Final Report
MUDDY CREEK WATERSHED PROJECT

Project Number: 0N005

Project Sponsor
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9-15-05

Water quality related aspects of the Savery Creek Watershed Project were a cooperative effort between the Little Snake River Conservation District, Wyoming Department of Environmental Quality, and United States Environmental Protection Agency, Region 8.

Grant No. C9008630-00

Table of Contents

Addendum A……3

Appendix……36

Dry Cow Creek……59

Wild Cow Creek……72

Cow Creek……109

Cherokee Creek……146

Deep Creek……191

Deep Gulch……207

Muddy Creek at Baggs……241

Littlefield Creek……280

Muddy Creek at Lake Draw……292

Muddy Creek at Grizzly……306

Muddy Creek at Bridger Pass……318

McKinney Creek……330

McKinney Creek at Eagle……342

Little Muddy Creek……352

Upper McKinney Creek……361

Doty Mountain……370

Red Wash……380

Art Samples……388

Discharge……399

Upper Muddy Creek Watershed Project DRAFT……415

Addendum A
UPPER MUDDY CREEK FINAL MONITORING REPORT

9-15-05

Introduction to the report:

This report covers water column data and macroinvertebrate data during the years 1999-2003. However, it should be noted that noted that some data was not collected at all sites during this time frame. In addition, there is data that was not collected as a result in transition of personnel in the Rawlins-BLM office. Initial efforts in collection of data were done by both the LSRCD and the BLM. Several of the monitoring stations in the Upper Watershed were not operated by the BLM due to l change in personnel. For all the water quality data collected the Macroinvertebrate date collected by the LSRCD is the most comprehensive with the greatest continuity of all the data and parameters monitored.

Data collection and monitoring was comprised of three different components.

1. Photopoints do not quantitatively illustrate improvements in water quality. However, they do serve to demonstrate the effect of management changes on the landscape. In addition, photopoints do serve as supporting evidence that water quality may be impacted by changes in condition of the watershed as a whole
2. Main stem monitoring using remote sensors and stream gauging at 4 sites in the watershed. In order from the lowest most site moving upstream they were Dad, Reach 3, Bridger Pass, and McKinney Creek. (Please see attached map). Data collected at these sites includes the following six parameters: temperature, D.O., EC, pH, TDS, and turbidity. In addition, grab samples were collected at these sites periodically and sent to the Wyoming Water Quality Lab to develop and baseline of the water chemistry.
3. Grab sampling and laboratory analysis of intermittent tributaries of lower reaches of Muddy Creek to develop a baseline of natural background water chemistry.
4. Benthic macroinvertebrates were collected at 9 sites in the Watershed. Collection of macroinvertebrates was initially started on some sites as early as 1994 as part of the 319 project. Macroinvertebrate data provides the longest set of data collected in the watershed with many of the sites having eight years of data collected over years of monitoring. In the case of Loco Creek 10 years of data were collected at the same site over a period of eleven year

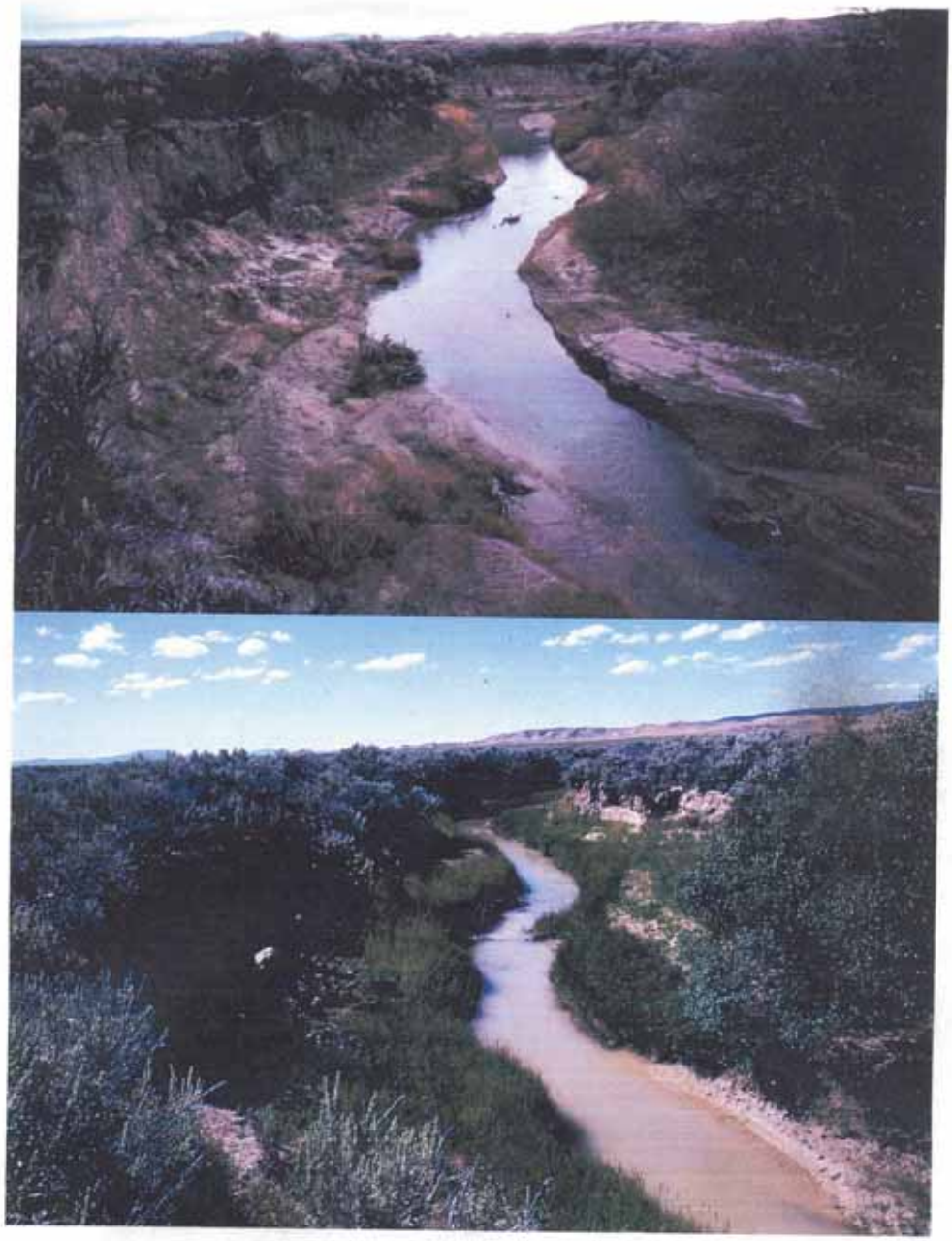
Photopoints

While numerous photopoints exist four sets are presented in this report representing three distinct segments of Muddy Creek and on of Little Field Creek which is one of the major tributaries to Muddy Creek in the upper watershed. Only four set of photopoints are presented however, they are representative of the results basin wide. While this report

only covers the period from 2000-2004 we have used the baseline year of 1989 as the first photograph in the series of before and after photographs.
Photopoint 1 (PP1) this site is west of state highway 789 approximately 2 miles above the Muddy Creek wetlands in the Doty Mountain grazing Allotment. Substantial deposition and channel narrowing has occurred at this site riparian vegetation has substantially increased and is trapping enormous quantities of sediment.
Photopoint 2 (PP2) is located at the lower reaches of the Muddy Creek Canyon near the old Washakie Stage Station on the Overland Trail. I t is located approximately seven air miles upstream from PP1 in the Doty Mountain grazing allotment. Similar to PP1 substantial amounts of sediment have been deposited and trapped on the stream banks by the robust riparian vegetation. Colonization of sand bar will at this site is apparent. The channel has narrowed and deepened also.
Photopoint 3 (PP3) is in the upper basin located above the confluence of Littlefield Creek in the Sulphur Springs Allotment. This site shows narrowing of the stream channel, through sediment deposition and trapping, increased herbaceous vegetation in both riparian and uplands and substantial increased vigor in the woody riparian vegetation present. The livestock trails have almost completely held.
Photopoint 4 (PP4) is on Littlefield Creek ½ mile upstream from the confluence with Muddy Creek. Similar to Muddy Creek substantial sediment trapping and bank building has occurred at this site. Increase herbaceous and woody vegetation cover and vigor is apparent in the riparian area and increased herbaceous cover is evident in adjacent uplands.

