

Canyon Fuel Company, LLC

Skyline Mines

A Subsidiary of Arch Western Bituminous Group, LLC

C/007/005

2008 Annual Report



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In C/007/005 Arch. Incoming

For additional information

0025

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Canyon Fuel Company, LLC. Skyline Mine

A Subsidiary of Arch Western Bituminous Group, LLC.

COPY

Gregg Galecki, Environmental Eng. HCR 35, Box 380 Helper, UT 84526 (435) 448-2636 - Office (435) 448-2632 - Fax

#3283

✗

May 13, 2009

RECEIVED

MAY 18 2009

DIV. OF OIL, GAS & MINING

Mr. Daron R. Haddock Permit Supervisor Utah Division of Oil, Gas and Mining 1594 West North Temple, Suite 1210 Salt Lake City, Utah 84114-5801

RE: 2008 Annual Report, Canyon Fuel Company, LLC, Skyline Mine, C/007/005,

Dear Mr. Haddock:

Please find enclosed with this letter two (2) copies of the 2008 Annual Report, with a corresponding CD of the information.

If you have any questions, please call me at (435) 448-2636.

Sincerely,

Handwritten signature of Gregg A. Galecki

Gregg A. Galecki Environmental Engineer, Skyline Mine Canyon Fuel Company, LLC enclosures

File in: C/007/005 2009 Incoming Refer to:

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Date: 05/30/09 For additional information

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Date

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For additional information

2008 ANNUAL REPORT**Page 1**

This Annual Report shows information the Division has for your mine. Please review the information to see if it is current. If the information needs to be updated please do so in this document. At the end of each section the operator is asked to verify if the information is correct. Please answer these questions and make all comments on this document. Submit the completed document and any additional information identified in the Appendicies to the Division by April 30, 2009. During a complete inspection an inspector will check and verify the information. To enter text, click in the cell and type your response. You can use the tab key to move from one field to the next. To enter an X in a box, click next to the box, right click, and select properties, then the checked circle, then hit enter, or hit the unchecked circle if the X is to be removed.

GENERAL INFORMATION**RECEIVED****MAY 18 2009****DIV. OF OIL, GAS & MINING**

Permitte Name	Canyon Fuel Company, LLC
Mine Name	Skyline Mine
Operator Name (If other then permittee)	
Permit Expiration Date	April 30, 2012
Permit Number	C/007/0005
Authorized Representative Title	Wess Sorensen, Mine Manager
Phone Number	(435) 4482619
Fax Number	(435) 4482636
E-mail Address	wsorensen@archcoal.com
Mailing Address	Skyline Mine HRC 35 Box 380 Helper, UT 84526
Designated Representative	Gregg Galecki
Resident Agent	Corporation Trust Company
Resident Agent Mailing Address	Corporation Trust Company 1209 Orange Street Wilmington, DE
Number of Binders Submitted	2

Operator, please update any incorrect information.

IDENTIFICATION OF OTHER PERMITS

Identify other permits that are required in conjunction with mining and reclamation activities.

Permit Type	ID Number	Description	Expiration Date
MSHA Mine ID(s)	42-01566	Skyline Mine #3	N/A
	1211-UT09-42-01566-01	Skyline Mine Waste Rock Disposal	N/A
MSHA Impoundment(s)	None		
NPDES/UPDES Permit(s)	UT 0023540-01, 02, 03	UPDES Permit for Skyline Mine, Rail Loadout, Waste Rock Disposal Site	11/30/09
PSD Permit(s) (Air)	10092	Approval Order	N/A
Other			
Storm Water Permit	UTR000578	Storm Water Discharge Permit	12/31/11

Operator, please update any incorrect information.

CERTIFIED REPORTS

List the certified inspection reports as required by the rules and under the approved plan that must be periodically submitted to the Division. Specify whether the information is included as Appendix A to this report or currently on file with the Division.

Certified Reports:	Required		Included or Included	DOG M file location Vol, Chapter, Page
	Yes	No		
Excess Spoil Piles	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Refuse Piles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submitted electronically via email on 2/4/09
Impoundments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submitted electronically via email on 2/4/09 and 5/6/09
Other				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Operator Comments:

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

COMMITMENTS AND CONDITIONS

The Permittee is responsible for ensuring annual technical commitments in the MRP and conditions accepted with the permit are completed throughout the year. The Division has identified these commitments below and has provided space for you to report what you have done during the past year for each commitment. If the particular section is blank, no commitment has been identified and no response is required for this report. If additional written response is required, it should be filed under Appendix B to this report.

Admin R645-301-100
Soils R645-301-200

Title: WASTE ROCK SAMPLING

Objective: To document chemical characteristics and support reclamation plan using less than four feet of cover and to protect surface and groundwater.

Frequency: During periods of deposition at the waste rock site.

Status: Quarterly sampling, 1 sample per 2000 tons hauled to disposal site.

Reports: Annual reporting.

Citation: Vol. 3, Section 4.4, pg. 4-30, 2nd para. And 1988 Soils Guidelines Table 6.

Operator Comments: Lab Analysis is included in Appendix B

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: SUBSOIL SAMPLING AT WASTE ROCK SITE.

Objective: To provide chemical characteristics of purchased subsoil.

Frequency: Sample purchased subsoil for parameters in Table 1 of the Utah 1988 Guidelines.

Status: Ongoing with contemporaneous reclamation at the waste rock site.

Reports: None specified. Suggest verbal communication with Division and lab analysis to be included in bond release application.

Citation: Vol. 3, Section 4.6.4.1, pg. 4-38a, 3rd para. And pg. 4-38b.

Operator Comments: No subsoil or substitute topsoil was purchased in 2008.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: SAMPLING PRIOR TO SLURRY PLACEMENT IN ABANDON UNDERGROUND WORKINGS.

Objective: Protection of groundwater.

Frequency: Every 450 ft. of advance.

Status: Ongoing.

Reports: Notification if parameters are out of compliance with Guidelines for Topsoil and Overburden.

Citation: Volume 2, Incorporation of 97K-1 and Section 1.2 (at the end of Section 3.2) and Section 3.2.8.

Operator Comments: No Slurry was pumped underground in 2008.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: SAMPLING OF WASTE ROCK IN TEMPORARY STOCKPILES.**Objective:** Protection of surface and groundwater.**Frequency:** If remains in temporary location longer than three months.**Status:** 1 sample/ 2000 tons of temporary stockpiled material.**Reports:** Annual reporting not specified, but assumed to be the same as disposal site sampling (previous paragraph on same page).**Citation:** Vol. 3, Section 4.4, pg. 4-30, 3rd para. And 1988 Soils Guidelines Table 6.**Operator Comments:** No temporary Waste Rock was stockpiled for longer than three (3) months in 2008.**Inspector:**Has the operator complied with this section? Yes No **Inspector Comments:**

Biology R645-301-300

Title: CULTURAL RESOURCES**Objective:** If during the course of mining operations, previously unidentified cultural resources are discovered, the Permittee shall ensure that the site(s) is not disturbed and shall notify the Division of Oil, Gas, and Mining. The Division, after coordination with OSM, shall inform the Permittee of necessary actions required. The Permittee shall implement the mitigation measures required by the Division within the time frame specified by the Division.**Frequency:** As needed.**Status:** Ongoing.**Reports:** Annual.**Citation:** Permit Condition Sec. 16.**Operator Comments:** No previously unidentified cultural resources were discovered in 2008 that would have been disturbed.**Inspector:**Has the operator complied with this section? Yes No **Inspector Comments:**

Title: MACROINVERTEBRATE SURVEYS

Objective: To determine if mining and mining related activities are impacting the perennial streams located in Woods, Eccles, Burnout and James Canyons.

Frequency: Fall and Spring every three years beginning in 2007.

Status: Ongoing.

Reports: Annual.

Citation: Appendix A-3, Volume 2, The Macro benthos of Burnout and James Canyon Creek. Benthos of Boardinghouse & Eccles Creek, Fall 2001. Macroinvertebrates of Eccles Creek, October 2004. Volume 1A, Section 2.8, pages 2-71, 71A, B, C, Section 2.8, table 2.8-1a.

Operator Comments: Field work was conducted in both 2007 and 2008; reports are being prepared.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: FISH SURVEYS

Objective: To determine if mining and mining related activities are impacting the perennial streams located in Woods, Eccles, Burnout and James canyons.

Frequency: In the Fall Every three years beginning in 2007.

Status: Ongoing.

Reports: Annual.

Citation: Volume 1A, Section 2.8, page 2-71.

Operator Comments: Field work was conducted in 2007; reports are located in Appendix B.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: TOPSOIL SAMPLING.

Objective: To determine fertilizer application rate.

Frequency: At final reclamation sample topsoil for N, P, K, Fe, Mg, Mn, Zn, Ca and pH.

Status: Analysis of redistributed topsoil.

Reports: None specified. Suggest verbal communication with Division and lab analysis to be included in bond release application.

Citation: Vol. 3, Section 4.5, pg. 4-32, 2nd para.

Operator Comments: No Topsoil was redistributed in 2008; no analysis of Topsoil was conducted.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Engineering R645-301-500

Geology R645-301-600

Hydrology R645-301-700

Title: Age-monitoring of Water.

Objective: Understand possible sources of groundwater inflows

Frequency: When inflows of 800 gpm are encountered.

Status: No significant inflows in the North Lease.

Reports: As needed.

Citation: Volume 1, Page 2-35b, Paragraph 2.

Operator Comments: Mine #2 sites have not been accessible since 2004. No sustained inflows >800 gpm have been encountered in the North Lease are of Mine #3. No additional age-dating water analysis has been collected.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: Measurement of Sediment Yield.

Objective: Understand how much excess sediment the mine is contributing to Eccles Creek.

Frequency: Annually.

Status: Ongoing.

Reports: Annually.

Citation: Volume 1a, Page 2-43a, Paragraph 2.

Operator Comments: Study was discontinued per Page 2-45 and 2-46 of M&RP. Average discharges are currently below 5,000 gpm.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: North Lease Perennial Stream Flow Measurement.

Objective: Understand the impact of longwall mining on perennial portions of streams in Winter Quarters and Woods Canyons.

Frequency: Monthly, June through October and when accessible, 1 year prior to, during and 1 year after undermining.

Status: Ongoing.

Reports: Quarterly to database - we should ask for a better map, or list of undermined dates for these sites yearly, otherwise it is impossible to tell if they are within the timeframes.

Citation: Volume 1a, Page 2-44a, Paragraph 5.

Operator Comments: Sites NL-13 and NL-14 will be dropped this year. An application to modify and reduce the NL site spacing will be submitted in 2nd quarter 2009.

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Title: Monthly Reporting of Pumped Flows to Electric Lake and Eccles Creek.

Objective: Be aware at all times, of the volume of water being pumped out of the Skyline Mine, and to which drainage.

Frequency: Cumulative monthly flows.

Status: Ongoing.

Reports: Monthly - first week.

Citation: Permit Condition 2.

Operator Comments: The information has been submitted as required

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

Bonding & Insurance R645-301-800

Other Commitments

*Reminder: If equipment has been abandoned during 2008, an amendment must be submitted that includes a map showing its location, a description of what was abandoned, whether there were any hazardous or toxic materials and any revision to the PHC as necessary.

REPORTING OF OTHER TECHNICAL DATA

List other technical data and information as required under the approved plan, which must be periodically submitted to the Division. Specify whether the information is included as Appendix B to this report or currently on file with the Division.

Operator Comments:

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

Change in administration or corporate structure can often bring about necessary changes to information found in the mining and reclamation plan. The Division is Requesting that each permittee review and update the legal, financial, compliance and related information in the plan as part of the annual report. Please provide the Department of Commerce, Annual Report of Officers, or other equivalent information as necessary to ensure that the information provided in the plan is current. Provide any other change as necessary regarding land ownership, lease acquisitions, legal results from appeals of violations, or other changes as necessary to update information required in the mining and reclamation plan. Include certified financial statements, audits or worksheets, which may be required to meet bonding requirements. Specify whether the information is currently on file with the Division or included as Appendix C to the report.

Legal / Financial Update	Required		Included	or	DOGM File location
	Yes	No			

Department of Commerce, Annual Report Officers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other				
Officers and Directors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Submitted by V. Miller on 4/30/09. Stand-alone Volume "General Chapter 1"
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Operator Comments:

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

MAPS

Copies of mine maps, current and up-to-date through at least December 31, 2008, are to be provided to the Division as Appendix D to this report in accordance with the requirements of R 645-301-525.240. The map copies shall be made in accordance with 30 CFR 75.1200 as required by MSHA. Mine maps are not considered confidential. (Please provide a CD.)

Confidential information is limited to:

R645-300-124.310. Information that pertains only to the analysis of the chemical and physical properties of the coal to be mined, except information on components of such coal which are potentially toxic in the environment.

R645-300-124.330. Information on the nature and location of archeological resources on public land and Indian land as required under the Archeological Resources Protection Act of 1979 (P. L. 96-95, 93 Stat. 721, 16 U.S.C. 470).

R645-301-322, Fish and Wildlife Information; R645-301-322.100, the scope and level of detail for such information will be determined by the Division in consultation with state and federal agencies with responsibilities for fish and wildlife and will be sufficient to design the protection and enhancement plan required under R645-301-333 and R645-301-322.230, other species or habitats identified through agency consultation as requiring special protection under state or federal law; R645-301-333.300, Include protective measures that will be used during the active mining phase of operation.

The Division will provide procedures, including notice and opportunity to be heard for persons both seeking and opposing disclosure.

Map Number(s) Map Title/ Description

Map Number(s)	Map Title/ Description	Confidential	
		Yes	No
Annual subsidence map	Cumulative Subsidence 1982 - 2008		
Mine map	Skyline Mines; Mine 3 Levels 2 & 3 2008		
Other maps			
Projected Mining	Skyline Mines Projected Mining 2009 - 2020	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Operator Comments:

Inspector:

Has the operator complied with this section? Yes No

Inspector Comments:

OTHER INFORMATION

Please provide any comments of further information to be included as part of the Annual Report. Any other attachments are to be provided as Appendix E to this report. If information is submitted as a group rather than by individual mine, please identify each of the mine's data in the list below.

Additional attachment to this report? Yes No

APPENDIX A

Certified Reports

Excess Spoil Piles
Refuse Piles
Impoundments

As required under R645-301-514

CONTENTS

Temporary Storage Refuse Pile Abandonment letters (MSHA / CFC)
Waste Rock Quarterly Inspections (submitted electronically)
Sediment Pond Quarterly Reports (Certified reports submitted electronically; non-certified reports attached)
Waste Rock Analysis

WES DOKEN 50
U.S. Department of Labor

Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225-0367



SEP 23 2008

Coal Mine Safety and Health
District 9

Michael Lynn Cooper
Safety Director
Canyon Fuel Co., LLC
HC 35, Box 380
Helper, UT 84526

RE: Skyline Mine #3
Mine ID No. 42-01566
Temporary Storage Refuse Pile
ID No. 1211-UT09-01566-02
Temporary Storage Refuse Pile Site 2
ID No. 1211-UT09-01566-03
Final Refuse Pile Abandonment

Dear Mr. Cooper:

The request for final abandonment of the referenced refuse piles is approved in accordance with 30 CFR 77.215-4. The request for final abandonment was submitted in a letter, dated July 14, 2008.

MSHA personnel have reviewed the documentation and have determined that the refuse piles met the requirements for abandonment which include provisions for major slope stability and the prevention of both burning and the future impoundment of water.

The referenced refuse piles identification numbers will be removed from the mine file. MSHA inspection and reporting requirements no longer apply to the referenced structures.

If you have any questions regarding this approval, please contact Ronald Gehrke at 303-231-5587 or Sid Hansen at 303-231-5590.

Sincerely,

A handwritten signature in cursive script that reads "Allyn C. Davis".

Allyn C. Davis
District Manager



Canyon Fuel
Company, LLC.
Skyline Mine

A Subsidiary of Arch Western Bituminous Group, LLC.

Wes Sorensen, General Manager
HCR 35, Box 380
Helper, UT 84526
(435) 448-2619 - Office
(435) 448-2632 - Fax

July 14, 2008

Mr. Allyn C. Davis, District Manager
MSHA, District 9
PO Box 25367
Denver, Colorado 80225-0367

Re: Skyline Mine – Abandonment of Temporary Waste Sites 1211-UT-09-01556-002
and -003

Dear Mr. Davis:

Skyline Mine has three sites that have been permitted for waste rock storage, two of which are "temporary" as acknowledged by MSHA. Both of the temporary sites were used during the early stages of mining at Skyline (approximately 1983 – 1985) until the third was ready for use. The third site was not designated "temporary" and has been used from 1985 until now. Skyline is abandoning the two temporary sites, neither of which has been identified as hazardous.

The first temporary site (1211-UT-09-01556-002) has been fully excavated and no waste remains at it. It is adjacent to the rock chute on the run-of-mine silo at the mine portals. The site is used for the interim holding of coal/rock material prior to its being shipped to the active waste site or to another destination. There is no impoundment, spontaneous combustion, or slope stability problem associated with it.

The second temporary site (1211-UT-09-01556-003) is at the surface coal storage area at the railroad loadout facility. It has no waste material. Again, there is no impoundment, spontaneous combustion, or slope stability problem associated with it.

Mr. Ted Farmer of the Price Field Office is aware of this action.

If you have any questions concerning this action, please contact me or Carl Winters at 435-448-2662.

Sincerely,

Wesley K. Sorensen
General Manager, Skyline Mine

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	October 7, 2008
Mine Name	Skyline Mine		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Mine Site Sediment Pond	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	September 23, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No signs of instability were observed. No hazardous conditions were observed during the inspection of the pond. Water level in the pond was 4.87 feet below the discharge level. All banks appear stable.</p>			
Required for an impoundment which functions as a SEDIMENTATION POND.	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 132,013 ft³ (based on 2008 survey) 60% Elevation: 8571.23 feet ASL (above sea level) 100% Elevation: 8573.50 feet ASL The elevation of the sediment within the pond at the discharge point was 8567.83ft. ASL (11.77 ft below spillway) during the 3rd quarter inspection. This does not represent the true bottom of the pond as the cleaning of the pond leaves a pedestal of sediment around the discharge as a security measure not to breach the pipe during cleaning.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillway Elevations: 8579.6 feet ASL (The outlet structure for Pond 001 serves as both the Principal and Emergency Spillways) Total volume of pond at Spillway: 295,023 ft³ Required runoff storage: 163,010 ft³ 100% Sediment storage: 132,013 ft³ 60% Sediment storage: 79,208 ft³</p>		

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water in the pond 4.87 feet below the spillway elevation during the inspection. The sediment pond did not discharge during the quarter as the water was drained for cleaning of sediment from the pond. A sample of the mine discharge water, (normally) including this pond's discharge, is taken on weekly basis throughout the quarter as required by the Mine's UPDES permit. On a biweekly basis the water sample is analyzed for total iron. The frequency of analysis for Total Phosphorus has been reduced from monthly to quarterly per DWQ direction. Weekly samples include oil and grease, total dissolved solids, total suspended solids, pH and conductivity. Flow is record by in-line flow meters.

Surface water is collected from the upper mine pad and discharged to the pond through a culvert located on the west end of the pond. The culvert is functioning as designed. The outlet structure was working as designed and appears to be in good working condition. The pond is an incised structure. Minimal vegetation exists on the banks.

A series of turbidity curtains are installed in the pond to help reduce the suspended load within the pond.

The pond was cleaned during the quarter.

During cleaning of the pond a previous repair to the Pond Discharge pipe was uncovered and failed – allowing some pond sediment to go down the creek. The hole in the discharge pipe was repaired. Water Quality was notified. Upon evaluation the Division of Water Quality did not issue any violation.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond has not changed based on both the cleaning and land survey conducted in 3rd Quarter 2008. The survey indicated portions of the pond are slightly deeper than the as-built construction. The pond did not discharge during this quarter. The minimum water elevation was zero. Water height reached approximately 4.87 feet below the discharge structure. Based on the September 2008 survey, approximately 132,013 ft³ of sediment storage is currently available.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: *Gregg A. Schuler* Date: 10/7/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	October 7, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	September 23, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted during the inspection. No hazardous conditions were noted at the time of the inspection. The pond was completely emptied of sediment in the 3rd quarter 2007, and a thorough inspection for structural weaknesses was possible at that time.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 22,963 ft³
60% Elevation: 7914.46 feet ASL (above sea level)
100% Elevation: 7915.40 ASL
The current elevation of the sediment within the pond at the discharge point measured 5.53 feet below the discharge (7914.17 ft, ASL). This does not represent the bottom of the pond as the cleaning of the pond leaves a pedestal of sediment around the discharge as a security measure not to breach the pipe during cleaning. No significant amount of material appears to have been added since a thorough cleaning conducted in 2007 when the pond was excavated to a depth of 7912.3 ft ASL.

3. Principle and emergency spillway elevations.

Principle Spillway Elevation: 7919.7 feet ASL
Emergency Spillway Elevation: 7922 feet ASL
Total volume of pond at Spillway: 68,701 ft³
Required runoff storage: 45,738 ft³
100% Sediment Storage: 22,963 ft³
60% Sediment Storage: 13,778 ft³

4. Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

The water was 3.10 feet below the discharge pipe at the time of the inspection. The sediment level was 5.53 (7914.17 ASL) feet below the discharge pipe. The depth to the bottom of the pond was measured at 7,912.3 feet ASL on survey conducted on 9/23/07. This is 7.4 feet below the spill point of the principal spillway.

The water level in the pond was 3.10 feet below the spillway during the inspection. The pond did not discharge during the 3rd Quarter 2008. The pond embankment appears stable and without noticeable erosion. The footprint of the pond remains unchanged. Stable grasses vegetate and stabilize the out slopes of the embankment.

