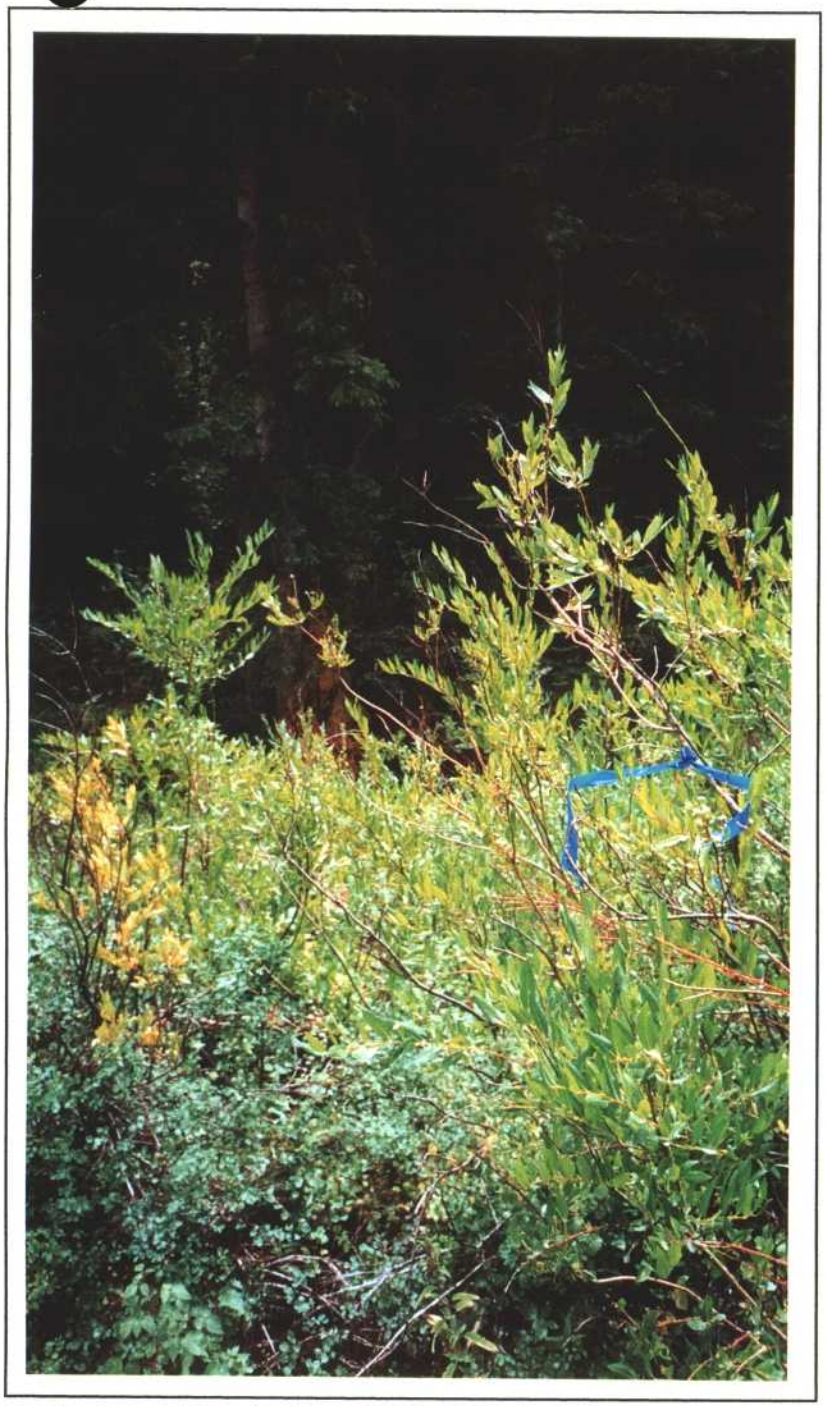
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E17

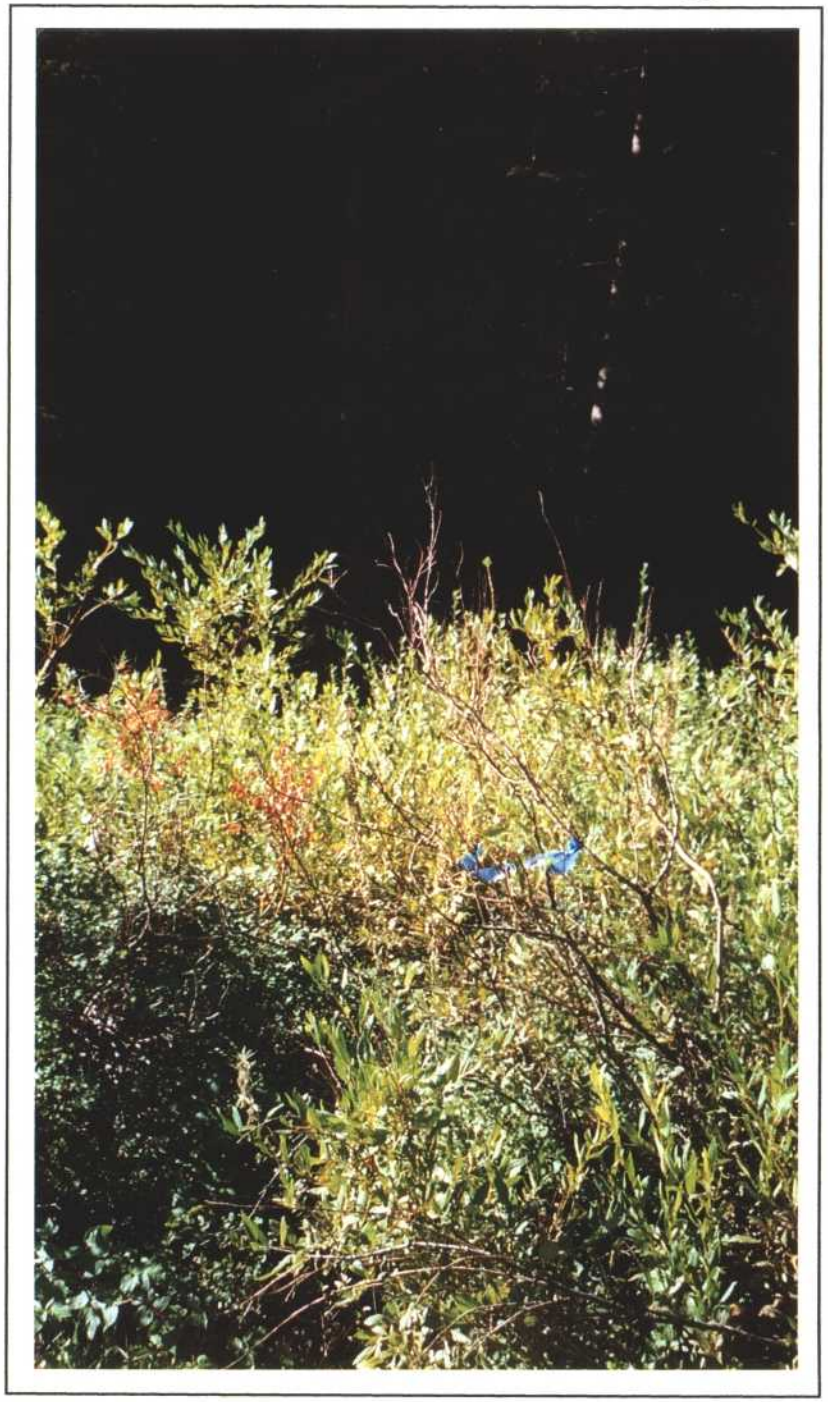
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus	10.0	10.0
Abies lasiocarpa/Ribes aureum	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	40.0	
Salix boothii		28.0
Dominant Herbaceous Species		
Agrostis stolonifera		9.0
Equisetum arvense/Agrostis stolonifera	1.0	
TOTAL COVER (Riparian Species)	41.0	37.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	13.0	17.0
TOTAL COVER	74.0	74.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-17 T57	2002	1. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (75%); redtop (25%). 2. Right side had little riparian vegetation due to boulders. 3. Both banks were stable.



Eccles Creek Riparian Sample Site E17 (2002)



Eccles Creek Riparian Sample Site E17 (2003)

TABLE 18: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E18
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E18

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Elymus smithii/Bromus carinatus	10.0	20.0
Abies lasiocarpa/Lonicera involucrata	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	22.0	11.0
Dominant Herbaceous Species		
Equisetum arvense/Agrostis stolonifera	1.0	1.0
TOTAL COVER (Riparian Species)	23.0	12.0
TOTAL COVER (Upland Species)	20.0	30.0
STREAM (Water Width)	9.0	10.0
TOTAL COVER	52.0	52.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-18 T50	2002	1. Left side riparian vegetation was ~ willow (65%) and redtop (35%). 2. Right side riparian vegetation was ~ fir (90%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow (50%); redtop (50%); but there was some current and twinberry in the area too. 2. Right side was a steep vegetated bank with a large spruce tree holding the bank in place. 3. Both banks were stable.

Eccles Creek Riparian Sample Site E18 (2002)

Eccles Creek Riparian Sample Site E18 (2003)

TABLE 19: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E19
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

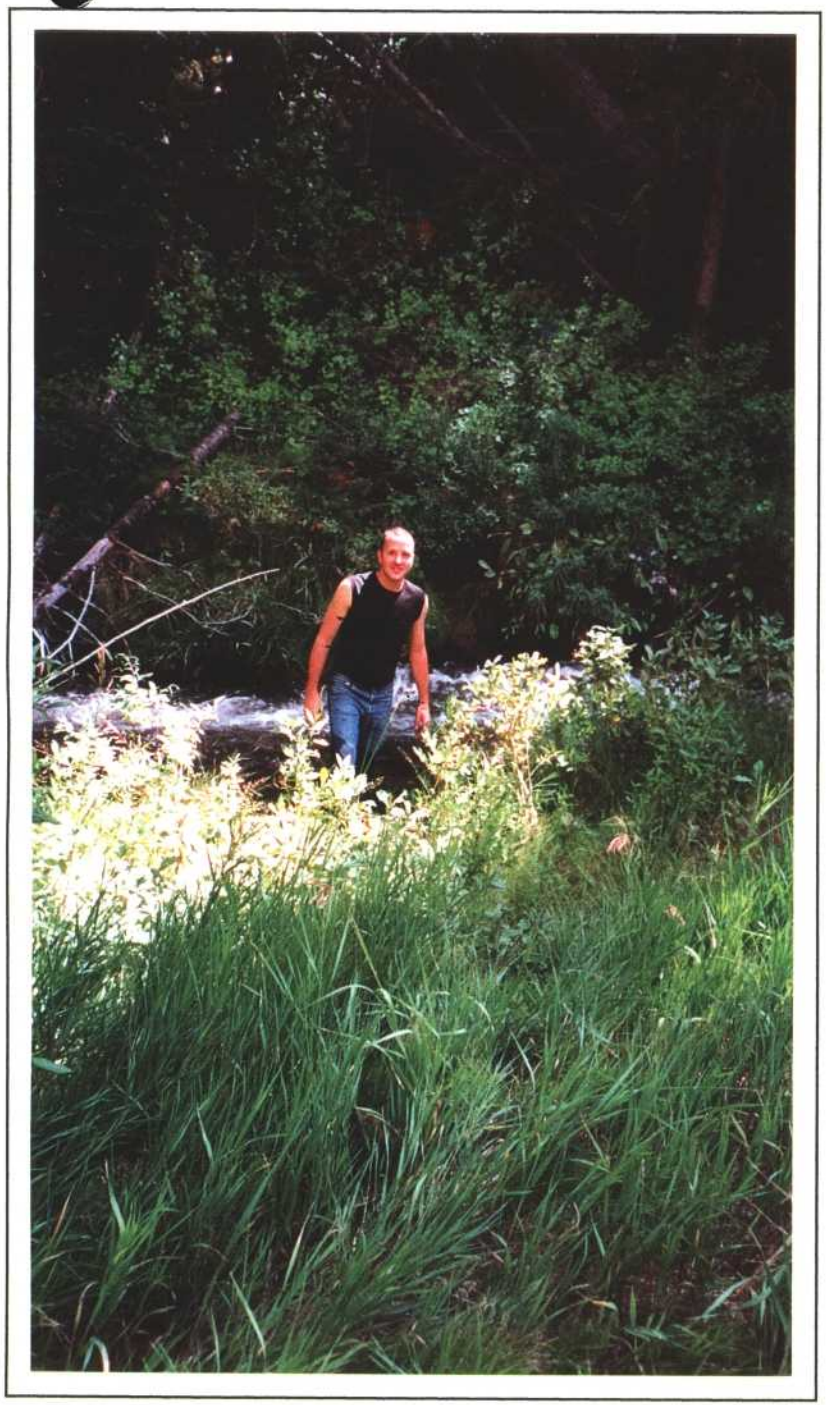
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E19

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus	10.0	6.0
Ribes aureum/Abies lasiocarpa	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	9.0	
Dominant Herbaceous Species		
Agrostis stolonifera		16.0
TOTAL COVER (Riparian Species)	9.0	16.0
TOTAL COVER (Upland Species)	20.0	16.0
STREAM (Water Width)	8.0	6.0
TOTAL COVER	37.0	37.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-19 T43½	2002	1. Left side riparian vegetation was ~ willow (20%) and redtop (80%). 2. Right side had no riparian vegetation. 3. Left bank was stable, right bank had undercutting.
	2003	1. Riparian vegetation appears to be increasing on left side. There was a good sediment beach area for expansion of riparian plants on this side. 2. Little vegetation on right side due to boulder armoring. 3. Both banks were stable.



Eccles Creek Riparian Sample Site E19 (2002)

Eccles Creek Riparian Sample Site E19 (2003)

TABLE 20: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E20
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E20

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Bromus carinatus/(Road Fill)	10.0	14.0
Abies lasiocarpa/Sherperdia canadensis	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Rosa woodsii	20.0	12.0
Dominant Herbaceous Species		
Equisetum arvense/Agrostis stolonifera	18.0	23.0
TOTAL COVER (Riparian Species)	38.0	35.0
TOTAL COVER (Upland Species)	20.0	24.0
STREAM (Water Width)	8.0	7.0
TOTAL COVER	66.0	66.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-20 T36 ½	2002	1. Left side riparian vegetation was ~ willow (45%); Wood's rose (45%); redtop (near waterline, 10%). 2. Right side riparian vegetation was ~ horsetail (70%); willow (10%); geranium (20%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ willow/redtop (60%); redtop (40%). 2. Right side riparian vegetation was ~horsetail (35%); redtop (65%). 3. Both banks were stable.

Eccles Creek Riparian Sample Site E20 (2002)

Eccles Creek Riparian Sample Site E20 (2003)

TABLE 21: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E21
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E21

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Bromus carinatus/Astragalus cicer	10.0	10.0
Abies lasiocarpa/Symphoricarpos oreophilus	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	19.5	19.5
Dominant Herbaceous Species		
TOTAL COVER (Riparian Species)	19.5	19.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	9.0	9.0
TOTAL COVER	48.5	48.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-21 T29 ½	2002	1. Left side riparian vegetation was ~ willow (80%) and redtop (20%). 2. Right side riparian vegetation was ~ willow (34%); redtop (33%); geranium (33%). 3. Right bank was stable. Left bank had some minor undercutting.
	2003	1. Left side riparian vegetation was ~ willow (20%); redtop (80%). 2. Right side riparian vegetation was ~redtop (30%); willow (35%); Wood's rose (15%); geranium (20%). 3. Both banks were stable.

Eccles Creek Riparian Sample Site E21 (2002)

Eccles Creek Riparian Sample Site E21 (2003)

TABLE 22: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E22
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E22

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Elymus smithii/Bromus carinatus	10.0	8.0
Abies lasiocarpa/Ribes aureum	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	7.5	8.0
Equisetum arvense/Agrostis stolonifera	5.0	6.5
TOTAL COVER (Riparian Species)	12.5	14.5
TOTAL COVER (Upland Species)	20.0	18.0
STREAM (Water Width)	10.0	10.0
TOTAL COVER	42.5	42.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-22 T23	2002	1. Left side riparian vegetation was ~ horsetail (60%) redtop (40%). 2. Right side riparian vegetation was ~ redtop (100%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~horsetail (50%); redtop (100%). It seemed to have more riparian species in upland areas. 2. Right side riparian vegetation was ~redtop (100%). 3. Both banks were stable.

Eccles Creek Riparian Sample Site E22 (2002)

Eccles Creek Riparian Sample Site E22 (2003)

TABLE 23: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E23
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E23

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Elymus smithii	10.0	7.0
Poa sp.	10.0	7.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	3.0	8.0
TOTAL COVER (Riparian Species)	3.0	8.0
TOTAL COVER (Upland Species)	20.0	14.0
STREAM (Water Width)	6.0	7.0
TOTAL COVER	29.0	29.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-23 T16	2002	1. Left side riparian vegetation was ~redtop (100%). 2. Right side riparian vegetation was ~ redtop (75%); fireweed (25%). 3. Both banks were stable. 4. Transect line hit a large boulder.
	2003	1. Left side riparian vegetation was ~ redtop (100%). 2. Right side riparian vegetation was ~redtop (100%). 3. Riparian plants seemed to be increasing on both sides. 4. Both banks were stable.

Eccles Creek Riparian Sample Site E23 (2002)

Eccles Creek Riparian Sample Site E23 (2003)

TABLE 24: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E24
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Trag-Croydon complex* (50% Trag stony loam; 30% Croydon loam; 20% other soils).
- *Uinta-Toze families complex* (35% Uinta family loam; 30% Toze family fine sandy loam; 35% other soils).

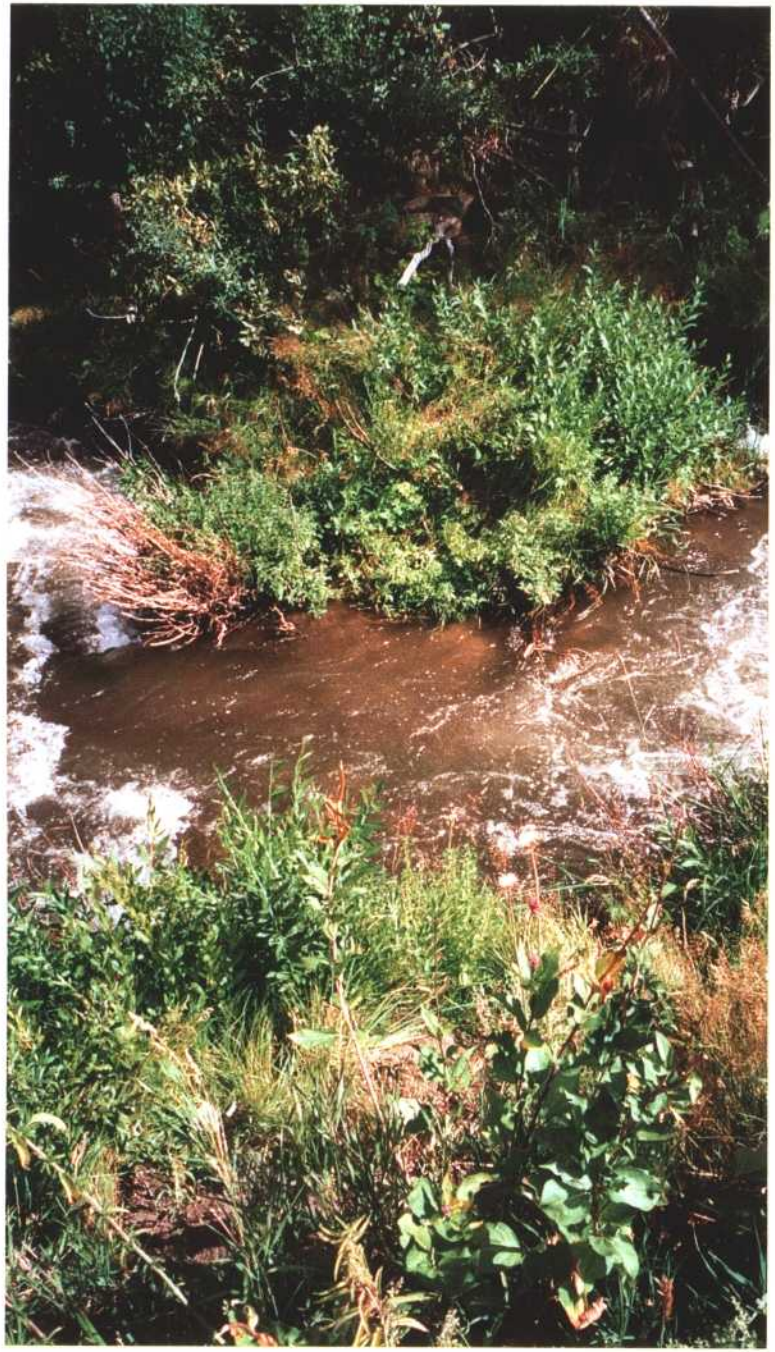
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E24

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus/Urtica dioica	10.0	4.5
Abies lasiocarpa/Ribes aureum	10.0	8.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix boothii/Agrostis stolonifera	17.0	19.0
Dominant Herbaceous Species		
Equisetum arvense/Agrostis stolonifera		7.0
TOTAL COVER (Riparian Species)	17.0	26.0
TOTAL COVER (Upland Species)	20.0	12.5
STREAM (Water Width)	10.5	9.0
TOTAL COVER	47.5	47.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-24 T10	2002	1. Left side riparian vegetation was ~ willow (50%); redtop (50%). 2. Right side riparian vegetation was ~ willow (50%) and redtop (50%). 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ horsetail (35%); redtop (55%); willow (10%). 2. Right side riparian vegetation was ~ willow (50%) and redtop (50%). 3. Riparian species seemed to be increasing in upland areas. 3. Both banks were stable.