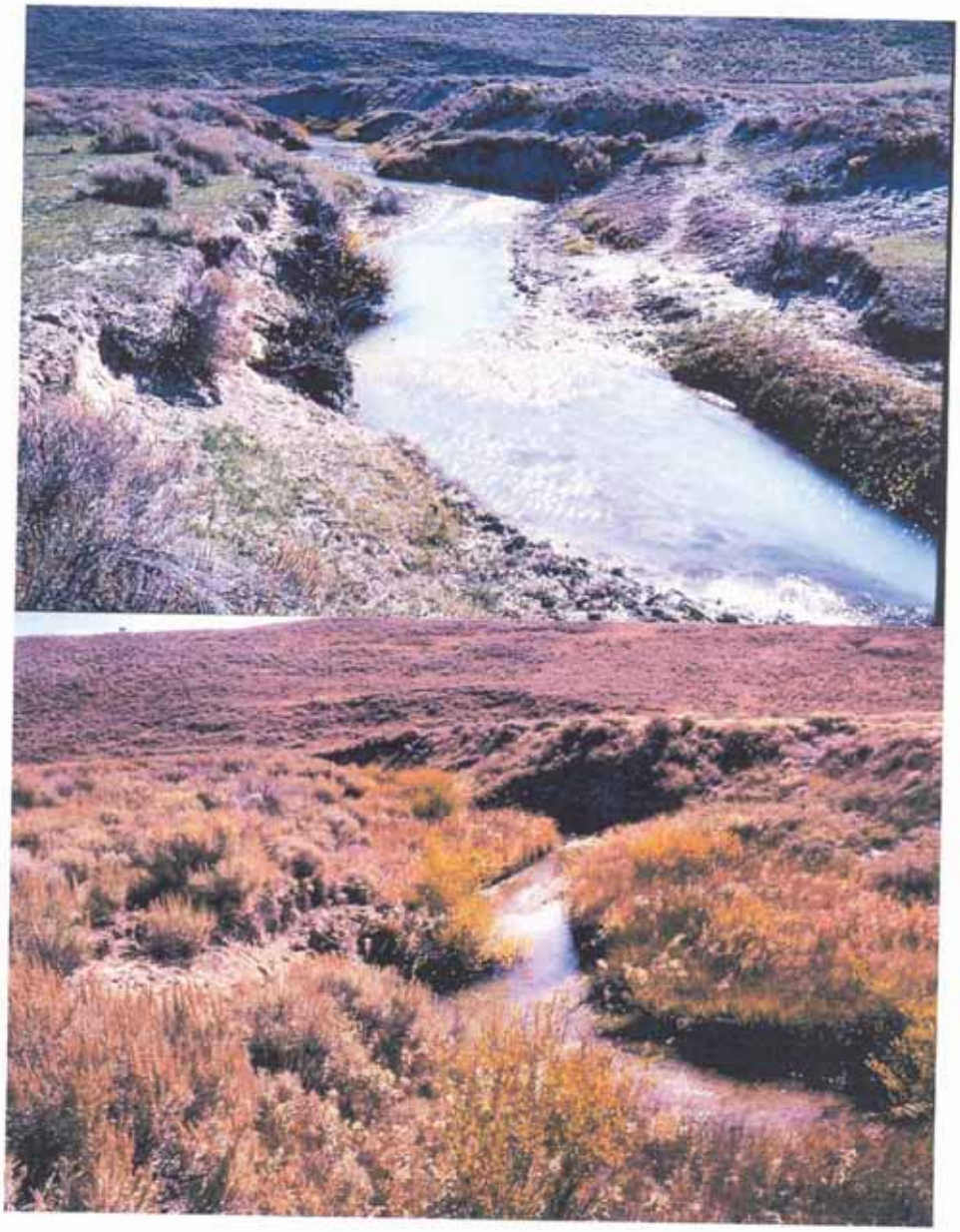
Photopoints definitively show improvements in riparian zones, uplands, stream channel morphology, and general condition of the watershed. As previously stated photopoints can not quantitatively demonstrate improvements in water quality. However, as is the case with Muddy Creek it is apparent that millions of tons of sediment have been trapped in riparian zones as a result of this 319 project. The photographs are irrefutable!

Muddy Creek 89 and 04 (PP1)



Muddy Creek 89 and 04 (PP2)

Muddy Creek 89 and 03 (PP3)



Littlefield Creek 89 and 03 (PP 4)

Main Stem Monitoring

Main stem monitoring consisted of the use of Hydrolab multiprobes. The probes collected data on 7 different parameters. The parameter of most interest is turbidity. Turbidity is measure of light reflectance through a water column, the unit of measure is in NTU's. The more opaque or darker the water due to suspended sediment the more reflectance. Turbidity can be used as a surrogate method to monitor trend in amount of suspended sediment in a water column. While it does not provide a quantitative estimate of the amount of suspended sediment it can show over repeat measurements or over time weather suspended sediment is increasing or decrease in the water. Data collection consisted of the probes recoding the data on an hourly basis. We then average the data for a daily average for use in this report.

Dad station and Reach 3.

The reach 3 monitoring site was approximately 2 miles below the sate highway 789 crossing. This site represent a culmination of all tributaries above the Muddy Creek wetlands segment and encompasses approximately 275,000 acres in the watershed above this point. The Dad, WY site is immediately below the Muddy Creek wetlands and approximately 7 miles downs stream of the Reach 3 site. One of the task for this 319 project was the construction, enhancement, and protection of beneficial wetlands between these two monitoring station. Data was concurrent gathered at both sites from 2000 – 2003. Results from the data are striking. In all four year the turbidity levels were 30% – 60% lower at Dad than at Reach 3. This clearly demonstrates a substantial reduction in the total amount of suspended sediment at the Dad site.

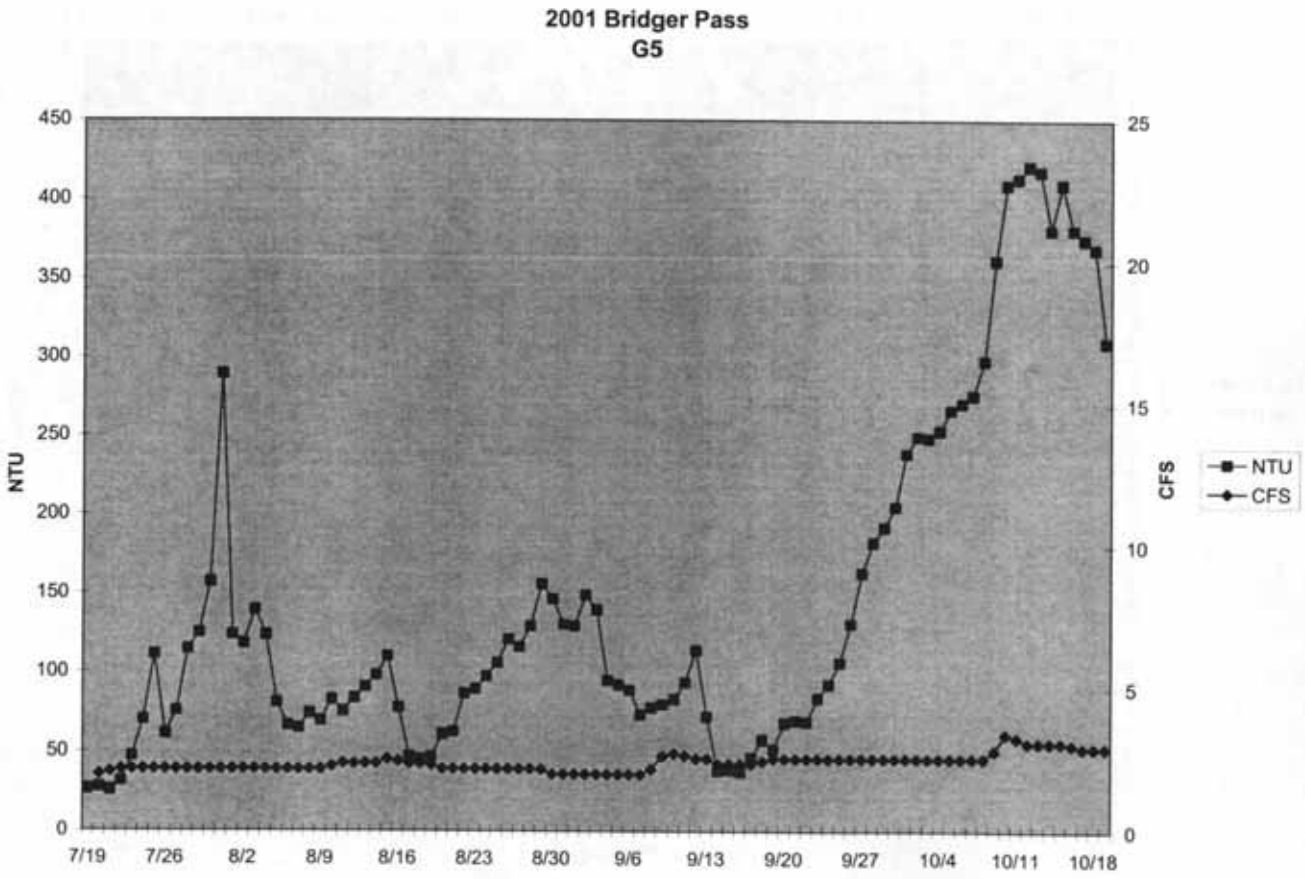
Bridger Pass

This site is situated at the head of the Muddy Creek Canyon and represent the total of all the upper tributaries. This site is located ¼ mile below the confluence of McKinney Creek. Below this confluence Muddy Creek becomes a 3rd order stream. The BLM was responsible for installing and maintaining this site but due to personnel changes no data was collected in 1999 through the early part of 2001. BLM recommitted to maintaining the site in 2002 but did not follow through and no data was collected. In July of 2001 the LSRCD resumed the operation of this site. Data was collected in 2001, 2003, and 2004. While the data is sporadic it does show elevated turbidity in September of 2001 and 2003 that coincides with when cattle were allowed into this pasture. Data from 2004 indicate little to no lag time between rain storm related events and spikes in turbidity.

McKinney Creek

This site is approximately one mile upstream of the confluence with Muddy Creek. The major purpose of this site was to partition the upper watershed out. McKinney Creek is roughly equal in size and amount of discharge as Muddy Creek. This is evident when comparing the discharge rates on any given data in the 2004 data for both McKinney Creek (G-9) and the Bridger Pass (G-7) site. Data from 2004 at both sites also demonstrates that much of the suspended sediment at the Bridger Pass site is actually coming from McKinney. As example on 8-5-04 turbidity spiked at approximately 310

NTU's on McKinney Creek but was only 375 NTU's at the Bridger Pass site 1 ¼ miles down stream after a rain storm related event. This pattern is evident on at least the three other times during 2004. The site also shows to a lesser degree the effect of isolated storm events in one part of the basin but not the other as shown on 7-27-04 were flow showed a modest peak at Bridger Pass but nothing on McKinney Creek.
While the data does not afford the determination of changes in the water column it does provide evidence of grazing management and a better understanding of the watershed and were to focus additional efforts to remediate elevated levels of sediment in Muddy and McKinney Creek.