The pond was completely drained and cleaned during the 3rd quarter 2007. The 2007 survey indicated the available sediment capacity is approximately 22,963 ft³.

Two turbidity curtains, added to the pond after the 2007 cleaning, contain a majority of material in the upper, west side and south sides of the pond where sediment can be periodically removed. The pond currently has three (3) turbidity curtains.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The geometry of the pond does not appear to have changed with the removing of sediment in September 2007. The volume calculations are based on a survey conducted in the Fall 2007 following the cleaning of the pond. A visual inspection indicated minimal additional sediment was accumulated during the quarter.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gregg A. Balaban Date: 10/7/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	October 7, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	September 29, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No instability, structural weakness or other hazardous condition was noted at the site during the quarterly pond site inspection.</p>			
<p>Required for an impoundment which functions as a SEDIMENTATION POND.</p>	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 9939 ft³ 60% Elevation: 7857.2 feet ASL (above sea level) 100% Elevation: 7858.1 ASL Current Sediment Level Elevation: The pond was cleaned of sediment in August 2007. The pond was resurveyed to estimate the available sediment capacity following the cleaning. A bedrock shelf exists in the bottom of the pond, enabling portions of the pond to be deeper in areas where the shelf does not exist. Minor additional sediment was observed during the inspection.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillways Elevation: 7864.0 feet ASL (The outlet of Pond 003 serves as both the principal and emergency spillway).</p>		

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

This pond did not discharge during the 3rd quarter of 2008, therefore no water samples were obtained. The out slopes of the pond embankment do not appear to present any type of hazardous conditions. No instability was noted in the pond embankment. The pond embankment is stabilized with native grasses. The pond was thoroughly cleaned in August 2007, and the capacity land surveyed. Based on the survey, the pond has a sediment capacity of approximately 9939 cu-ft.

Both the pond inlet and outlet appeared to be clear of debris. The pond decant pipe was clear. The valve on the decant pipe was checked to confirm it is functional.

The current sediment storage capacity is based on the 2007 survey. The perimeter footprint of the pond did not change during the cleaning project, only the depth of the pond was modified.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The pond was cleaned in August 2007. No changes or modifications from the cleaning have been noted in the geometry or perimeter footprint of the pond since the last inspection. After the August 2007 cleaning, the pond was resurveyed and determined to have approximately 9,939 ft³ of sediment storage capacity. Run off of snowmelt was encountered during the quarter, but did not affect the stability or function of the pond.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: *Suzanne A. Sabatini* Date: 10/7/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	July 15, 2008
Mine Name	Skyline Mine		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Mine Site Sediment Pond	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	May 28, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No signs of instability were observed. No hazardous conditions were observed during the inspection of the pond. Water level in the pond was 0.03 feet below the discharge level. All banks appear stable.</p>			
Required for an impoundment which functions as a SEDIMENTATION POND.	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 187,427ft³ (based on 2005 survey and MRP as-built drawings) 60% Elevation: 8568.5 feet ASL (above sea level) 100% Elevation: 8572.45 feet ASL The elevation of the sediment within the pond at the discharge point was 8570.59 ft. ASL during the 1st quarter inspection.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillway Elevations: 8579.6 feet ASL (The outlet structure for Pond 001 serves as both the Principal and Emergency Spillways) Total volume of pond at Spillway: 350,437 ft³ Required runoff storage: 163,010 ft³ 100% Sediment storage: 187,427 ft³ 60% Sediment storage: 112,456 ft³</p>		
<p>4. Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.</p>			

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT

Water in the pond 0.03 feet below the spillway elevation during the inspection. The sediment pond has discharged periodically during the quarter. A sample of the mine discharge water, including this pond's discharge, has been taken on weekly basis throughout the quarter as required by the Mine's UPDES permit. On a biweekly basis the water sample is analyzed for total iron. The frequency of analysis for Total Phosphorus has been reduced from monthly to quarterly per DWQ direction. Weekly samples include oil and grease, total dissolved solids, total suspended solids, pH and conductivity. Flow is record by in-line flow meters.

Surface water is collected from the upper mine pad and discharged to the pond through a culvert located on the west end of the pond. The culvert is functioning as designed. A small delta has formed below the culvert. The outlet structure was working as designed and appears to be in good working condition. The pond is an incised structure. Minimal vegetation exists on the banks.

A series of turbidity curtains are installed in the pond to help reduce the suspended load within the pond.

The pond was cleaned in October 2007. The pond is scheduled for cleaning again in the 2nd quarter 2008.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond has not changed based on both the cleaning and land survey conducted in October 2007. The survey indicated portions of the pond are slightly deeper than the as-built construction. The pond discharged periodically during this quarter. The minimum water elevation has been approximately 8579.0. Water height over the lip of the discharge pipe has not really varied between 0.00 and 0.02 feet below the lip. Based on the October 2007 survey, approximately 19,858 ft³ of sediment storage is currently available. The sediment depth in the pond will be closely monitored in 2008 to ensure adequate sediment capacity.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: *Gregg A. Redden* Date: 7/15/08
5/28/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	July 15, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	May 28, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No instability of the embankment was noted during the inspection. No hazardous conditions were noted at the time of the inspection. The pond was completely emptied of sediment in the 3rd quarter 2007, and a thorough inspection for structural weaknesses was possible at that time.</p>			
Required for an impoundment which functions as a SEDIMENTATION POND.	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 22,963 ft³ 60% Elevation: 7914.46 feet ASL (above sea level) 100% Elevation: 7915.40 ASL The current elevation of the sediment within the pond at the discharge point measured 4.58 feet below the discharge (7915.12 ft, ASL). This does not represent the bottom of the pond as the cleaning of the pond leaves a pedestal of sediment around the discharge as a security measure not to breach the pipe during cleaning. No significant amount of material appears to have been added since a thorough cleaning conducted in 2007 when the pond was excavated to a depth of 7912.3 ft ASL.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principle Spillway Elevation: 7919.7 feet ASL Emergency Spillway Elevation: 7922 feet ASL Total volume of pond at Spillway: 68,701 ft³ Required runoff storage: 45,738 ft³ 100% Sediment Storage: 22,963 ft³ 60% Sediment Storage: 13,778 ft³</p>		

4. Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

The water was 0.09 feet below the discharge pipe at the time of the inspection. The depth to the bottom of the pond was measured at 7,912.3 feet ASL on survey conducted on 9/23/07. This is 7.4 feet below the spill point of the principal spillway.

The pond was not discharging at the time of the inspection. The pond discharged periodically during the 2nd Quarter 2008 due to Spring Runoff. The pond embankment appears stable and without noticeable erosion. The footprint of the pond remains unchanged. Stable grasses vegetate and stabilize the out slopes of the embankment.

The pond was completely drained and cleaned during the 3rd quarter 2007. The 2007 survey indicated the available sediment capacity is approximately 22,963 ft³.

Two additional turbidity curtains were added to the pond after the cleaning to help contain a majority of material in the upper, west side and south sides of the pond where sediment can be periodically removed. The pond currently has three (3) turbidity curtains.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The geometry of the pond does not appear to have changed with the removing of sediment in September 2007. The volume calculations are based on a survey conducted in the Fall 2007 following the cleaning of the pond. A visual inspection indicated minimal additional sediment was accumulated during the quarter.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gregg A. Aulesthi Date: 7/15/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	July 16, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	June 25, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No instability, structural weakness or other hazardous condition was noted at the site during the quarterly pond site inspection.</p>			
<p>Required for an impoundment which functions as a SEDIMENTATION POND.</p>	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 9939 ft³ 60% Elevation: 7857.2 feet ASL (above sea level) 100% Elevation: 7858.1 ASL Current Sediment Level Elevation: The pond was cleaned of sediment in August 2007. The pond was resurveyed to estimate the available sediment capacity following the cleaning. A bedrock shelf exists in the bottom of the pond, enabling portions of the pond to be deeper in areas where the shelf does not exist. Minor additional sediment was observed during the inspection.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillways Elevation: 7864.0 feet ASL (The outlet of Pond 003 serves as both the principal and emergency spillway).</p>		

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

This pond did not discharge during the 2nd quarter of 2008, therefore no water samples were obtained. The out slopes of the pond embankment do not appear to present any type of hazardous conditions. No instability was noted in the pond embankment. The pond embankment is stabilized with native grasses. The pond was thoroughly cleaned in August 2007, and the capacity land surveyed. Based on the survey, the pond has a sediment capacity of approximately 9939 cu-ft.

Both the pond inlet and outlet appeared to be clear of debris. The pond decant pipe was clear. The valve on the decant pipe was checked to confirm it is functional.

The current sediment storage capacity is based on the 2007 survey. The perimeter footprint of the pond did not change during the cleaning project, only the depth of the pond was modified.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The pond was cleaned in August 2007. No changes or modifications from the cleaning have been noted in the geometry or perimeter footprint of the pond since the last inspection. After the August 2007 cleaning, the pond was resurveyed and determined to have approximately 9,939 ft³ of sediment storage capacity. Run off of snowmelt was encountered during the quarter, but did not affect the stability or function of the pond.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gregg A. Schuch Date: 7/16/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	April 14, 2008
Mine Name	Skyline Mine		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Mine Site Sediment Pond	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	March 25, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No signs of instability were observed. No hazardous conditions were observed during the inspection of the pond. The pond had a sheet of ice and snow covering the surface.</p>			
<p>Required for an impoundment which functions as a SEDIMENTATION POND.</p>	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 187,427ft³ (based on 2005 survey and MRP as-built drawings) 60% Elevation: 8568.5 feet ASL (above sea level) 100% Elevation: 8572.45 feet ASL The elevation of the sediment within the pond at the discharge point was not collected due to ice during the 1st quarter inspection. A land survey of the pond indicated a sediment depth of 8567.92 ft. ASL.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillway Elevations: 8579.6 feet ASL (The outlet structure for Pond 001 serves as both the Principal and Emergency Spillways) Total volume of pond at Spillway: 350,437 ft³ Required runoff storage: 163,010 ft³ 100% Sediment storage: 187,427 ft³ 60% Sediment storage: 112,456 ft³</p>		

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT

4. Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

Water in the pond was frozen during the inspection – the level was close, but not discharging. The sediment pond has not discharged during the quarter. A sample of the mine discharge water, including this pond's discharge, has been taken on weekly basis throughout the quarter as required by the Mine's UPDES permit. On a biweekly basis the water sample is analyzed for total iron. The frequency of analysis for Total Phosphorus has been reduced from monthly to quarterly per DWQ direction. Weekly samples include oil and grease, total dissolved solids, total suspended solids, pH and conductivity. Flow is record by in-line flow meters.

Surface water is collected from the upper mine pad and discharged to the pond through a culvert located on the west end of the pond. The culvert is functioning as designed. A small delta has formed below the culvert. The outlet structure was working as designed and appears to be in good working condition. The pond is an incised structure. Minimal vegetation exists on the banks.

A series of turbidity curtains are installed in the pond to help reduce the suspended load within the pond.

The pond was cleaned in October 2007.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond has not changed based on both the cleaning and land survey conducted in October 2007. The survey indicated portions of the pond are slightly deeper than the as-built construction. The pond has not discharged this quarter. The minimum water elevation has been approximately 8579.3. Water height over the lip of the discharge pipe has not really varied between 0.00 and 0.3 feet below the lip. Based on the October 2007 survey, approximately 19,858 ft³ of sediment storage is currently available. The sediment depth in the pond will be closely monitored in 2008 to ensure adequate sediment capacity.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: *Gregory A. Salas* Date: 4/14/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	April 14, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	March 27, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No instability of the embankment was noted during the inspection. No hazardous conditions were noted at the time of the inspection. The pond was completely emptied of sediment in the 3rd quarter 2007, and a thorough inspection for structural weaknesses was possible at that time.</p>			
Required for an impoundment which functions as a SEDIMENTATION POND.	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 22,963 ft³ 60% Elevation: 7914.46 feet ASL (above sea level) 100% Elevation: 7915.40 ASL The current elevation of the sediment within the pond at the discharge point was not determined – pond was frozen. The sediment level was not determined due to snow and ice. No significant amount of material appears to have been added since then.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principle Spillway Elevation: 7919.7 feet ASL Emergency Spillway Elevation: 7922 feet ASL Total volume of pond at Spillway: 68,701 ft³ Required runoff storage: 45,738 ft³ 100% Sediment Storage: 22,963 ft³ 60% Sediment Storage: 13,778 ft³</p>		

4. Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

The water/ice level was 1.76 feet below the discharge pipe at the time of the inspection. The depth to the bottom of the pond was measured at 7,912.3 feet ASL on survey conducted on 9/23/07. This is 7.4 feet below the spill point of the principal spillway.

The pond was not discharging at the time of the inspection. The pond did not discharge during the 1st quarter 2008, although water/ice was present the majority of the time. The pond embankment appears stable and without noticeable erosion. The footprint of the pond remains unchanged. Stable grasses vegetate and stabilize the out slopes of the embankment but were covered with snow during the inspection.

The pond was completely drained and cleaned during the 3rd quarter 2007. Based on the combination a 2007 land survey conducted of the pond when it was empty relative to the elevation of the sediment from the 2nd quarter 2007 inspection, and calculating the amount of material moved to the Waste Rock site, approximately 13,000 ft³ of sediment was removed from the pond. The 2007 survey indicated the available sediment capacity is approximately 22,963 ft³.

A second turbidity curtain was added to the pond after the cleaning to help contain a majority of material in the upper or west side. The pond currently has two turbidity curtains.

5. Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The geometry of the pond does not appear to have changed with the removing of sediment in September 2007. The sediment volume in the pond after sediment removal was estimated to be zero ft³ with a remaining sediment storage capacity of 22,963 ft³. The volume calculations are based on a survey conducted in the Fall 2007 following the cleaning of the pond. No measurement of sediment was conducted during the 1st quarter inspection due to snow and ice. A visual inspection indicated minimal additional sediment was accumulated during the quarter.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gregg A. Baluchi Date: 4/14/08

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	April 14, 2008
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	
IMPOUNDMENT INSPECTION			
Inspection Date	March 18, 2008		
Inspected By	Gregg Galecki		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly		
<p>1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.</p> <p>No instability, structural weakness or other hazardous condition was noted at the site during the quarterly pond site inspection. The pond was covered with approximately 4 feet of snow.</p>			
Required for an impoundment which functions as a SEDIMENTATION POND.	<p>2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.</p> <p>Sediment Storage Capacity: 9939 ft³ 60% Elevation: 7857.2 feet ASL (above sea level) 100% Elevation: 7858.1 ASL Current Sediment Level Elevation: The pond was cleaned of sediment in August 2007. The pond was resurveyed to estimate the available sediment capacity following the cleaning. A bedrock shelf exists in the bottom of the pond, enabling portions of the pond to be deeper in areas where the shelf does not exist. No additional sediment was observed during the inspection.</p>		
	<p>3. Principle and emergency spillway elevations.</p> <p>Principal and Emergency Spillways Elevation: 7864.0 feet ASL (The outlet of Pond 003 serves as both the principal and emergency spillway).</p>		

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

This pond did not discharge during the 1st quarter of 2008, therefore no water samples were obtained. The pond was covered with snow at the time of the inspection. The out slopes of the pond embankment do not appear to present any type of hazardous conditions. No instability was noted in the pond embankment. The pond embankment is stabilized with native grasses. The pond was thoroughly cleaned in August 2007, and the capacity land surveyed. Based on the survey, the pond has a sediment capacity of approximately 9939 cu-ft.

Both the pond inlet and outlet appeared to be clear of debris. The pond decant pipe was clear. The valve on the decant pipe was checked to confirm it is functional.

The current sediment storage capacity is based on the 2007 survey. The perimeter footprint of the pond did not change during the cleaning project, only the depth of the pond was modified.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The pond was cleaned in August 2007. No changes or modifications from the cleaning have been noted in the geometry or perimeter footprint of the pond since the last inspection. After the August 2007 cleaning, the pond was resurveyed and determined to have approximately 9,939 ft³ of sediment storage capacity. The pond was snow covered during the inspection. Precipitation during the quarter came in the form of snow – no water accumulations were noted. No run off of snowmelt was encountered during the quarter to affect the stability or function of the pond.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gregg A. Adulala Date: 4/14/08



Soil Analysis Report
Canyon Fuel Company, LLC.

HCR 35, Box 380
Helper, UT 84526

Report ID: S0806071001

Project: Skyline Utah#6

Date Received: 6/4/2008

Date Reported: 6/23/2008
Work Order: S0806071

Lab ID	Sample ID	pH	Saturation %	Electrical		Field Capacity %	Wilt Point %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	Potassium meq/L	SAR
				Conductivity dS/m	Capacity %							
S0806071-001	SPS-001-07	8.0	52.8	0.70	17	5.7	2.09	1.76	2.18	0.14	1.57	
S0806071-002	WR-001-08	8.1	45.7	0.67	16	6.1	1.82	2.01	2.28	0.17	1.65	
S0806071-003	WR-002-08	8.1	55.5	0.60	13	6.3	1.50	1.43	2.20	0.13	1.81	

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2Osol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S. = Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, Py/S= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A. Secor
Karen A. Secor, Soil Lab Supervisor



Soil Analysis Report

Canyon Fuel Company, LLC.

HCR 35, Box 380

Helper, UT 84526

Report ID: S0806071001

Date Reported: 6/23/2008

Work Order: S0806071

Project: Skyline Utah#6

Date Received: 6/4/2008

Lab ID	Sample ID	Sand			Silt			Clay			Texture	Coarse Fragment	Available Sodium	Exchangeable Sodium
		%	%	%	%	%	%	%	meq/100g	meq/100g				
S0806071-001	SPS-001-07	72.0	27.0	1.0	Loamy Sand	13.1	0.60	0.48						
S0806071-002	WR-001-08	72.0	26.0	2.0	Loamy Sand	68.4	0.51	0.41						
S0806071-003	WR-002-08	28.0	71.0	1.0	Silty Loam	78.1	0.58	0.46						

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2OSol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen A Secor, Soil Lab Supervisor



Soil Analysis Report
Canyon Fuel Company, LLC.
 HCR 35, Box 380
 Helper, UT 84526

Report ID: S0806071001

Project: Skyline Utah#6
 Date Received: 6/4/2008
 Date Reported: 6/23/2008
 Work Order: S0806071

Lab ID	Sample ID	Nitrogen			Total		T.S.		Neut.		T.S.		Total	
		TKN	Nitrate	Boron	Selenium	Sulfur	AB	Pot.	ABP	Carbon	TOC			
		%	ppm	ppm	ppm	%	1/1000t	1/1000t	%	1/1000t	%	%	%	
S0806071-001	SPS-001-07	0.74	0.48	0.36	<0.02	0.44	13.7	43.5	29.8	70.6	70.1			
S0806071-002	WR-001-08	0.79	0.14	0.38	<0.02	0.39	12.2	34.7	22.5	59.1	58.7			
S0806071-003	WR-002-08	0.86	0.08	0.34	<0.02	0.47	14.5	25.1	10.6	64.8	64.5			

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2OSol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
 Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral, Pot.= Neutralization Potential
 Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
 Karen A Secor, Soil Lab Supervisor



INTER-MOUNTAIN LABS

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801

(307) 672-8945

Soil Analysis Report

Canyon Fuel Company, LLC.

HCR 35, Box 380
Helper, UT 84526

Report ID: S0903204001

Project: Skyline Utah#6

Date Received: 3/13/2009

Date Reported: 3/25/2009
Work Order: S0903204

Lab ID	Sample ID	pH	Saturation %	Electrical		Field Capacity %	Wilts Point %	PE Calcium meq/L	PE Magnesium meq/L	PE Potassium meq/L	PE Sodium meq/L	SAR
				Conductivity dS/m	s.u.							
S0903204-001	WR-003-08	7.6	35.8	3.06	16.1	9.0	27.6	16.5	0.62	1.80	0.38	
S0903204-002	WR-004-08	8.1	40.1	1.75	19.8	11.0	5.30	4.34	0.40	8.72	3.97	

These results apply only to the samples tested.

Abbreviations for extractants: PE = Saturated Paste Extract, H2OSol = water soluble, AB-DTPA = Ammonium Bicarbonate-DTPA, AAO = Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S. = Total Sulfur, AB = Acid Base, ABP = Acid Base Potential, PyS = Pyritic Sulfur, Py+Org = Pyritic Sulfur + Organic Sulfur, Neutral. Pot. = Neutralization Potential
Miscellaneous Abbreviations: SAR = Sodium Adsorption Ratio, CEC = Cation Exchange Capacity, ESP = Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor



Soil Analysis Report

Canyon Fuel Company, LLC.
 HCR 35, Box 380
 Helper, UT 84526

Report ID: S0903204001

Project: Skyline Utah#6
 Date Received: 3/13/2009

Date Reported: 3/25/2009
 Work Order: S0903204

Lab ID	Sample ID	Sand		Silt		Clay		Texture	Coarse		Boron	Nitrogen		Selenium	TKN
		%	%	%	%	%	%		ppm	ppm		ppm	%		
S0903204-001	WR-003-08	79.0	16.0	5.0	Loamy Sand	10.7	0.94	0.5	0.05	0.24					
S0903204-002	WR-004-08	85.0	12.0	3.0	Loamy Sand	6.08	1.18	0.5	<0.02	0.56					

These results apply only to the samples tested.