Eccles Creek Riparian Sample Site E24 (2002)

Eccles Creek Riparian Sample Site E24 (2003)

TABLE 25: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E25
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

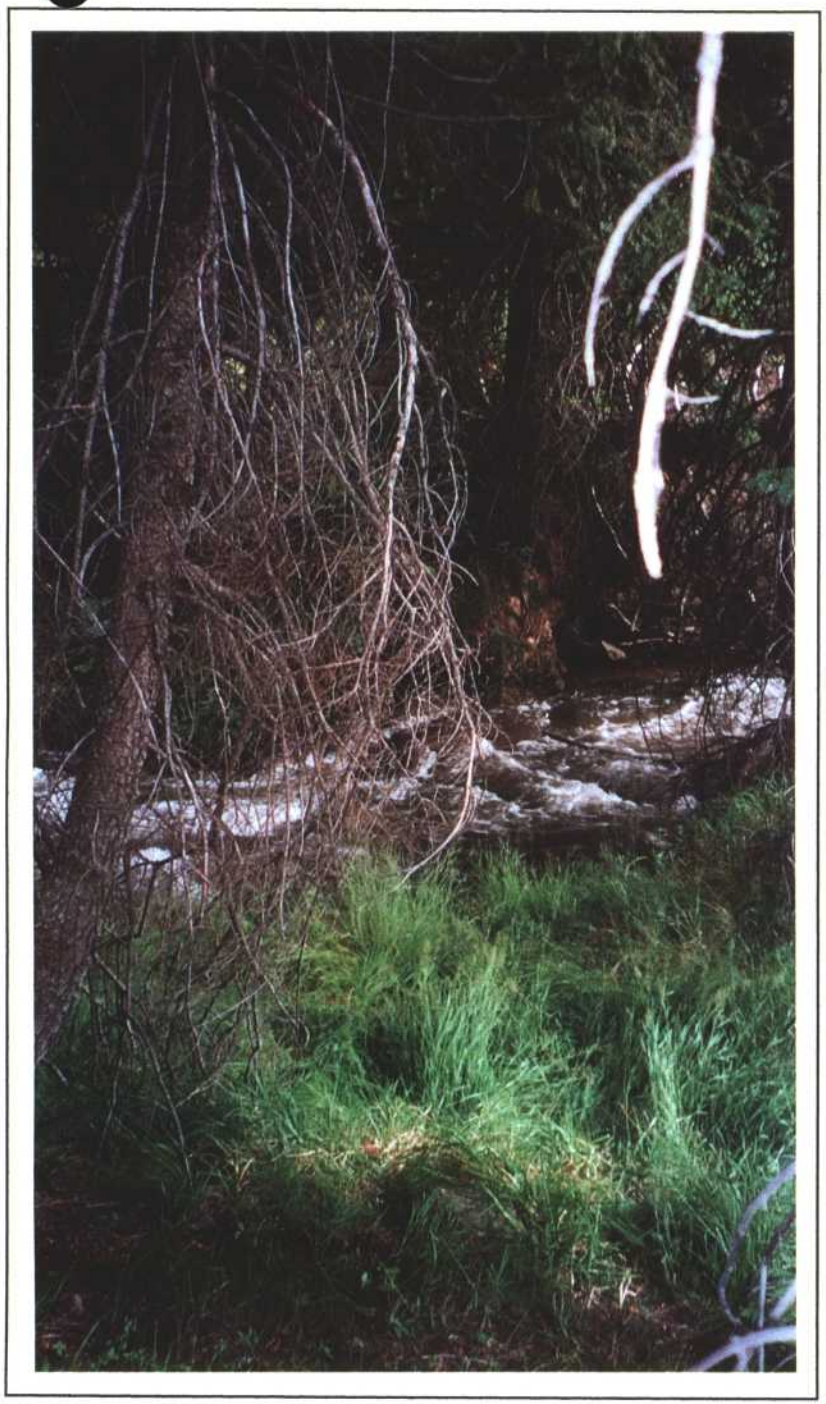
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E25

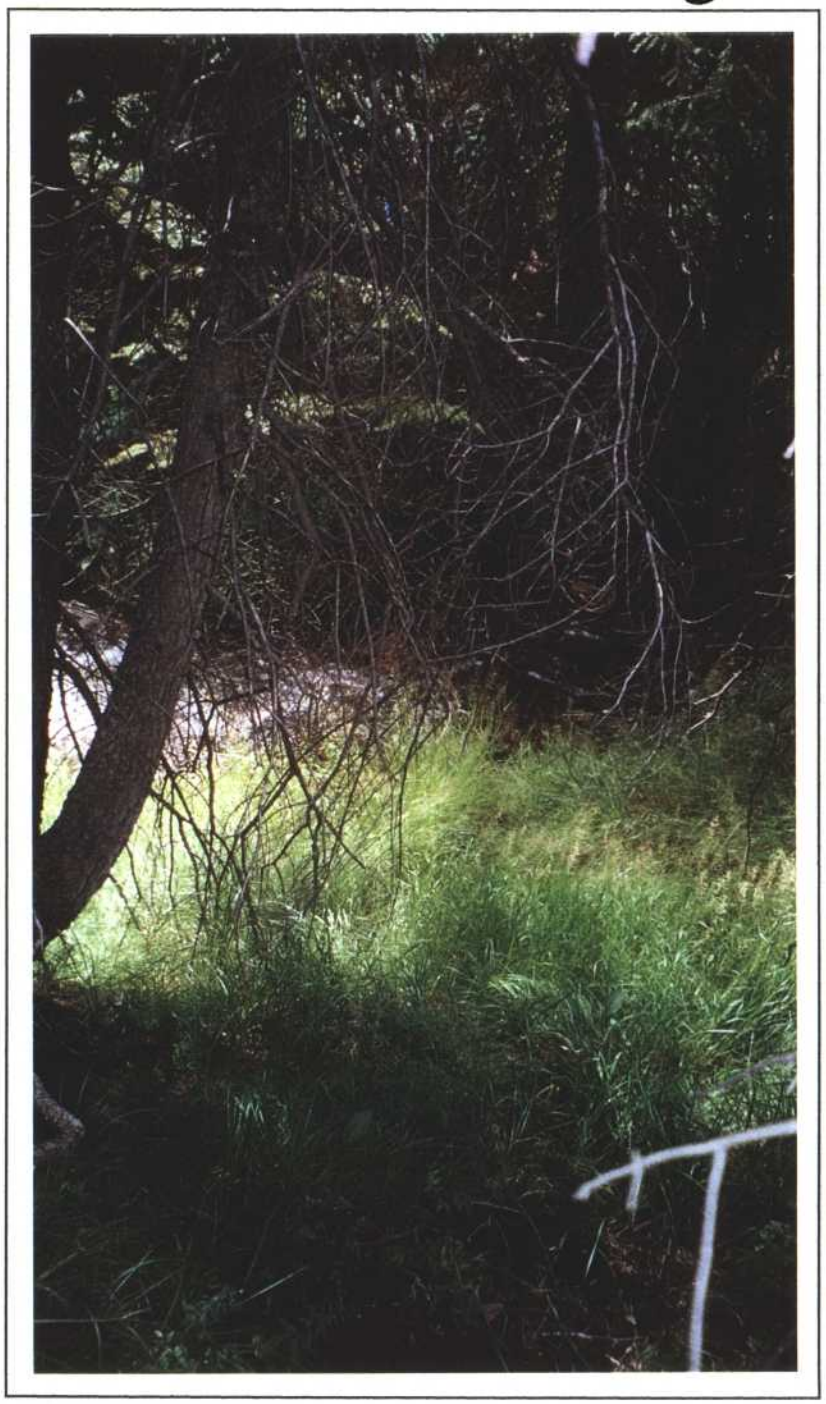
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Equisetum arvense	10.0	6.0
Abies lasiocarpa	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	13.0	7.0
Equisetum arvense/Agrostis stolonifera		8.0
TOTAL COVER (Riparian Species)	13.0	15.0
TOTAL COVER (Upland Species)	20.0	16.0
STREAM (Water Width)	11.0	13.0
TOTAL COVER	44.0	44.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-25 T2	2002	1. Left side riparian vegetation was ~ horsetail (10%) and redtop (90%). 2. Right side riparian not present. 3. Left bank was stable. Right bank unstable.
	2003	1. Left side riparian vegetation was ~ horsetail (50%) and redtop (50%). 2. There was a spring on the left side. Riparian vegetation appeared to be increasing. 3. Right side riparian vegetation was ~ redtop (100%), but it was mostly bare understory. 4. The left bank was stable, the right side was somewhat unstable.



Eccles Creek Riparian Sample Site E25 (2002)



Eccles Creek Riparian Sample Site E25 (2003)

TABLE 26: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E26
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

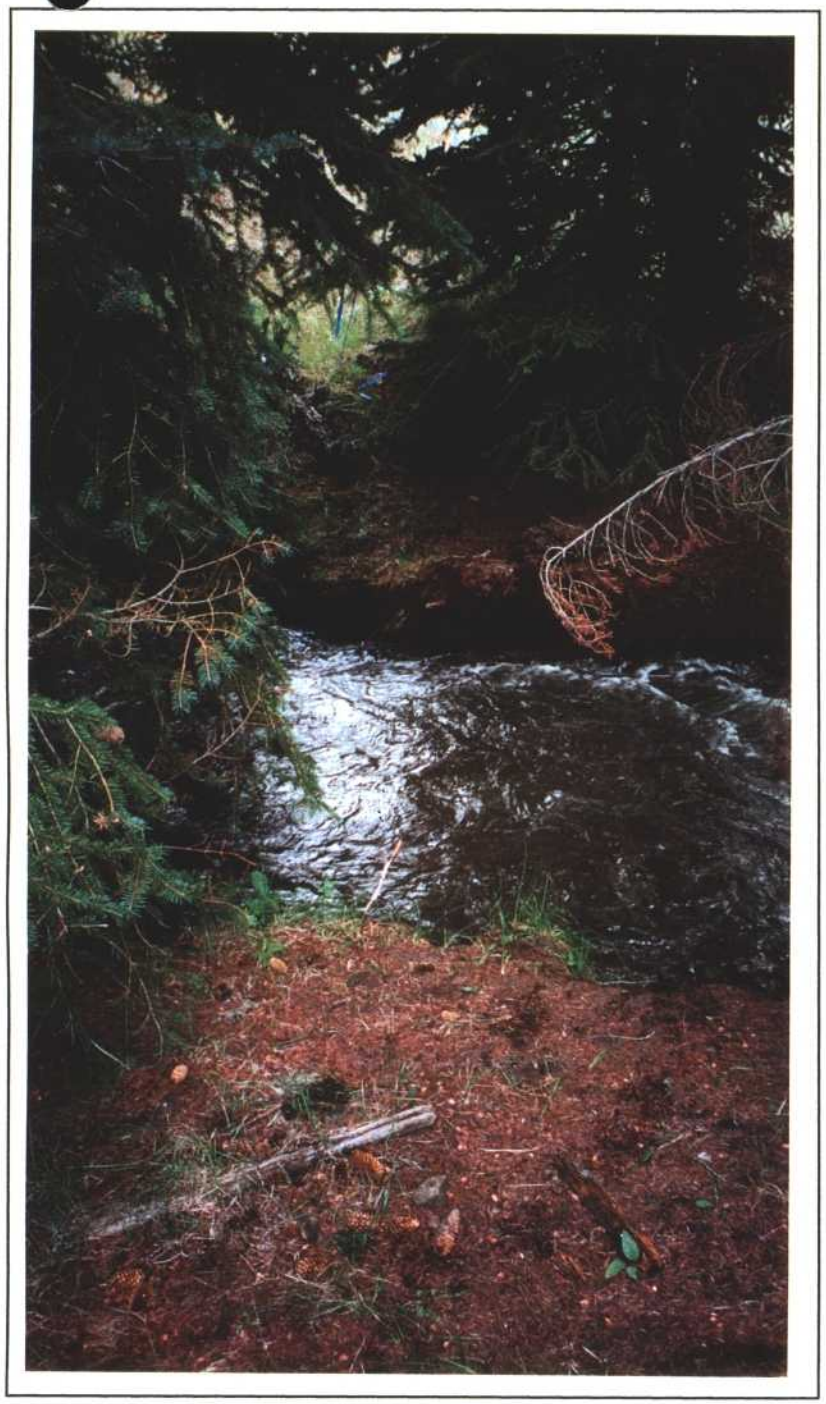
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E26

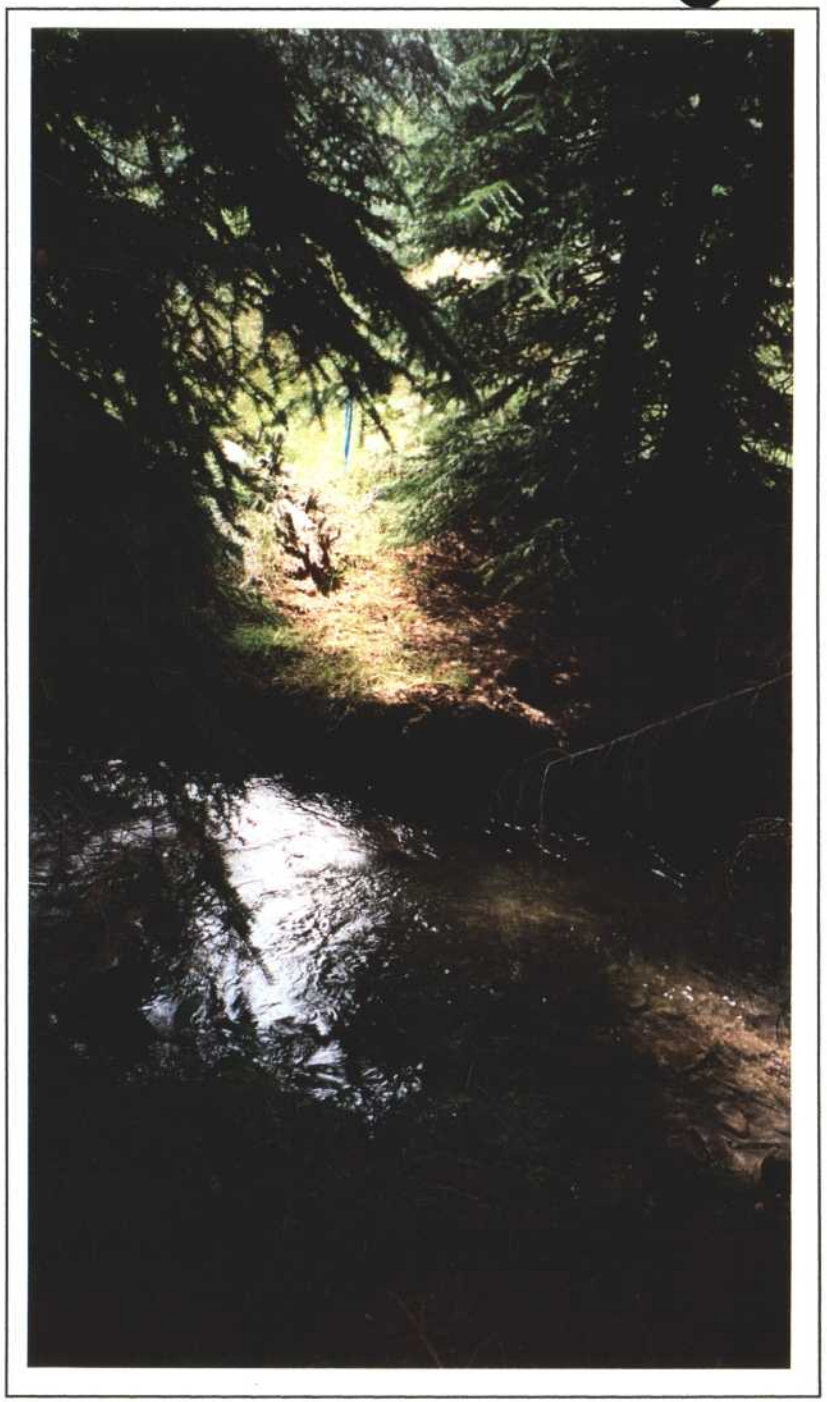
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Abies concolor	10.0	10.0
Abies concolor	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	1.0	1.0
TOTAL COVER (Riparian Species)	1.0	1.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	11.0	11.0
TOTAL COVER	32.0	32.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-26 (no conveyor)	2002	1. Both banks were unstable and supported little riparian vegetation. 2. There was a break in the 'regular' transect placement due to the road over the river to the loadout. To get the next transect, we began by measuring 400' on the other side of the road to the conveyor at MP-15.
	2003	1. Left side riparian vegetation was ~ redtop (100%). 2. Right side riparian vegetation was ~redtop (100%). 3. Both banks were undercut and somewhat unstable, but appear more stable than last year due to less flow.