2001 Bridger Pass
G5
NTU
CFS
450
400
350
300
250
200
150
100
50
0
25
20
15
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5
0
7/19
7/26
8/2
8/9
8/16
8/23
8/30
9/6
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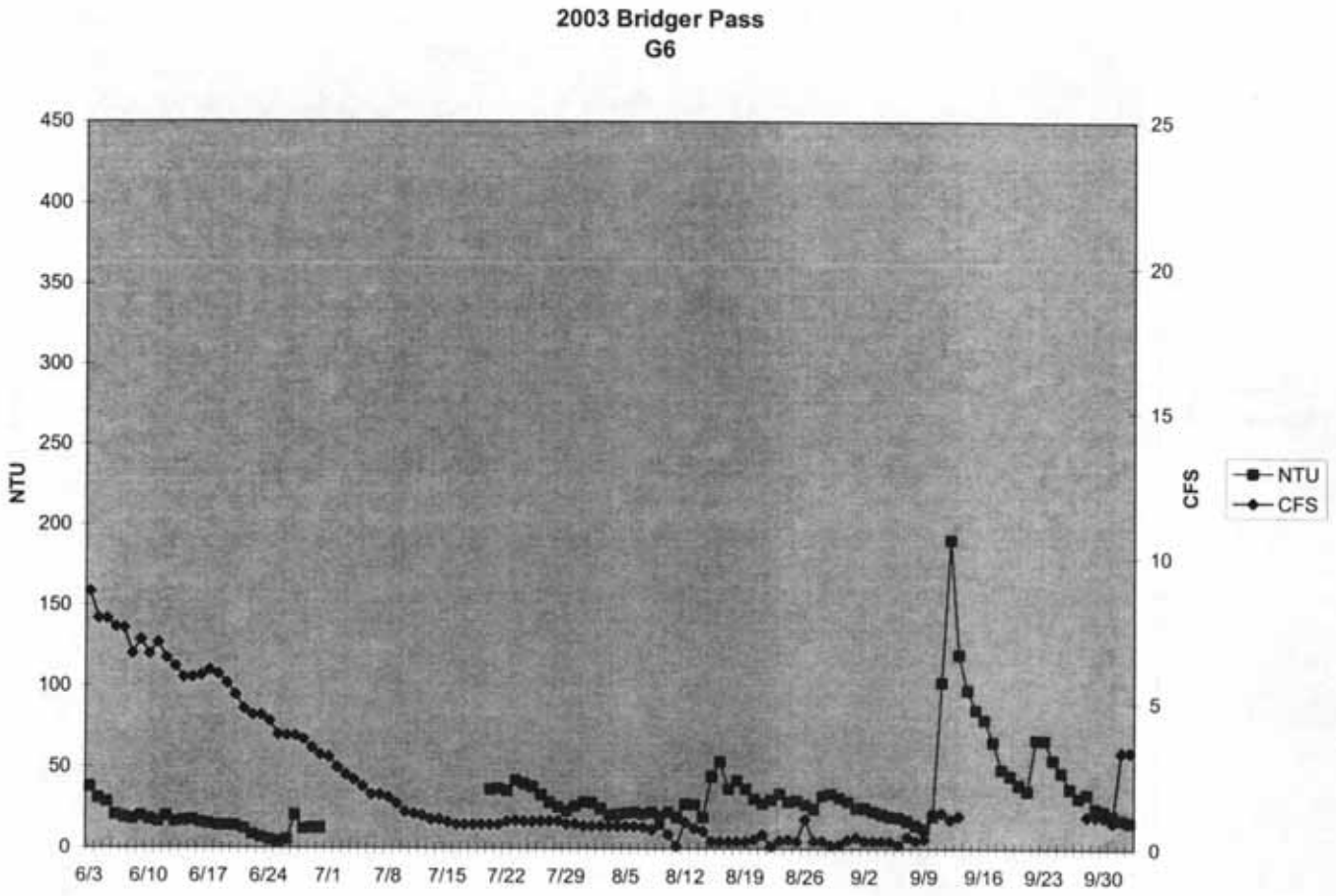
9/20
9/27
10/4
10/11
10/18
NTU
CFS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CFS
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6/3
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7/1
7/8
7/15
7/22
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8/12
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8/26
9/2
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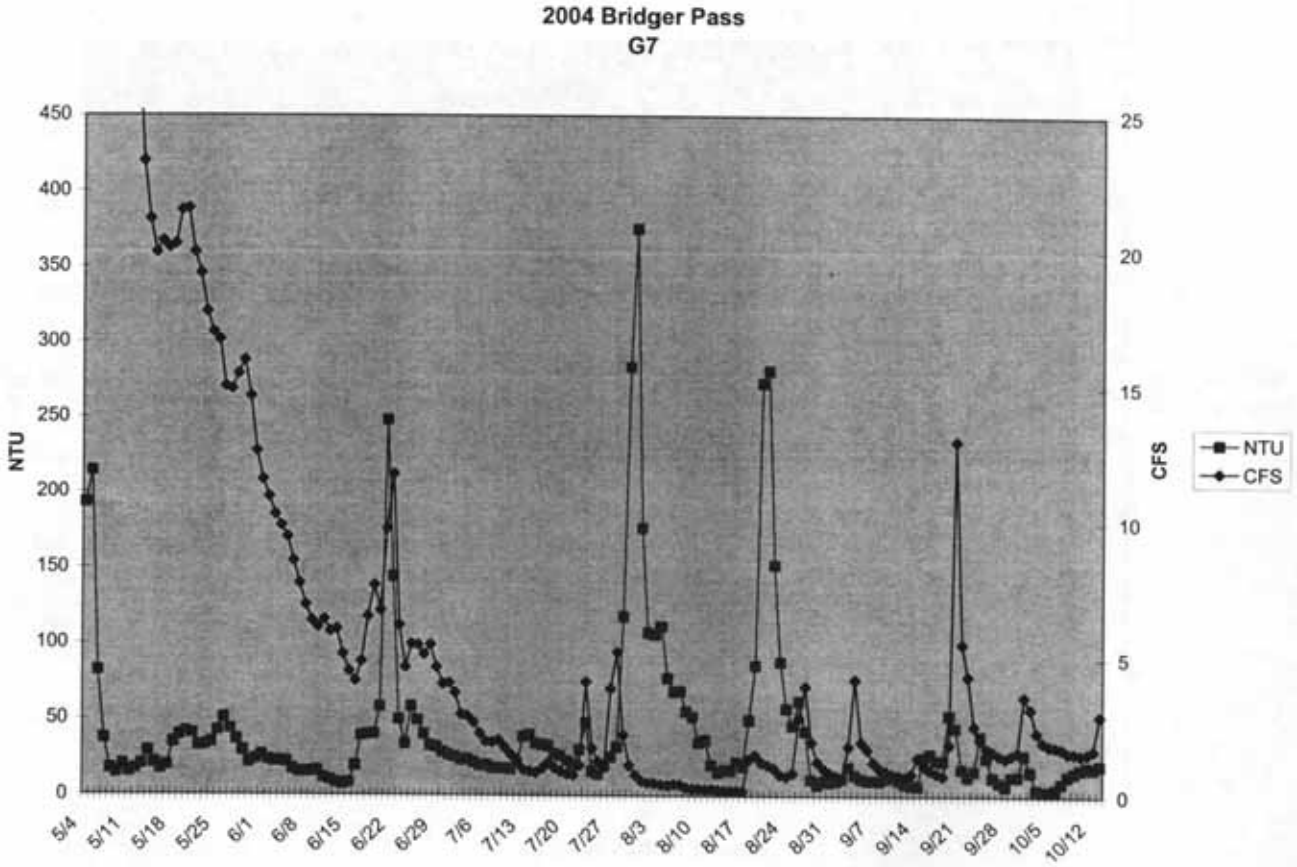
9/23
9/30
NTU
CFS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NTU
CFS
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400
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250
200
150
100
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5/4
5/11
5/18
5/25
6/1
6/8
6/15
6/22
6/29
7/6
7/13
7/20
7/27
8/3
8/10
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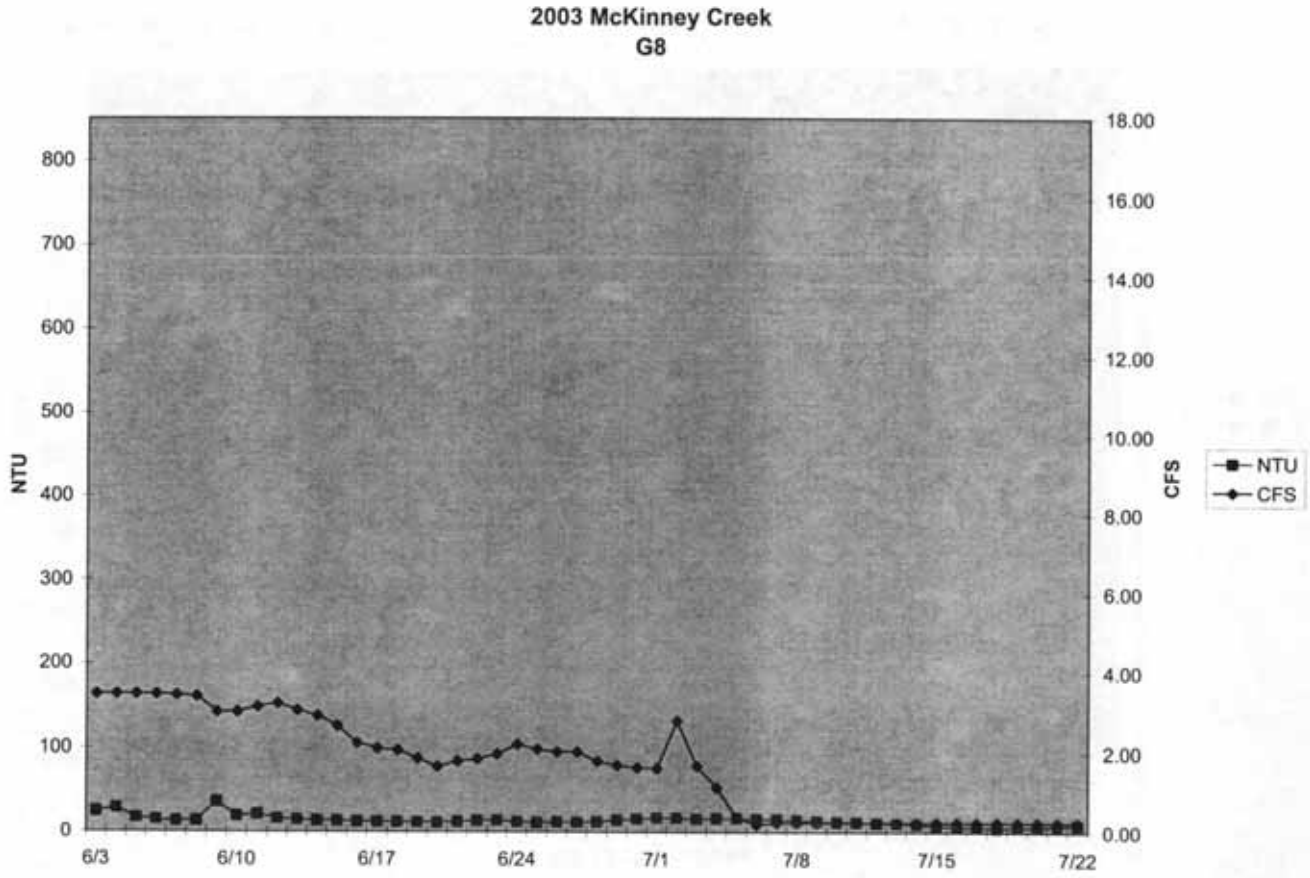
9/7
9/14
9/21
9/28
10/5
10/12
NTU
CFS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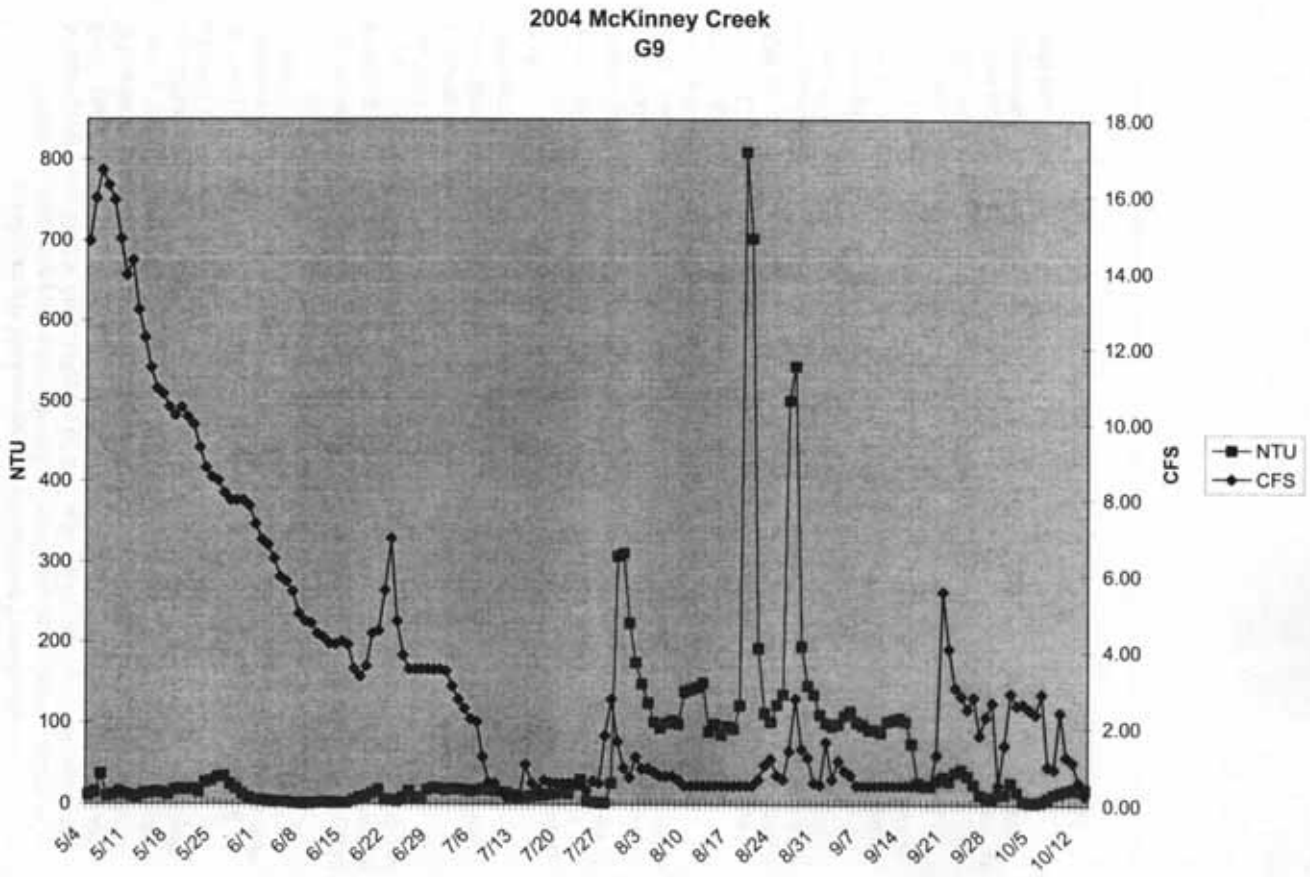
NTU
CFS
800
700
600
500
400
300
200
100
0
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
6/3
6/10
6/17
6/24
7/1
7/8
7/15
7/22
NTU
CFS