Abbreviations for extractants: PE = Saturated Paste Extract, H2OSol = water soluble, AB-DTPA = Ammonium Bicarbonate-DTPA, AAO = Acid Ammonium Oxalate
 Abbreviations used in acid base accounting: T.S. = Total Sulfur, AB = Acid Base, ABP = Acid Base Potential, Pys = Pyritic Sulfur, Pyr+Org = Pyritic Sulfur + Organic Sulfur, Neutral. Pot. = Neutralization Potential
 Miscellaneous Abbreviations: SAR = Sodium Adsorption Ratio, CEC = Cation Exchange Capacity, ESP = Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
 Karen Secor, Soil Lab Supervisor



Soil Analysis Report

Canyon Fuel Company, LLC.
 HCR 35, Box 380
 Helper, UT 84526

Report ID: S0903204001

Project: Skyline Utah#6
 Date Received: 3/13/2009

Date Reported: 3/25/2009
 Work Order: S0903204

Lab ID	Sample ID	Available		Exchangeable		Total Sulfur	T.S.		Neutral.		T.S.		Total Carbon		TOC	
		Sodium	meq/100g	Sodium	meq/100g		AB	V/1000l	Potential	V/1000l	ABP	V/1000l	%	%	%	%
S0903204-001	WR-003-08	0.12	0.06	0.45	14.0	24.5	10.5	53.5	53.2							
S0903204-002	WR-004-08	0.65	0.30	0.44	13.6	44.2	30.6	64.8	64.2							

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2Osol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
 Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
 Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
 Karen Secor, Soil Lab Supervisor

APPENDIX B

Reporting of Technical Data

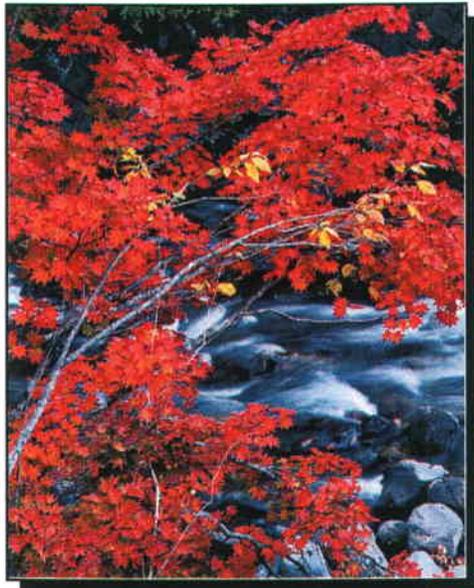
Including monitoring data, reports, maps, and other information
As required under the approved plan or as required by the Division

In accordance with the requirement of R645-310-130 and R645-301-140

CONTENTS

- Riparian Plan Community Monitoring Report for Selected Reaches in Winter Quarters Canyon, 2008 – Mt. Nebo Scientific
- Estimates of the Fall 2007, Cutthroat Trout Population Densities in Eccles Creek, Tributary to Scofield Reservoir – Mt. Nebo Scientific
- Estimates of the Fall, 2007 Cutthroat Trout Population Densities in Burnout and James Canyon Creeks, Tributary to Electric Lake, Huntingtion Creek Drainage – Mt Nebo Scientific
- 2008 Vegetation Report
- 2008 Waste Rock Raptor Report
- Cumulative Subsidence 1982 – 2008 Monitoring Map
- Skyline Mine, Mine 3 – Levels 2 and 3 As-Mined 2008
- Skyline Mine, Mine 3 – Levels 2 and 3 Projected Mining 2009 -2020

**Riparian Plant Community
Monitoring Report for
Selected Reaches in
Winter Quarters Canyon
2008**



Prepared by

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(801) 489-6937

by

Patrick D. Collins, Ph.D.

for

CANYON FUEL COMPANY, LLC.

Skyline Mines
HC 35 Box 380
Helper, Utah 84526



April 2009

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Introduction

Study Objectives

This document is the next report showing the results of a sequence of studies that have been planned for riparian plant communities in Winter Quarters Canyon. Underground coal mining activities are currently being conducted below Winter Quarters Canyon. Mining under this area has been planned over the next several years. Before, during, and after this mining occurs, Canyon Fuel committed to conducting studies of the riparian plant communities in these canyons to monitor potential impacts of the mining activities. The first such study began in 2005 with the objective to provide a comprehensive baseline data set of representative sample reaches of the *entire area* in Winter Quarters (and Woods Canyons) that could potentially be impacted by future underground mining. The 2005 monitoring year has been called the *Initial Baseline Year* for the riparian studies.

Regular monitoring of the riparian zones should provide data to determine long-term trends, natural variability and benchmark information including the possible impacts to the riparian plant communities caused by mining beneath the creeks of the canyons. That said, additional monitoring studies were planned to be conducted after the 2005 baseline study year. Or, in the subsequent years, the studies were planned to focus on locations where impacts from mining, if any, would most likely occur. In those monitoring years, sample frequency was designed to be intensified in the areas where: 1) underground mining is planned for the near future (for more baseline data), 2) where mining is currently occurring, and 3) where mining has occurred in the recent past.

The methodologies used in the studies have been consistent for all monitoring periods. They were not designed to provide data that could show *subtle* changes to community structure and species composition as a result of *minor* changes to the riparian habitat (which can occur as a result of several factors i.e. precipitation changes). Rather, the studies were designed to be compared with future monitoring studies in an attempt to document *major* impacts to the plant communities along the stream due to catastrophic events, such as loss of water and habitat from the effects of subsidence caused from underground mining.

The Study Areas

Winter Quarters Canyon is located within the Wasatch Plateau, a high plateau that lies between the Colorado Plateau and Great Basin regions of the western United States. The canyon is located about 3 miles west of the town of Scofield, in Carbon County, Utah. The study areas of Winter Quarters Canyon are located within the Manti-La Sal National Forest. Geologically, most of the area is Cretaceous in age with formations present that include the Price River, North Horn, and Blackhawk formations. The dominant plant communities of these canyons were riparian, spruce-fir, aspen/grass, sagebrush/grass and mountain herblands.

Methods

Sample Design, Transect Placement & Frequency

The riparian vegetation of specific reaches in Winter Quarters Canyon were surveyed in August 2008. Selection of the sample locations of the reaches were based on the underground coal mining schedule of the Skyline Mines. Like 2006 and 2007, the methods for 2008 follow the *Initial Baseline Year* (2005) described above. The riparian vegetation surveys have been designed to concentrate on recently mined areas, current mining, and areas to be mined in the near future. More specifically, the surveys are to be conducted where mining activities are planned under the streams according to the following schedule: 1) two years prior to mining specific areas, 2) the year of the mining activities, and 3) two years after mining has occurred in the areas. During these study periods, sampling will be intensified by placing sample stations at regular intervals every 400 ft., rather than the 800 ft. spacing that was used in the *Baseline Year*. [NOTE: In the *Initial Baseline Year* (2005) sample locations were placed every 800 ft with the exception of those areas that were scheduled to be mined in late-2005; in those areas the 400 ft spacing was used].

Line transects were placed at each sample station. Locations and extent of the transects were semi-permanently marked using numbered and flagged wooden stakes and 12-inch metal rods. The vegetation monitoring methods of the studies have been primarily based on those described by the USDA Forest Service manual for a "*Level III Riparian Area Evaluation*" (Integrated Riparian Evaluation Guide, March 1992). Qualitative and quantitative data were recorded at the sample

stations established in the field. In the first year of the studies, the overall objective of the study plan was to begin monitoring years with one complete baseline data set for all riparian areas near the perennial streams located in the mine permit area prior to any mining. As mentioned, in the subsequent monitoring years, sample station locations have been determined and mapped based on the time period schedule for the proposed underground mining activities.

Geomorphological stream channel data outlined in the Level III protocol were not being recorded as part of this study because Canyon Fuel Company has conducted other studies that will suffice for this information. Additionally, soils information through the Natural Resources Conservation Service (NRCS) were not available for the study areas.

Qualitative Data

The "Riparian Complex Data Sheet" shown on Table 1 lists all of the qualitative and quantitative data that has been, and will continue to be, collected in the future at each

TABLE 1: RIPARIAN COMPLEX DATA SHEET	
CLIENT:	
COMPLEX: Riverine - Number	
WATERBODY NAME:	
LOCATION:	
DATE:	
OBSERVER(S):	
QUAD NAME:	
GEOLOGIC PARENT MATERIAL:	
ASPECT:	
STREAM GRADIENT:	
ELEVATION: .	
ADJACENT UPLAND VEGETATION (looking downstream)	
Left:	Right:
VEGETATIVE DESCRIPTION (Dominance by Community Types)	
SUCCESSIONAL STATUS:	
APPARENT FORAGE TREND:	
ESTIMATED FORAGE PRODUCTION:	
BEAVER ACTIVITY:	
PHOTOGRAPH TAKEN:	
LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA:	
SPECIES OBSERVED:	
POOL ATTRIBUTES	
	% area in pools:
	% pool area made up of pools > 2' deep:
AQUATIC VEGETATION	
	% streambed with filamentous algae:
	% stream margin with rooted aquatic:
BANK TYPE & VEGETATION OVERHANG	
	% bank length undercut (<90°):
	% bank length gently sloping (>135°):
	% bank length with overhanging vegetation:
BANK CONDITION (bankfull area only)	
	% bank length vegetated, stable:
	% bank length unvegetated, stable:
	% bank length vegetated, unstable:
	% bank length unvegetated, unstable:
NOTES:	
QUANTITATIVE DATA SUMMARY:	
PHOTOGRAPHIC DOCUMENTATION:	

sample station.

Photographic stations for documentation and future comparisons have also been established at each sample location. A sample location map has been included in this report.

Quantitative Data

USDA Forest Service protocol was employed as a model to drive the study plan for quantitative data. *Community Type Cover* is one method to record cover in the USFS Level III protocol. At the sample locations, transect lines have been placed across (or perpendicular to) the stream channel. By design, the line transects vary in lengths which are based on several factors. Although sometimes limited by topographical features, the intent was to make the transects long enough to cover the entire stream, its riparian communities, plus an additional 10 ft on each side of the stream to record the adjacent upland communities. Monitoring the total extent of the riparian plant communities including some upland community data should provide information about possible increases or decreases in the riparian communities relative to the adjacent upland communities.

Once the transects were placed, the line-intercept method was employed to measure the extent of each major riparian plant community. The plant communities have been named by the dominant two plant species. If only one species dominates the community by a wide margin, the plant community was named by this single species. In this report, when reference is made to the left or right side of the drainage, this means “river left” or “river right”, *as characterized by looking downstream.*

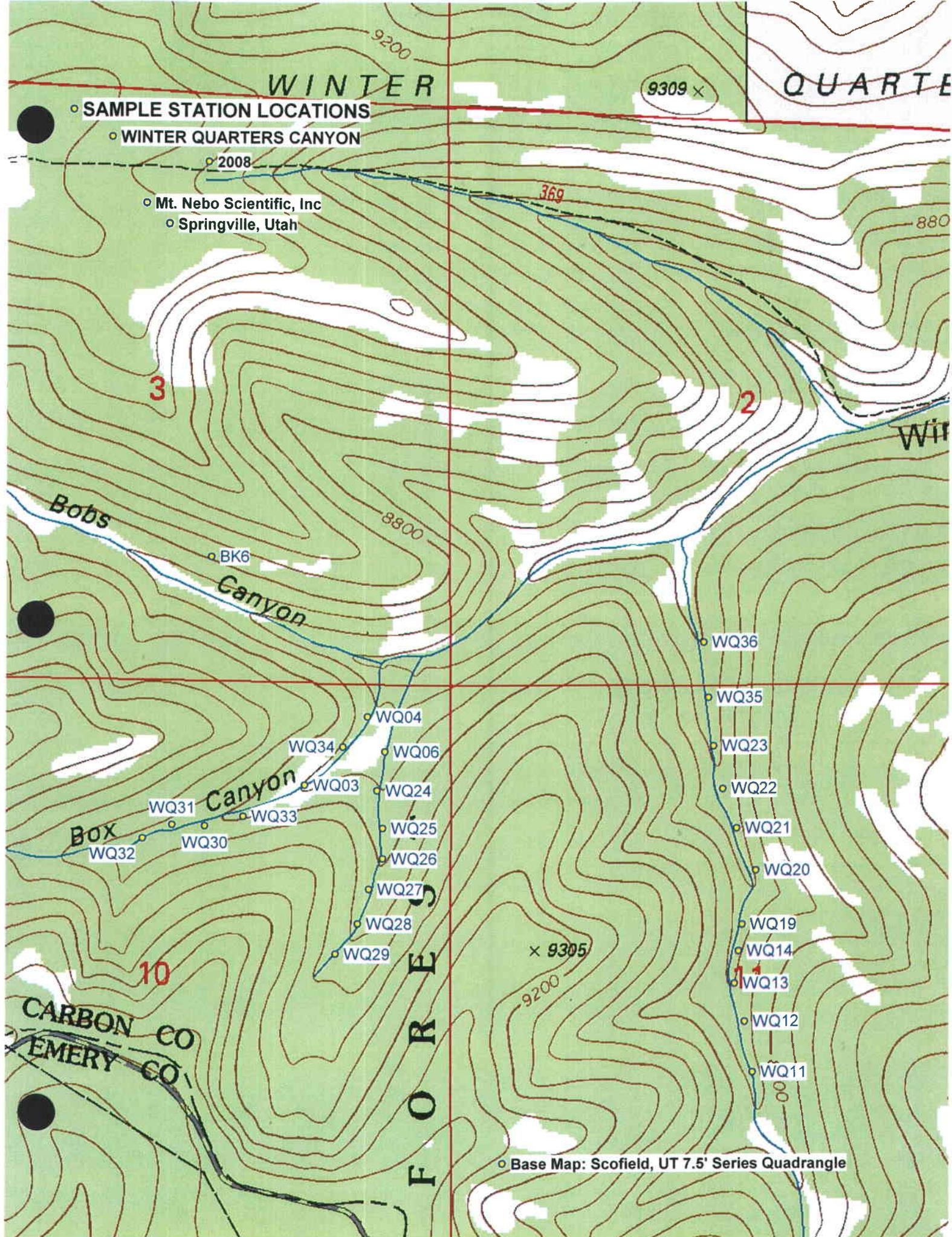
Results & Discussion

Listed below is a summary of the sample stations for the study areas in 2008 (Table 2). For a map of the locations, refer to the *Sample Station Locations for Winter Quarters Canyon* in this report.

**TABLE 2. Riparian Sample Stations in
Winter Quarters Canyon
2008**

Section 11 Drainage	No-Name Drainage	Box Canyon
WQ-11	WQ-06	WQ-04
WQ-12	WQ-24	WQ-34
WQ-13	WQ-25	WQ-03
WQ-14	WQ-26	WQ-33
WQ-19	WQ-27	WQ-30
WQ-20	WQ-28	WQ-31
WQ-21	WQ-29	WQ-32
WQ-22		
WQ-23		
WQ-35		
WQ-36		

Sample results are shown for each site on the data sheets provided in this report. Each sheet shows all qualitative and quantitative data recorded as well as photographic documentation.



○ SAMPLE STATION LOCATIONS

○ WINTER QUARTERS CANYON

○ 2008

○ Mt. Nebo Scientific, Inc
○ Springville, Utah

9309 x

3

2

Bobs

BK6

Canyon

WQ04

WQ34

WQ06

WQ03

WQ24

WQ31

WQ33

Box

WQ32

WQ30

WQ25

WQ26

WQ27

WQ28

WQ29

WQ36

WQ35

WQ23

WQ22

WQ21

WQ20

WQ19

WQ14

WQ13

WQ12

WQ11

x 9305

10

CARBON CO
EMERY CO

FORRE

○ Base Map: Scofield, UT 7.5' Series Quadrangle

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-11

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-2 °

ELEVATION: 8,727 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Grass/Forb/Spruce/Aspen

Right: Grass/Forb/Spruce/Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 100 lbs/acre

BEAVER ACTIVITY: Historical activity lower in this drainage.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes sp.</i>	<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Delphinium barbeyi</i>	<i>Bromus carinatus</i>
		<i>Geranium richardsonii</i>	<i>Carex hoodii</i>
		<i>Equisetum arvense</i>	<i>Elymus canadensis</i>
		<i>Helianthella uniflora</i>	<i>Poa secunda</i>
		<i>Lupinus sp.</i>	
		<i>Osmorhiza obtusa</i>	
		<i>Ranunculus cymbalaria</i>	

POOL ATTRIBUTES

% area in pools: 30

% pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0

% stream margin with rooted aquatic: 10 (Racy)

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 0

% bank length gently sloping (>135°): 0

% bank length with overhanging vegetation: 40 (herbaceous)

BANK CONDITION

% bank length vegetated, stable: 80

% bank length unvegetated, stable: 15

% bank length vegetated, unstable: 0

% bank length unvegetated, unstable: 5

NOTES:

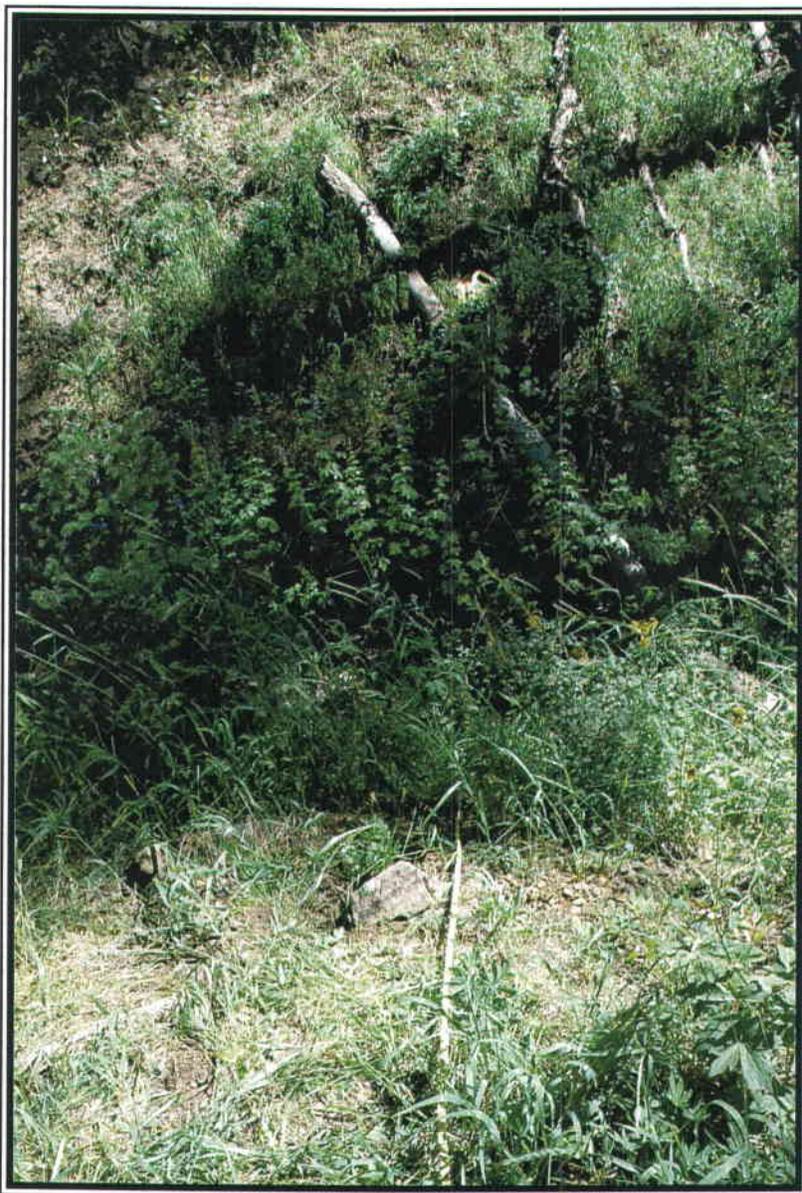
- 1) The bottom of the steep bank is where I began the measurements for the riparian community.
- 2) The upper banks had some riparian species but it's obvious they were mostly influenced by side slope water.
- 3) In this Sec. 11 tributary of WQ Canyon, we sampled beginning at this WQ-11 site.
- 4) Beetle kill was present in the conifers of the area.
- 5) Site went from 27 ft to 24 ft riparian and 20 ft to 17 ft upland from 2007 to 2008.

DATA SUMMARY

WQ-11: Cover by community types in Winter Quarters Canyon (2008).

UPLAND VEGETATION	Cover (ft)
<i>Grass/Forb/Picea pungens/Populus tremuloides</i>	17.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	2.00
<i>Agrostis stolonifera/Carex hoodii</i>	2.50
TOTAL COVER (Upland Species)	17.00
TOTAL COVER (Riparian Species)	4.50
ROCK (channel)	1.00
WATER (channel)	1.50
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	24.00

PHOTOGRAPHIC DOCUMENTATION



WQ-11

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-12

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3 °

ELEVATION: 8,716 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Blue Spruce

Right: Grass/Forb (to Aspen higher)

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 800 lbs/acre

BEAVER ACTIVITY: Historical use lower in this drainage

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
		<i>Equisetum arvense</i>	<i>Agrostis stolonifera</i>
		<i>Mimulus guttatus</i>	<i>Elymus canadensis</i>
		<i>Ranunculus cymbalaria</i>	<i>Carex hoodii</i>
		<i>Rudbeckia occidentalis</i>	
		<i>Senecio sp.</i>	

POOL ATTRIBUTES

- % area in pools: 25
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 20 (Racy)

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 0
- % bank length gently sloping (>135°): 0
- % bank length with overhanging vegetation: 50 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 80
- % bank length unvegetated, stable: 20
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) On the right side there were 2 trails. The lower trail went through the riparian community.
- 2) Called upland to trail on right, so this delineated more riparian than before. It could be changed back, but I think it's correct this year.
- 3) GPS EPE was 60 ft. in this area.
- 4) Transect width was 29' in 2005; it was 28' in 2006 (stake was down due to some soil movement); then 27' in 2006; 24.5 in 2008.

DATA SUMMARY

WQ-12: Cover by community types in Winter Quarters Canyon (2008).