Eccles Creek Riparian Sample Site E26 (2002)



Eccles Creek Riparian Sample Site E26 (2003)

TABLE 27: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E27
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

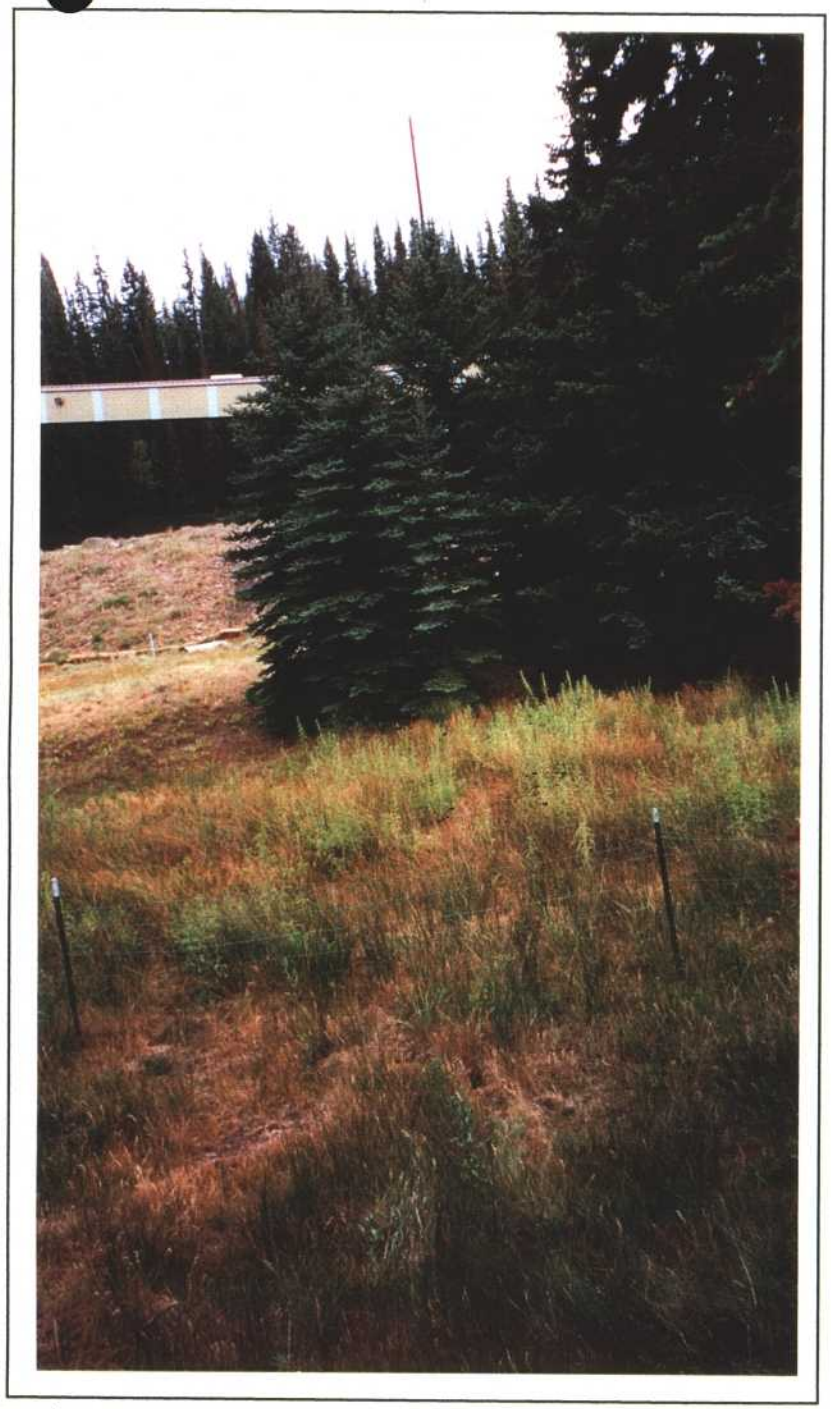
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E27

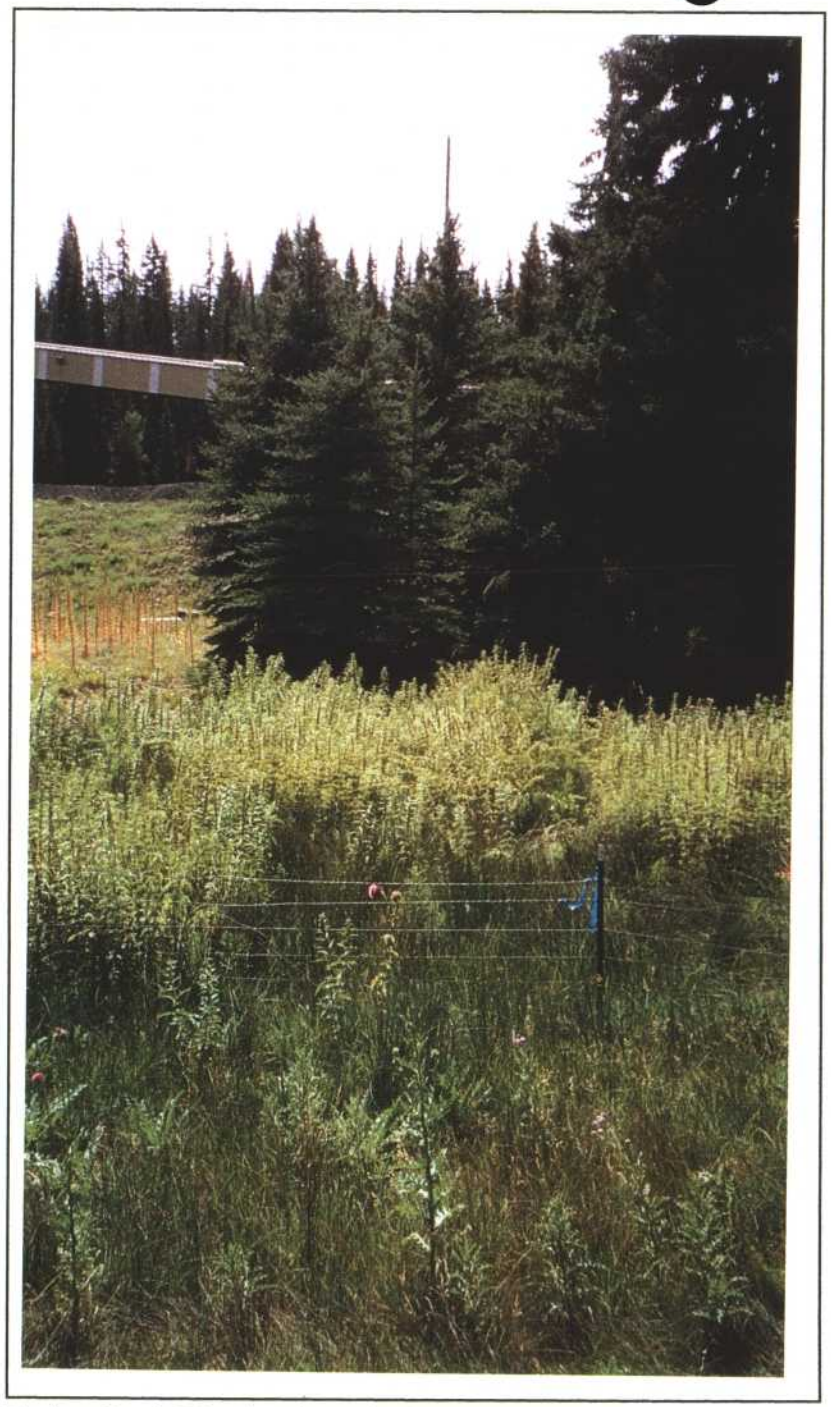
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Artemisia tridentata/Grass	10.0	5.0
Abies concolor	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	1.0	
Juncus articus	57.0	
Juncus articus/Urtica dioica		63.0
TOTAL COVER (Riparian Species)	58.0	63.0
TOTAL COVER (Upland Species)	20.0	15.0
STREAM (Water Width)	9.0	9.0
TOTAL COVER	87.0	87.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-27 (no conveyor)	2002	1. Left side riparian vegetation was ~ rushes (85%); stinging nettle (15%). 2. Right side bank was unstable.
	2003	1. Left side riparian vegetation was ~ rushes (50%) and stinging nettle (increased to 50%). 2. Right side no riparian vegetation. 3. Both banks were unstable.



Eccles Creek Riparian Sample Site E27 (2002)



Eccles Creek Riparian Sample Site E27 (2003)

TABLE 28: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E28
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

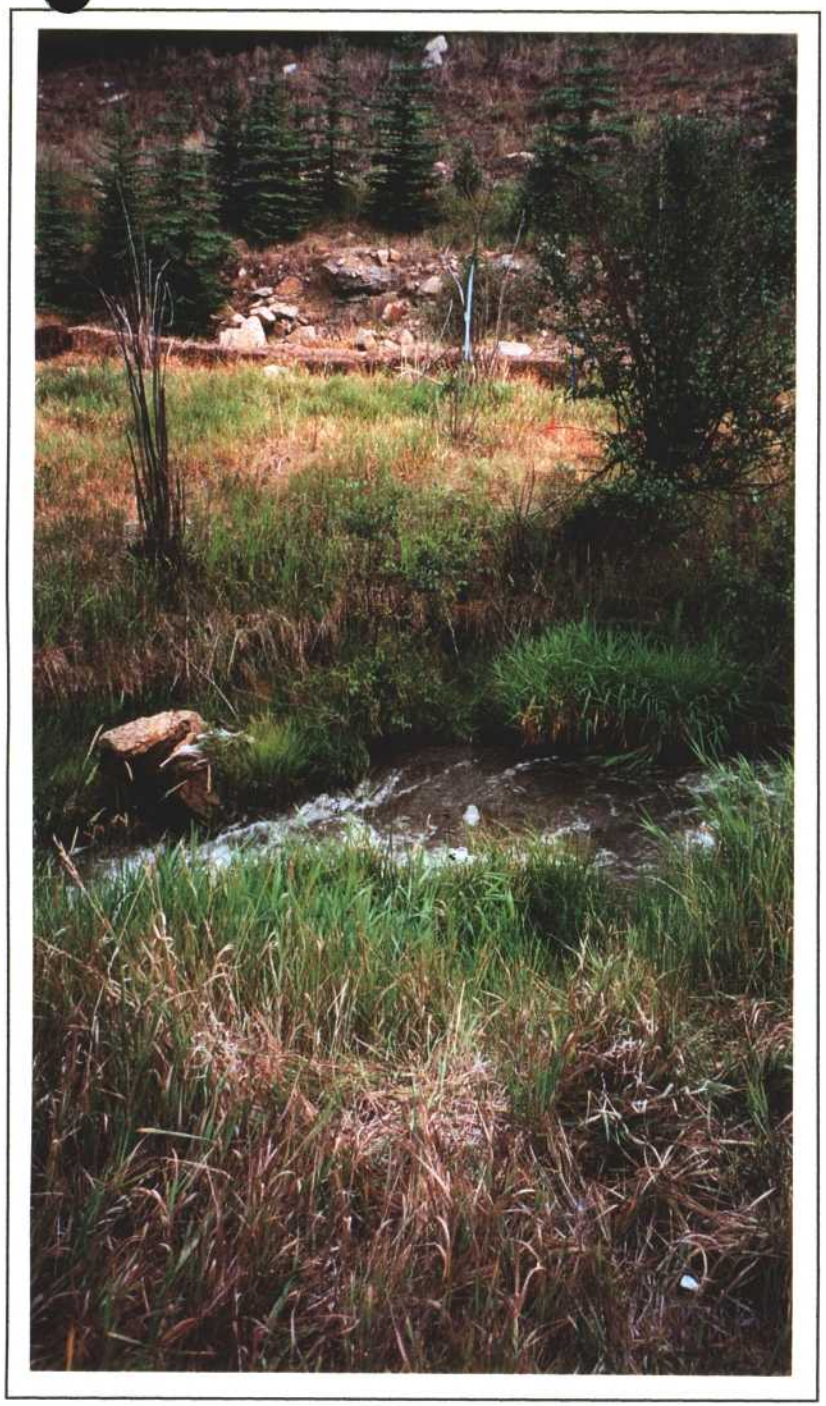
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E28

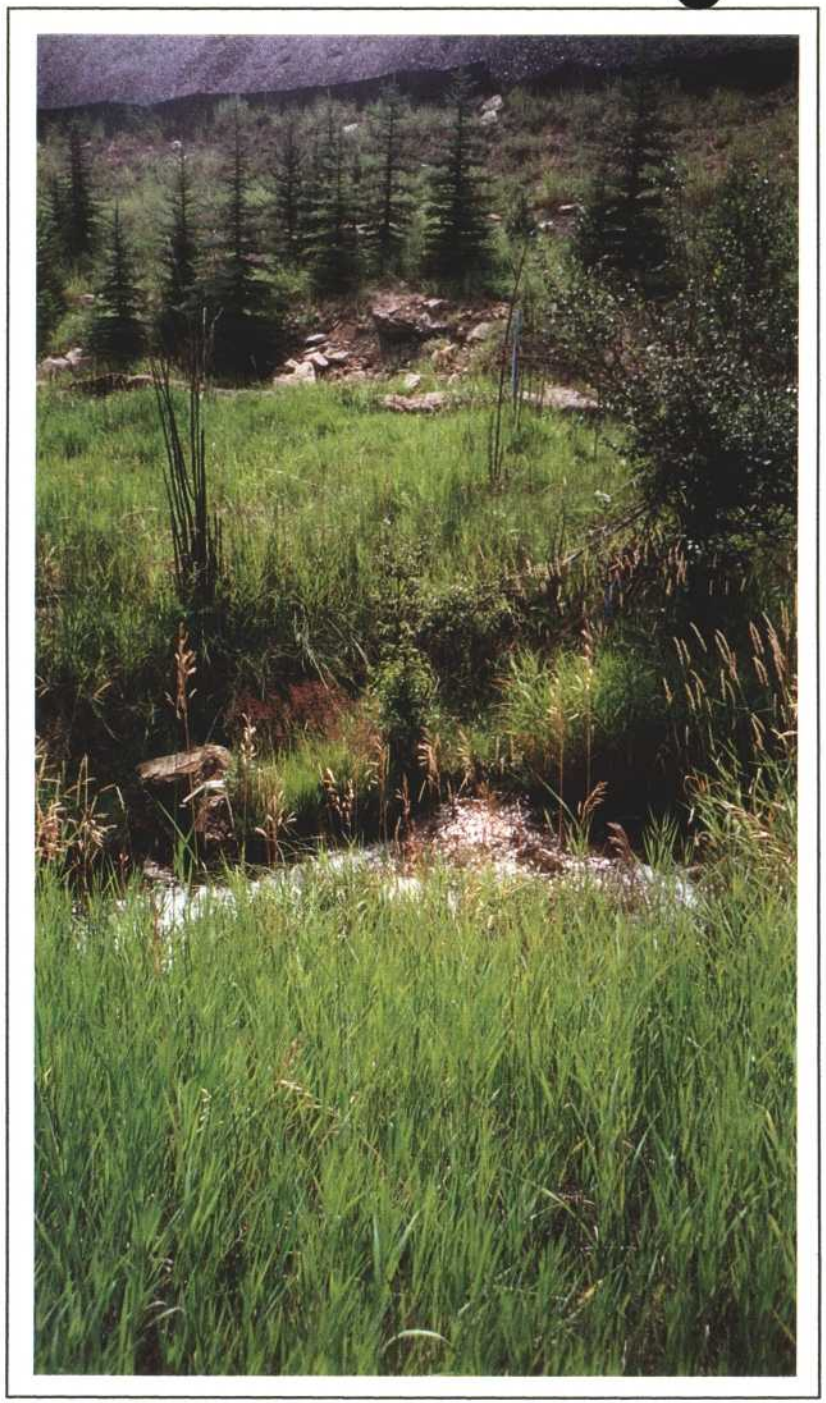
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Bromus carinatus/Artemisia tridentata	10.0	10.0
Abies concolor	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Equisetum arvense/Phalaris arundinacea	15.5	16.0
TOTAL COVER (Riparian Species)	15.5	16.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	9.0	8.0
TOTAL COVER	44.5	44.0

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-28 (no conveyor)	2002	1. Left side riparian vegetation was ~ horsetail (75%); canary reed grass (25%). 2. The vegetation here was impacted by the coal loadout. 3. Both banks were stable.
	2003	1. Left side riparian vegetation was ~ horsetail (75%); canary reed grass (25%). 2. The vegetation here was impacted by the coal loadout. 3. Both banks were stable.



Eccles Creek Riparian Sample Site E28 (2002)



Eccles Creek Riparian Sample Site E28 (2003)

TABLE 29: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - E29
WATERBODY NAME: Eccles Canyon Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Sandstone and shale from the Blackhawk Formation
ASPECT: East
ELEVATION: Eccles Creek sample sites were between 7,920 - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

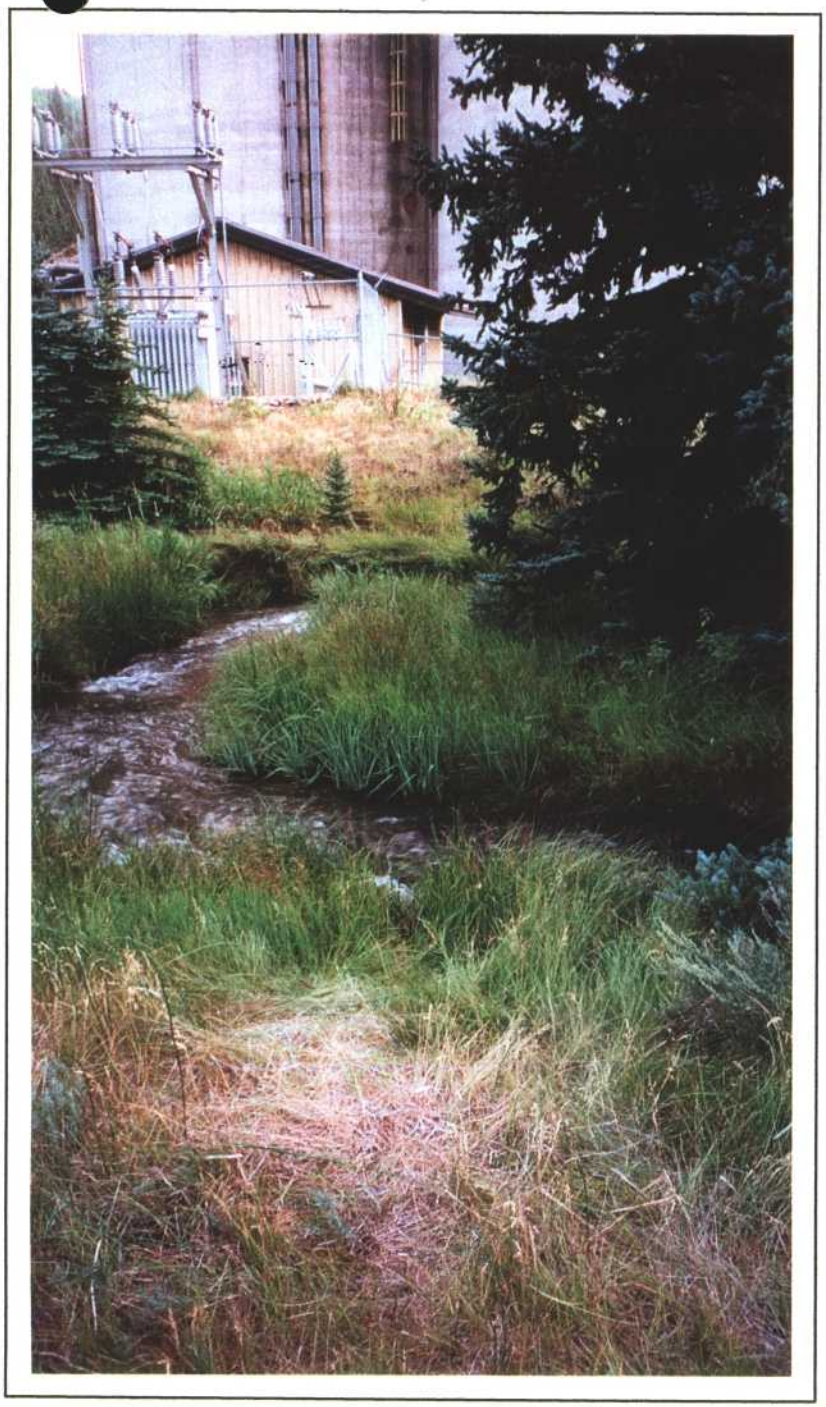
QUANTITATIVE DATA:

Eccles Creek: Cover by Community Types - E29

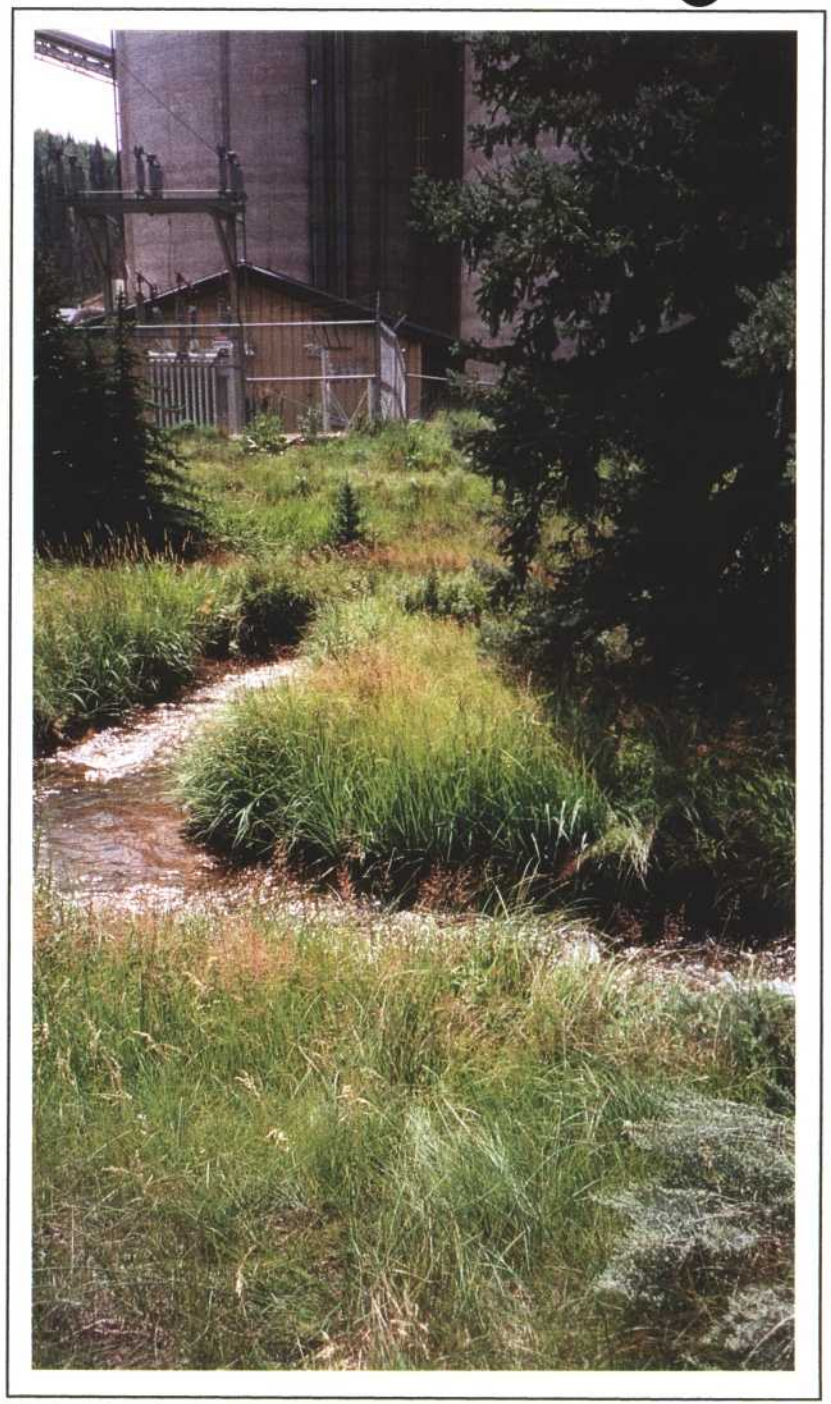
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
(No upland vegetation in sample)	0.0	0.0
(Meander, no vegetation)	0.0	0.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	24.0	24.0
TOTAL COVER (Riparian Species)	24.0	24.0
TOTAL COVER (Upland Species)	0.0	0.0
STREAM (Water Width)	7.5	7.5
TOTAL COVER	31.5	31.5

NOTES:

Transect No. and Location (nearest conveyor tower no.)	Sample Year	General Notes
E-29 (no conveyor)	2002	1. Left side riparian vegetation was ~redtop (100%). 2. Right side riparian vegetation was ~ redtop (100%). 3. Left bank was slightly unstable. Right bank was stable. 4. There was no upland vegetation marked due to stream meanders.
	2003	1. Left side riparian vegetation was ~redtop (100%). 2. Right side riparian vegetation was ~ redtop (100%). 3. Left bank was slightly unstable. Right bank was stable. 4. There was no upland vegetation marked due to stream meanders.



Eccles Creek Riparian Sample Site E29 (2002)



Eccles Creek Riparian Sample Site E29 (2003)

TABLE 30: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M1
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

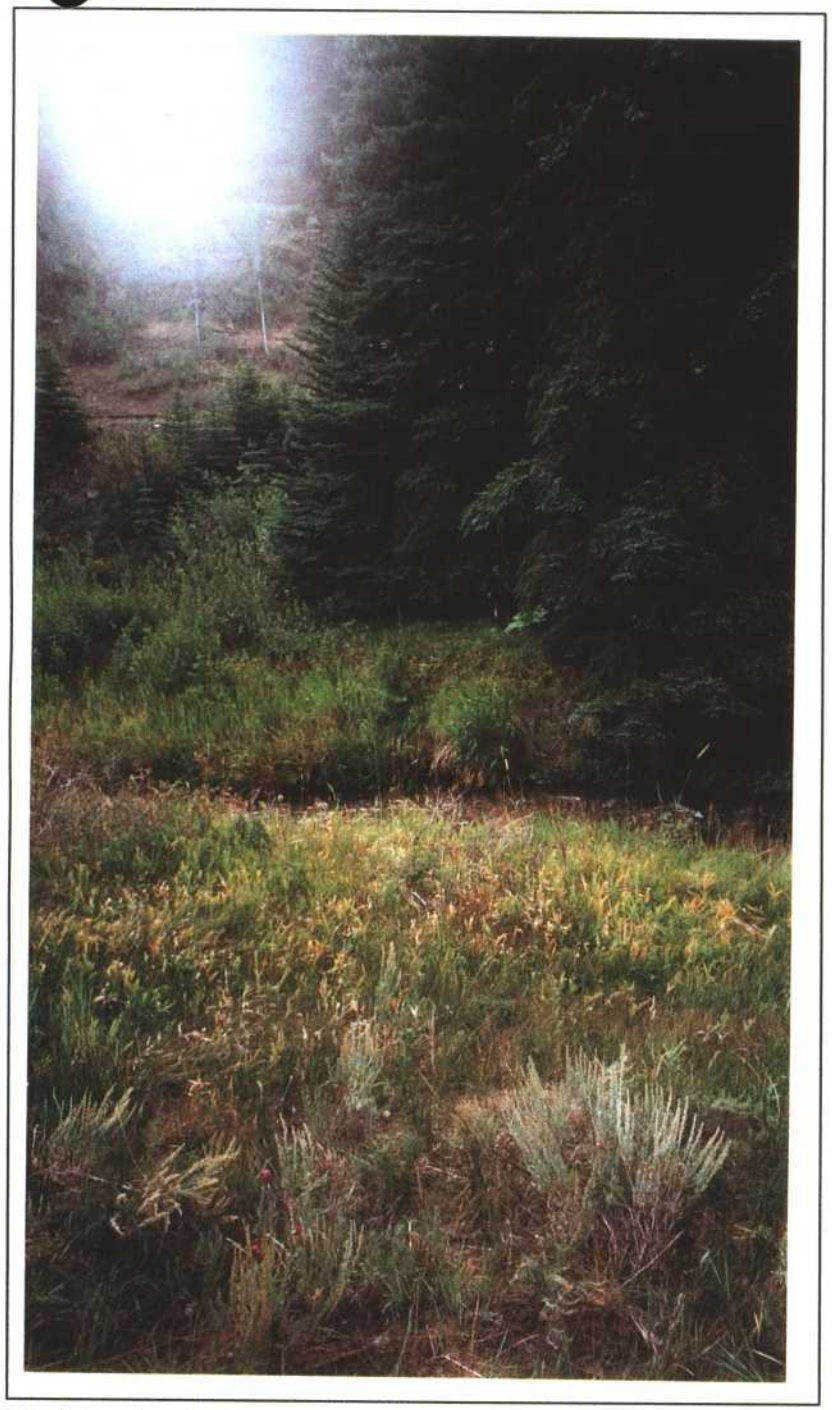
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M1

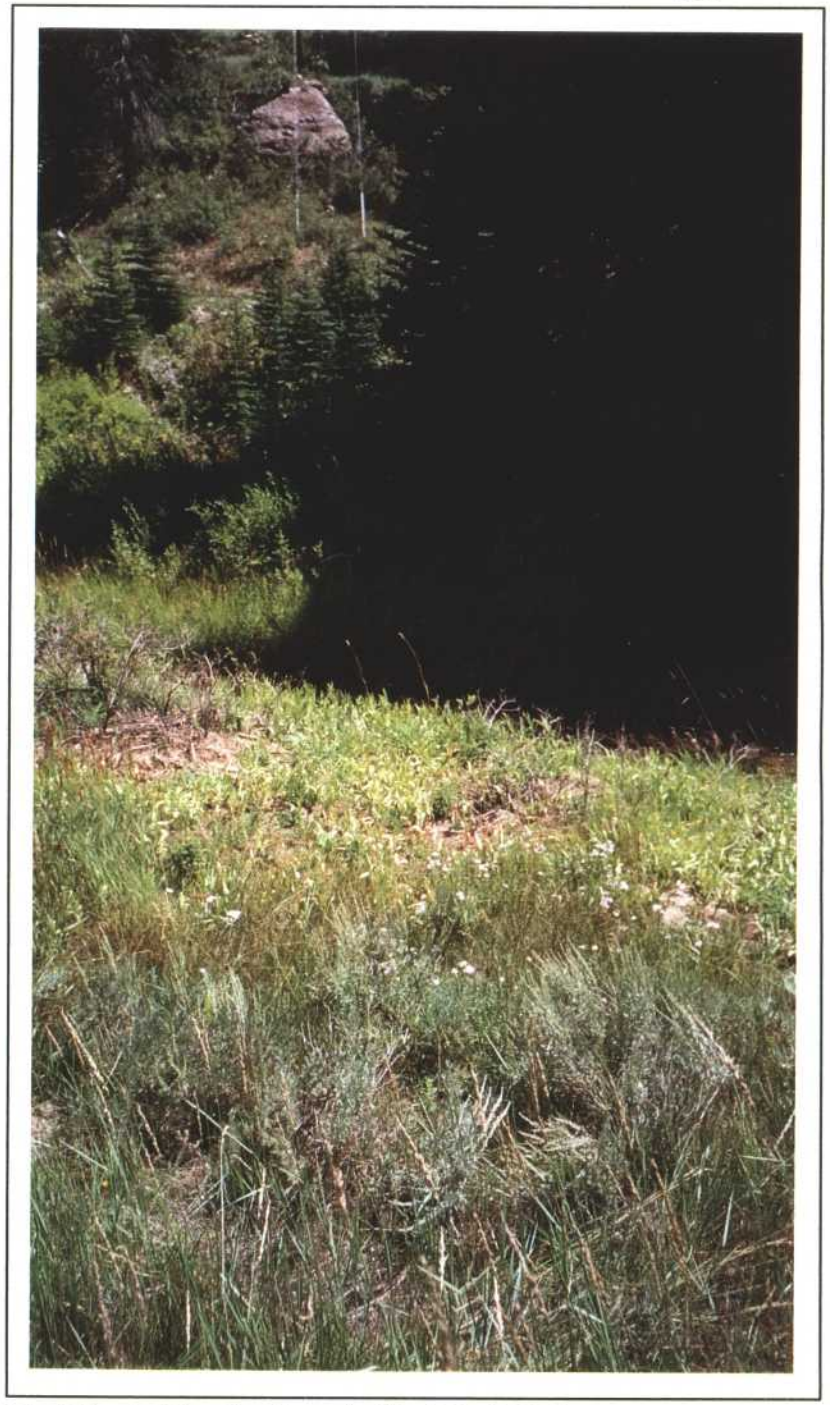
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Elymus smithii	10.0	10.0
Picea engelmannii	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Juncus arcticus/Agrostis stolonifera		17.0
Juncus arcticus	22.0	22.0
Juncus anticus/Equisetum arvense	16.0	
TOTAL COVER (Riparian Species)	38.0	39.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	15.3	16.0
TOTAL COVER	73.3	75.0

NOTES:

Transect No.	Sample Year	General Notes
M1	2002	1. First transect on Mud Creek was about .1 mile from MP at intersection. 2. Left side riparian vegetation was ~rushes (90%); redtop (10%). 3. Right side riparian vegetation was ~rushes (60%); horsetail (40%). 4. Both side banks were stable.
	2003	1. Left side riparian vegetation was ~rushes (90%); redtop (10%). 2. Horsetail grew all the way to the right side marker and 4-5' higher elevation than the river elevation. 3. Both side banks were stable.



Mud Creek Riparian Sample Site M1 (2002)



Mud Creek Riparian Sample Site M1 (2003)

TABLE 31: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M2
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M2

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Elymus smithii/Agropyron cristatum	10.0	13.0
Salix spp.	10.0	7.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus arcticus/Circium spp.	65.0	
Salix spp./Agrostis stolonifera	15.0	75.0
Dominant Herbaceous Species		
Agrostis stolonifera/Phalaris arundinacea	3.0	10.0
Agrostis stolonifera/Juncus arcticus		
Eleocharis palustris		5.0
Equisetum arvense		
TOTAL COVER (Riparian Species)	83.0	90.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	14.0	7.0
TOTAL COVER	117.00	117.0

NOTES:

Transect No.	Sample Year	General Notes
M2	2002	1. Left side riparian vegetation was ~willow (35%); rushes (30%); thistle (30%). 2. Right side riparian vegetation was ~willow (20%); redtop (80%). 3. Left side bank was stable; right side had some undercutting. 4. Willow in more upland areas could be a result of a water source other than the stream.
	2003	1. Left side riparian vegetation was ~willow (40%); redtop (40%); thistle (20%). 2. Right side riparian vegetation was ~reed canary grass (50%); redtop (40%); spike rush (10% water's edge). 3. There were some willows quite a bit higher in elevation than the stream, suggesting there may be other water sources to support them. 4. Left side bank was stable; right side had some undercutting.

Mud Creek Riparian Sample Site M2 (2002)

Mud Creek Riparian Sample Site M2 (2003)

TABLE 32: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M3
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

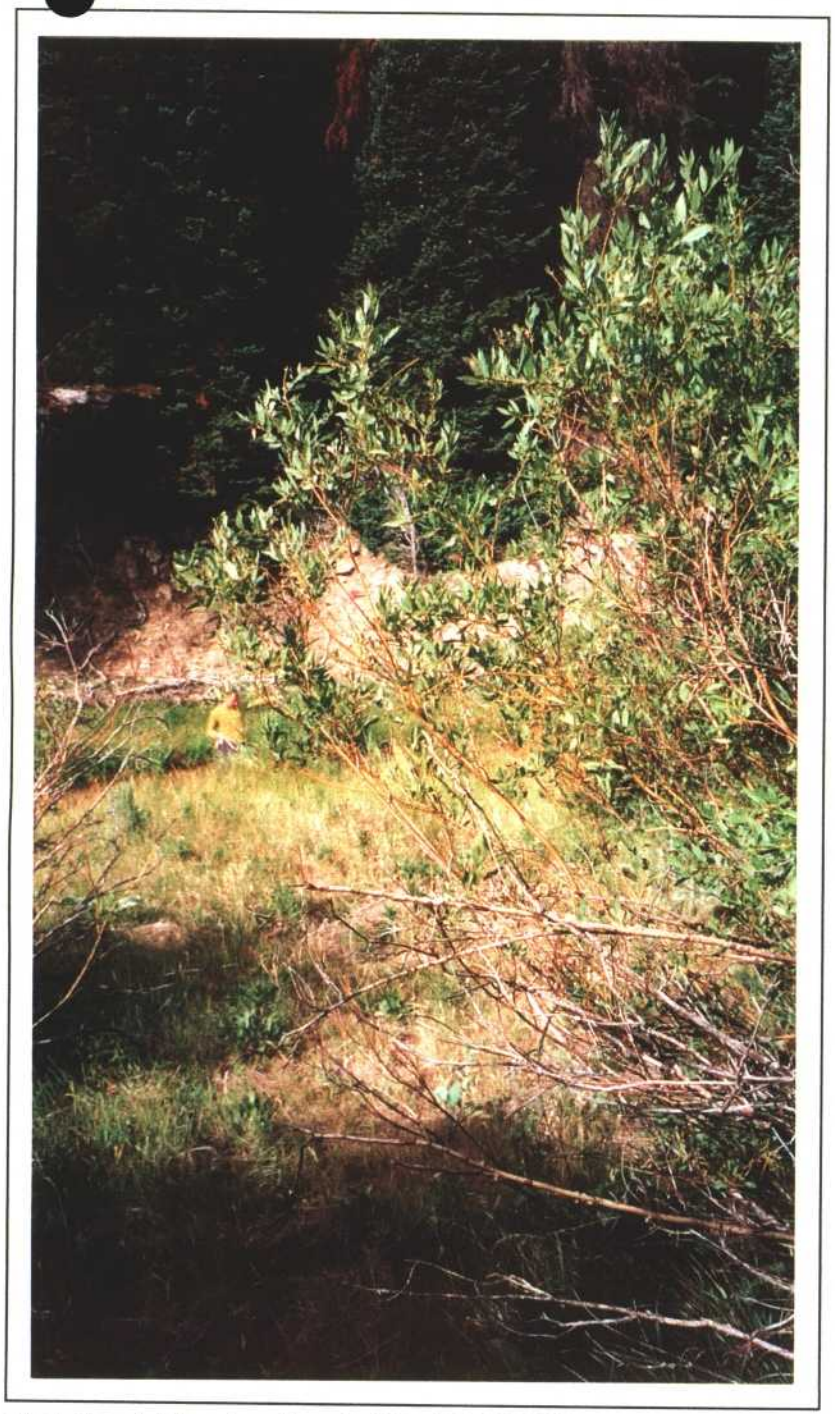
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M3

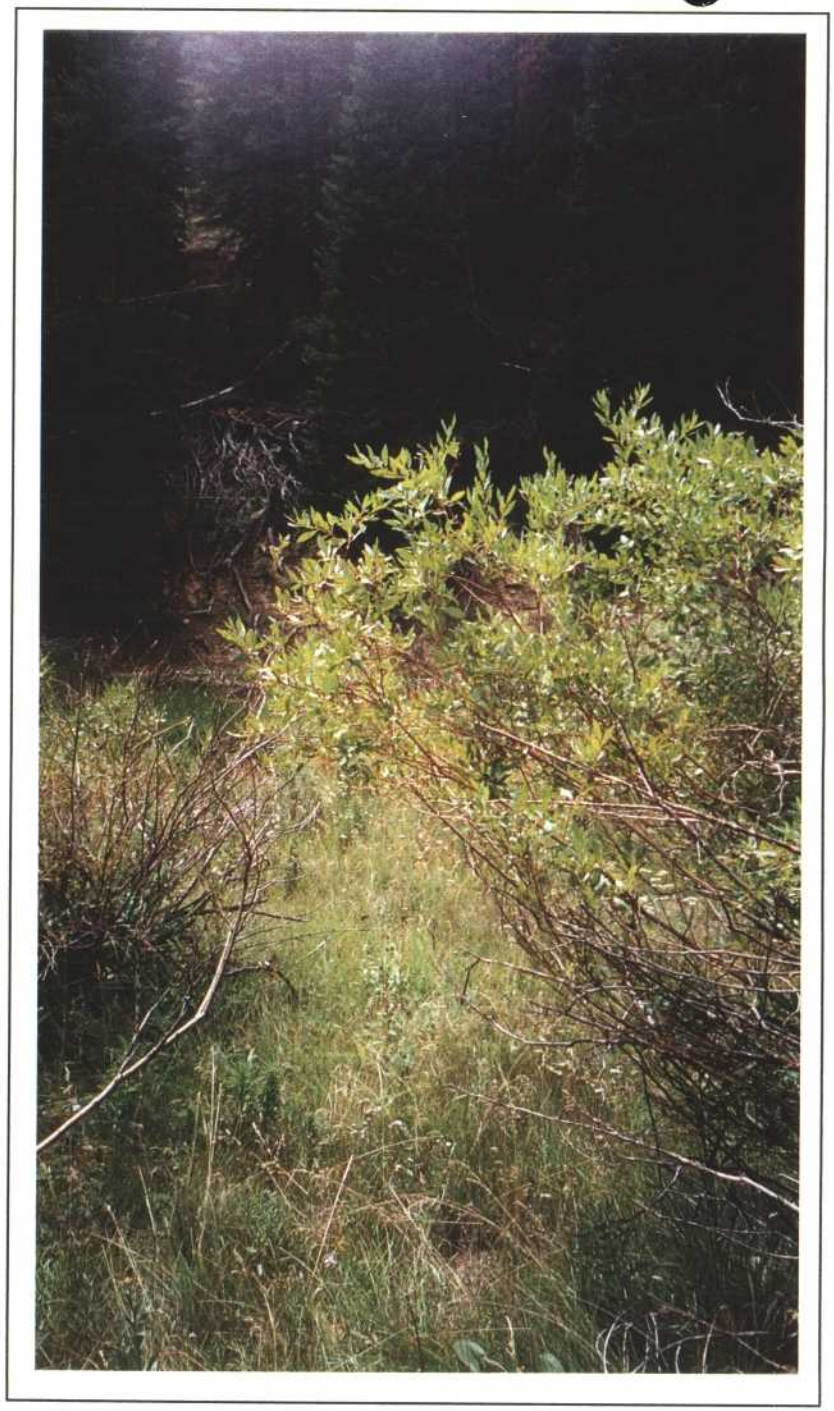
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Abies lasiocarpa	10.0	10.0
Picea pungens/Agrostis stolonifera	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera	52.0	
Dominant Herbaceous Species		
Agrostis stolonifera		4.0
Agrostis stolonifera/Phalaris arundinacea	8.0	
Agrostis stolonifera/Juncus arcticus		53.5
Juncus arcticus	2.0	
Juncus anticus/Equisetum arvense		
Phalaris arundinacea		5.0
TOTAL COVER (Riparian Species)	62.0	62.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	13.5	13.0
TOTAL COVER	95.5	95.5

NOTES:

Transect No.	Sample Year	General Notes
M3	2002	1. Left side riparian vegetation was ~redtop (90%); reed canary grass (10%). 2. Right side riparian vegetation was ~willow (80%); redtop (20%). 3. Both side banks were stable. 4. Most of this entire area was a wetland with influences from an unknown water source.
	2003	1. Besides the riparian plant communities here near Mud Creek, M3 through M6 were within large wetland areas suggesting that springs or other water sources may be a factor for the existence of the current vegetation. If additional water sources are involved in these areas, they may not be good indicators for changes in the stream flows in Mud Creek. 2. Banks on both sides of the stream were stable.