2004 McKinney Creek
G9
NTU
CFS
800
700
600
500
400
300
200
100
0
18.00
16.00
14.00
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10.00
8.00
6.00
4.00
2.00
0.00
5/4
5/11
5/18
5/25
6/1
6/8
6/15
6/22
6/29
7/6
7/13
7/20
7/27
8/3
8/10
8/17
8/24
8/31
9/7
9/14
9/21
9/28
10/5
10/12
NTU
CFS

Grab Sample Monitoring of Intermittent Tributaries

Grab samples were primarily collected on tributaries on the lower reaches of Muddy Creek from Dad to the confluence of the Little Snake. All the tributaries in the lower Muddy Creek basin are intermittent routinely drying up in early to late summer. While the tributaries are intermittent they can provide a substantial amount of the total flow to Muddy Creek in the lower basin. Segregating the basin from upper and lower result in approximately 280,000 acres above Dad. For the boundaries of the 319 project area there are approximately another 220,000 acres in the lower. The project area included all the tributaries arising on the eastern side of Muddy Creek. And grazing allotments on the west side that encompassed or were directly adjacent to the main stem of Muddy Creek.

Because of the intermittent nature of the tributaries they did not warrant the expenditure in capital and or time for the use of remote sensing multiprobes. Rather grab sampling was done to gain information on the water column of these tributaries. Because the area is on the verge of substantial coalbed methane development the background SAR and TDS fro each of the tributaries was determined. The six tributaries monitored included Dry Cow, Deep Gulch, Cow, Wild Cow, Cherokee, and Deep Creeks. For discussion in this document all references for TDS and EC will be from field sampling. However, the laboratory samples are included for comparison.

SAR

Across all sample tested on all the tributaries among all years the lowest reading was 1.1 on Cherokee Creek and the highest was 23.7 on Cow Creek. The tributaries varied significantly as to their levels of SAR in the water column. In order of least SAR to the highest were Cherokee Creek, Deep Gulch, Deep Gulch, Dry Cow Creek, Cow Creek, and Wild Cow Creek. Both Cow and Wild Cow Creek had several dates in which SAR in the water Column exceeded the state standard of 8.

TDS & EC

TDS ranged from a low of 765 on Cow Creek to high of 2150 on Deep Creek. TDS meet state standards on all tributaries at all sampling dates. Similar to SAR there was considerable variability among tributaries suggesting differences in geologic parent material and soils. As would be expected TDS and EC increased as flows decrease. Whereas EC is a function of TDS and level TDS in the water column is a function of stream discharge this would be expected. EC is an estimate of salts in the water column and while levels detected are not exceeding any numeric standards it is never the less an important measure in this watershed because of the Colorado River Salinity control Forum and the impending development of CBM in this basin. Not only do surface discharges of CBM water have the potential to elevate the salt loads, the construction and development of this field through surface disturbing activities could also increase salt loads into the system.

Dry Cow

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
4/11/01	2880	1840	3000	2420	6.115
4/16/02	2150	1370	2210	1692	4.4
4/3/03	No Flow				

Cow Creek

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
3/19/01	2248	1437	2300	1610	7.14
4/11/01	2440	1560	2500	1920	5.239
5/2/01	2483	1588	2500	1840	5.401
6/5/03	2853	1824	2800	2130	6.753
					6.13
3/26/02	1196	765	1240	996	12.86
4/2/02	1480	947	1510	1032	3.03
4/16/02	2140	1370	2200	1520	5.31
5/13/02	3310	2120	3580	2350	10.5
					7.93
3/31/03	2250	1440	2200	1630	5.66
4/15/03	2410	1540	2500	1810	23.71
5/13/03	2590	1650	2600	1740	9.17
6/2/03	n/a	n/a	3950	2580	12.84

Deep Gulch

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
4/11/01	1940	1240	2000	1500	2.523
5/2/01	2026	1296	2100	1540	2.767
6/5/01	2300	1470	2300	1776	3.345
6/20/01	n/a	n/a	2300	1570	3.406
					3.01
4/2/02	1375	880	1410	992	2.22
4/16/02	1860	1190	1910	1364	2.71
5/13/02	2390	1530	2400	1770	3.15
					2.69
3/31/03	2210	1410	2200	1680	2.66
4/15/03	2430	1550	2500	1880	3.84
5/13/03	2390	1530	2400	1680	3.53
					3.34

Wild Cow Creek

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
4/11/01	2520	1610	2600	1880	5.9
5/2/01	2497	1597	2500	1780	8.445
6/5/01	2650	1695			
6/20/01	n/a	n/a	3520	2480	17.371
					10.57
4/2/02	1515	968	1550	1064	4.85
4/16/02	2980	1910	3050	2088	9.67
5/13/02	2999	1917	3010	2140	9.84
					8.12
3/31/03	2460	1570	2400	1640	6.15
4/15/03	2500	1600	2600	1800	8.03
5/13/03	2520	1610	2500	1720	7.6
6/2/03	n/a	n/a	2800	1830	13.47
					8.81

Cherokee Creek

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
4/16/01	1410	902	1400	1050	1.40
5/2/01	1345	861	1400	976	1.29
6/5/01	1307	836			
6/20/01	1291	826	1300	928	1.18
8/15/01	1368	875	1340	964	1.29
					1.29
4/3/02	1272	814	1290	904	
4/17/02	1510	963	1550	1132	1.45
5/15/02	1489	952	1480	1060	1.59
6/18/02	1433	917	1500	1052	1.57
8/14/02	1550	990	1590	1150	1.76
					1.59
3/31/03	1345	860	1300	900	1.5
4/15/03	1368	875	1400	992	1.41
5/13/03	1271	813	1200	844	1.14
6/2/03	n/a	n/a	1300	916	1.14
					1.3

Deep Creek

Date	Grab		Lab		SAR
	SpCond æS/cm	TDS g/l	SpCond æS/cm	TDS g/l	
4/11/01	2140	1370	2200	1760	4.03
5/2/01	3150	2020	3200	2660	5.91
					4.97
4/2/02	1980	1270	2000	1520	3.92
4/17/02	1252	801	1300	844	2.88
					3.4
4/1/03	3370	2150	3400	2350	4.99
4/15/03	2000	1280	2100	1530	3.98
					4.49