UPLAND VEGETATION	Cover (ft)
<i>Picea pungens</i>	6.50
Grass/Forb	5.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	1.50
<i>Agrostis stolonifera/Carex hoodii</i>	5.00
<i>Agrostis stolonifera/Elymus canadensis</i>	3.00
<hr/>	
TOTAL COVER (Upland Species)	11.50
TOTAL COVER (Riparian Species)	9.50
ROCK (channel)	1.50
WATER (channel)	2.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	24.50

PHOTOGRAPHIC DOCUMENTATION



WQ-12

RIPARIAN COMPLEX RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-13

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,673 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Aspen

Right: Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 800 lbs/acre

BEAVER ACTIVITY: Historical use lower in canyon.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Aster sp.</i>	<i>Bromus carinatus</i>
		<i>Epilobium sp.</i>	<i>Carex hoodii</i>
		<i>Geranium richardsonii</i>	<i>Elymus canadensis</i>
		<i>Helianthella uniflora</i>	<i>Phleum alpinum</i>
		<i>Mimulus guttatus</i>	<i>Poa pratensis</i>
		<i>Ranunculus cymbalaria</i>	
		<i>Senecio serra</i>	

POOL ATTRIBUTES

- % area in pools: 10
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 30 (Racy)

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 0
- % bank length gently sloping (>135°): 50
- % bank length with overhanging vegetation: 5 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 85
- % bank length unvegetated, stable: 15
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) The species here seemed to be mostly influence by the stream (rather than hillside). I measured riparian species on the side from near the small blue spruce tree (5 ft) on the transect line.
- 2) Total transect length was 41.5' in 2006; (it was 42.0' in 2005 - possible downward movement of soil); 41.5' in 2007; 41.4 in 2008 (put up new stake on right because the old one was gone; used 2007 transect length).
- 3) Stakes were also replaced in 2006.

DATA SUMMARY

WQ-13: Cover by community types in Winter Quarters Canyon (2008).

UPLAND VEGETATION	Cover (ft)
<i>Populus tremuloides/Picea pungens</i>	10.00
<i>Populus tremuloides</i>	9.50
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	18.50
<i>Carex hoodii/Agrostis stolonifera</i>	3.50
TOTAL COVER (Upland Species)	19.50
TOTAL COVER (Riparian Species)	18.50
ROCK (channel)	0.50
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	41.50

PHOTOGRAPHIC DOCUMENTATION



WQ-13

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-14

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,658 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Aspen Right: Spruce/Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 1,000 lbs/acre

BEAVER ACTIVITY: Historical use lower in canyon.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes</i>	<i>Aster sp.</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Helianthella uniflora</i>	<i>Carex hoodii</i>
		<i>Mimulus guttatus</i>	<i>Elymus canadensis</i>
		<i>Ranunculus cymbalaria</i>	<i>Poa pratensis</i>
		<i>Senecio multilobatus</i>	
		<i>Thalictrum fendleri</i>	
		<i>Urtica dioica</i>	
		<i>Vicia americana</i>	

POOL ATTRIBUTES

% area in pools: 40
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 10 (Racy)

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 20
 % bank length gently sloping (>135°): 60
 % bank length with overhanging vegetation: 10

BANK CONDITION

% bank length vegetated, stable: 90
 % bank length unvegetated, stable: 10
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 0

NOTES:

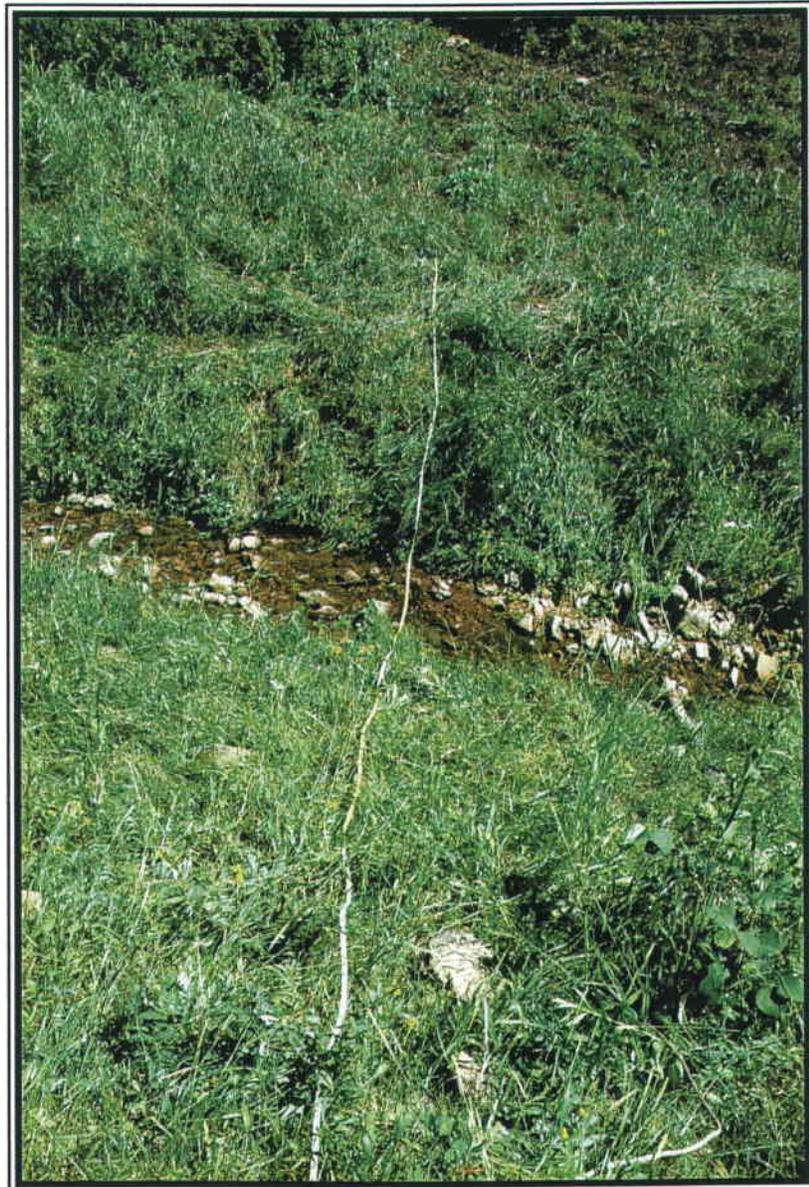
- 1) Like WQ-13, the left side rose to a higher elevation. The species here seemed to be mostly influenced by the stream (rather than hillside).
- 2) Right side upland community measured was *Elymus canadensis*; left side was *Poa pratensis*/*Elymus canadensis*.
- 3) Unlike 2006 when the transect line measured 33', in 2007 it was 32' and in 2008 it was 29.0'.

DATA SUMMARY

WQ-14: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Populus tremuloides/Picea pungens</i>	16.50
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Elymus canadensis</i>	7.00
<i>Carex hoodii/Elymus canadensis</i>	2.50
TOTAL COVER (Upland Species)	16.50
TOTAL COVER (Riparian Species)	9.50
ROCK (channel)	0.00
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	29.00

PHOTOGRAPHIC DOCUMENTATION



WQ-14

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-19

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-2 °

ELEVATION: 8,633ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Aspen

Right: Spruce/Fir

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 400 lbs/acre

BEAVER ACTIVITY: Historical activity lower in this drainage.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Delphinium barbeyi</i>	<i>Poa secunda</i>
		<i>Epilobium sp.</i>	
		<i>Osmorhiza obtusa</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	
		<i>Viguiera multiflora</i>	

POOL ATTRIBUTES

% area in pools: 50
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 80 (Racy)

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 10
 % bank length gently sloping (>135°): ±10
 % bank length with overhanging vegetation: 20

BANK CONDITION

% bank length vegetated, stable: 75
 % bank length unvegetated, stable: 20
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 5

NOTES:

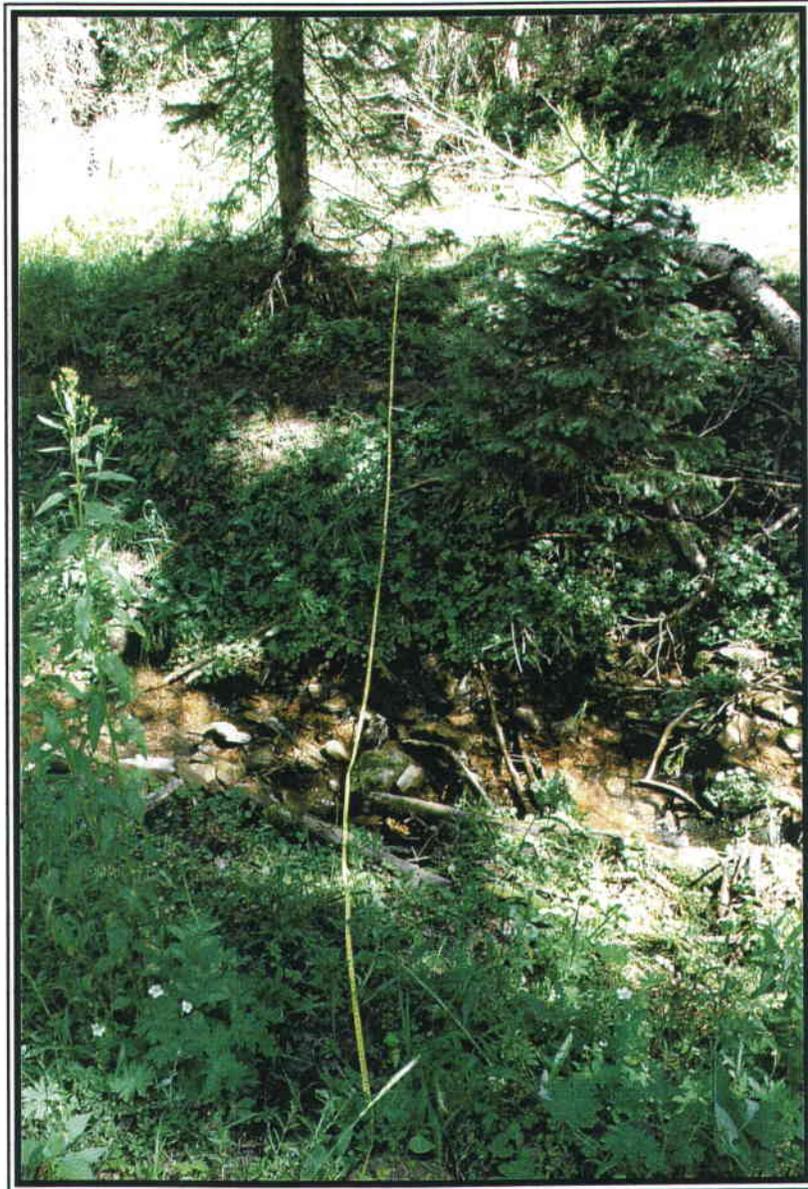
- 1) Site located just upstream from a spring area.
- 2) Placed site upstream from the spring to decrease influence of the stream water.
- 3) Left hillside was sloughing in this area.
- 4) Transect length was 31' in 2006, then to 30' in 2007, then 27' in 2008.

DATA SUMMARY

WQ-19: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Populus tremuloides</i>	7.00
<i>Picea pungens/Abies sp.</i>	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	5.50
<hr/>	
TOTAL COVER (Upland Species)	17.00
TOTAL COVER (Riparian Species)	5.00
ROCK (channel)	1.00
WATER (channel)	4.00
BAREGROUND (channel)	2.50
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	29.50

PHOTOGRAPHIC DOCUMENTATION



WQ-19

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-20

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3 °

ELEVATION: 8,567 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Aspen

Right: Aspen/Spruce

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 500 lbs/acre (right side)

BEAVER ACTIVITY: Historical use lower in this drainage

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Epilobium angustifolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Equisetum arvense</i>	<i>Elymus canadensis</i>
		<i>Geranium richardsonii</i>	<i>Carex hoodii</i>
		<i>Rudbeckia occidentalis</i>	
		<i>Senecio serra</i>	
		<i>Thalictrum fendleri</i>	

POOL ATTRIBUTES

- % area in pools: 50
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 70
- % bank length gently sloping (>135°):
- % bank length with overhanging vegetation: 5

BANK CONDITION

- % bank length vegetated, stable: 20 (2+78)/2=40%total or 20/20 stable/unstable.
- % bank length unvegetated, stable: 5
- % bank length vegetated, unstable: 20
- % bank length unvegetated, unstable: 55

NOTES:

1) Right side sloughing from 28' to 15'; some fallen aspen. Not sure what's happening here with the width. It went from 28 ft to 15 ft total width from 2007 to 2008. May be a measurement error. Check it next year.

DATA SUMMARY

WQ-20: Cover by community types in Winter Quarters Canyon (2008).	
UPLAND VEGETATION	Cover (ft)
<i>Populus tremuloides/Picea pungens</i>	7.50
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Carex hoodii/Agrostis stolonifera</i>	2.00
<hr/>	
TOTAL COVER (Upland Species)	7.50
TOTAL COVER (Riparian Species)	2.00
ROCK (channel)	0.00
WATER (channel)	2.50
BAREGROUND (channel)	3.00
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	15.00

PHOTOGRAPHIC DOCUMENTATION



WQ-20

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-21

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,560 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Open/Spruce/Aspen

Right: Open to Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 1,000 lbs/acre

BEAVER ACTIVITY: Historical use lower in canyon.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Symphoricarpos oreophilus</i>	<i>Aster sp.</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Carduus nutans</i>	<i>Carex hoodii</i>
		<i>Helianthella uniflora</i>	<i>Elymus canadensis</i>
		<i>Ranunculus cymbalaria*</i>	
		<i>Senecio serra*</i>	
		<i>Urtica dioica*</i>	

POOL ATTRIBUTES

- % area in pools: 20
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 20 (Racy)

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 0
- % bank length gently sloping (>135°): 50
- % bank length with overhanging vegetation: 0

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 10
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

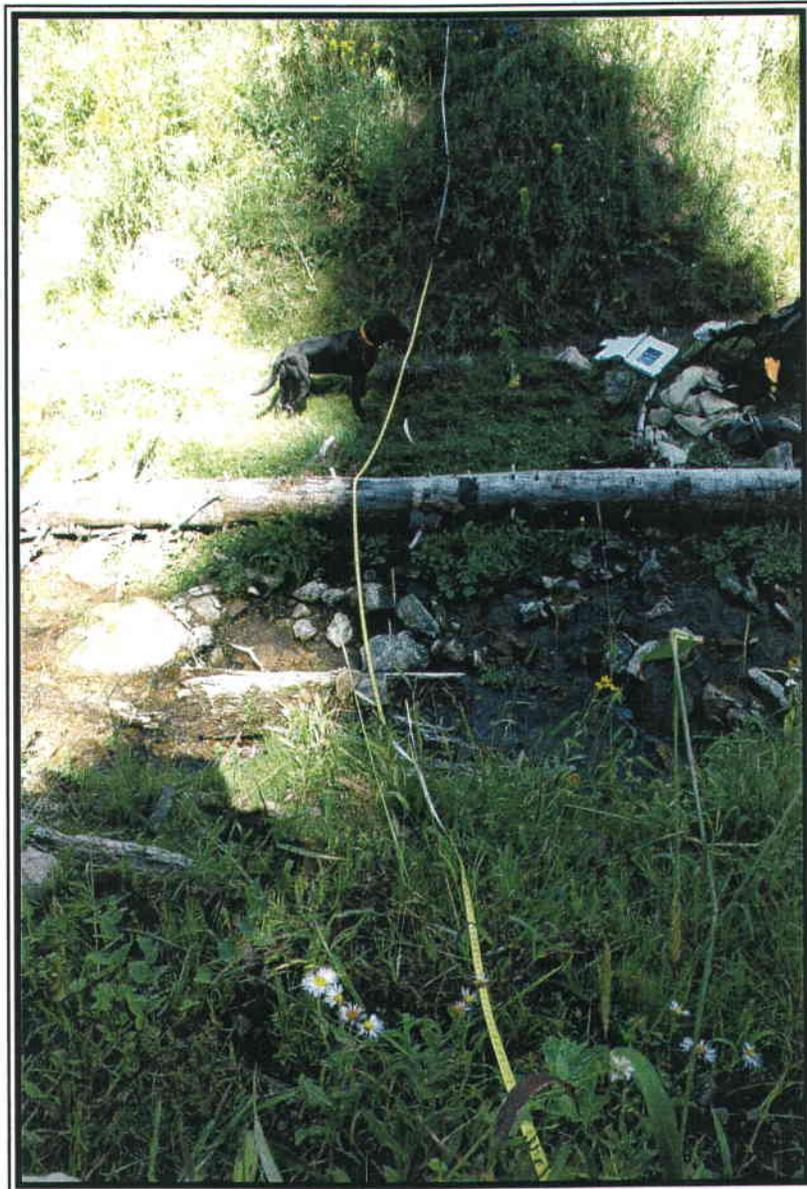
- 1) Good study site - there was an obvious transition from stream riparian to upland.
- 2) The riparian zone here was wider than up- or down-stream.
- 3) Site was located in a flatter area that holds the riparian species well.
- 4) Transect length has decreased 1.0' each year or from 37' to 36' to 35' from 2006 to 2007 to 2008, respectively.
- 5) Logs and litter in stream (see photo).

DATA SUMMARY

WQ-21: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Grass/Forb/Picea pungens/Populus tremuloides</i>	4.00
<i>Populus tremuloides/Mountain Herbland</i>	11.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Ranunculus cymbalaria/Agrostis stolonifera</i>	9.50
<i>Agrostis stolonifera/Elymus canadensis</i>	7.00
<hr/>	
TOTAL COVER (Upland Species)	15.00
TOTAL COVER (Riparian Species)	16.50
ROCK (channel)	2.00
WATER (channel)	1.50
BAREGROUND (channel)	0.00
LITTER	1.00
MOSS	0.00
<hr/>	
TOTAL COVER	35.00

PHOTOGRAPHIC DOCUMENTATION



WQ-21

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-22

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,527 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Aspen

Right: Open to Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 800 lbs/acre

BEAVER ACTIVITY: Historical use lower in canyon

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes</i>	<i>Geranium richardsonii</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Senecio serra</i>	<i>Carex hoodii</i>
		<i>Ranunculus cymbalaria</i>	<i>Elymus canadensis</i>
		<i>Urtica dioica</i>	<i>Carex nebrascensis</i>
		<i>Veratrum californicum</i>	<i>Juncus longistylis</i>

POOL ATTRIBUTES

% area in pools: 10
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 0
 % bank length gently sloping (>135°): 50
 % bank length with overhanging vegetation: 5

BANK CONDITION

% bank length vegetated, stable: 95
 % bank length unvegetated, stable: 5
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 0

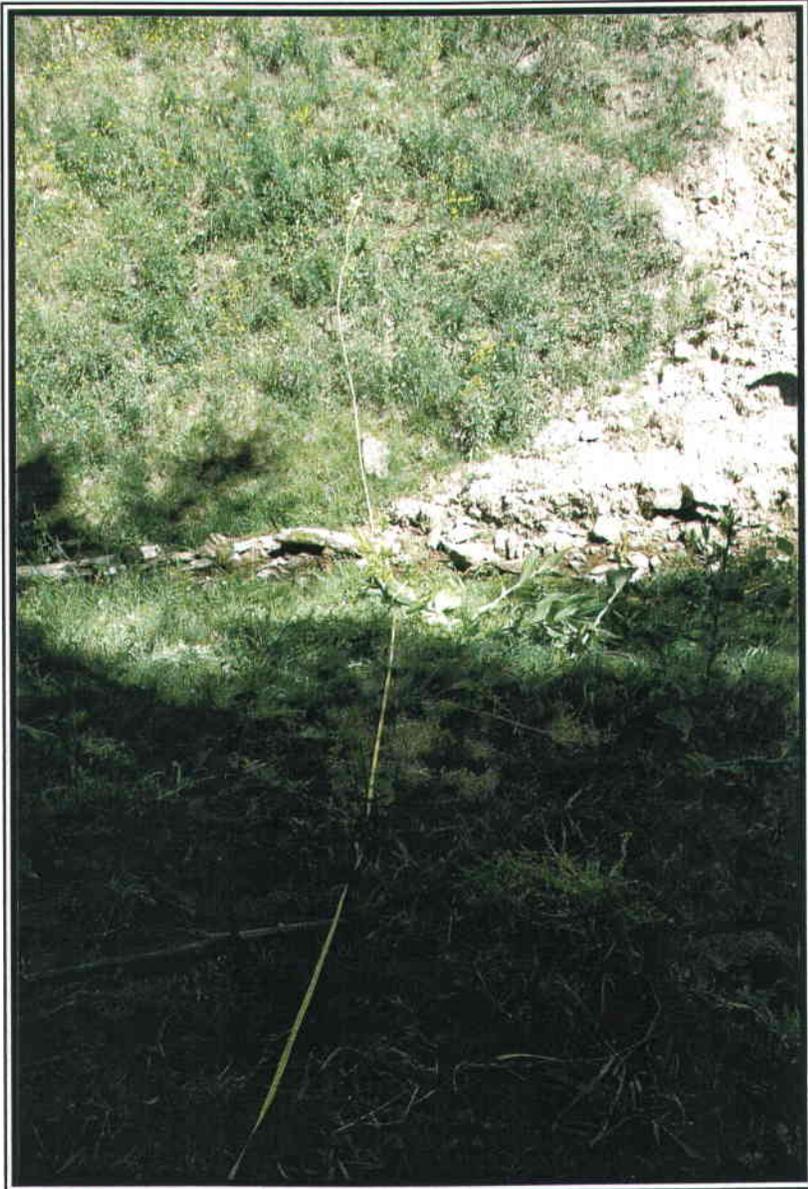
NOTES:

- 1) There was a wide riparian area on the left side.
- 2) It was difficult to tell where the stream water or the hillside water influenced the riparian plants, but I thought the stream had most influence in the area where the riparian cover approached 100%. On the left side, this was an area of about 11' (refer to data).
- 3) There were riparian spp. at higher elevations where I considered it was more upland.
- 4) Cattle were present in this area.
- 5) Beware: We were attacked by wasps from a gray hanging hive at this site.