Mud Creek Riparian Sample Site M3 (2002)



Mud Creek Riparian Sample Site M3 (2003)

TABLE 33: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M4
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M4

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Artemisia cana/Salix spp.	10.0	10.0
(Road Fill)/Hordeum jubatum	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera	10.0	
Salix spp.		3.0
Dominant Herbaceous Species		
Agrostis stolonifera		16.0
Carex nebrascensis	5.0	8.0
Distichlis spicata/Juncus anticus	16.0	
TOTAL COVER (Riparian Species)	31.0	27.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	13.0	17.0
TOTAL COVER	64.0	64.0

NOTES:

Transect No.	Sample Year	General Notes
M4	2002	1. Left side riparian vegetation was ~willow (50%); redtop (50%). 2. Right side riparian vegetation was ~saltgrass (90%); rushes (10%). 3. One side bank was stable, the other unstable. 4. Most of this entire area was a wetland with influences from unknown water sources.
	2003	1. Besides the riparian plant communities here near Mud Creek, M3 -M6 were within large wetland areas suggesting that springs or other water sources may be a factor for the existence of the current vegetation. If additional water sources are involved in these areas, they may not be good indicators for changes in the stream flows in Mud Creek. 2. The left bank was stable, the right bank had a 55" cut bank.

Mud Creek Riparian Sample Site M4 (2002)

Mud Creek Riparian Sample Site M4 (2003)

TABLE 34: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M5
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

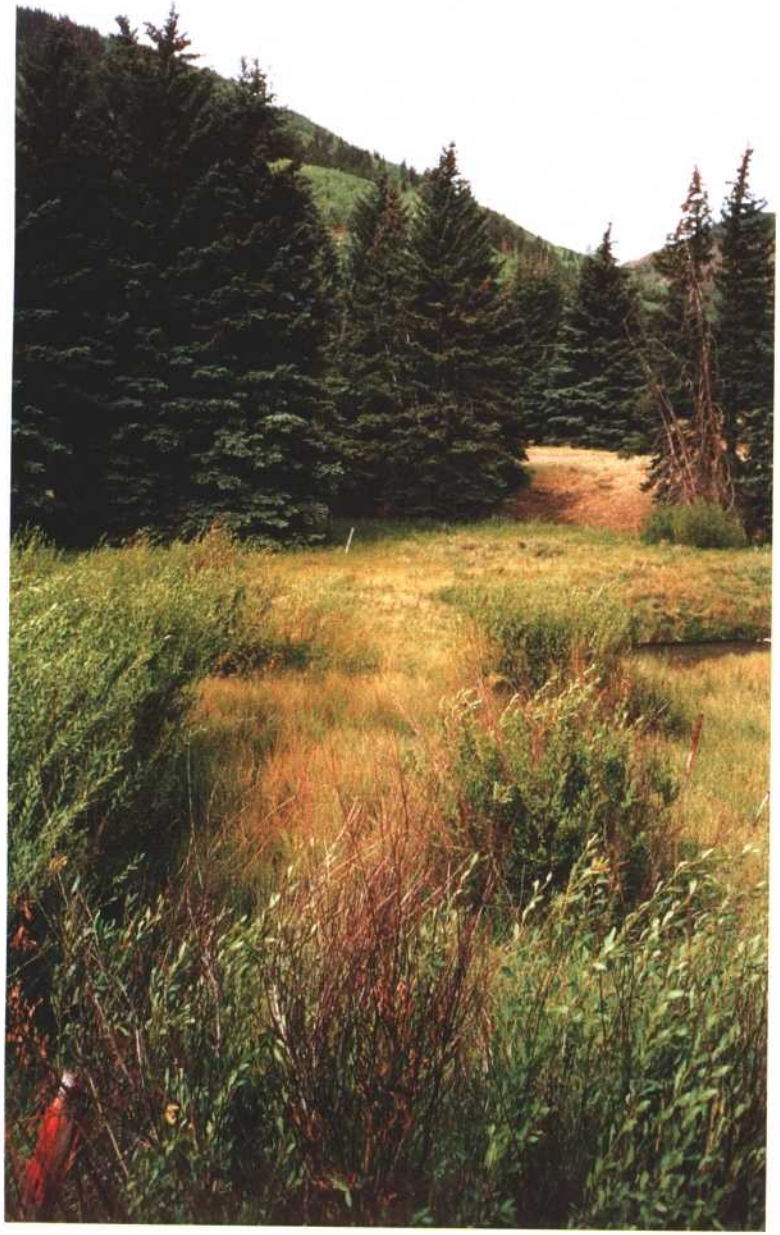
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M5

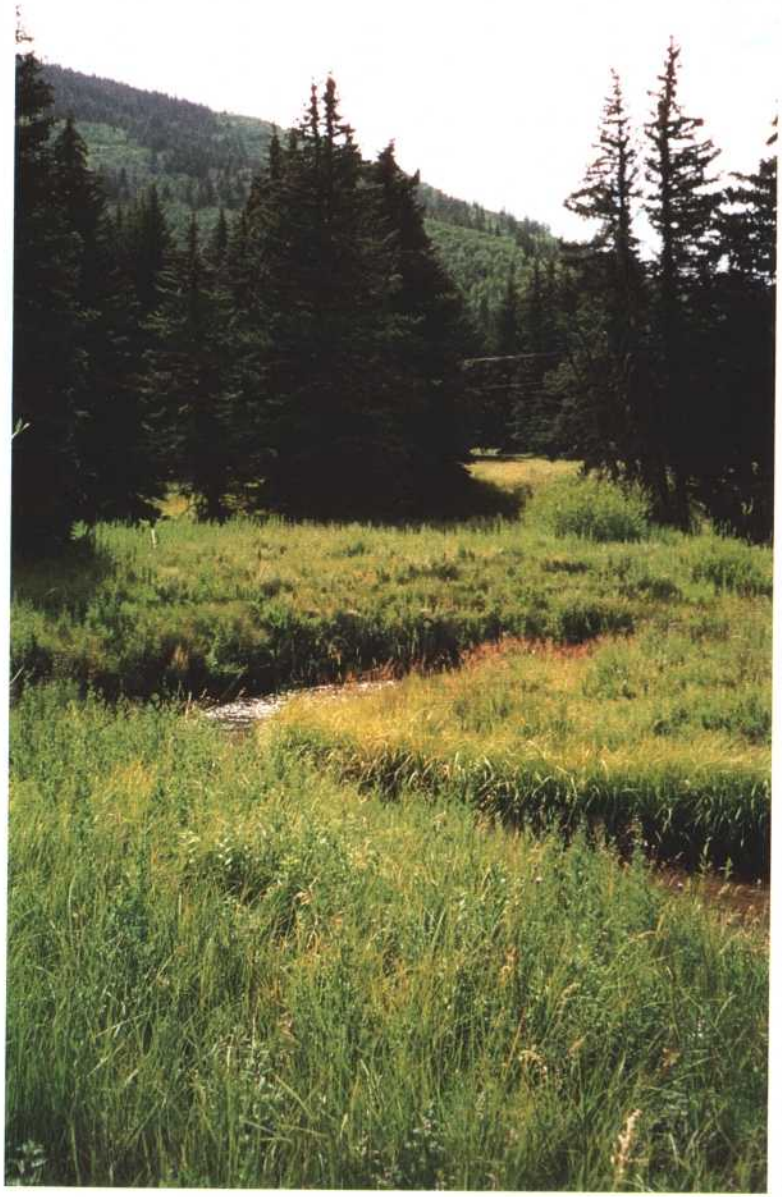
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Picea pungens	10.0	10.0
(Road Fill)/Elymus smithii	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus arcticus/Circium spp.	169.0	169.0
Dominant Herbaceous Species		
Agrostis stolonifera/Phalaris arundinacea	12.0	12.0
TOTAL COVER (Riparian Species)	181.0	181.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	16.0	16.0
TOTAL COVER	217.0	217.0

NOTES:

Transect No.	Sample Year	General Notes
M5	2002	1. Left side riparian vegetation was ~ redtop/reed canary grass (100%). 2. On the right side riparian vegetation was rushes (50%); redtop (40%); willow (10%). 3. Both side banks were stable. 4. Most of this entire area was a wetland with influences from unknown water sources.
	2003	1. Besides the riparian plant communities here near Mud Creek, M3 through M6 were within large wetland areas suggesting that springs or other water sources may be a factor for the existence of the current vegetation. If additional water sources are involved in these areas, they may not be good indicators for changes in the stream flows in Mud Creek. 2. Banks on both sides of the stream were stable.



Mud Creek Riparian Sample Site M5 (2002)



Mud Creek Riparian Sample Site M5 (2003)

TABLE 35: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M6
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

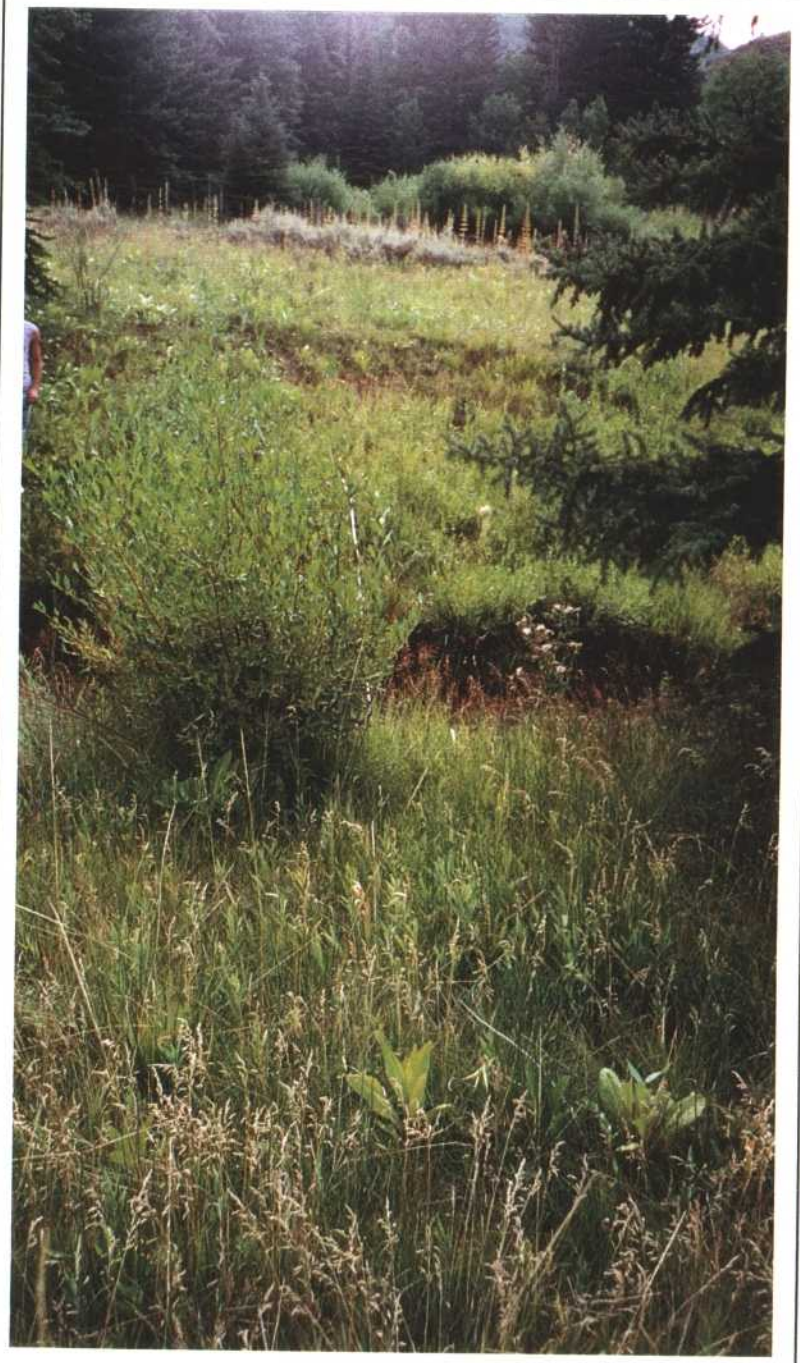
Mud Creek: Cover by Community Types - M6

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Artemisia sp./Grass	10.0	7.0
Artemisia sp./Chrysothamnus viscidiflorus	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera		18.0
Salix spp./Equisetum arvense/Juncus arcticus	13.5	
Dominant Herbaceous Species		
Agrostis stolonifera/Juncus arcticus		12.0
Juncus arcticus/Agrostis stolonifera	12.0	
TOTAL COVER (Riparian Species)	25.5	30.0
TOTAL COVER (Upland Species)	20.0	17.0
STREAM (Water Width)	11.5	11.0
TOTAL COVER	57.0	58.0

NOTES:

Transect No.	Sample Year	General Notes
M6	2002	1. Left side riparian vegetation was ~ willow/redtop (100%). 2. Right side riparian vegetation was ~rushes (50%); redtop (45%); willow (5%). 3. Both side banks were stable, but the left side was a little less stable. 4. Most of this entire area was a wetland with influences from unknown water sources.
	2003	1. Besides the riparian plant communities here near Mud Creek, M3 through M6 were within large wetland areas suggesting that springs or other water sources may be a factor for the existence of the current vegetation. If additional water sources are involved in these areas, they may not be good indicators for changes in the stream flows in Mud Creek. 2. Both side banks were stable, but the left side was a little less stable.

Mud Creek Riparian Sample Site M6 (2002)



Mud Creek Riparian Sample Site M6 (2003)

TABLE 36: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M7
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M7

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Artemisia cana	10.0	10.0
Artemisia cana	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Artemisia cana/Juncus arcticus	55.0	25.0
Salix spp./Juncus arcticus/Circium spp.	12.0	
Salix spp./Juncus arcticus		44.0
Dominant Herbaceous Species		
Agrostis stolonifera/Phalaris arundinacea	3.0	
Carex nebrascensis	2.0	
Juncus arcticus/Agrostis stolonifera	3.0	
Phalaris arundinacea/Carex nebrascensis		6.0
TOTAL COVER (Riparian Species)	75.0	75.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	11.0	11.0
TOTAL COVER	106.0	106.0

NOTES:

Transect No.	Sample Year	General Notes
M7	2002	1. Left side riparian vegetation was ~sagebrush (30%); rushes (70%). 2. Right side riparian vegetation was ~sagebrush (30%); rushes/sedges (70%). 3. Both side banks were stable.
	2003	1. Left side riparian vegetation was ~sagebrush (20%); rushes (80%). 2. Right side riparian vegetation was ~sagebrush (20%); rushes/sedges (80%). 3. Both side banks were stable.

Mud Creek Riparian Sample Site M7 (2002)

Mud Creek Riparian Sample Site M7 (2003)

TABLE 37: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M8
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

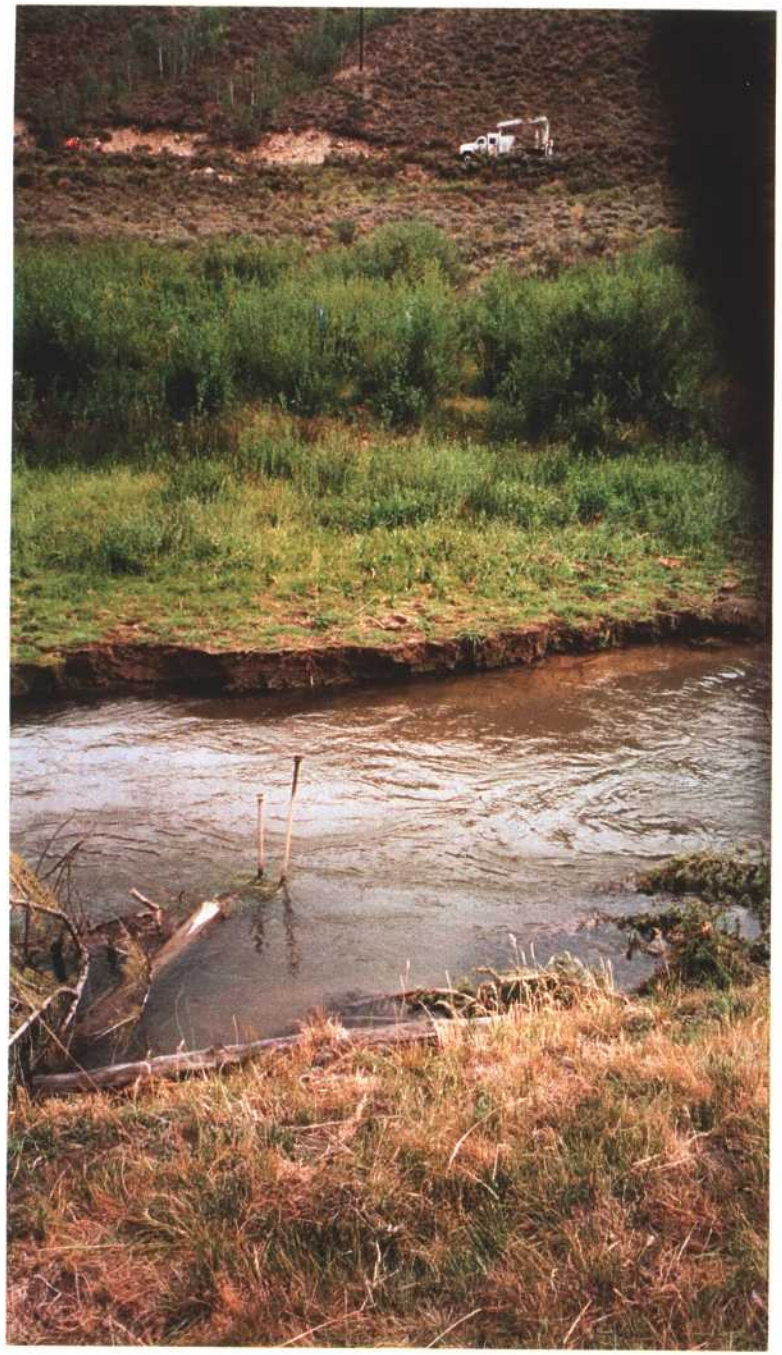
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M8

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Stipa comata	10.0	10.0
Salix spp.	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus arcticus/Circium spp.	35.0	
Salix spp./Juncus arcticus		35.0
Dominant Herbaceous Species		
Agrostis stolonifera		3.0
Equisetum arvense	2.0	
TOTAL COVER (Riparian Species)	37.0	38.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	11.0	22.0
TOTAL COVER	68.0	80.0

NOTES:

Transect No.	Sample Year	General Notes
M8	2002	1. This whole area is a wetland area that looks like it has communication from water in addition to the stream. 2. Left bank was unstable; right bank stable. 3. New private property (pasture) begins near this site.
	2003	1. Same note as #1 above. 2. The left bank was very unstable last year. After the 2002 data collection, dead trees were placed in areas along the stream channel where the banks were the most unstable. In 2003 these banks looked much more stable and have begun to revegetate with desirable riparian plant species.