Benthic Macroinvertebrate Data and Discussion

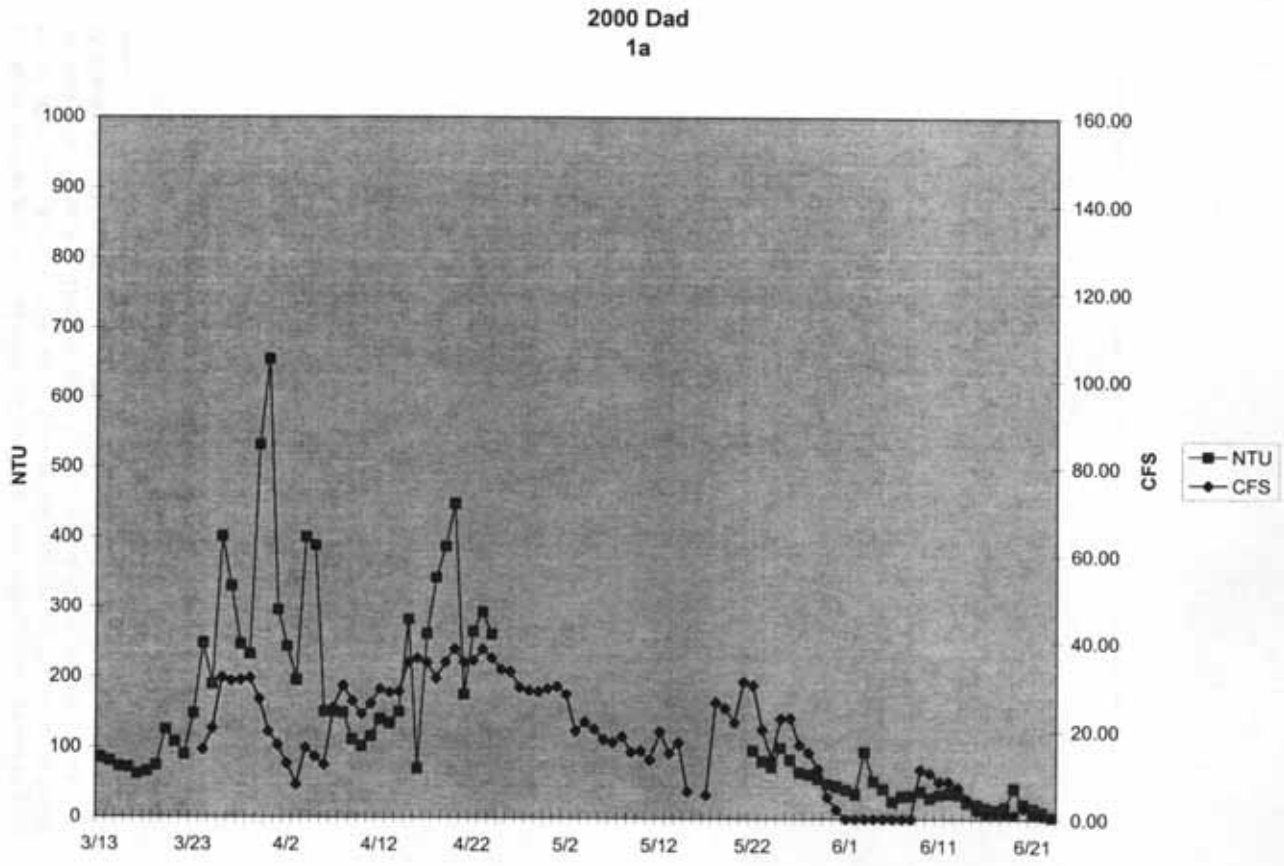
Benthic macroinvertebrates are important elements of water quality evaluations because 1) they live in, on, or near streambed sediments; (2) have relatively long life cycles; and (3) are relatively sessile compared with larger organisms, such as fish. This combination of characteristics ensures that benthic invertebrates (1) respond to natural and anthropogenic environmental conditions that physically or chemically alter streambed sediments; (2) integrate effects over a year; and (3) characterize effects over a relatively small spatial scale (in contrast with fish, which may travel long distances). These factors make benthic invertebrates well suited for use in assessing site-specific water quality and comparing spatial patterns of water quality at multiple sites, and for integrating effects up to a year after a pollution or disturbance event.

The occurrence of benthic invertebrates in a stream is a response to natural and anthropogenic influences. Rivers naturally change as they flow downstream. Riparian vegetation conditions, light, temperature, hydraulics, and substrate composition all change in response to these environmental changes, consequently benthic invertebrate's community's change. Thus each location in a river has a range of environmental conditions that dictate which invertebrates species are found there.

Numerous parameters and indices indicative of the invertebrate community are used to evaluate water quality. Invertebrate **taxa richness** is a component of community structure and stream health based on the number of distinct taxa. Taxa richness normally decreases with decreasing water quality. In some situations organic enrichment can cause an increase in the number of pollution tolerant taxa. **EPT taxa richness** is a summary of taxa richness and abundance among the insect orders Ephemoptera, Plecoptera, and Trichoptera (EPT). These orders are commonly considered sensitive to pollution. **Percent taxon or family dominance,** an invertebrate community dominated by a single taxon or several taxa from the same family suggests environmental stress. **Shannon Diversity Index,** ecological diversity is a measure of community structure defined by the relationship between the number of distinct taxa and their relative abundance. The **Hisenhoff Biotic Index (HBI)** is a biotic indices that uses the indicator taxa concept. HBI summarizes the overall pollution tolerance of the taxa collected. This index has been used to detect nutrient enrichment, high sediment loads, low dissolved oxygen, and thermal impacts. It is best at detecting organic pollution. The number of **long lived taxa** and the number of **clinger taxa** have been found by Karr and Chu (1998) to respond negatively to human disturbance. **Clinger taxa** cling to the top of rocks and are thought to be reduced by sedimentation or abundant algal growths. **Long lived taxa** are those taxa that typically have 2-3 year life cycles. Disturbances and water quality and habitat impairments typically reduce the number of long-lived taxa.

Thirty one biometrics parameters were evaluated (Table 3) to determine trends in the invertebrate community at each of the eight sites in the Muddy Creek Watershed. Impacts of the drought were apparent especially in the lower monitoring sites. This was very apparent at the Doty Mountain site. Trend at most sites showed improvements from 1994,1996 through 2000 when most sites exhibited a declining trend and then a rebound in 2004. While there was a decline in high quality invertebrate parameters associated with the drought, with the accept ion of the McKinney Creek site, all sites exhibiting this trend still indicated higher quality than the initial dates. This scenario was less apparent at the highest sites were stream hydrology and temperature are driven by springs. All of the