DATA SUMMARY

WQ-22: Cover by community types in Winter Quarters Canyon (2008).	
UPLAND VEGETATION	Cover (ft)
<i>Populus tremuloides/Picea pungens</i>	10.00
<i>Populus tremuloides/Mountain Herbland</i>	8.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Geranium richardsonii</i>	17.00
TOTAL COVER (Upland Species)	18.00
TOTAL COVER (Riparian Species)	17.00
ROCK (channel)	1.50
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	1.50
MOSS	0.00
TOTAL COVER	41.00

PHOTOGRAPHIC DOCUMENTATION



WQ-22

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-23

WATERBODY NAME: Winter Quarters Canyon Creek (Section 11 tributary)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,481 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Fir

Right: Open to Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 500 lbs/acre

BEAVER ACTIVITY: Historical use lower in canyon

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Equisetum arvense</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	<i>Carex hoodii</i>
		<i>Ranunculus cymbalaria</i>	<i>Elymus canadensis</i>
		<i>Senecio serra</i>	

POOL ATTRIBUTES

- % area in pools: 10
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 0
- % bank length gently sloping (>135°): 10
- % bank length with overhanging vegetation: 10

BANK CONDITION

- % bank length vegetated, stable: 80
- % bank length unvegetated, stable: 20
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) On the left side, the upper 3 ft of the riparian zone may be influenced by hillside *and* stream water.

DATA SUMMARY

WQ-23: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Abies sp/Picea pungens</i>	6.00
<i>Populus tremuloides/Mountain Herbland</i>	8.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
 <i>Ranunculus cymbalaria/Agrostis stolonifera</i>	 13.00
<hr/>	
TOTAL COVER (Upland Species)	14.00
TOTAL COVER (Riparian Species)	13.00
ROCK (channel)	1.00
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	1.00
MOSS	0.00
<hr/>	
TOTAL COVER	32.00

PHOTOGRAPHIC DOCUMENTATION



WQ-23

RIPARIAN COMPLEX DATA SHEET
AUGUST 2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-35

WATERBODY NAME: Winter Quarters Canyon Creek

LOCATION: Southern Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: north

STREAM GRADIENT: 1-2 °

ELEVATION: ~8478 ft.

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Aspen

Right: Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 900

BEAVER ACTIVITY: none

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes sp.</i>	<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
		<i>Delphinium barbeyi</i>	
		<i>Equisetum arvense</i>	
		<i>Geranium richarsonii</i>	
		<i>Helianthella uniflora</i>	
		<i>Mimulus guttatus</i>	
		<i>Nasturtium officinale</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Senecio serra</i>	
		<i>Veratrum californicum</i>	

POOL ATTRIBUTES

- % area in pools: 20
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 20 (*Nasturtium officinale*)

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 50
- % bank length gently sloping (>135°): 50
- % bank length with overhanging vegetation: 25

BANK CONDITION

- % bank length vegetated, stable: 50
- % bank length unvegetated, stable: 20
- % bank length vegetated, unstable: 20
- % bank length unvegetated, unstable: 10

NOTES:

- 1) New sample site this year.
- 2) Good flat riparian community to monitor on the right site.

DATA SUMMARY

**WQ-: Baseline plant community cover types in
Winter Quarters Canyon riparian areas (August 2008).**
USDA Forest Service Protocol (1992)

UPLAND VEGETATION

<i>Populus tremuloides</i>	10.00
<i>Abies sp/Picea pungens</i>	18.00

RIPARIAN VEGETATION

Dominant Woody Species

Dominant Herbaceous Species

<i>Agrostis stolonifera</i>	9.50
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	6.50

TOTAL COVER (Upland Species)	28.00
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TOTAL COVER (Riparian Species)	16.00
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ROCK (channel)	1.50
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WATER (channel)	3.50
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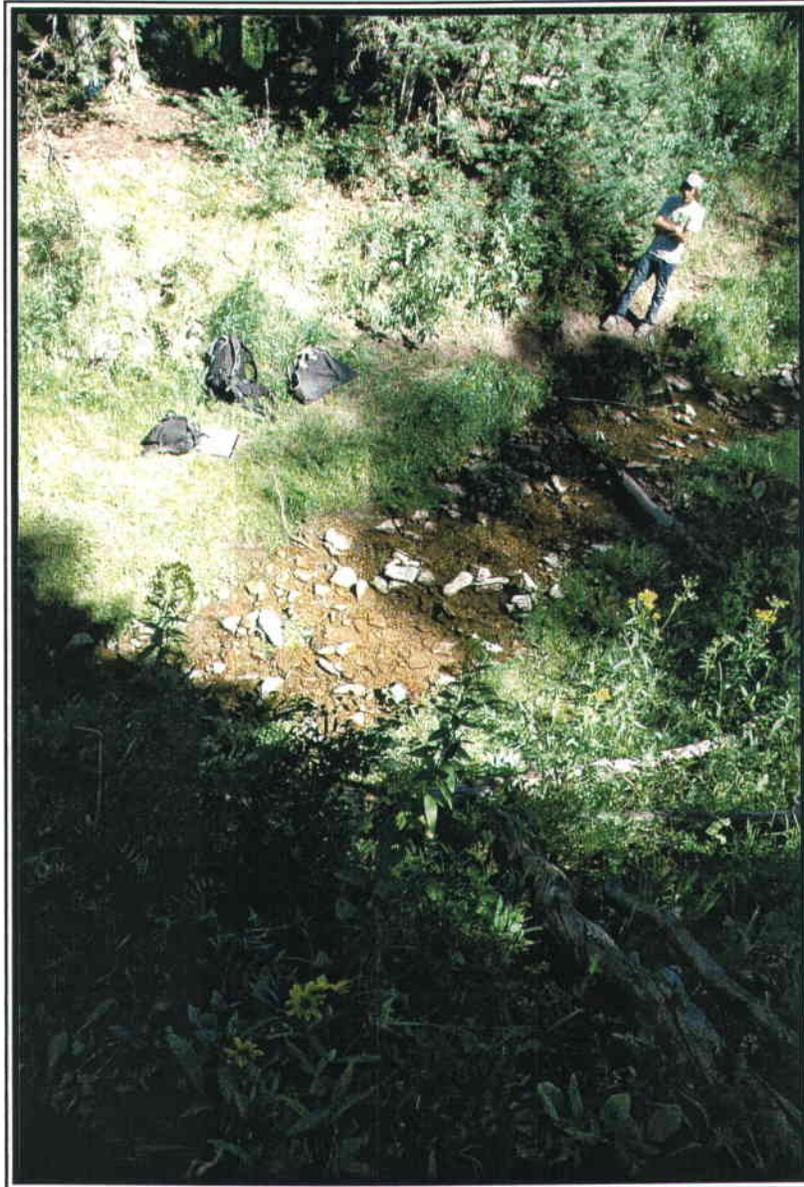
BAREGROUND (channel)	0.00
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LITTER	0.00
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MOSS	0.00
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TOTAL COVER	49.00
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PHOTOGRAPHIC DOCUMENTATION



WQ-35

RIPARIAN COMPLEX DATA SHEET
AUGUST 2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-36

WATERBODY NAME: Winter Quarters Canyon Creek

LOCATION: Southern Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: north

STREAM GRADIENT: 1-2 °

ELEVATION: 8475 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Conifer

Right: Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 600

BEAVER ACTIVITY: no

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
		<i>Delphinium barberi</i>	<i>Elymus canadensis</i>
		<i>Geranium richardsonii</i>	
		<i>Mimulus guttatus</i>	
		<i>Nasturium officinale</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Senecio serra</i>	

POOL ATTRIBUTES

- % area in pools: 15
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 5

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 50
- % bank length gently sloping (>135°): 50
- % bank length with overhanging vegetation: 50 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 0
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 10

NOTES:

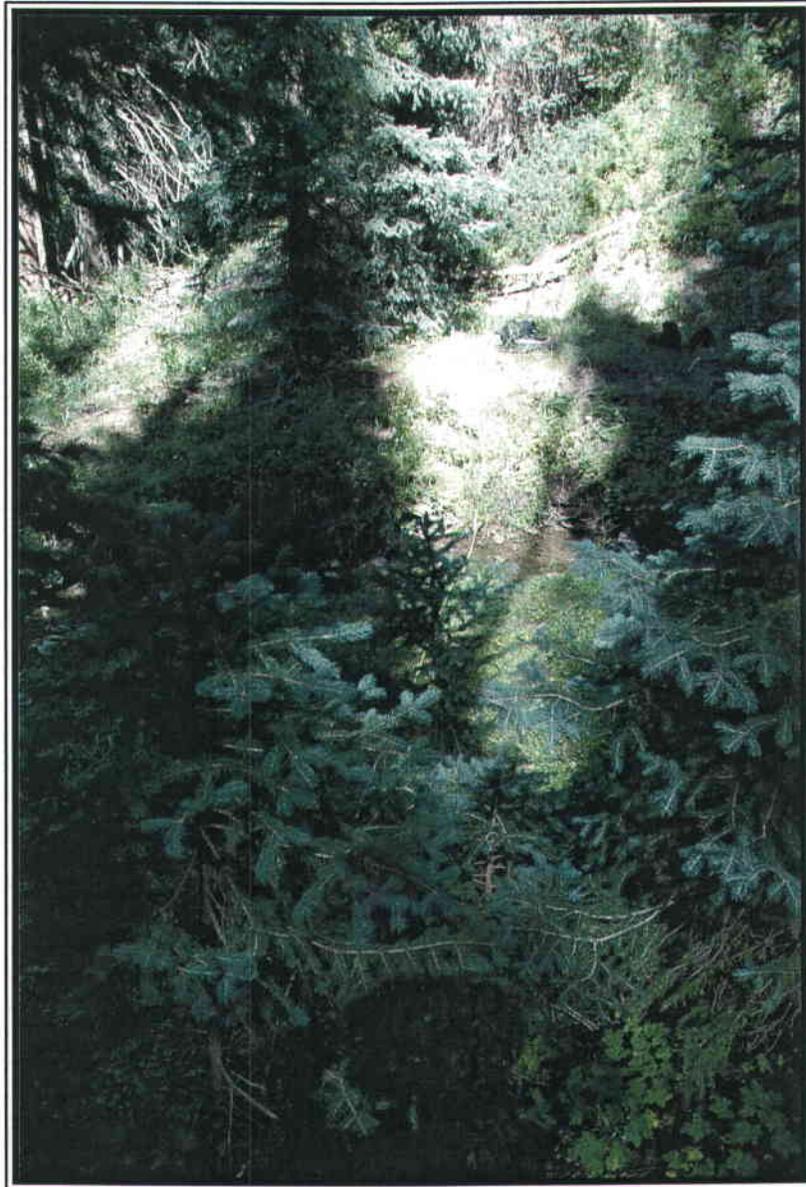
- 1) This was a new site for 2008 monitoring.
- 2) There was an especially good riparian community on the left side for monitoring.
- 3) This sample site was somewhat more than the prescribed distance from the last monitoring station because a spring would have made the appropriate distance difficult to accurately monitor. That said, even in this area there could have been some hillside water influence to the riparian community. I would guess it about a 70% chance that this influence existed.

DATA SUMMARY

**WQ-36: Baseline plant community cover types in
 Winter Quarters Canyon riparian areas (August 2008).**
USDA Forest Service Protocol (1992)

UPLAND VEGETATION	
Conifer	10.00
Conifer	11.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	19.00
<i>Elymus canadensis</i>	2.00
<hr/>	
TOTAL COVER (Upland Species)	21.00
TOTAL COVER (Riparian Species)	21.00
ROCK (channel)	2.00
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	47.00

PHOTOGRAPHIC DOCUMENTATION



WQ-36

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-06

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,709ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Blue Spruce Right: Blue Spruce

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 500 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
		<i>Delphinium barbeyi</i>	<i>Bromus carinatus</i>
		<i>Geranium richardsonii</i>	
		<i>Osmorhiza obtusa</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	

POOL ATTRIBUTES

- % area in pools: 35
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 0
- % bank length gently sloping (>135°): 10
- % bank length with overhanging vegetation: 50 (woody)

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 0
- % bank length vegetated, unstable: 5
- % bank length unvegetated, unstable: 5

NOTES:

- 1) Good supply of water this year
- 2) The right bank of this site was steep and moisture from the bank may also influence the riparian vegetation.
- 3) The riparian species on the banks were not well defined visually.

DATA SUMMARY

WQ-06: Cover by community types in Winter Quarters Canyon (2008).

UPLAND VEGETATION	Cover (ft)
<i>Picea pungens</i>	10.00
<i>Picea pungens</i>	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	10.00
TOTAL COVER (Upland Species)	20.00
TOTAL COVER (Riparian Species)	10.00
ROCK (channel)	0.00
WATER (channel)	2.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	32.00

PHOTOGRAPHIC DOCUMENTATION



WQ-06

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-24

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STREAM ASPECT: N

STREAM GRADIENT: 1-3^o

ELEVATION: 8,737 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Grass/Forb (Ruoc)

Right: Grass/Forb (Ruoc)

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 600 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Geranium richardsonii</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Mimulus guttatus</i>	<i>Elymus canadensis</i>
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	
		<i>Senecio serra</i>	

POOL ATTRIBUTES

- % area in pools: 50
- % pool area made up of pools > 2' deep: no

AQUATIC VEGETATION

- % streambed with filamentous algae: no
- % stream margin with rooted aquatic: no

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 50
- % bank length gently sloping (>135°): 0
- % bank length with overhanging vegetation: 100 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 80
- % bank length unvegetated, stable: 0
- % bank length vegetated, unstable: 20
- % bank length unvegetated, unstable: 0

NOTES:

DATA SUMMARY

WQ-24: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Rudbeckia occidentalis/Grass</i>	10.00
<i>Rudbeckia occidentalis/Grass</i>	11.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera</i>	3.50
<hr/>	
TOTAL COVER (Upland Species)	21.00
TOTAL COVER (Riparian Species)	3.50
ROCK (channel)	1.00
WATER (channel)	1.50
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	27.00

PHOTOGRAPHIC DOCUMENTATION



WQ-24

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-25

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STREAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,783 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Spruce/Fir/Aspen

Right: Spruce/Fir/Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 650 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Abies lasiocarpa</i>	<i>Ribes sp.</i>	<i>Geranium richardsonii</i>	<i>Agrostis stolonifera</i>
<i>Picea pungens</i>		<i>Osmorhiza obtusa</i>	<i>Elymus spicatus</i>
<i>Populus tremuloides</i>		<i>Ranunculus cymbalaria</i>	

POOL ATTRIBUTES

- % area in pools: 50
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: Some rooted Racy

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 10
- % bank length gently sloping (>135°): 30
- % bank length with overhanging vegetation: 100 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 10
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

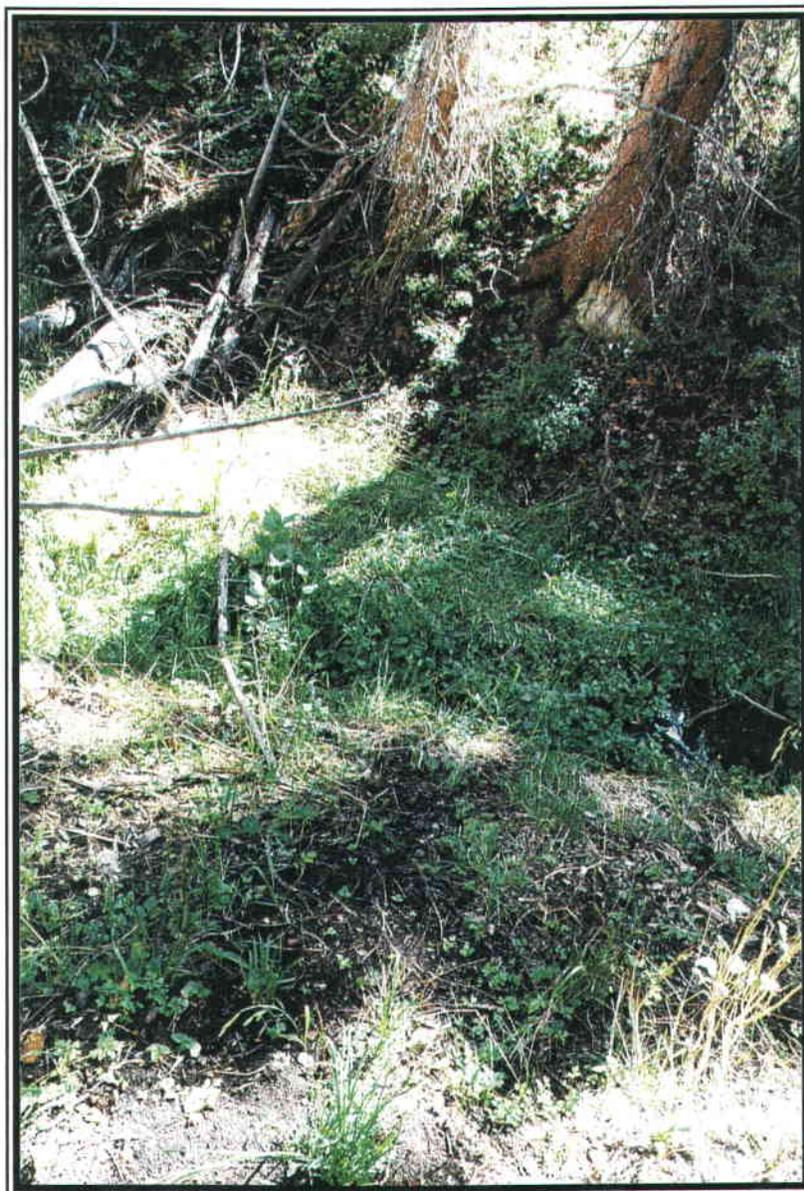
- 1) Good, well-defined river channel.
- 2) Bank slope increases abruptly. Therefore riparian habitat on right.

DATA SUMMARY

WQ-25: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Picea pungens/Abies lasiocarpa/Populus tremuloides</i>	11.00
<i>Picea pungens/Abies lasiocarpa/Populus tremuloides</i>	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	8.00
TOTAL COVER (Upland Species)	21.00
TOTAL COVER (Riparian Species)	8.00
ROCK (channel)	0.00
WATER (channel)	1.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	30.00

PHOTOGRAPHIC DOCUMENTATION



WQ-25

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-26

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,804 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Blue Spruce

Right: Grass/Forb

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 500 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Aster sp.</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	<i>Bromus carinatus</i>
		<i>Lathyrus lanszwertii</i>	<i>Elymus spicatus</i>
		<i>Mimulus guttatus</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	
		<i>Wyethia amplexicaulis</i>	

POOL ATTRIBUTES

- % area in pools: 50
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 30
- % bank length gently sloping (>135°):
- % bank length with overhanging vegetation: 100 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 10
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) Approximate beginning of mining year 2009.

DATA SUMMARY

WQ-26: Cover by community types in Winter Quarters Canyon (2008).	
UPLAND VEGETATION	
<i>Populus tremuloides/Picea pungens</i>	10.00
Grasses/Forbs	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Elymus canadensis</i>	5.00
TOTAL COVER (Upland Species)	20.00
TOTAL COVER (Riparian Species)	5.00
ROCK (channel)	0.00
WATER (channel)	1.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	26.00

PHOTOGRAPHIC DOCUMENTATION



WQ-26

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-27

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,858 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Right:

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 600 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	
		<i>Mimulus guttatus</i>	
		<i>Nasturtium officinale</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	

POOL ATTRIBUTES

% area in pools: 20
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 10 (*Nasturtium officinale*)

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 40
 % bank length gently sloping (>135°): 30
 % bank length with overhanging vegetation: 50 (herbaceous)

BANK CONDITION

% bank length vegetated, stable: 50
 % bank length unvegetated, stable: 10
 % bank length vegetated, unstable: 30
 % bank length unvegetated, unstable: 10

NOTES:

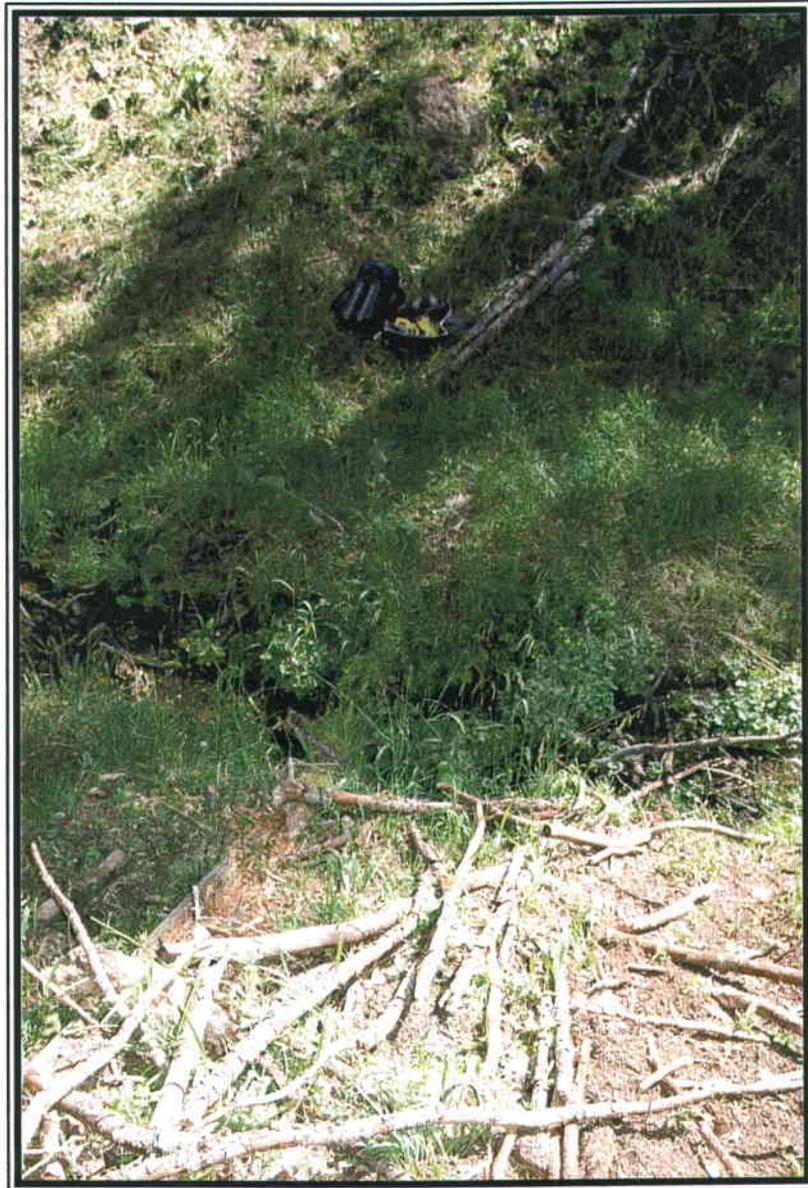
- 1) Good well-defined flat area with Agst on right side.
- 2) Mine maps indicated that this sample area is above 2008 mining year.