Mud Creek Riparian Sample Site M8 (2002)

Mud Creek Riparian Sample Site M8 (2003)

TABLE 38: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M9
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

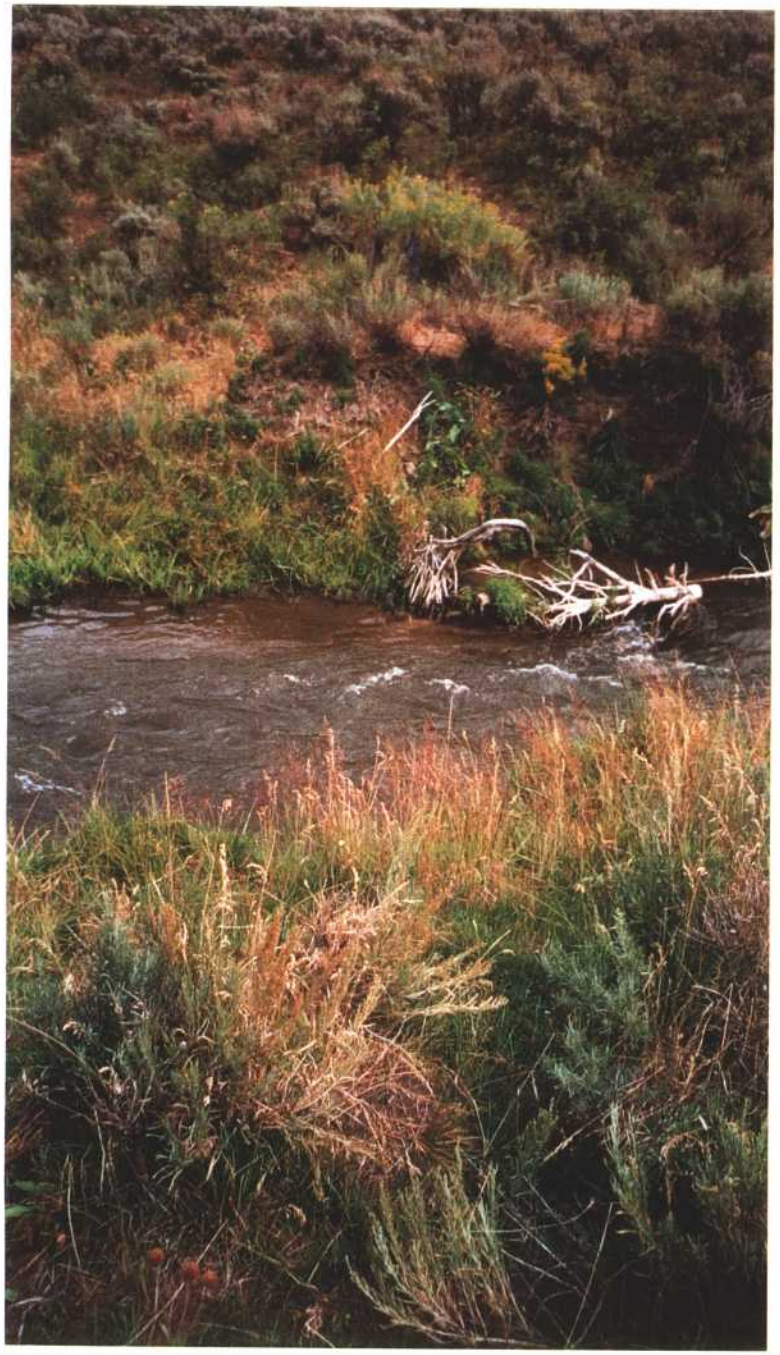
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M9

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Poa sp./Artemisia cana	10.0	11.0
Artemisia tridentata/Symphoricarpos oreophilus	10.0	13.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	8.0	
Agrostis stolonifera/Phleum pratense		6.0
TOTAL COVER (Riparian Species)	8.0	6.0
TOTAL COVER (Upland Species)	20.0	24.0
STREAM (Water Width)	13.0	11.0
TOTAL COVER	41.0	41.0

NOTES:

Transect No.	Sample Year	General Notes
M9	2002	1. Springs from the west side of this area influences wetland and riparian species. We tried to predict those plants that were most influenced by the stream. 2. The banks were stable in the transect area, but not in nearby areas.
	2003	1. Same note as above. 2. Additionally old river oxbows were present in the area. These oxbows supported some wetland plant species.



Mud Creek Riparian Sample Site M9 (2002)

Mud Creek Riparian Sample Site M9 (2003)

TABLE 39: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M10
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

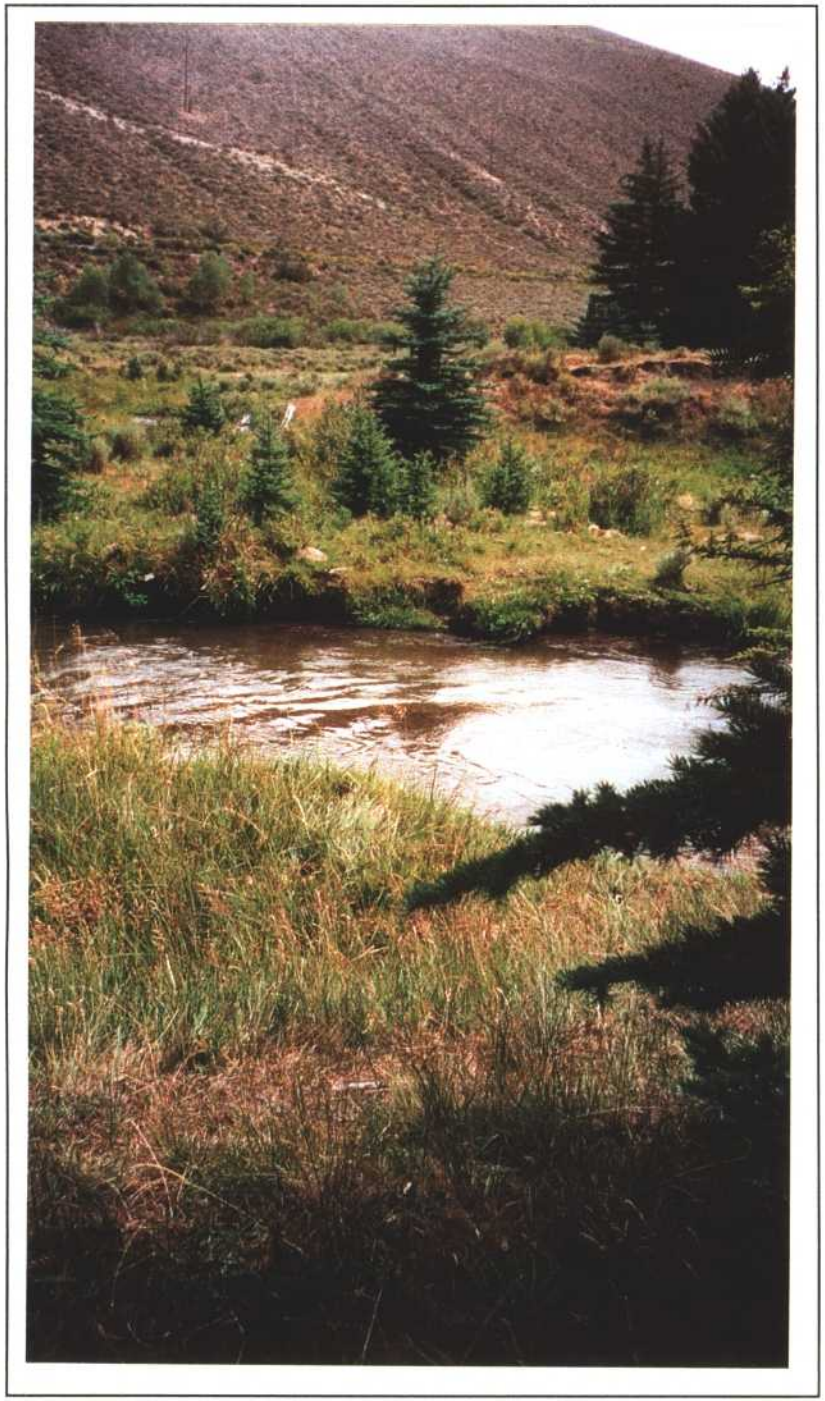
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M10

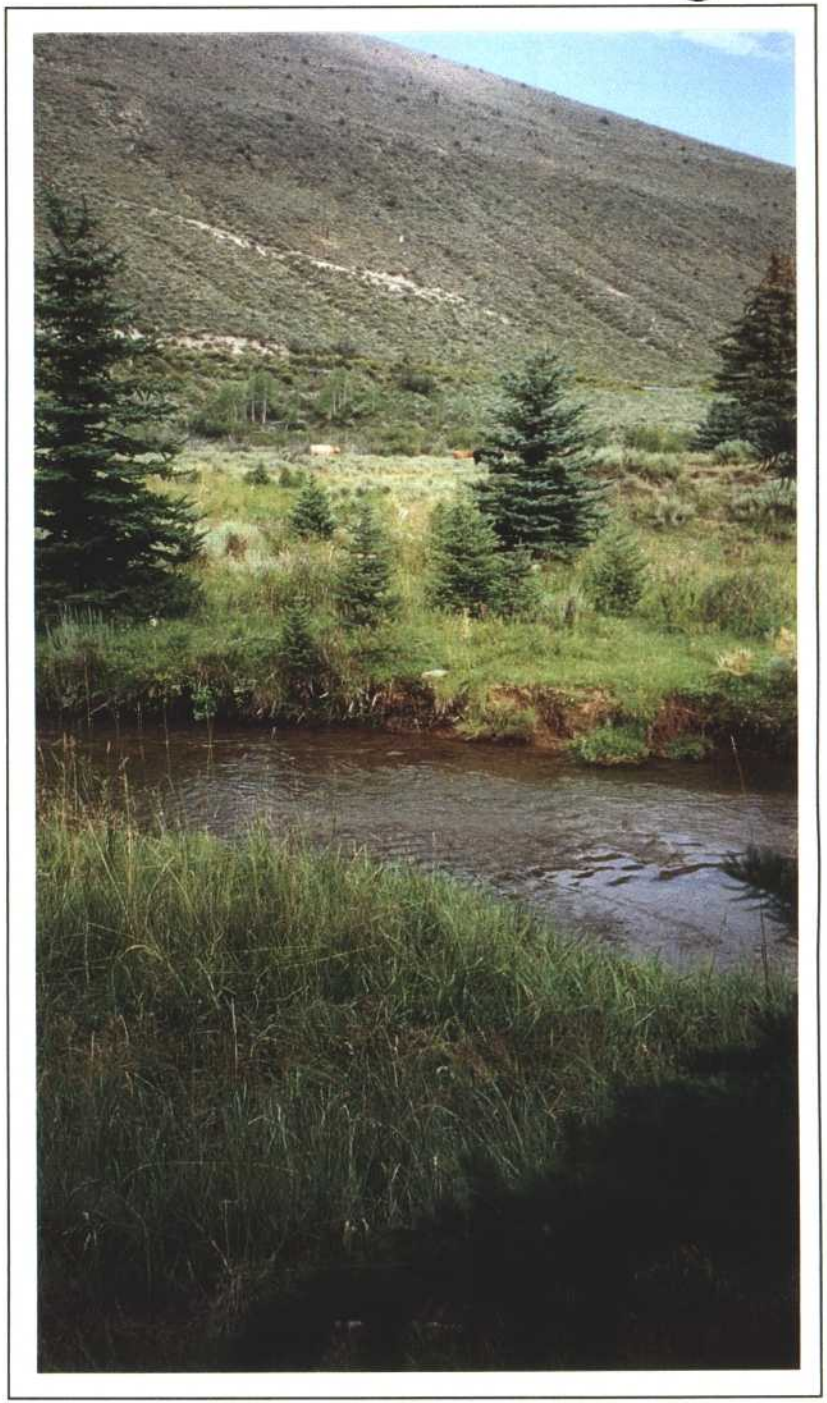
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Picea pungens	10.0	10.0
Water/Meander	0.0	0.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus articus/Circium spp.		
Salix spp./Agrostis stolonifera	32.0	32.0
Dominant Herbaceous Species		
Agrostis stolonifera	9.0	12.0
Carex nebraskensis	2.0	
TOTAL COVER (Riparian Species)	43.0	44.0
TOTAL COVER (Upland Species)	10.0	10.0
STREAM (Water Width)	16.0	15.0
TOTAL COVER	69.0	69.0

NOTES:

Transect No.	Sample Year	General Notes
M10	2002	1. No upland areas on one side due to meanders. 2. Springs (and irrigation) from the west side of this area influences wetland and riparian species. We tried to predict those plants that were most influenced by the stream. 3. Left bank stable; right less stable. 4. Over-grazing in the pasture very much influenced bank erosion severity.
	2003	1. Same notes as above.



Mud Creek Riparian Sample Site M10 (2002)



Mud Creek Riparian Sample Site M10 (2003)

TABLE 40: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M11
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M11

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Pastureland	10.0	10.0
Artemisia spp./Grass	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera	5.0	
Dominant Herbaceous Species		
Agrostis stolonifera	3.0	3.5
Agrostis stolonifera/Juncus arcticus		21.5
Juncus arcticus/Agrostis stolonifera	14.0	
Juncus arcticus	2.0	
TOTAL COVER (Riparian Species)	24.0	25.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	14.0	13.0
TOTAL COVER	58.0	58.0

NOTES:

Transect No.	Sample Year	General Notes
M11	2002	1. Left side riparian vegetation ~ redtop/rushes (100%). 2. Right side was redtop (100%) 3. There were some sedges present at waters edge.
	2003	1. Left side riparian vegetation ~ rushes (85%); redtop (15%). 2. Right side was redtop (100%) 3. There were some sedges present at waters edge.

Mud Creek Riparian Sample Site M11 (2002)

Mud Creek Riparian Sample Site M11 (2003)

TABLE 41: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M12
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

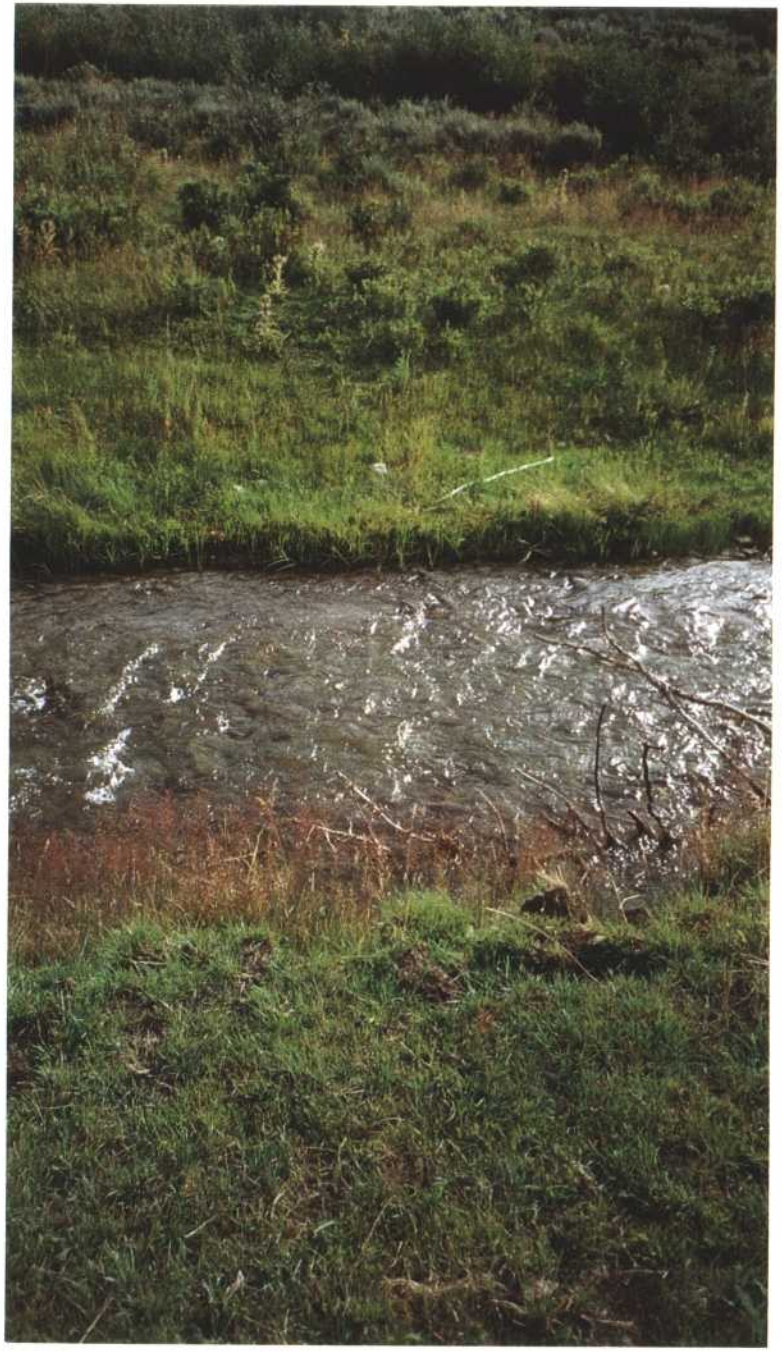
Mud Creek: Cover by Community Types - M12

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Pastureland	10.0	10.0
Pastureland	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Artemisia cana/Agrostis stolonifera		42.0
Salix spp./Agrostis stolonifera	46.0	
Dominant Herbaceous Species		
Agrostis stolonifera	2.0	
Juncus articus/Agrostis stolonifera	17.0	
Juncus articus		14.0
Juncus longistylis		1.0
Phalaris arundinacea		1.5
TOTAL COVER (Riparian Species)	65.0	58.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	14.6	14.0
TOTAL COVER	99.6	92.5

NOTES:

Transect No.	Sample Year	General Notes
M12	2002	1. Left side riparian vegetation was ~redtop (100%). 2. Right side riparian vegetation was ~willow/redtop (75%); rushes/redtop (25%). 3. Left bank was unstable; right bank was stable. 4. Springs (and irrigation) from the west side of this area influences wetland and riparian species. We tried to predict those plants that were most influenced by the stream.
	2003	1. Left side riparian vegetation was ~redtop (100%). 2. Right side riparian vegetation was ~rushes (25%); sagebrush/redtop (75%). 3. Left bank was unstable but was more stable than last year due to channel restoration efforts made by placing dead conifers at cut banks; right bank was stable. 4. Springs (and irrigation) from the west side of this area influences wetland and riparian species. We tried to predict those plants that were most influenced by the stream.