tributaries and the main stem of Muddy Creek arise from under ground springs at their source. The closer the monitoring site to these springs the less apparent or no impact of the drought was observed. This was apparent at the Muddy Creek Site and Upper McKinney site were water quality continued to improve even during the worst drought years.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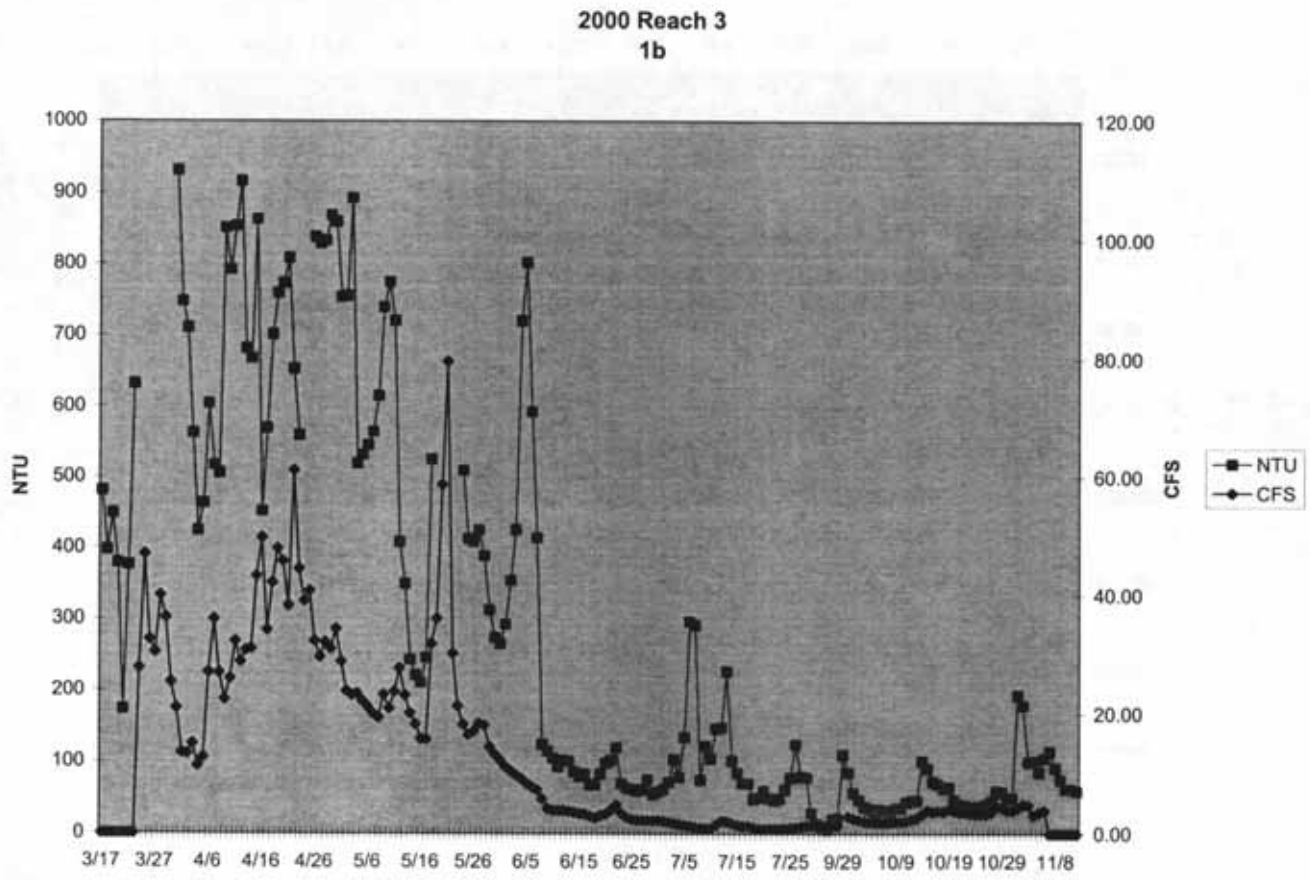
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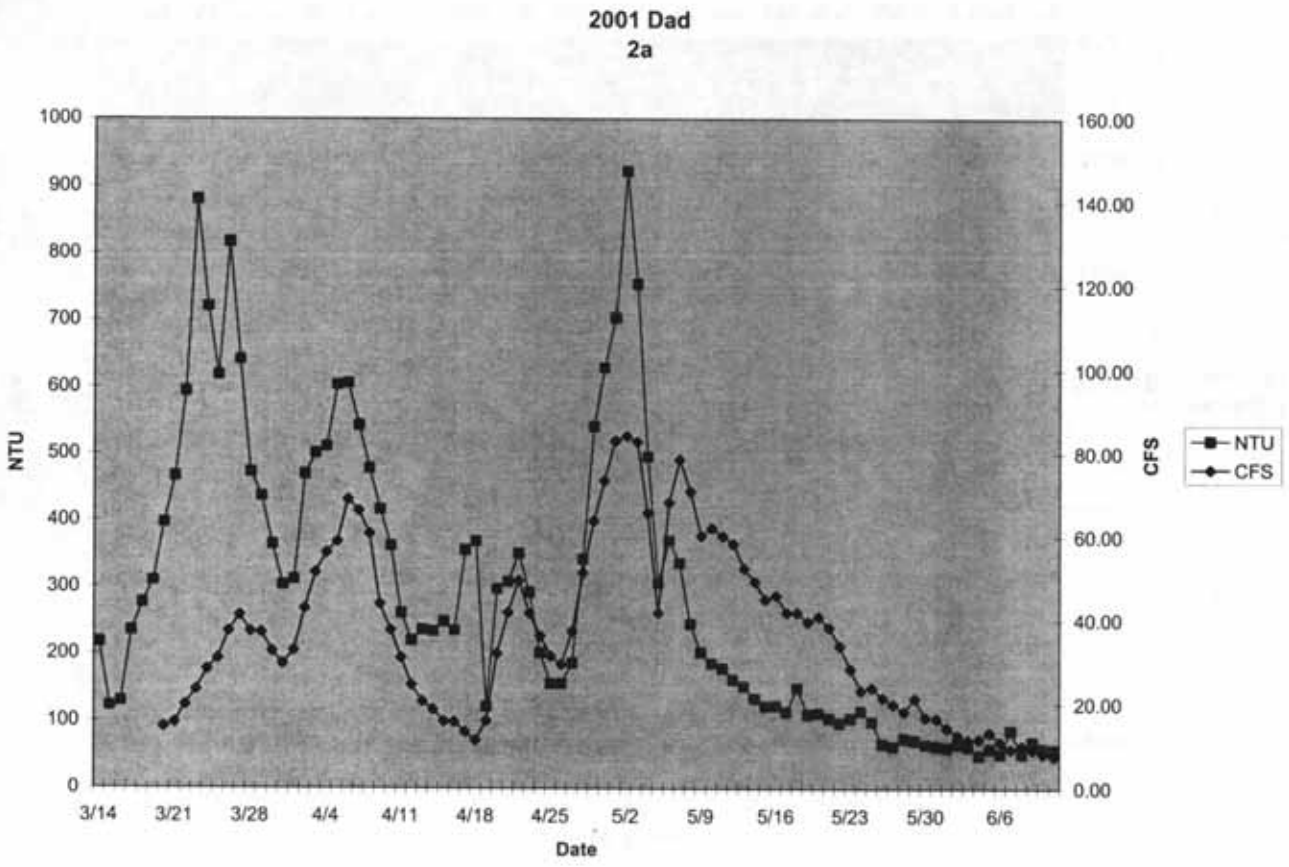
NTU
CFS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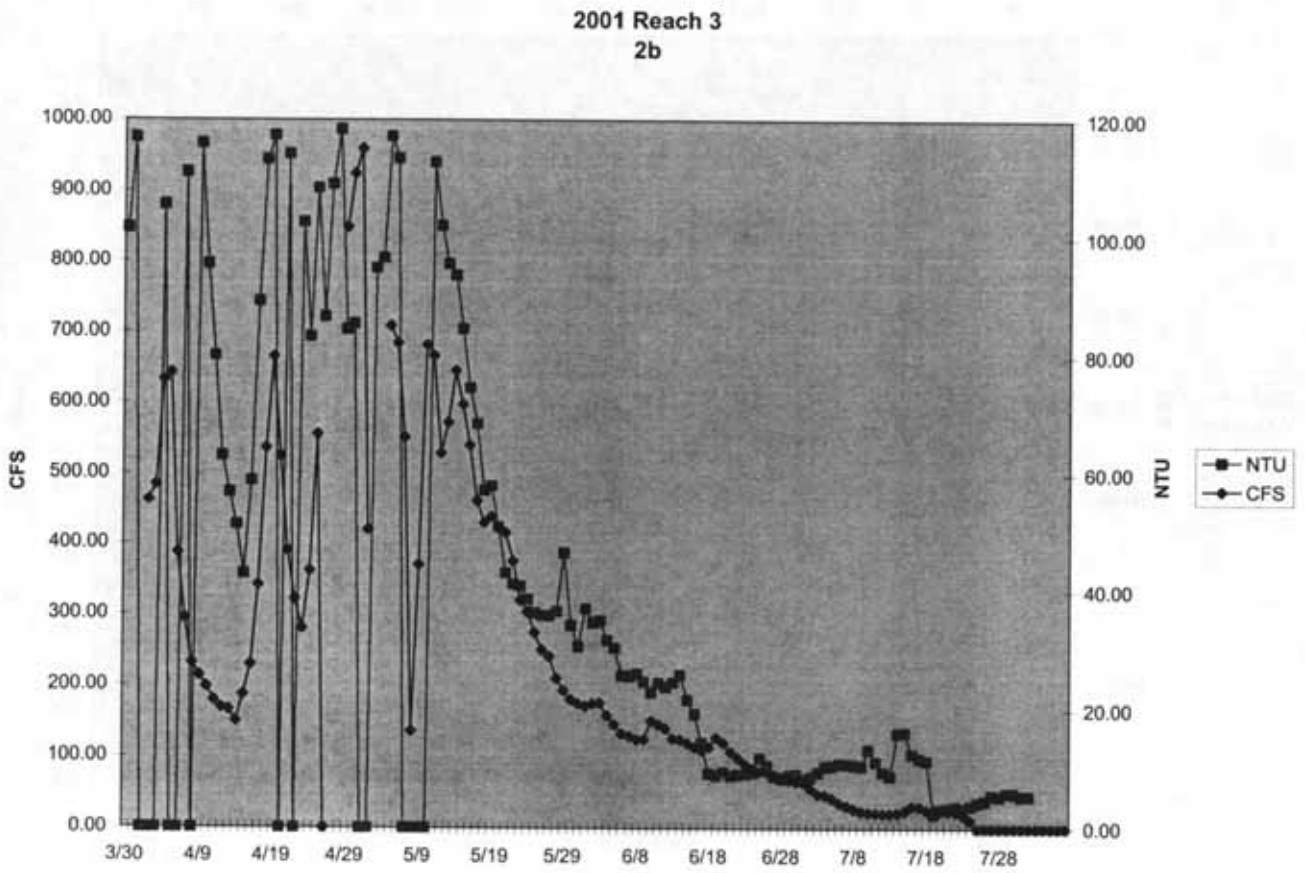
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NTU
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60.00
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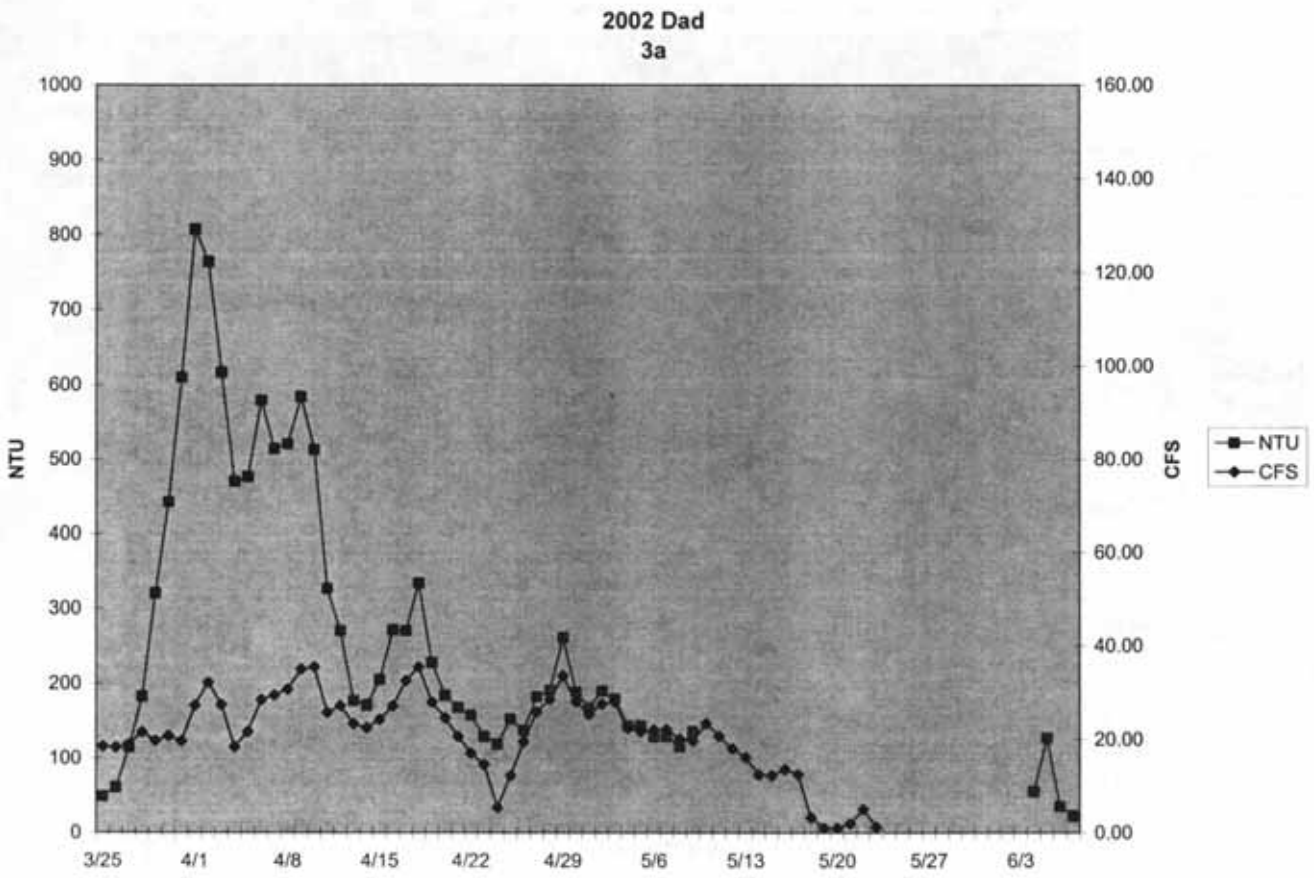
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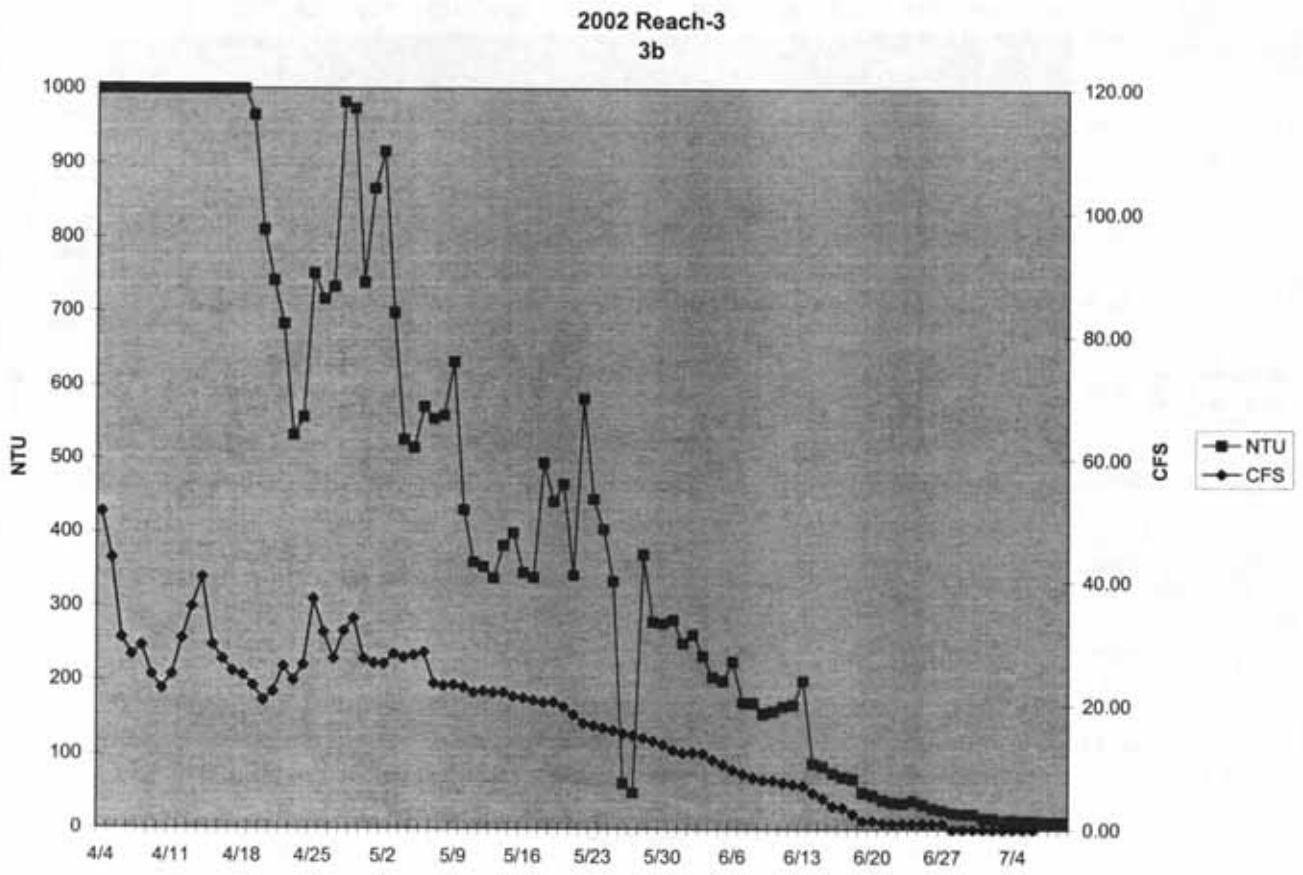
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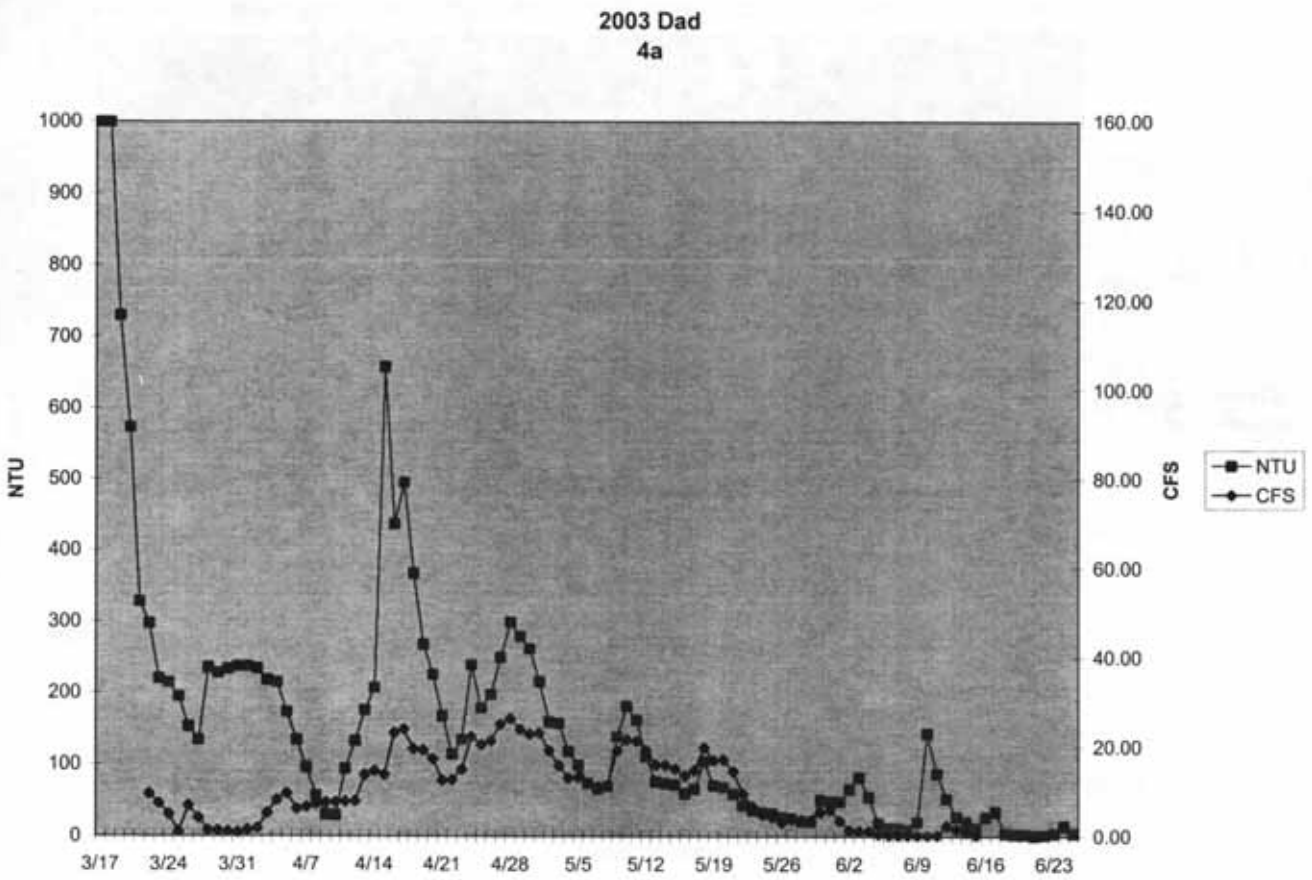
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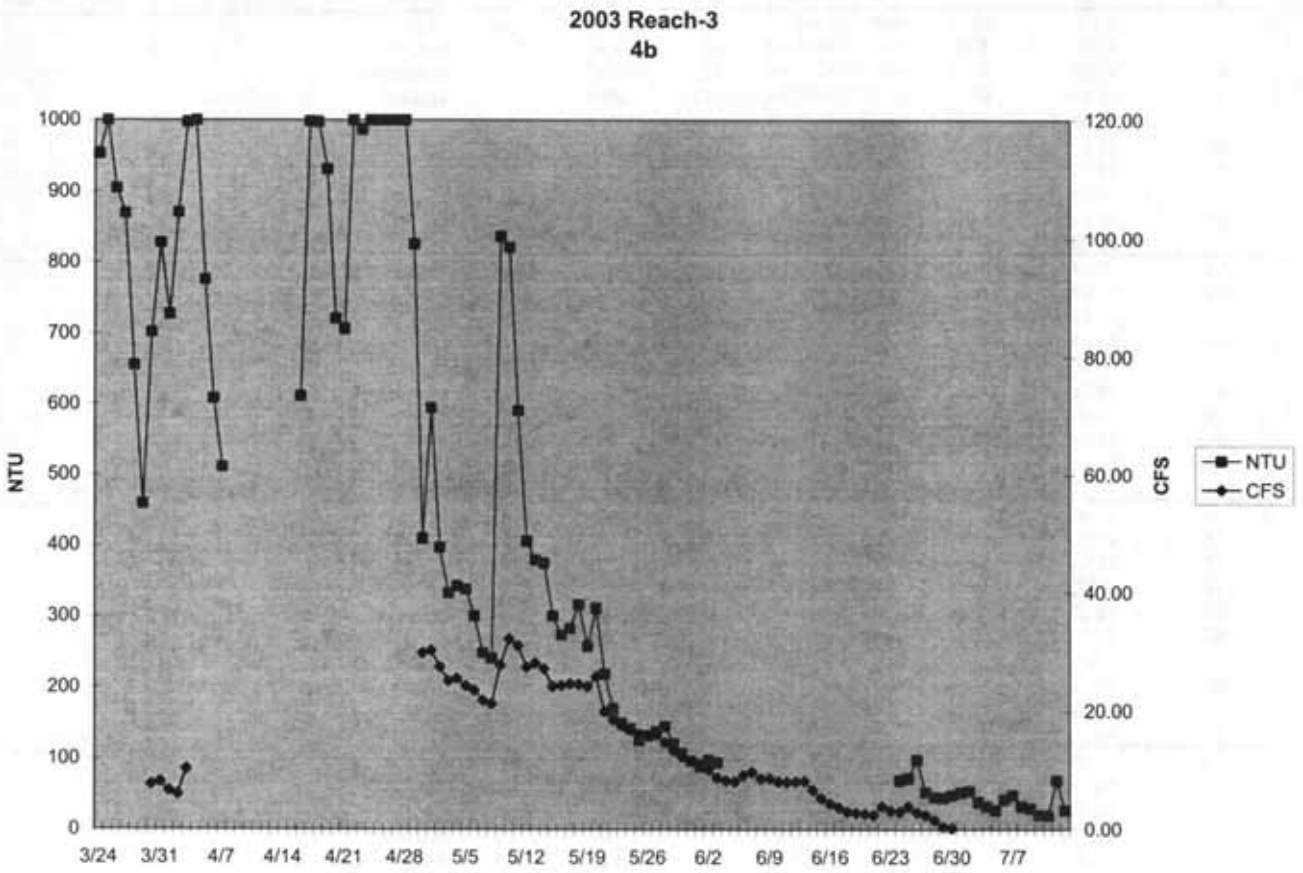
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MUDDY CREEK (TABLE 3)