DATA SUMMARY

WQ-27: Cover by community types in Winter Quarters Canyon (2008).

UPLAND VEGETATION	Cover (ft)
	10.00
	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera</i>	8.00
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	7.00
<hr/>	
TOTAL COVER (Upland Species)	20.00
TOTAL COVER (Riparian Species)	15.00
ROCK (channel)	0.00
WATER (channel)	1.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
<hr/>	
TOTAL COVER	36.00

PHOTOGRAPHIC DOCUMENTATION



WQ-27

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-28

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STREAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,879 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Conifer/Aspen Right: Conifer/Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 400 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Delphinium barbeyi</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	<i>Avena fatua</i>
		<i>Osmorhiza obtusa</i>	<i>Carex hoodii</i>
		<i>Ranunculus cymbalaria</i>	<i>Poa secunda</i>
		<i>Thalictrum fendleri</i>	
		<i>Veratrum californicum</i>	

POOL ATTRIBUTES

% area in pools: 50

% pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0

% stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 50

% bank length gently sloping (>135°): 50

% bank length with overhanging vegetation: 75 (herbaceous)

BANK CONDITION

% bank length vegetated, stable: 70

% bank length unvegetated, stable: 5

% bank length vegetated, unstable: 20

% bank length unvegetated, unstable: 5

NOTES:

1) Good water flow, does not appear to be decreasing with elevation yet.

2) There has been some disturbance to the riparian zone in the transect line area, but not above or below it, so monitoring could continue.

DATA SUMMARY

WQ-28: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Populus tremuloides/Picea pungens</i>	15.00
<i>Populus tremuloides/Picea pungens</i>	8.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	3.00
TOTAL COVER (Upland Species)	23.00
TOTAL COVER (Riparian Species)	3.00
ROCK (channel)	0.00
WATER (channel)	2.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	28.00

PHOTOGRAPHIC DOCUMENTATION



WQ-28

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-29

WATERBODY NAME: Winter Quarters Canyon Creek (Unnamed tributary east of Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-3°

ELEVATION: 8,939 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Conifer/Aspen Right: Conifer/Aspen

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 600 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes sp.</i>	<i>Osmorhiza obtusa</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Rudbeckia occidentalis</i>	

POOL ATTRIBUTES

- % area in pools: 20
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 50
- % bank length gently sloping (>135°): 0
- % bank length with overhanging vegetation:

BANK CONDITION

- % bank length vegetated, stable: 75
- % bank length unvegetated, stable: 15
- % bank length vegetated, unstable: 5
- % bank length unvegetated, unstable: 5

NOTES:

- 1) Most of left bank was called "upland" because the redtop occurring there seemed to be more influenced by side slope moisture.
- 2) There was water flow at this elevation too.

DATA SUMMARY

WQ-29: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Populus tremuloides/Picea pungens</i>	13.00
<i>Populus tremuloides/Picea pungens</i>	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera</i>	5.50
TOTAL COVER (Upland Species)	23.00
TOTAL COVER (Riparian Species)	5.50
ROCK (channel)	0.00
WATER (channel)	1.50
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	30.00

PHOTOGRAPHIC DOCUMENTATION



WQ-29

RIPARIAN COMPLEX DATA SHEET
AUGUST 2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-04

WATERBODY NAME: Winter Quarters Canyon Creek

LOCATION: Southern Wasatch Plateau, Utah; Lower Box Canyon

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: NE

STREAM GRADIENT: ~2 °

ELEVATION: 8,664 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream):

Left: Aspen/Mtn. Herbland

Right: Blue Spruce/Mtn. Herbland

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 600 lbs/acre

BEAVER ACTIVITY: Historical activity a few hundred feet upstream.

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Agastache urticifolia</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Aster sp.</i>	<i>Carex hoodii</i>
		<i>Geranium richardsonii</i>	<i>Elymus canadensis</i>
		<i>Helianthella uniflora</i>	
		<i>Ligusticum porteri</i>	
		<i>Lupinus sp.</i>	
		<i>Mimulus guttatus</i>	
		<i>Ranunculus cymbalaria</i>	
		<i>Senecio serra</i>	
		<i>Urtica dioica</i>	
		<i>Viguiera multiflora</i>	

POOL ATTRIBUTES

- % area in pools: 40
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 10
- % bank length gently sloping (>135°): 20
- % bank length with overhanging vegetation: 50 (herb.)

BANK CONDITION

- % bank length vegetated, stable: 90
- % bank length unvegetated, stable: 10
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) This site is approx. midway between main channel and upper Box Canyon sample point.
- 2) Not sure why there's more riparian width here compared to 2005.

DATA SUMMARY

**WQ04: Baseline plant community cover types in
Winter Quarters Canyon riparian areas (August 2008).
USDA Forest Service Protocol (1992)**

UPLAND VEGETATION	
<i>Populus tremuloides</i> Mountain Herbland	7.00
<i>Picea pungens</i> Mountain Herbland	10.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Elymus canadensis</i> / <i>Ranunculus cymbalaria</i>	3.50
<i>Elymus canadensis</i> / <i>Geranium richardsonii</i>	2.50
TOTAL COVER (Upland Species)	17.00
TOTAL COVER (Riparian Species)	6.00
ROCK (channel)	2.50
WATER (channel)	1.50
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	27.00

PHOTOGRAPHIC DOCUMENTATION



WQ-04

**RIPARIAN COMPLEX DATA SHEET
AUGUST 2008**

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-34

WATERBODY NAME: Winter Quarters Canyon Creek; upper Box Canyon

LOCATION: Southern Wasatch Plateau, Utah; upper Box Canyon

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: ENE

STREAM GRADIENT: 2°

ELEVATION: 8,729 ft.

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Mtn. Herbland/Conifer

Right: Mtn. Herbland/Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 1100 lbs./acre

BEAVER ACTIVITY: see Notes

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
			<i>Agrostis stolonifera</i>
			<i>Carex nebrascensis</i>
			<i>Elymus canadensis</i>

POOL ATTRIBUTES

% area in pools: 50
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 40
 % bank length gently sloping (>135°): 0
 % bank length with overhanging vegetation: 90 (herbaceous)

BANK CONDITION

% bank length vegetated, stable: 95
 % bank length unvegetated, stable: 5
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 0

NOTES:

1) This site was a new sample station in 2008.

DATA SUMMARY

**WQ-04: Baseline plant community cover types in
Winter Quarters Canyon riparian areas (August 2008).**
USDA Forest Service Protocol (1992)

UPLAND VEGETATION

<i>Mountain Herbland</i>	10.00
<i>Mountain Herbland</i>	13.00

RIPARIAN VEGETATION

Dominant Woody Species

Dominant Herbaceous Species

<i>Agrostis stolonifera/Elymus canadensis</i>	9.00
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TOTAL COVER (Upland Species)	23.00
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TOTAL COVER (Riparian Species)	9.00
---------------------------------------	-------------

ROCK (channel)	1.00
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WATER (channel)	1.00
------------------------	-------------

BAREGROUND (channel)	0.00
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LITTER	0.00
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MOSS	0.00
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TOTAL COVER	34.00
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PHOTOGRAPHIC DOCUMENTATION



WQ-34

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: NumberWQ-03

WATERBODY NAME: Winter Quarters Canyon Creek; upper Box Canyon

LOCATION: Southern Wasatch Plateau, Utah; upper Box Canyon

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: ENE

STREAM GRADIENT: 2°

ELEVATION: 8,729 ft.

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Mtn. Herbland

Right: Mtn. Herbland

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Increasing

ESTIMATED FORAGE PRODUCTION: 1300 lbs./acre

BEAVER ACTIVITY: see Notes

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Achillea millefolium</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Helianthella uniflora</i>	<i>Carex nebrascensis</i>
		<i>Senecio serra</i>	<i>Carex hoodii</i>
		<i>Viguiera multiflora</i>	<i>Juncus longistylis</i>

POOL ATTRIBUTES

- % area in pools: 50
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 50 (much of the stream had rooted vegetation)

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 30
- % bank length gently sloping (>135°): 0
- % bank length with overhanging vegetation: 90

BANK CONDITION

- % bank length vegetated, stable: 95
- % bank length unvegetated, stable: 5
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 0

NOTES:

- 1) This site was approx. 400 ft upstream from a very old beaver dam.
- 2) There was very little water at the site - about 12 inches wide.
- 3) This site's elev. may be too high to always observe water. This was a good water year; there may be no water here in lower prec. years.
- 4) The adjacent areas were open areas (Mtn. Herblands)
- 5) One site was missing the stake; we re-stake it using 2005 measurement.

DATA SUMMARY

**WQ-03: Baseline plant community cover types in
Winter Quarters Canyon riparian areas (August 2008).**
USDA Forest Service Protocol (1992)

UPLAND VEGETATION

Mountain Herbland 19.00

RIPARIAN VEGETATION

Dominant Woody Species

Dominant Herbaceous Species

Carex nebrascensis/Agrostis stolonifera 6.00

Juncus longistylis/Carex hoodii 5.00

TOTAL COVER (Upland Species) 19.00

TOTAL COVER (Riparian Species) 11.00

ROCK (channel) 0.00

WATER (channel) 1.00

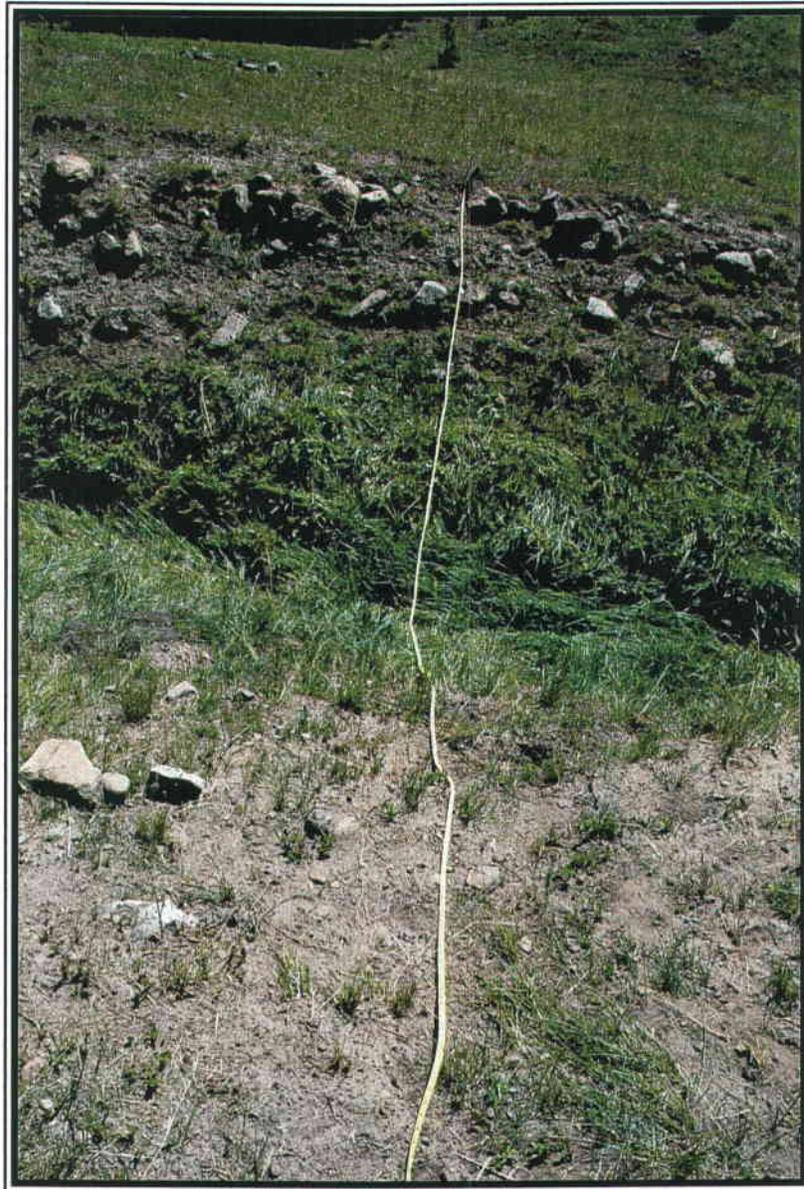
BAREGROUND (channel) 0.00

LITTER 0.00

MOSS 0.00

TOTAL COVER 31.00

PHOTOGRAPHIC DOCUMENTATION



WQ-03

**RIPARIAN COMPLEX DATA SHEET
AUGUST 2008**

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-33

WATERBODY NAME: Winter Quarters Canyon Creek

LOCATION: Southern Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: N

STREAM GRADIENT: 1-2 °

ELEVATION: 8769 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Mtn Grassland/Conifer

Right: Mtn Grassland/Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types):

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 400 lbs./ac

BEAVER ACTIVITY: Several beaver ponds located below this site.

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Lupinus sp.</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Rudbeckia occidentalis</i>	<i>Elymus canadensis</i>
<i>Sambucus caerulea</i>		<i>Taraxacum officinale</i>	

POOL ATTRIBUTES

- % area in pools: 100
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 5
- % bank length gently sloping (>135°): 40
- % bank length with overhanging vegetation: 20 (herbaceous)

BANK CONDITION

- % bank length vegetated, stable: 60
- % bank length unvegetated, stable: 30
- % bank length vegetated, unstable: 0
- % bank length unvegetated, unstable: 10

NOTES:

- 1) This is a new sample location for 2008.
- 2) There was lots of beaver influence below this site.

DATA SUMMARY

**WQ- 33: Baseline plant community cover types in
Winter Quarters Canyon riparian areas (August 2008).**
USDA Forest Service Protocol (1992)

UPLAND VEGETATION

Mtn Grassland/Conifer	10.00
Mtn Grassland/Conifer	10.00

RIPARIAN VEGETATION

Dominant Woody Species

Dominant Herbaceous Species

<i>Agrostis canadensis/Elymus canadensis</i>	7.00
--	------

TOTAL COVER (Upland Species)	20.00
TOTAL COVER (Riparian Species)	7.00
ROCK (channel)	0.00
WATER (channel)	5.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	32.00

PHOTOGRAPHIC DOCUMENTATION



WQ-33

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-30

WATERBODY NAME: Winter Quarters Canyon Creek (Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: ENE

STREAM GRADIENT: 1-3°

ELEVATION: 8,856 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Aspen/Conifer Right: Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 900 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: *Yes*

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: *Mining, grazing, hunting, recreation.*

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>	<i>Ribes sp.</i>	<i>Geranium richardsonii</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Lathyrus lanszwertii</i>	<i>Carex hoodii</i>
		<i>Ranunculus cymbalaria</i>	<i>Elymus canadensis</i>
		<i>Urtica dioica</i>	

POOL ATTRIBUTES

- % area in pools: 70
- % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

- % streambed with filamentous algae: 0
- % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

- % bank length undercut (<90°): 60
- % bank length gently sloping (>135°): 40
- % bank length with overhanging vegetation: 95(shrubs & herbs)

BANK CONDITION

- % bank length vegetated, stable: 80
- % bank length unvegetated, stable: 5
- % bank length vegetated, unstable: 10
- % bank length unvegetated, unstable: 5

NOTES:

DATA SUMMARY

WQ-30 Cover by community types in Winter Quarters Canyon (2008).	
UPLAND VEGETATION	Cover (ft)
<i>Populus tremuloides/Picea pungens</i>	11.00
<i>Picea pungens</i>	8.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Elymus canadensis</i>	5.00
TOTAL COVER (Upland Species)	19.00
TOTAL COVER (Riparian Species)	5.00
ROCK (channel)	0.00
WATER (channel)	3.00
BAREGROUND (channel)	0.00
LITTER	1.00
MOSS	0.00
TOTAL COVER	28.00

PHOTOGRAPHIC DOCUMENTATION



WQ-30

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-31

WATERBODY NAME: Winter Quarters Canyon Creek (Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: ENE

STREAM GRADIENT: 1-3°

ELEVATION: 8,868 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Aspen

Right: Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 400 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Abies lasiocarpa</i>	<i>Symphoricarpos oreophilus</i>	<i>Arnica cordifolia</i>	<i>Agrostis stolonifera</i>
<i>Picea pungens</i>		<i>Equisetum arvensis</i>	<i>Calamagrostis canadensis</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	<i>Juncus longistylis</i>
		<i>Ranunculus cymbalaria</i>	
		<i>Rudbeckia occidentalis</i>	

POOL ATTRIBUTES

% area in pools: 40
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 100
 % bank length gently sloping (>135°): 0
 % bank length with overhanging vegetation: 0

BANK CONDITION

% bank length vegetated, stable: 90
 % bank length unvegetated, stable: 5
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 5

NOTES:

- 1) This was a good sample site because the riparian and upland zones were obvious.
- 2) There was no ambiguity about what water was influencing the riparian zone - it was the stream water, not the side-slope ground moisture.

DATA SUMMARY

WQ-31: Cover by community types in Winter Quarters Canyon (2008).	
UPLAND VEGETATION	Cover (ft)
<i>Populus tremuloides</i>	10.50
<i>Picea pungens/Abies lasiocarpa</i>	8.50
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Ranunculus cymbalaria</i>	3.00
<i>Agrostis stolonifera</i>	1.00
TOTAL COVER (Upland Species)	19.00
TOTAL COVER (Riparian Species)	4.00
ROCK (channel)	1.00
WATER (channel)	2.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	26.00

PHOTOGRAPHIC DOCUMENTATION



WQ-31

RIPARIAN COMPLEX DATA SHEET
2008

CLIENT: Canyon Fuel Company, Skyline Mines

COMPLEX: Number WQ-32

WATERBODY NAME: Winter Quarters Canyon Creek (Box Canyon)

LOCATION: Wasatch Plateau, Utah

DATE: August 18-23, 2008

OBSERVER(S): P.D. Collins, S. Vlietstra²

QUAD NAME: Scofield, Utah

GEOLOGIC PARENT MATERIAL: Blackhawk Formation

STEAM ASPECT: ENE

STREAM GRADIENT: 1-3^o

ELEVATION: 8,870 ft

SIZE OF COMPLEX: (see quantitative data)

ADJACENT UPLAND VEGETATION (looking downstream)

Left: Grass/Forb Right: Aspen/Conifer

VEGETATIVE DESCRIPTION (Dominance by Community Types)

Community Name	% of Complex
(refer to quantitative data results for this information)	

SUCCESSIONAL STATUS: Climax

APPARENT FORAGE TREND: Stable

ESTIMATED FORAGE PRODUCTION: 800 lbs/acre

BEAVER ACTIVITY: No

PHOTOGRAPH TAKEN: Yes

LAND USE ACTIVITIES THAT COULD INFLUENCE RIPARIAN AREA: Mining, grazing, hunting, recreation.

SPECIES OBSERVED:

Trees	Shrubs	Forbs	Grasses (or grasslike)
<i>Picea pungens</i>		<i>Equisetum arvensis</i>	<i>Agrostis stolonifera</i>
<i>Populus tremuloides</i>		<i>Geranium richardsonii</i>	<i>Elymus canadensis</i>
		<i>Mimulus guttatus</i>	
		<i>Rudbeckia occidentalis</i>	
		<i>Viguiera multiflora</i>	

POOL ATTRIBUTES

% area in pools: 50
 % pool area made up of pools > 2' deep: 0

AQUATIC VEGETATION

% streambed with filamentous algae: 0
 % stream margin with rooted aquatic: 0

BANK TYPE & VEGETATION OVERHANG

% bank length undercut (<90°): 0
 % bank length gently sloping (>135°): 0
 % bank length with overhanging vegetation: 100 (herbaceous)

BANK CONDITION

% bank length vegetated, stable: 100
 % bank length unvegetated, stable: 0
 % bank length vegetated, unstable: 0
 % bank length unvegetated, unstable: 0

NOTES:

- 1) Good well-defined riparian zone.
- 2) Good water flow; flow also continues from upper canyon reaches.
- 3) It was thought that the riparian zone and sampling locations were well-represented in Box Canyon, so more sampling upstream was not done.

DATA SUMMARY

WQ-32: Cover by community types in Winter Quarters Canyon (2008).