Mud Creek Riparian Sample Site M12 (2002)



Mud Creek Riparian Sample Site M12 (2003)

TABLE 42: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M13
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

QUANTITATIVE DATA:

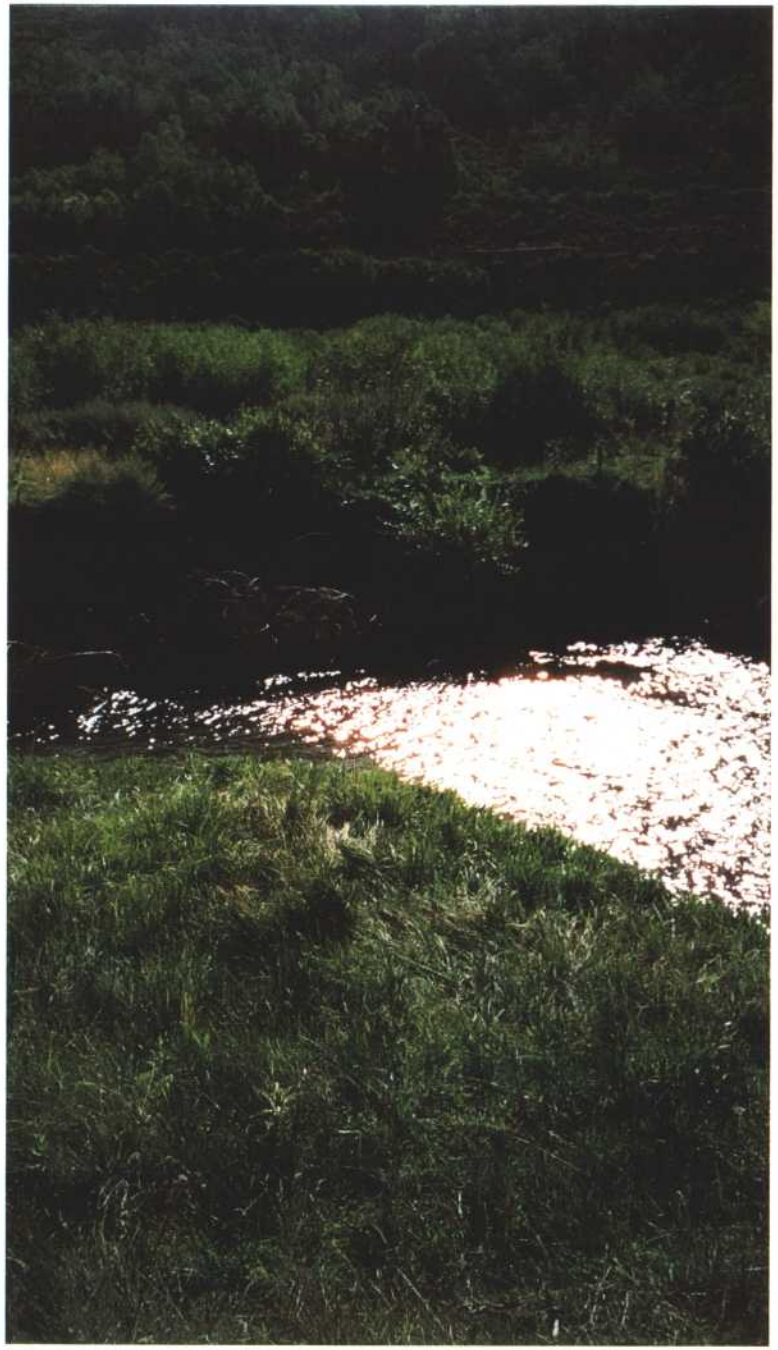
Mud Creek: Cover by Community Types - M13

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Pastureland	10.0	8.0
Artemisia cana/Grass	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera/Juncus arcticus	20.0	
Equisetum arvense		1.5
Juncus arcticus/Agrostis stolonifera		19.5
TOTAL COVER (Riparian Species)	20.0	21.0
TOTAL COVER (Upland Species)	20.0	18.0
STREAM (Water Width)	14.0	15.0
TOTAL COVER	54.0	54.0

NOTES:

Transect No.	Sample Year	General Notes
M13	2002	1. Measuring the left side, the riparian species were ~ rushes (50%); redtop (45%); willow (5%). 2. The right side had no riparian vegetation due to unstable bank. 3. Left bank was stable.
	2003	1. Left side had ~ rushes (15%); redtop (83%); willow (2%). 2. Left bank was unstable but was more stable than last year due to channel restoration efforts made by placing dead conifers at cut banks; right bank was stable. Horsetails were invading the restoring banks cuts this year.

Mud Creek Riparian Sample Site M13 (2002)



Mud Creek Riparian Sample Site M13 (2003)

TABLE 43: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M14
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

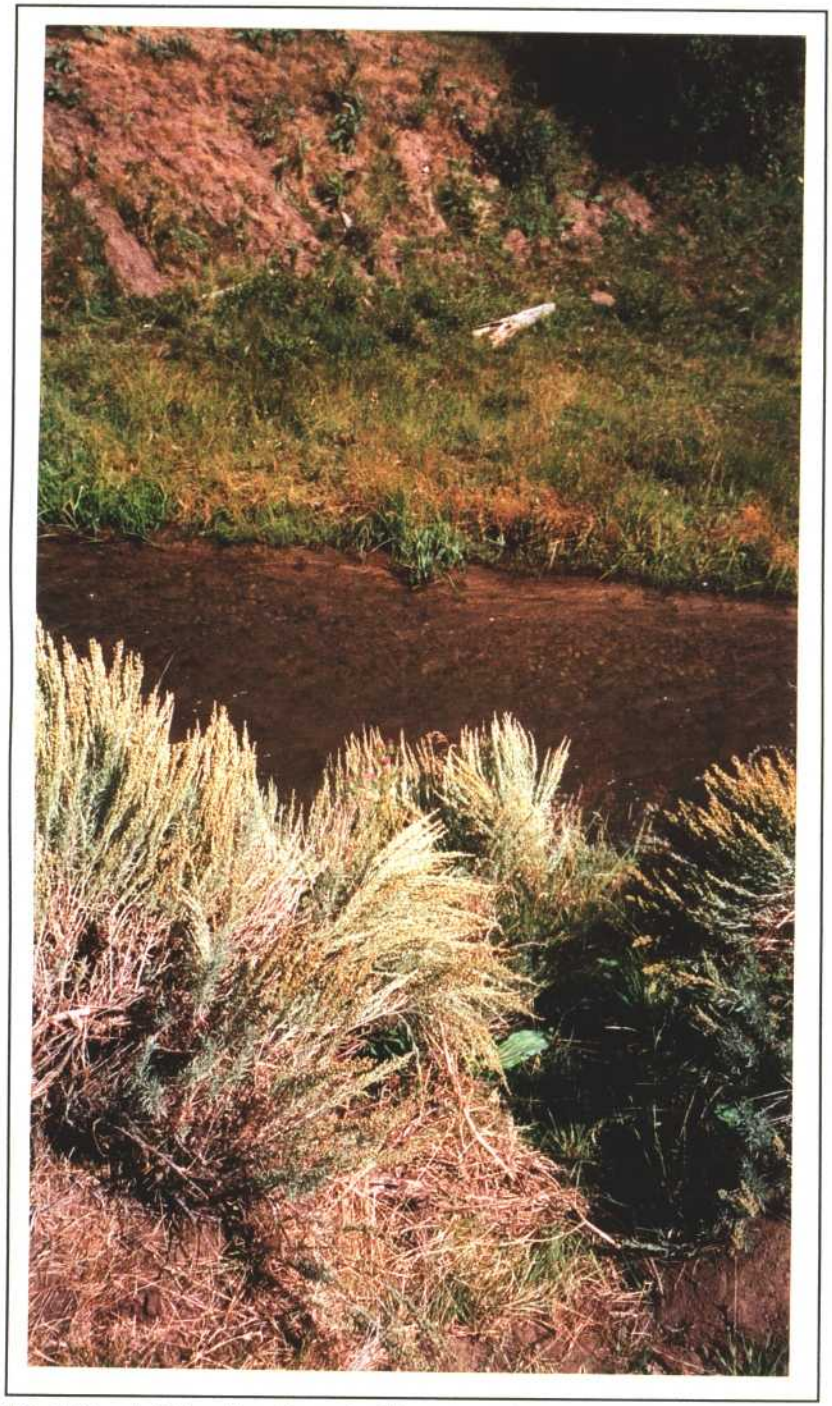
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M14

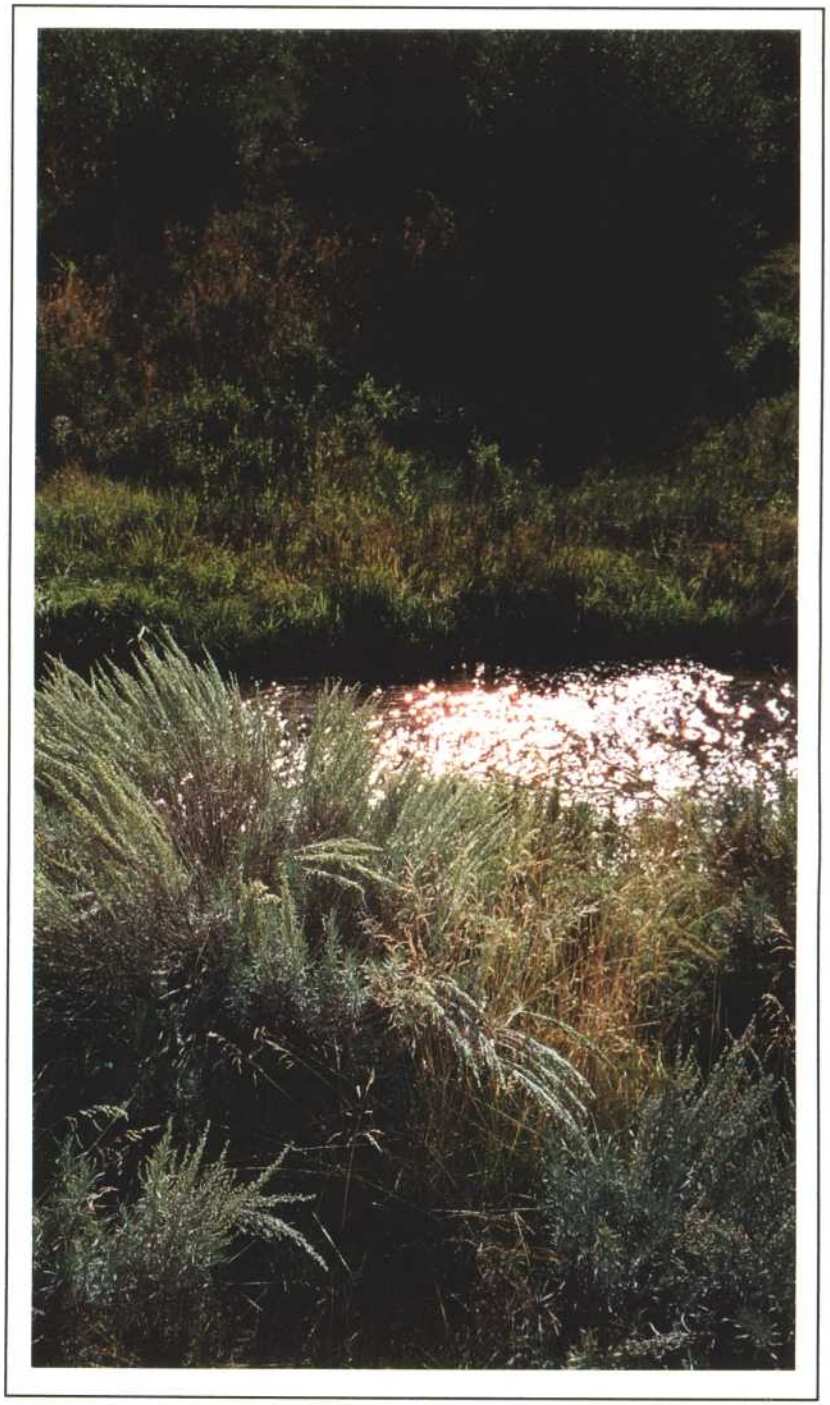
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Artemisia cana/Grass	10.0	10.0
Salix spp. (from hillside)	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera		13.5
Agrostis stolonifera/Equisetum arvense	1.5	
Juncus articus/Agrostis stolonifera	11.5	
TOTAL COVER (Riparian Species)	13.0	13.5
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	11.5	11.0
TOTAL COVER	44.5	44.5

NOTES:

Transect No.	Sample Year	General Notes
M14	2002	1. Left side had little riparian vegetation due to unstable bank.. 2. Right side riparian vegetation was ~rushes/redtop (100%). 3. Right bank was fairly stable at lower elevations.
	2003	1. Left bank was unstable but was more stable than last year due to channel restoration efforts made by placing dead conifers at cut banks; right bank was stable. 2. Willow populations were established at elevations at least 7 ft above the river channel. Water other than the stream flows may be a factor here.



Mud Creek Riparian Sample Site M14 (2002)



Mud Creek Riparian Sample Site M14 (2003)

TABLE 44: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M15
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

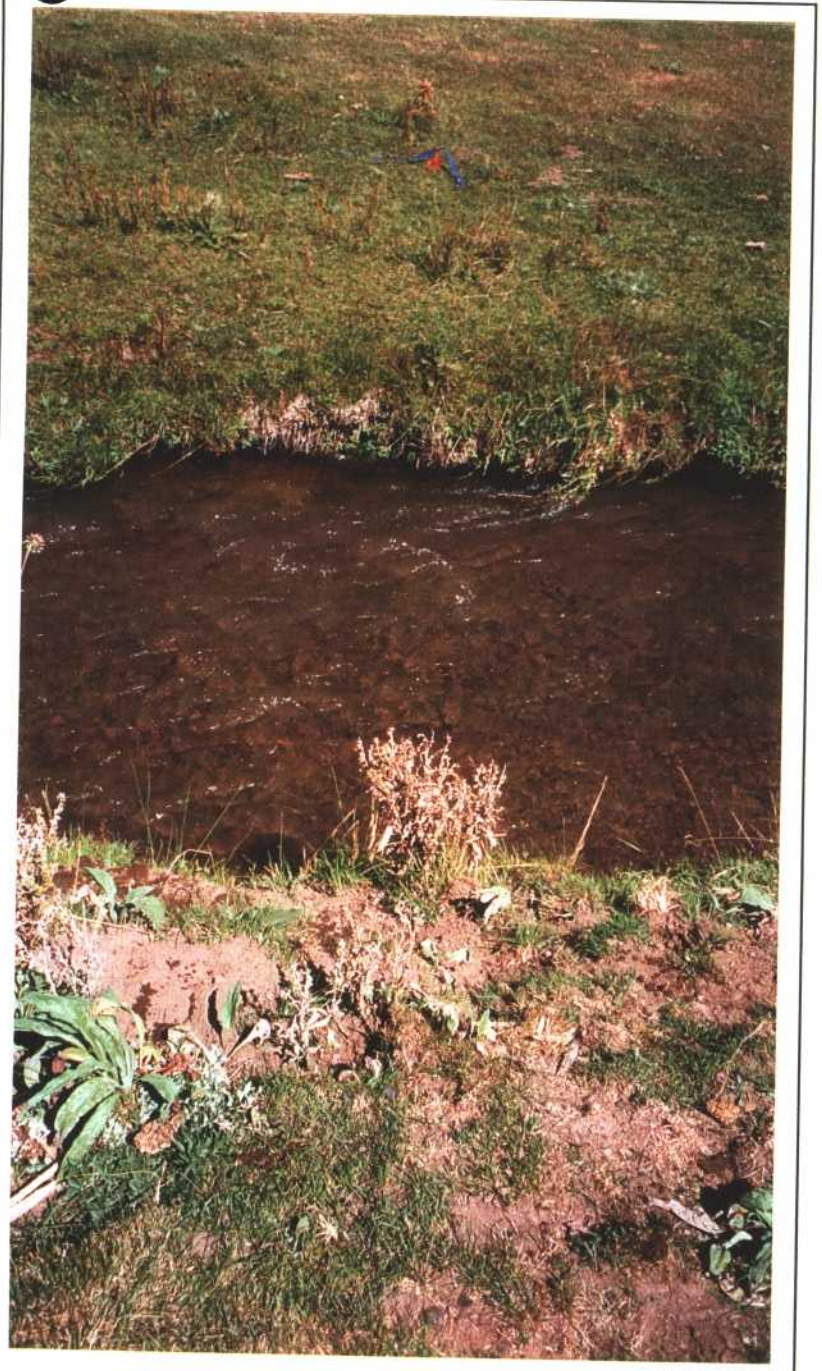
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M15

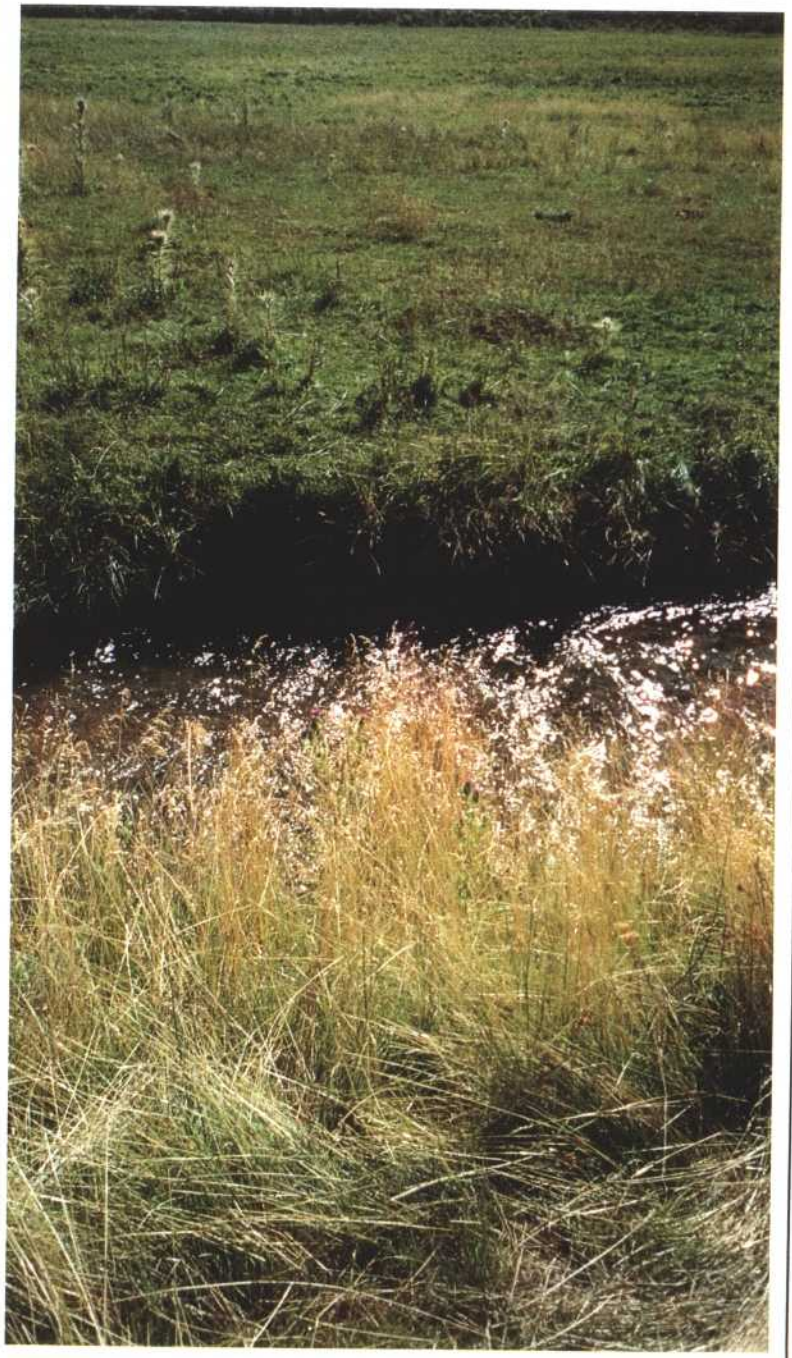
USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Pastureland	10.0	10.0
Pastureland	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera	1.5	1.0
Agrostis stolonifera/Juncus arcticus		2.0
Juncus arcticus/Agrostis stolonifera	2.0	
TOTAL COVER (Riparian Species)	3.5	3.0
TOTAL COVER (Upland Species)	20.0	20.0
STREAM (Water Width)	11.5	11.0
TOTAL COVER	35.0	34.0

NOTES:

Transect No.	Sample Year	General Notes
M15	2002	1. Steep banks on both sides, but not vertical. Not very much riparian vegetation on either side (see quantitative data). 2. Both banks relatively unstable.
	2003	1. Banks remain unstable, but some vegetation was becoming established on the cut banks this year.