Stream Name	Station #	Date	Total Abundance	EPT abundance	# of families	Dominant family	Dom. Family abundance	Dom. Family % contribution	Total taxa richness
McKinney Creek	AQMAC-00	9/20/96	194	14	7	Elmidae	115	59.28	11
		10/7/97	2518	1367	20	Hydropsychidae	806	32.01	33
		10/8/98	1247	726	22	Hydropsychidae	373	29.91	30
		9/30/99	1103	574	19	Elmidae	288	26.11	32
		9/20/00	631	102	18	Chironomidae	327	51.82	29
		9/25/01	5463	1132	24	Chironomidae	3211	58.78	38
		9/23/02	168	3	8	Chironomidae	137	81.55	11
		9/24/04	1805	89	17	Chironomidae	1230	68.14	28
Littlefield Creek	AQMAC-02	8/4/94	853	430	6	Tricorythidae	512.6	57.84	24
		9/6/96	5151	1903	24	Chironomidae	1509	29.3	37
		8/13/97	2922	1767	24	Baetidae	642	21.97	36
		10/8/98	3956	1616	20	Elmidae	1701	43	29
		10/5/99	5738	3351	19	Elmidae	1390	24.22	33
		9/27/00	11417	4607	15	Chironomidae	2996	26.24	27
		9/25/01	11844	6752	21	Leptohyphiae	3470	29.3	38
		9/24/02	21659	13471	17	Hydropsychidae	3533	16.31	32
		9/23/03	6118	334	20	Elmidae	3707	35.01	41
		9/24/04	5003	3064	23	Leptohyphiae	1292	25.82	40
Muddy Creek	AQMAC-03	8/4/94	982	43	9.3	Elmidae	727.6	71.79	10
		9/6/96	2780	376	16	Elmidae	1448	52.09	22
		10/16/97	6806	937	14	Chironomidae	3731	54.85	18
		10/9/98	7162	735	16	Elmidae	2781	38.83	21
		10/6/99	7283	775	18	Chironomidae	3472	47.67	24
		9/28/00	8003	445	14	Elmidae	3128	39.09	23
		9/26/01	22372	2881	15	Chironomidae	10535	47.09	28
		9/25/02	7963	419	19	Elmidae	3650	45.84	28
		9/24/03	10589	334	20	Elmidae	3707	35.01	36
		9/29/04	13357	1929	14	Elmidae	5352	40.07	25
Bridger Pass	AQMAC-05	8/8/94	634.3	577	5	Tricorythidae	333.3	52.27	7
		9/20/96	7272	5032	24	Hydropsychidae	4473	61.51	33
		10/7/97	1627	1437	13	Hydropsychidae	1345	82.67	19
		10/8/98	907	472	24	Chironomidae	269	29.66	32
		10/5/99	1005	730	23	Hydropsychidae	3149	42.01	34
		9/21/00	11174	3197	14	Chironomidae	5534	49.53	26
		9/25/01	7496	4300	22	Hydropsychidae	3149	42.01	36
		9/23/02	4140	2580	18	Hydropsychidae	2212	53.43	30
		9/23/03	1723	910	25	Hydropsychidae	685	39.76	38
		9/23/04	15778	6067	24	Hydropsychidae	3724	23.6	42
Cherokee Creek	CHERO-1	9/15/99	1969	643	11	Gammaridae	543	27.58	19
		8/8/00	2837	183	16	Gammaridae	1308	46.11	27
		8/15/01	2809	231	12	Gammaridae	887	31.58	25
		8/14/02	5431	291	14	Elmidae	2630	48.43	21
MC @ Grizzly	AQMAC-11	8/12/94	1323	487	9	Elmidae	731	50.85	11