	Cover (ft)
UPLAND VEGETATION	
<i>Mountain Herbland</i>	10.00
<i>Populus tremuloides/Picea pungens</i>	11.00
RIPARIAN VEGETATION	
<u>Dominant Woody Species</u>	
<u>Dominant Herbaceous Species</u>	
<i>Agrostis stolonifera/Elymus canadensis</i>	9.00
TOTAL COVER (Upland Species)	21.00
TOTAL COVER (Riparian Species)	9.00
ROCK (channel)	0.00
WATER (channel)	2.00
BAREGROUND (channel)	0.00
LITTER	0.00
MOSS	0.00
TOTAL COVER	32.00

PHOTOGRAPHIC DOCUMENTATION



WQ-32

ESTIMATES OF THE FALL, 2007,
CUTTHROAT TROUT POPULATION DENSITIES
IN ECCLES CREEK,
TRIBUTARY TO SCOFIELD RESERVOIR



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August 2008

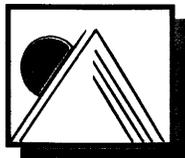


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LITERATURE CITED	16

INTRODUCTION

In the late summer and fall of 2001, water entering Skyline Mine of Canyon Fuel Company was allowed to discharge water from an underground aquifer into Eccles Creek to prevent mine flooding. At that time, a series of studies was initiated to assess the impact of the increased flows on the biota of Eccles Creek. Most of the assessment focused on the invertebrate communities of the stream, but electrofishing surveys were included to evaluate the response of fish to the flows. In the initial qualitative sampling survey in 2001, no fish were collected. However by 2004, fish had been seen in the stream, and fish survey stations were established at each of the three benthos sampling stations in Eccles Creek. This report compares the fish densities and species composition in the three reaches in October, 2007, with that recorded in October, 2004.

METHODS

On October 5, 2004, three 100 meter sample stations were established at each of three sections of Eccles Creek (Table 1). A fourth station was established in the South Fork of Eccles Creek. The sites were initially marked with flagging to allow easy location when the population estimates were conducted. The first series of population estimates were conducted in October, 2004. In 2007, samples were completed in late September and early October (Table 1).

Table 1. Sampling Stations on Eccles Creek

Station	Date	GPS Coordinates Start Location	GPS Coordinates End Location
Lower Eccles Creek	September 28, 2007	N 39° 41' 0.87" W 111° 9' 57.47"	N 39° 41' 0.06" W 111° 10' 1.86"
Middle Eccles Creek (above Whisky Canyon)	October 7, 2007	N 39° 40' 55.54" W 111° 10' 40.11"	N 39° 40' 54.48" W 111° 10' 44.82"
Upper Eccles Creek	October 7, 2007	N 39° 40' 58.20" W 111° 11' 34.74"	N 39° 40' 55.79" W 111° 11' 27.39"
South Fork Eccles Creek	October 7, 2007	N 39° 40' 55.79" W 111° 11' 27.39"	N 39° 40' 53.06" W 111° 11' 30.90"

Fish population estimates were based on removal summation sampling (Moran 1951; Zippen 1956, 1958; Van Deventer and Platts 1985) applied to the measured sections of stream. The fish were captured with a Smith-Root Model 12 battery-powered backpack electrofisher. All captured fish were transferred to buckets and were held in flow-through holding pens until two electrofishing passes had been completed. Fish were then identified and counted. Fish from each station were also measured so that length frequency could be examined.

RESULTS AND DISCUSSION

The length frequency of the trout collected allowed separation of fish into size classes, but accurate age estimation would require scale or otolith examination. It is likely that the largest fish collected in this survey were age 2+ or 3+, but the majority were likely age 1+. The high elevation of the site suggests that the larger fish are 3+ to 4+ or older, but the increased stream temperature resulting from

the mine discharge could confound the elevation effect by favoring more rapid growth.

The 2007 sampling resulted in relatively narrow confidence ranges (Table 2) indicating that the estimates made in the three sections were relatively accurate. The lower Eccles Creek station had a total population estimate of 109 fish in 2007 (Table 2) with a density of 1.09 fish per linear meter of stream. The 2007 trout population in the lower Eccles station had increased about 20% over the 2004 density estimate (Table 3). The Middle Eccles site, however, underwent a 66% decline in density from 93 in 2004 to 32 in 2007. In contrast, the population density of the upper Eccles Creek station increased from 15 in 2004 to 71 in 2007. This station increased by 470%. No fish were found in the South Fork of Eccles Creek in 2007. Overall, the population density in the four stations increased from a total of 160 trout in 2004 to 212 trout in 2007. The density adjusted per square meter of stream reflects the same information. The trout density increased from 0.4 trout per linear meter of stream in 2004 to 0.53 fish per linear meter in 2007 despite the significant decline in the Middle Eccles Creek station.

Table 2. Population estimates and confidence intervals for Eccles Creek, October, 2007

Station	Population Estimate	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Density per Linear Meter of Stream
Lower Eccles Creek	109	101	120	1.09
Middle Eccles Creek	32	32	34	0.32
Upper Eccles Creek	71	71	75	0.71
South Fork Eccles Creek	0	0	0	0.00
Total Estimate (400 m of stream)	212	204	229	0.71

Table 3. Comparison of population estimates and densities for Eccles Creek, October, 2004, and October, 2007.

Station	Population Estimate, 2004	Population Estimate, 2007	Density per Linear Meter of Stream, 2004	Density per Linear Meter of Stream, 2007
Lower Eccles Creek	90	109	0.90	1.09
Middle Eccles Creek	93	32	0.93	0.32
Upper Eccles Creek	15	71	0.15	0.71
South Fork Eccles Creek	1	0	0.01	0.00
Total Estimate (400 m of stream)	160	212	0.40	0.53

In the 2004 population estimates, the only species collected in Eccles Creek was the cutthroat trout, *Oncorhynchus clarkii*. In 2007, both rainbow trout and fish that were clearly hybrids between rainbow trout and cutthroat trout were collected. The trout classified as rainbow trout appear to be typical rainbow trout. The hybrid individuals have the appearance of typical F1 individuals. But the actual extent of the introgression is unknown (i.e., whether or not back crossing has taken place). The presence of hybrids indicates that introgression is taking place within the drainage basin. The highest frequency of hybrid phenotypes occur in Lower Eccles Creek (Table 4). This suggests that the introgression may be occurring in the downstream reaches of the stream or in adjacent tributaries. It is unlikely that introgression is being generated the Middle or Upper Eccles sections because of the lack of spawning habitat.

Table 4. Percent composition of phenotypes for Eccles Creek, October, 2007

Station	Cutthroat Trout	Hybrids	Rainbow Trout
Lower Eccles Creek	85.3%	10.8%	3.9%
Middle Eccles Creek	97.1%	2.9%	0
Upper Eccles Creek	95.8%	0	4.2%
South Fork Eccles Creek	0	0	0

The length frequencies for 2004 (Figures 1-4) covered a range from 5 cm to 29 cm. The size frequency distribution showed a dominance of small trout, age 0+ and 1+ (5-10 cm). The larger size classes dropped off in numbers as would be expected and may have suggested an additional 2 to 4 cohorts. The most robust size structure occurred in the Lower Eccles Creek population, and the weakest size structure was in the Upper Eccles station where low frequencies of all size classes occurred. In 2007, the size frequencies shifted (Figures 5-8). Lower Eccles Creek (Figure 5) still showed the most diverse size frequency, but the Middle Eccles Creek (Figure 6) station had a significant drop in the proportion of small trout in the population. Approximately half of the fish were less than 15 cm in length, and the other half were over 20 cm in length. This skewing of the size distribution may be an artifact of the low frequency of fish at this station. Only one fish appeared to be a hybrid, and no rainbow trout were collected at this station. The Upper Eccles station (Figure 7) had a length frequency distribution that was more similar to the 2004 Middle Eccles station. While several rainbow trout were collected, they were small and likely immature. No evidence of introgression was detected. The overall size structure of the stations in 2007 suggested that the stream trout population was robust, possibly in better condition than in 2004.

The lower station on Eccles Creek (Table 2) was much more armored and cemented than it was in 2004. Nevertheless, it still contained complex habitat. The reach contained plunge pools, an abandoned beaver dam, and downed timber; most of which was heavily encrusted with mineral deposition. In 2004, the bed was sand with some gravel and small backwater eddies where fine sands and silts accumulated. In 2007, very little bed gravel was seen.

The Middle Eccles Creek station was similar to what it was in 2004 but had less woody debris and less mobile sediment than in 2004. It had fewer extensive steep gradient reaches than did the Lower Eccles Creek station. The upper station in Eccles Creek still flowed through an open meadow habitat, but a number of side channels had developed and these provided more cover than had occurred in 2004. However, most of these side channels were also becoming heavily coated with marl. The South Fork of Eccles Creek had very low discharge in both 2004 and 2007. No fish were collected in 2007.

Trout have an established population in Eccles Creek. However, it appears to still be undergoing changes following the increase in discharge in 2001. Their abundance appears to be associated with the geomorphology of the stream segments. Physical characteristics that favor narrow channels also tend to favor an increase in carbonate armoring of the stream bed. This armoring may be mitigated by beaver dams which can temporarily retain sediments and by extended flood plains where the stream can occasionally escape its armored bed. While it may be that the fish grow rapidly in the stream due to higher temperatures year round, based on the 2007 data, it appears that most of the smaller fish originated outside of the armored areas and dispersed into those reaches. Little to no

spawning habitat exists in the three main stream sample sites, and it appears that the South Fork has not been used for spawning recently. Still, the increasing trout population indicates that trout can survive in the stream and that they can actively migrate into and through the stream.

Figure 1. Length Frequency, Lower Eccles Creek, 2004.

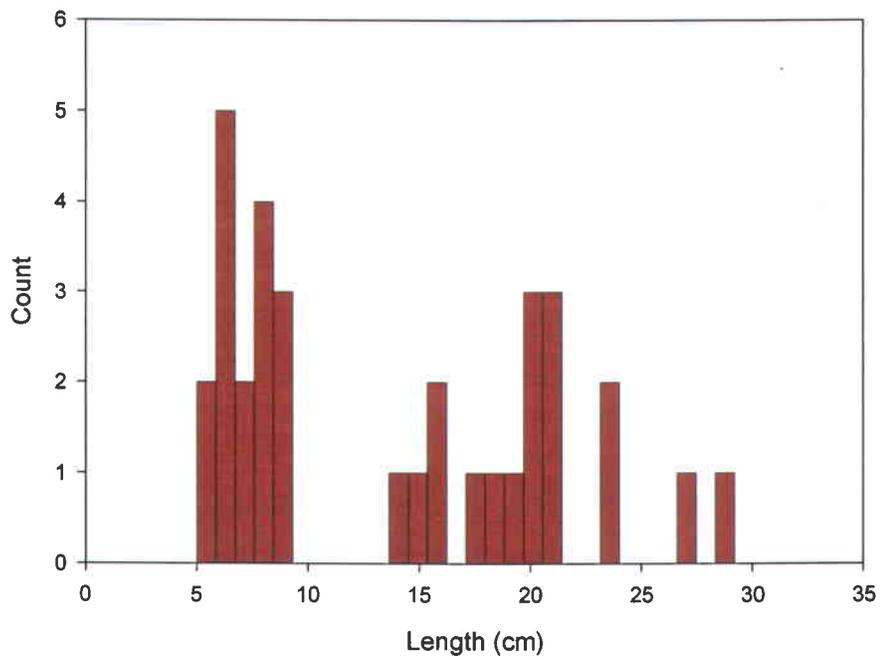


Figure 2. Length Frequency, Middle Eccles Creek, 2004.

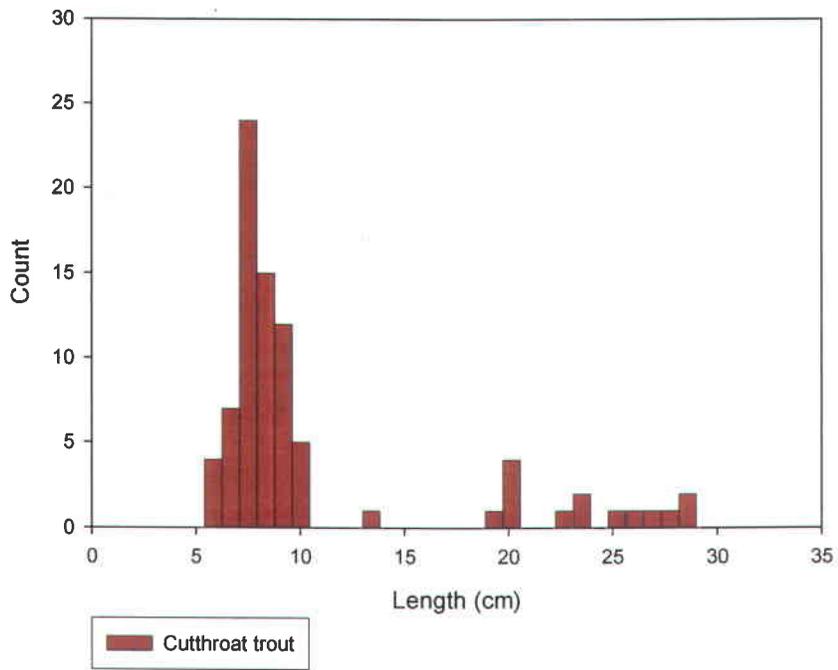


Figure 3. Length Frequency, Upper Eccles Creek, 2004.

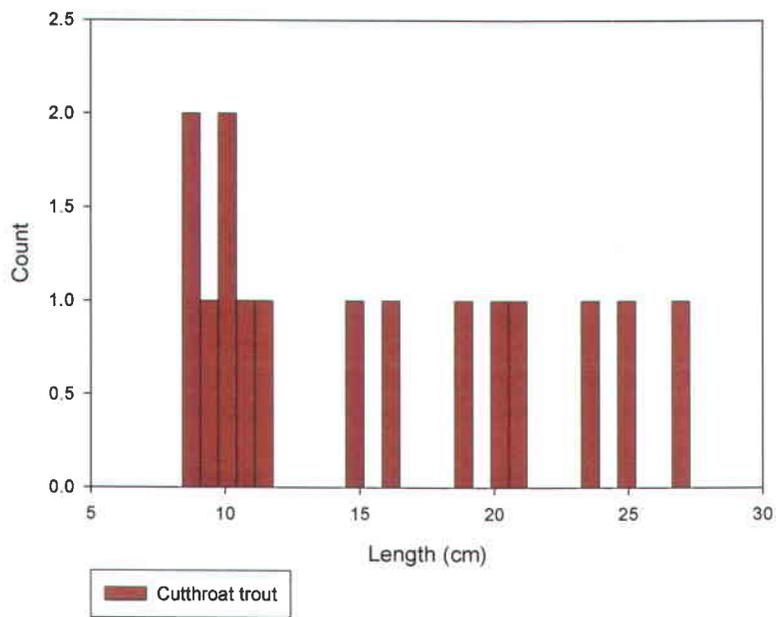


Figure 4. Length frequency, Eccles Creek, Total, 2004.

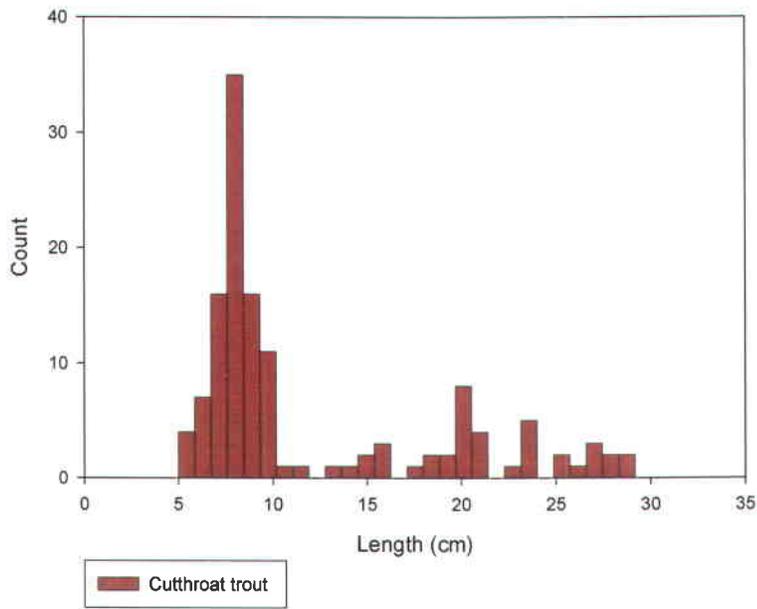


Figure 5. Length Frequency, Lower Eccles Creek, 2007.

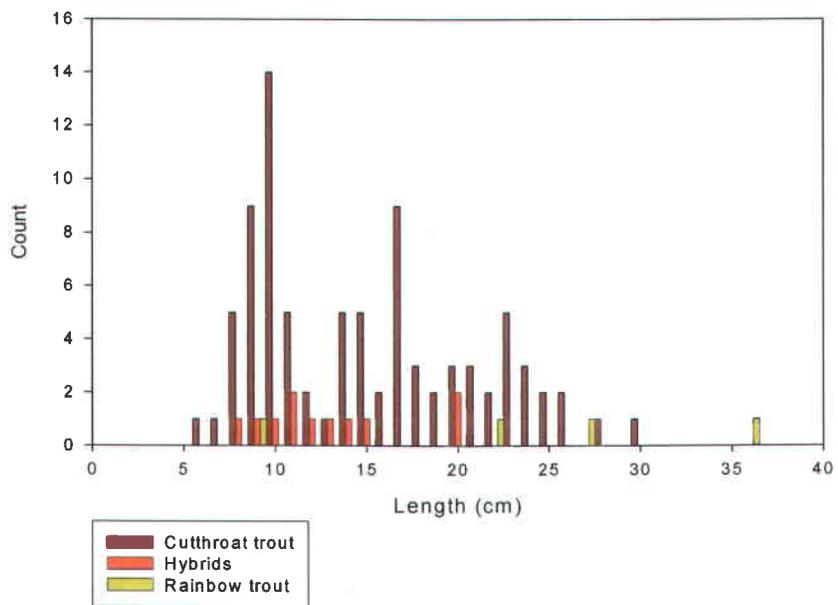


Figure 6. Length Frequency, Middle Eccles Creek, 2007.

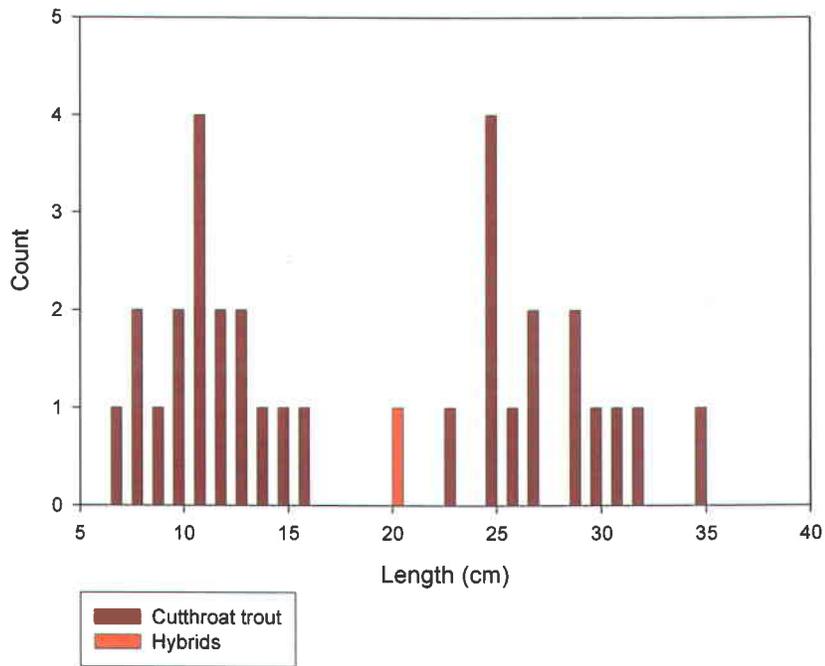


Figure 7. Length Frequency, Upper Eccles Creek, 2007.