Mud Creek Riparian Sample Site M15 (2002)



Mud Creek Riparian Sample Site M15 (2003)

TABLE 45: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M16
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

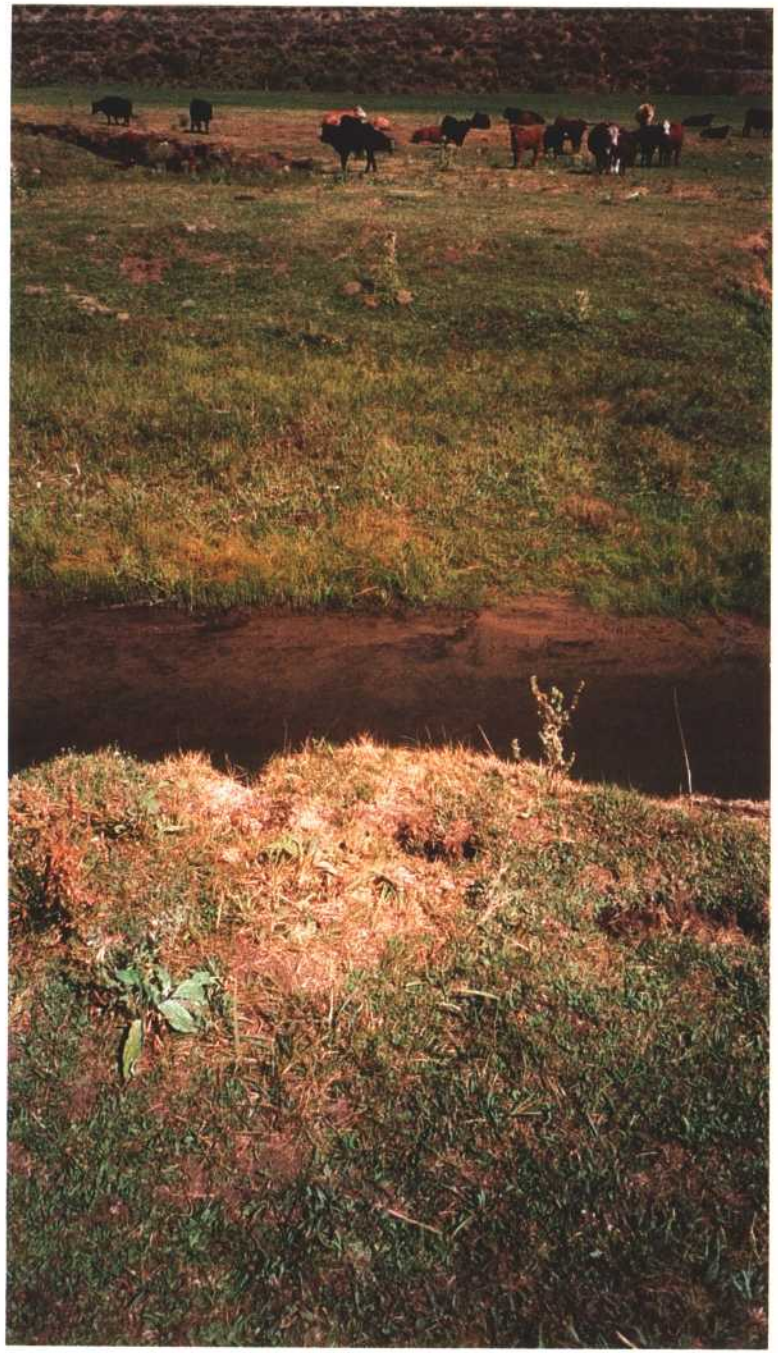
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M16

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Pastureland	10.0	8.0
Pastureland	10.0	10.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus arcticus/Agrostis stolonifera		20.0
Dominant Herbaceous Species		
Equisetum arvense		2.0
Juncus arcticus/Agrostis stolonifera	20.0	
TOTAL COVER (Riparian Species)	20.0	22.0
TOTAL COVER (Upland Species)	20.0	18.0
STREAM (Water Width)	13.0	13.0
TOTAL COVER	53.0	53.0

NOTES:

Transect No.	Sample Year	General Notes
M16	2002	1. Left side due to steep banks, no riparian vegetation. 2. Right side riparian vegetation was ~rushes (50%); redtop (45%); willow (5%). 3. Right bank was unstable; left bank was stable.
	2003	1. Left side due to steep banks (5'), but about 50% horsetail cover this year. 2. Right side riparian vegetation was ~rushes (50%); redtop (45%); willow (5%). 3. Right bank was unstable; left bank was stable. 4. Cattle had removed stakes. We use 2002 photos to locate site.



Mud Creek Riparian Sample Site M16 (2002)

Mud Creek Riparian Sample Site M16 (2003)

TABLE 46: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M17
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas - Brycan loams* - (65% Silas loam; 20% Brycan loam; 15% other soils)

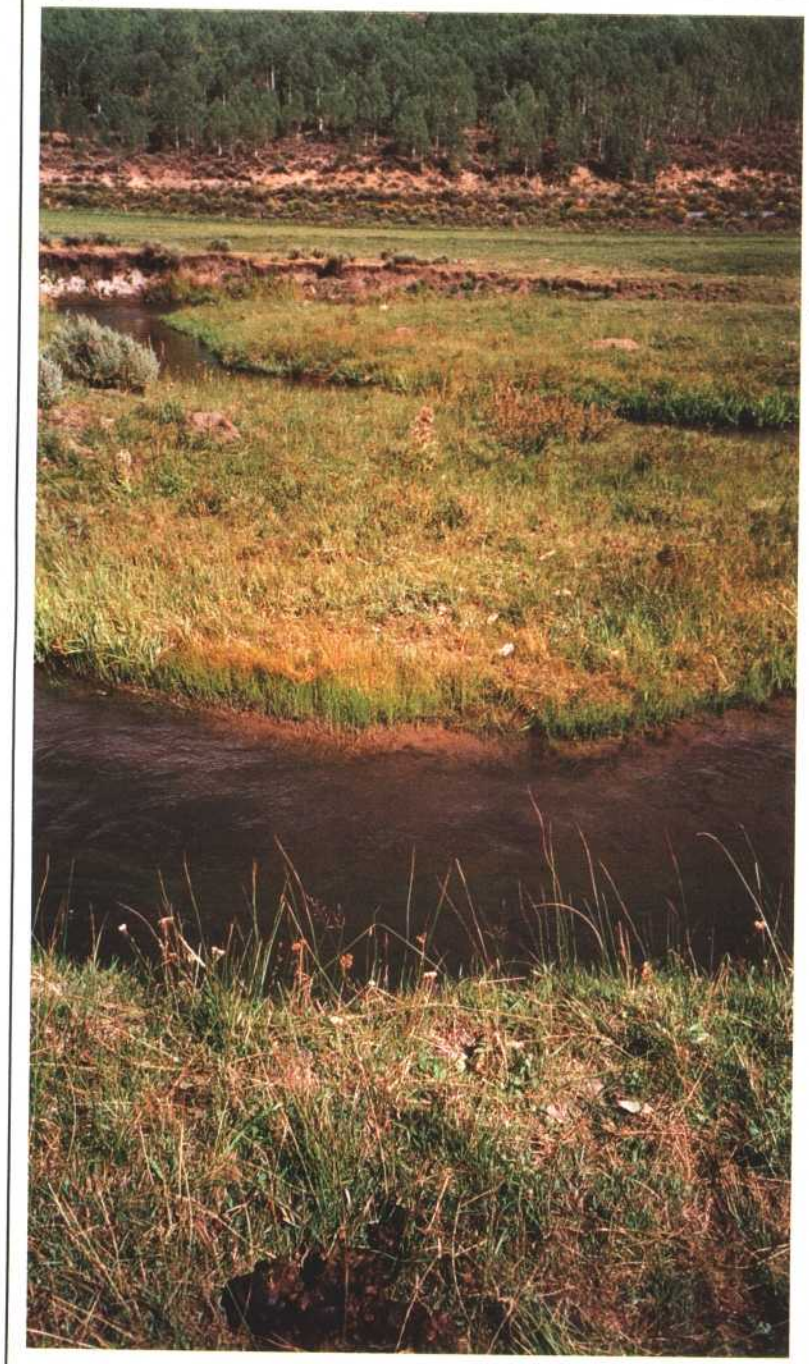
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M17

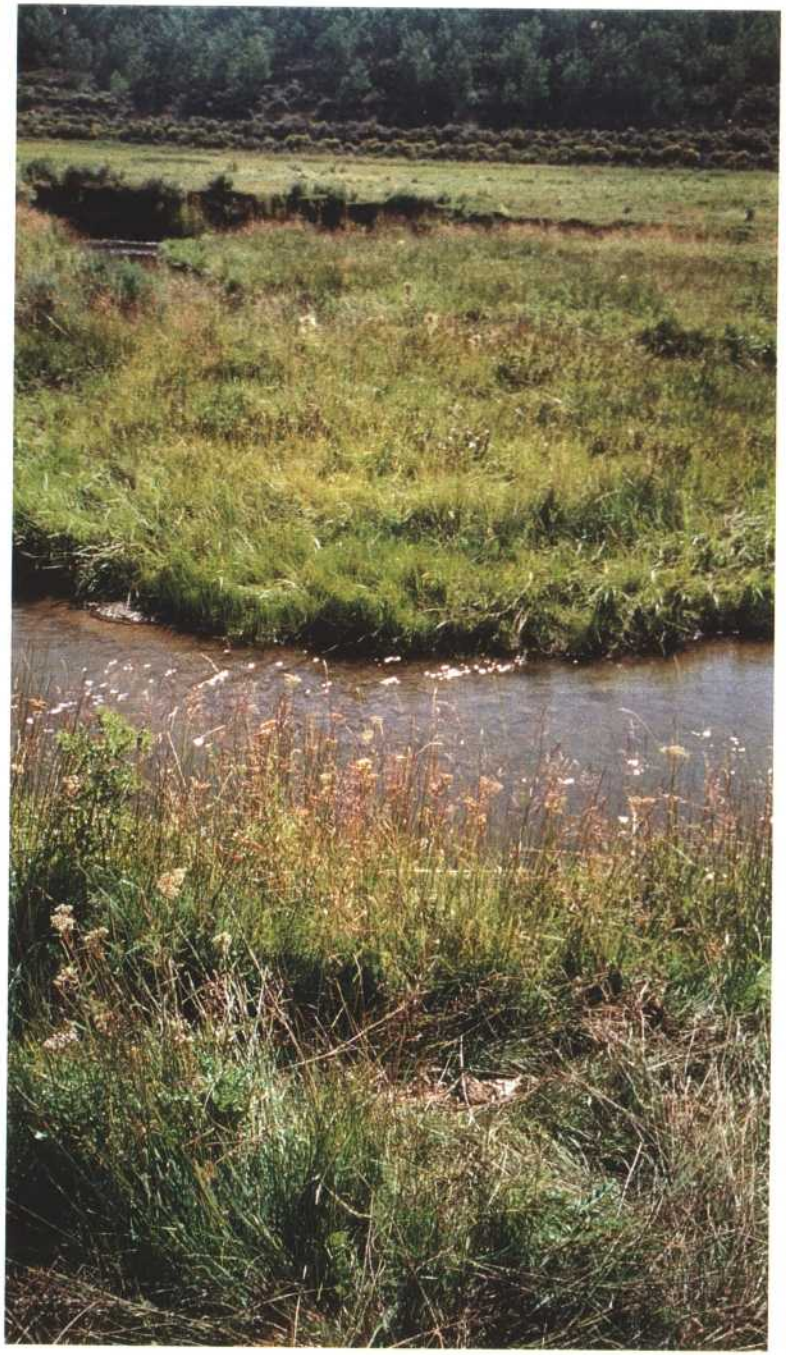
USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Pastureland	10.0	8.5
Pastureland	0.0	0.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Dominant Herbaceous Species		
Agrostis stolonifera/Phalaris arundinacea		33.0
Agrostis stolonifera/Juncus arcticus	33.0	1.0
TOTAL COVER (Riparian Species)	33.0	34.0
TOTAL COVER (Upland Species)	10.0	8.5
STREAM (Water Width)	10.5	11.0
TOTAL COVER	53.5	53.5

NOTES:

Transect No.	Sample Year	General Notes
M17 (End of private pasture south of town.	2002	1. Left side had a 36" vertical cut. No riparian vegetation. 2. Right side riparian vegetation was ~rushes/redtop (100%). 3. Left bank was unstable; right bank was stable. 4. No upland species on right side due to meander.
	2003	1. (Same notes and measurements as above).



Mud Creek Riparian Sample Site M17 (2002)



Mud Creek Riparian Sample Site M17 (2003)

TABLE 47: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M18
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas loams* - (100% Silas loam)

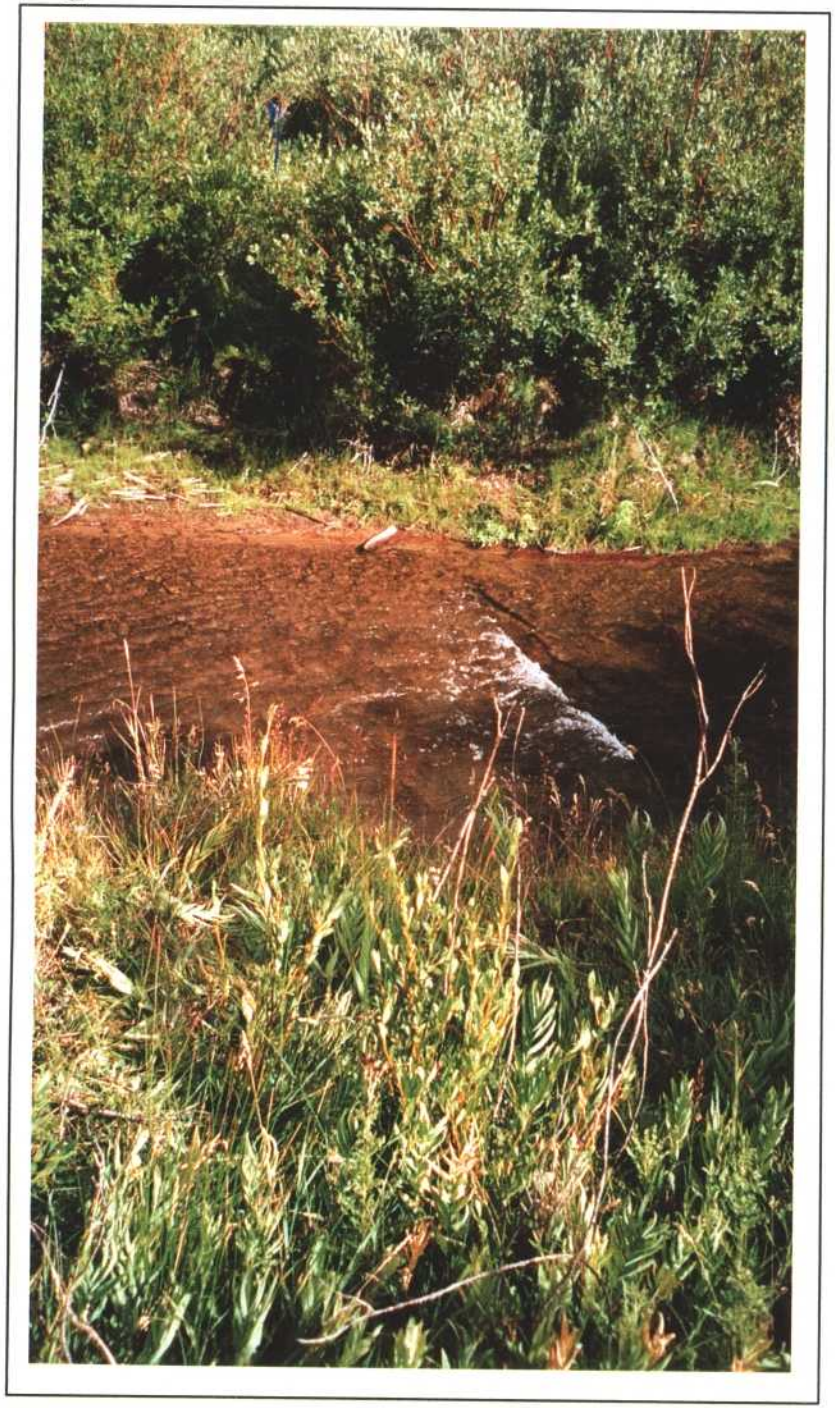
QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M18

USDA Forest Service Protocol (1992)	Cover (ft)	
	2002	2003
UPLAND VEGETATION		
Pastureland/Salix spp.	0.0	0.0
Pastureland/Salix spp.	0.0	0.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera	10.0	
Salix spp./ Poa sp./Smilacina stellata	10.0	18.0
Dominant Herbaceous Species		
Equisetum arvense		2.0
TOTAL COVER (Riparian Species)	20.0	20.0
TOTAL COVER (Upland Species)	0.0	0.0
STREAM (Water Width)	16.0	16.0
TOTAL COVER	36.0	36.0

NOTES:

Transect No.	Sample Year	General Notes
M18 (first samples north of the town of Scofield)	2002	1. Most all of this area is a wetland. It was very difficult to discern where the water comes from that influences the wetland/riparian species the most. 2. We sampled from 10 ft on each side of the river. 3. Left bank was unstable and had a 3 ft cut bank. 4. Right bank was more stable.
	2003	1. Same notes as above, but horsetail was invading banks.



Mud Creek Riparian Sample Site M18 (2002)

Mud Creek Riparian Sample Site M18 (2003)

TABLE 48: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M19
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas loams* - (100% Silas loam)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M19

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Pastureland/Salix spp.	0.0	0.0
Pastureland/Salix spp.	0.0	0.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Juncus arcticus /Agrostis stolonifera	20.0	20.0
Dominant Herbaceous Species		
TOTAL COVER (Riparian Species)	20.0	20.0
TOTAL COVER (Upland Species)	0.0	0.0
STREAM (Water Width)	22.0	22.0
TOTAL COVER	42.0	42.0

NOTES:

Transect No.	Sample Year	General Notes
M19 (just past E/W fence line)	2002	1. See notes in M18.
	2003	1. Same notes as above, but some stabilizing has occurred.

Mud Creek Riparian Sample Site M19 (2002)

Mud Creek Riparian Sample Site M19 (2003)

TABLE 49: RIPARIAN COMPLEX DATA SHEET
2002 & 2003

COMPLEX: Riverine - M20
WATERBODY NAME: Mud Creek
DATE: August 21-23, 2002; August 19-21, 2003
OBSERVER(S): P. Collins, A. Faberzani
QUAD NAME: Scofield 7.5
GEOLOGIC PARENT MATERIAL: Alluvium sandstone and shale from the Blackhawk Formation
ASPECT: North
ELEVATION: Mud Creek sample sites were between 7,500 ft. - 8,560 ft. above sea level
SOIL FAMILY:

- *Silas loams* - (100% Silas loam)

QUANTITATIVE DATA:

Mud Creek: Cover by Community Types - M20

USDA Forest Service Protocol (1992)	Cover (ft) 2002	2003
UPLAND VEGETATION		
Pastureland/Salix spp.	10.0	8.0
Pastureland/Salix spp.	10.0	7.0
RIPARIAN VEGETATION		
Dominant Woody Species		
Salix spp./Agrostis stolonifera/Eleocharis palustris	13.0	11.0
Dominant Herbaceous Species		
TOTAL COVER (Riparian Species)	13.0	11.0
TOTAL COVER (Upland Species)	20.0	15.0
STREAM (Water Width)	9.5	12.0
TOTAL COVER	42.5	38.0

NOTES:

Transect No.	Sample Year	General Notes
M20	2002	1. See notes in M17. 2. To locate go 800 ft from the last mark, or a bit farther to old log structure. Or go to north fence line (north of log structure) of property (blue gate); take fence line to river (walk on north side of fence).
	2003	1. Much of the banks on left side had fallen off here. Cut bank was 48" this year. Compare 2002 and 2003 photographs.

Mud Creek Riparian Sample Site M20 (2002)

Mud Creek Riparian Sample Site M20 (2003)