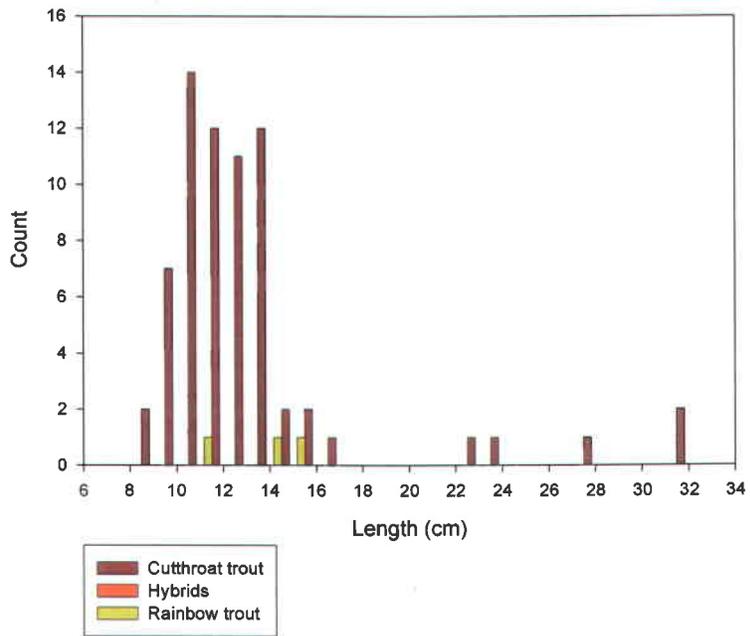
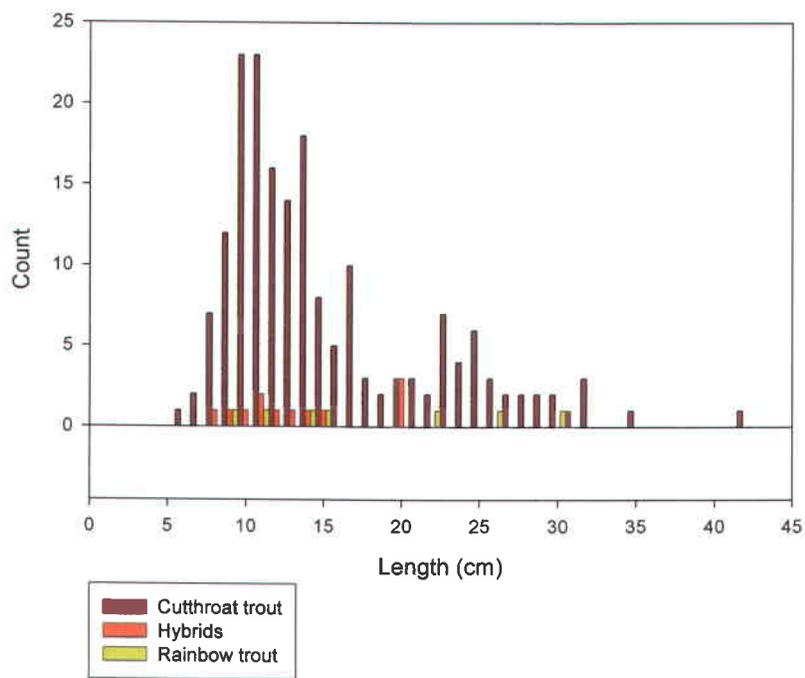


Figure 8. Length Frequency, Eccles Creek 2007, Total.



LITERATURE CITED

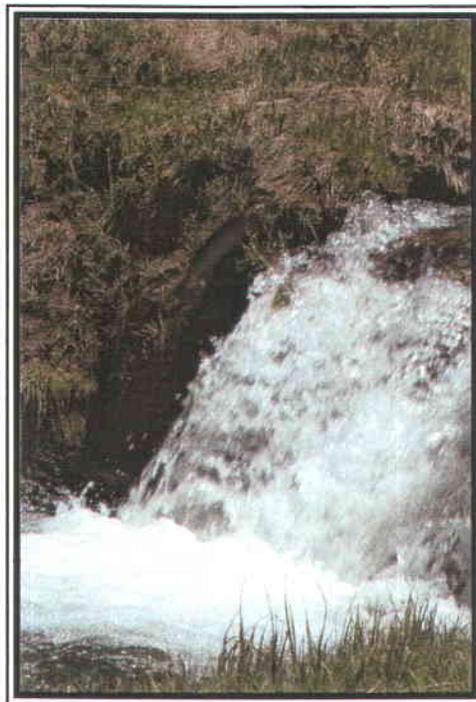
Moran, P. A. P. 1951. A mathematical theory of animal trapping. *Biometrika* 38:307-311.

Van Deventer, J. S. and W. S. Platts. 1985. A computer software system for entering, managing, and analyzing fish capture data from streams. USDA Forest Service Research Note INT-352. Intermountain Research Station, Ogden, Utah 12pp.

Zippen, C. 1956. An evaluation of the removal method of estimating animal populations. *Biometrics* 12:163-169.

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**ESTIMATES OF THE FALL, 2007,
CUTTHROAT TROUT POPULATION DENSITIES
IN BURNOUT AND JAMES CANYON CREEKS,
TRIBUTARIES TO ELECTRIC LAKE,
HUNTINGTON CREEK DRAINAGE**



Burnout Creek Falls

Prepared by

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Springville, UT 84663
(801) 489-6937

Dennis K. Shiozawa, Ph.D.

for

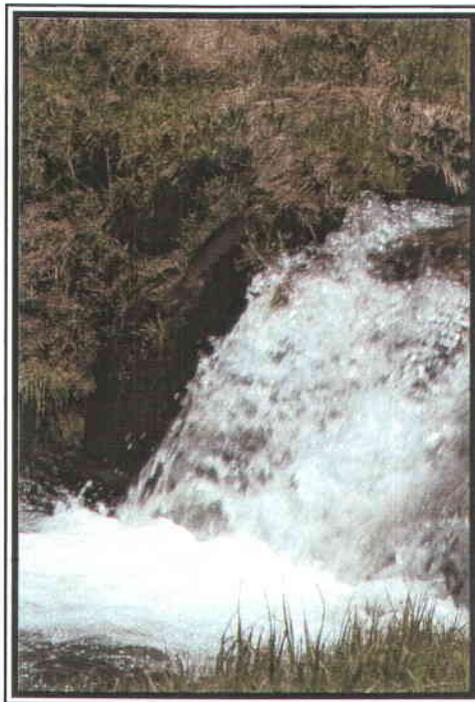
CANYON FUEL COMPANY, LLC.

Skyline Mines
HC 35 Box 380
Helper, Utah 84526

September 2008



**ESTIMATES OF THE FALL, 2007,
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INTRODUCTION

The cutthroat trout in Electric Lake, Huntington Canyon; Emery County, UT, spawn in the tributaries to Electric Lake. The Utah Division of Wildlife Resources requested that Canyon Fuel Company's Skyline Mines (HC 35 Box 380; Helper, UT 84526) establish base-line data on the fish and macrobenthos in both Burnout and James Canyon Creeks. These streams are tributaries to Electric Lake. Both streams enter Electric Lake near the upstream end of the reservoir. James Canyon Creek directly enters Electric Lake through a culvert beneath an abandoned road berm built prior to construction of the Electric Lake dam. Burnout Creek, 1.8 km north of James Canyon Creek, enters the reservoir at approximately the high water mark where Huntington Creek enters the reservoir. During low water years, Burnout Creek enters Huntington Creek above its confluence with the reservoir. This report focuses on fish population estimates from a census on October 5, 2004.

METHODS

In 2000 a total stream length of 162 meters (528 feet) was marked off in each stream. This became the permanent stations utilized in the 2000, 2001, and 2004 population estimation studies. The designated stream length began at the reservoir high water mark as determined from shoreline bench marks (beach and littoral shelf) and vegetation. Fish population estimates were based on removal summation sampling (Moran 1951; Zippen 1956, 1958) applied to the measured sections of stream. The fish were captured with a Smith-Root Model 12 battery-powered backpack electrofisher. All captured fish were transferred to buckets and held in flow-through pens until two passes had been

completed. Fish were then identified and counted. Data were analyzed with the program, Microfish (Van Deventer and Platts,1985). This is the fourth population estimate in James Canyon and Burnout Creeks with the first being completed in October, 2000; the second in October, 2001; the third in October, 2004; and the fourth in October, 2007.

RESULTS AND DISCUSSION

James Canyon Creek

The 2000 population estimate indicated that James Canyon Creek was a well populated nursery for cutthroat trout. But in 2001, the level of Electric Lake had fallen significantly and the low lake levels left the upstream end of the James Canyon culvert exposed so that water actively flowed into it. The downstream end of the culvert was submerged in Electric Lake and was observed to be covered with upwelling sand. Further, increased sedimentation in the stream was noted. This could have been associated with a number of factors such as the continuing drought conditions, concentrated sheep grazing in side drainages of the watershed, road construction at the head of the watershed, and construction of a pipeline taking water pumped from Skyline Mine into Electric Lake. The 2001 fish densities within the 162 meter section in James Canyon Creek fell 84%, from an estimated 587 fish in 2000 to 93 fish in 2001 (Table 1). The majority of the fish in the 2001 sample were one+ aged individuals indicating that only limited successful reproduction had occurred in the stream in the spring of 2001. The lack of success could have been a result of in-stream sedimentation or, more likely, was due to barriers to fish access caused by the low lake levels and

the exposure of lake-deposited sediments at the mouth of the culvert.

Table 1. Population estimates in James Canyon Creek and Burnout Creek, 2000-2007.

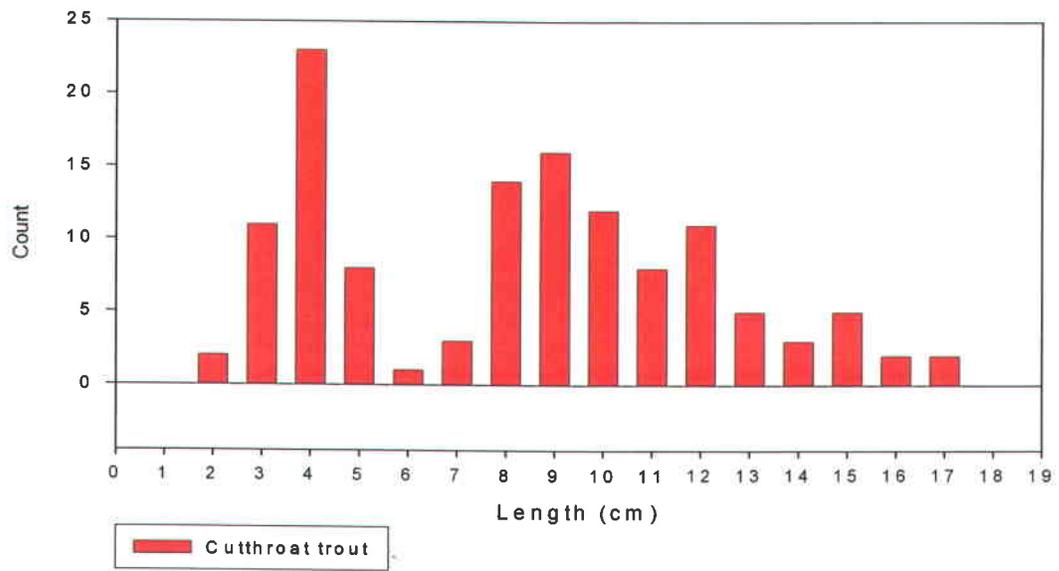
		2000	2001	2004	2007
James Canyon	Total cutthroat	587	93	0	137
Burnout	Total cottids	1	11	0	0
	Total tiger trout	0	0	0	183
	below first falls	0	0	0	150
	above first falls	0	0	0	33
	Total cutthroat trout	304	246 ct	22	8
	below first falls	280	236	22	7
	above first falls	24	10	0	1

During the drought years, Electric Lake continued to fall in elevation, and James Canyon Creek cut a channel into the sand and silt of the exposed lake bed. While the discharge in James Canyon Creek, above the Electric Lake high water mark, appeared to remain high enough to provide successful egg incubation and to allow trout fry survival, the stream's outflow below the culvert quickly percolated into the exposed sandy lake bed and often only a small amount of water was flowing in the stream channel itself. That formed a strong barrier to fish movement. In the fall of 2004, two sampling runs were made on James Canyon Creek with the backpack electrofisher. No fish were collected on either run. The drought conditions eased in 2006, and the level of Electric Lake rose sufficiently to cover the culvert. The culvert remained covered in 2007, and cutthroat trout fry were again collected in the stream in the fall of 2007. The 2007 numbers were approximately

50% higher than the population estimate in 2001 but were still less than a fourth of the density recorded in 2000.

The length frequency of fish in James Canyon Creek in 2007 show a clear bimodal pattern (Figure 1). The first peak representing age 0+ fish, ranging between 2 to about 6 cm in length, while the second, with a modal peak at 9 cm but ranging up to 17 cm in length, represents fish in the 1+ and possibly higher age classes. These numbers suggest spawning success in 2006 as well as in 2007. This stream population appears to be recovering from the drought impacts.

Figure 1. Length Frequency, James Canyon Creek, 2007.



Burnout Creek

Burnout Creek has two waterfalls within the 162 meter monitoring section. The first waterfall is 97 meters upstream from the high water line, and the second waterfall is 30 meters upstream of the first waterfall. The stream below the lower waterfalls represents about 60% of the sampled section while between the two falls an additional 18.5% of the sampled stream channel occurs. The first waterfall was originally thought to be a partial barrier to all upstream fish movement. Young-of-the-year and one-year old fish would find it to be a significant barrier to their upstream movement, but spawning trout would be able to continue upstream especially with high spring flows. The second waterfall appeared to be a stronger barrier to fish passage, although it was low enough to be potentially passable especially during high water periods. In the spring and early summer, spawning trout actively try to jump the waterfall, and some, in the spring of 2005, were observed almost succeeding (Shiozawa personal observations).

The sample reach extended an additional 35 meters above this second waterfall, and the presence of a single trout upstream of this sampling reach in 2001 indicates that occasionally both male and female trout are successful in ascending the falls. Of the sections of Burnout Creek inhabited by trout, the region below the waterfall comprises about 76% of the linear stream distance, and the section between the two waterfalls makes up the remaining 24%.

In 2000, the total population estimate for Burnout Creek was 304 trout with one cottid, and in 2001, the population size was 257 (of which 11 were cottids). In 2000, the population estimate between

the high water mark and the first waterfall was 280 fish (92% of the fish) with the remaining being between the first and second waterfall. In 2001, in this same section, 236 trout and 11 cottids were collected. This represented 96% of the trout in the stream. Between 2000 and 2001, the number of trout in Burnout Creek declined by about 15%. In 2004, 14 trout were collected on the first electrofishing run and six on the second. The 2004 population estimate was 22 fish with 95% confidence limits between 20 and 29. All fish were young-of-the-year cutthroat trout, so no length data were taken in 2004. No fish were collected upstream of the first waterfall. In the 2007 sampling, the overall trout population was estimated at 191 fish, 63% of the 2000 estimate and 77% of the 2001 estimate (Table 1). The Burnout Creek population had a capture probability of 0.800 and relatively narrow confidence bounds compared to James Canyon Creek (Table 2).

However, what was significant with the 2007 estimate in Burnout Creek is that all but eight of the trout collected were tiger trout (Tables 1, 2). This was the first time tiger trout were collected in Burnout Creek although larger tiger trout are present in the Electric Lake Basin. Tiger trout are sterile hybrids generated by a cross between brook trout and brown trout, and neither of these parent species are found in the Electric Lake Basin. Therefore, the tiger trout fry in Burnout Creek had to have been stocked by the Utah Division of Wildlife Resources. While tiger trout are widely used as a supplemental put and take fishery, the identification of whirling disease from Huntington Creek below Electric Lake in the spring of 2006 and from Electric Lake itself in the fall of 2006, likely influenced the decision to stock tiger trout which are more resistant to the parasite.

Table 2. Catch statistics for the 2007 sampling in James Canyon and Burnout Creeks.

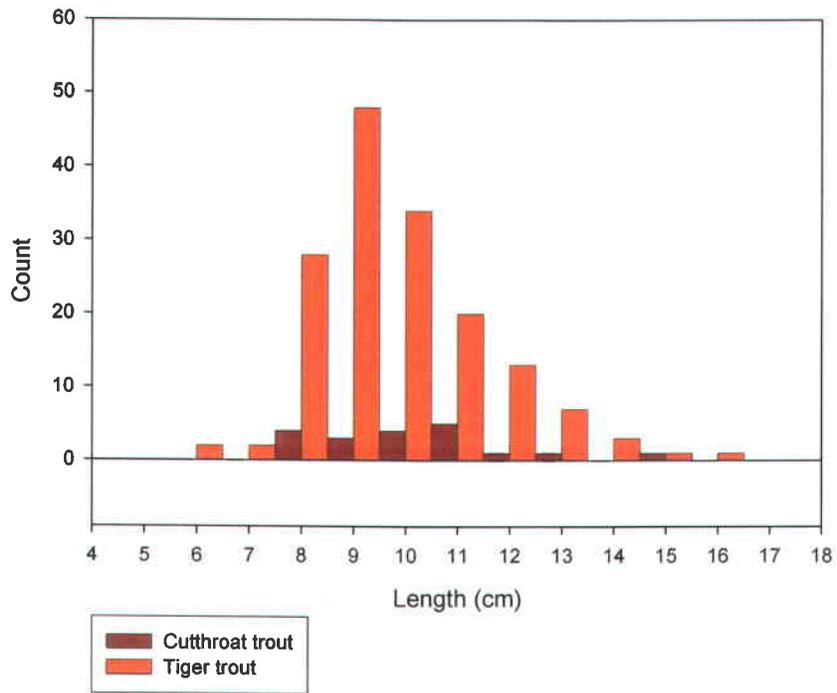
2007 catch data	James Canyon cutthroat	Burnout tiger	Burnout cutthroat
Total catch	126	176	8
Population Estimate	137	183	8
Chi Sq	0.033	0.019	0.443
Pop est Std error	6.373	4.142	0.866
Lower CI	126	176	8.0
Upper CI	150	191.16	10.048
Capture prob	0.712	0.800	0.800
Capture prob std error =	0.062	0.040	0.194
Lower CI =	0.590	0.720	0.342
Upper CI =	0.834	0.880	1.258

The tiger trout ranged in length from 6 to 16 cm in length (Figure 2). The modal tiger trout length was 9 cm, and the few cutthroat trout collected were also in this range. In comparison, the length frequency for the James Canyon cutthroat trout (Figure 1) included fish that were between 2 and 6 cm with a modal length of 4 cm. This suggests that either the cutthroat trout did not spawn in the stream in 2007 or that survival of age 0+ cutthroat trout was very low in the stream that year.

While the cutthroat trout are significantly declining in Burnout Creek, their numbers appear to be

recovering in James Canyon Creek. The decline in Burnout Creek appears to be a combination of low water levels in the last six years, the advent of whirling disease, and the addition of tiger trout into the stream. Future trends in James Canyon Creek will help decipher which factors are most important in the decline within Burnout Creek.

Figure 2. Length Frequency, Burnout Canyon Creek, 2007.



LITERATURE CITED

Moran, P. A. P. 1951. A mathematical theory of animal trapping. *Biometrika* 38:307-311.

Shiozawa, D. K. August, 2006. Estimates of the fall, 2004, cutthroat trout population densities in Burnout and James Canyon Creeks, tributaries to Electric lake, Huntington Creek drainage. Report to Canyon Fuel Company. Nebo Scientific, Inc. 4 pp.

Van Deventer, J. S. and W. S. Platts. 1985. A computer software system for entering , managing, and analyzing fish capture data from streams. USDA Forest Service Research Note INT-352. Intermountain Research Station; Ogden, Utah. 12 pp.

Zippen, C. 1956. An evaluation of the removal method of estimating animal populations. *Biometrics* 12:163-169.

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Canyon Fuel
Company, LLC.
Skyline Mine

A Subsidiary of Arch Western Bituminous Group, LLC.

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2008 Vegetation Report for Skyline Mine

The following seedlings were purchased from the Lone Peak Nursery in Draper Utah:

- Antelope Bitter Brush
- Basin Big Sage
- Rubber Rabbit Brush

Unfortunately, due to miscommunication between the mine and the nursery the plants were destroyed prior to being picked up. After the plants were destroyed the available planting options included 1) purchasing a limited number of large plants; or 2) planting double the number of plants in 2009 (increasing from approximately 300 plants to 600). When the options were discussed with DOGM biologist Mr. Joe Helfrich, he suggested conducting a vegetation survey to determine whether planting was still necessary.

Mt. Nebo Scientific conducted a survey of the existing vegetation cover based on the information and commitments listed in the Conveyor Bench Revegetation Plan located in Appendix Volume A-2 of the currently approved M&RP. Attached is email correspondence with Dr. Patrick Collins of Mt Nebo Scientific outlining the findings of the field survey. Although the final report is still in draft form, preliminary information indicates the prescribed vegetation cover has been achieved and annual planting is no longer necessary.



MT NEBO SCIENTIFIC, INC.

research & consulting

May 13, 2009

Gregg Galecki
CANYON FUEL COMPANY, LLC.
Skyline Mines
HC 35 Box 380
Helper, Utah 84526

RE: Skyline Mine Conveyor Revegetation Study

Dear Mr. Galecki:

This letter is in response to your questions regarding quantitative vegetation sampling that was conducted in Treatment Area No. 3 of at Skyline Mine's conveyor corridor.

The final report for this work is in progress, however, please note the following statements about the sample results.

- Forty (40) samples were taken to record total cover, cover by species, composition and frequency at the site using 'ocular methods' in September 2008.
- The dataset has been entered to a spreadsheet and computed.
- The mean total living cover (\bar{x}) was estimated at 54.25% with a standard deviation (Std.Dev.) of 13.16%.
- Nearly all of the species that have become established at this site to-date were "desirable" plant species such as shrubs and perennial forbs and grasses.

It is my understanding from recent conversations with you that the total living cover success standard for revegetation here was 20.00%. Clearly, the data show that this area has met (and exceeded) that standard.

A final report describing sample methodologies and results are forthcoming. Please call is you have questions or comments.

Sincerely,

Patrick D. Collins, Ph.D.
Biologist/Environmental Consultant



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2008 Raptor Report for Scofield Waste Rock Site Skyline Mine

Per commitments outlined in Section 2.10 of the currently approved M&RP, a previously used raptor nest located at the Scofield Waste Rock site was monitored for activity in the Spring of 2008. The nest was monitored for raptor activity on the following dates in 2008:

- March 18
- April 25
- May 16
- May 30
- June 17
- June 25

At no time during the above-listed dates were signs that the nest was being actively used by raptors in 2008. The re-allocation project was initiated with the mobilization of equipment on June 17, 2008.

No additional monitoring of the nest is scheduled in the future.

APPENDIX C

Legal Financial, Compliance and Related Information

Annual Report of Officers
As submitted to the Utah Department of Commerce

Other change in ownership and control information
As required under R645-301-110

CONTENTS

None – Submitted by V. Miller for all CFC Mines on 4/30/09

APPENDIX D

Mine Maps

As required under R645-302-525-270

CONTENTS

None – See Appendix B

APPENDIX E

Other Information

In accordance with the requirements of R645-301 and R645-302

CONTENTS

None