		9/6/96	5498	2548	24	Elmidae	2108	38.34	34
		10/10/97	3893	1190	17	Elmidae	1319	34.65	28
		10/9/98	4520	2238	18	Chironomidae	1205	26.66	24
		10/6/99	8853	3880	21	Chironomidae	2120	23.95	33
		9/26/00	11296	3902	18	Elmidae	5859	51.87	28
		9/26/01	22283	16171	16	Leptohyphiae	11180	50.17	25
		9/25/02	43159	22960	19	Leptohyphiae	13545	31.38	30
		9/25/03	20087	8237	21	Elmidae	8645	43.04	36
		9/29/04	10775	3510	20	Elmidae	3628	33.67	36
Doty Mountain	DTMT-1	11/11/94	647	62	15	Simuliidae	398	61.51	19
		12/1/95	1608	539	21	Chironomidae	763	47.45	30
		10/7/96	513	39	7	Chironomidae	254	49.51	10
		11/14/97	1846	948	21	Chironomidae	635	34.4	32
		11/13/98	4473	1198	15	Chironomidae	2973	66.47	24
		11/15/99	5711	2175	20	Chironomidae	3028	53.02	32
		10/1/01	931	652	12	Hydropsychidae	411	44.15	19
		9/30/02	1385	48	12	Chironomidae	1040	75.09	22
		9/29/03	47	0	5	more than one	13	27.66	7
		10/4/04	3265	143	14	Simuliidae	1444	44.23	22
Little Muddy Creek	LIMUD-1	9/18/00	7634	3691	19	Elmidae	3317	43.45	33
		9/10/01	7575	4749	21	Capniidae	2353	31.06	33
		9/11/02	13167	6812	24	Elmidae	3174	24.11	42
		9/25/03	18403	9769	21	Elmidae	5167	28.08	36
		9/14/04	10658	4255	23	Elmidae	3459	32.45	32
McKinney Creek @ Eagle	MCEAGLE-1	9/19/00	7377	3296	29	Chironomidae	2057	27.88	46
		9/11/01	5495	4432	18	Hydropsychidae	32.89	59.85	27
		9/17/02	5435	1013	23	Chironomidae	2401	44.18	38
		9/15/03	2369	319	28	Elmidae	381	16.08	41
		9/15/04	6153	3808	27	Hydropsychidae	1654	26.88	39
McKinney Creek Upper	UPMCK-1	9/18/00	7368	3778	15	Elmidae	3073	41.71	23
		9/10/01	7544	3422	24	Elmidae	2326	30.83	43
		9/11/02	13646	9242	21	Leptohyphiae	3641	26.68	35
		9/16/03	15368	8026	21	Elmidae	5098	33.17	37
		9/14/04	7022	3868	22	Elmidae	2264	32.24	42

EPT[illegible]a richness	Shannon diversity	Simpson diveristy	evenness	HBI	Indication	BCI	Indication	Shredders	Scrapers	Collector filterers	Collect[illegible] gatherers
2	1.813	0.220	0.693	3.65	Slight organic enrichment	58	Poor	18	18	9	9
18	2.566	0.131	0.550	4.35	Moderate organic enrichment	60	Poor	15	9	12	27
17	2.366	0.148	0.598	4.42	Moderate organic enrichment	64	Poor	3	10	13	33
18	2.726	0.103	0.610	3.73	Slight organic enrichment	58	Poor	9	9	13	28
9	2.313	0.150	0.620	5.24	Moderate organic enrichment	53	Poor	14	7	21	24
17	2.518	0.133	0.570	4.77	Moderate organic enrichment	54	Poor	11	13	13	29
1	0.083	0.651	0.416	5.56	Moderate organic enrichment	51	Poor	18	9	0	45
9	2.005	0.232	0.514	5.55	Moderate organic enrichment	53	Poor	7	4	14	39
3	1.073	0.431	0.717	3.92	Slight organic enrichment	56	Poor	0	32	13	33
15	2.807	0.082	0.720	4.12	Moderate organic enrichment	64	Poor	11	8	19	22
19	2.586	0.120	0.599	4.59	Moderate organic enrichment	58	Poor	11	8	19	22
15	2.335	0.183	0.479	4.27	Moderate organic enrichment	63	Poor	17	14	14	21
14	2.550	0.109	0.691	3.13	Slight organic enrichment	62	Poor	15	6	9	33
13	2.311	0.155	0.602	4.00	Slight organic enrichment	55	Poor	11	7	15	22
16	2.494	0.149	0.513	2.51	Slight organic enrichment	75	Poor	13	8	13	24
15	2.748	0.081	0.773	3.32	Slight organic enrichment	76	Fair	13	9	16	25
15	2.599	0.138	0.503	3.59	Slight organic enrichment	76	Fair	12	7	12	24
17	2.525	0.133	0.569	3.09	Slight organic enrichment	75	Fair	15	3	13	25
3	1.122	0.524	1.414	3.91	Slight organic enrichment	64	Poor	4	21	6	40
8	1.546	0.331	0.548	4.12	Moderate organic enrichment	64	Poor	36	5	9	18
5	1.573	0.331	0.529	4.59	Moderate organic enrichment	58	Poor	22	11	11	39
8	1.785	0.248	0.612	4.27	Moderate organic enrichment	63	Poor	38	10	5	29
9	1.838	0.272	0.508	4.70	Moderate organic enrichment	77	Fair	25	8	13	38
10	1.921	0.211	0.640	4.21	Moderate organic enrichment	75	Fair	9	9	13	30
13	1.838	0.274	0.500	4.68	Moderate organic enrichment	78	Fair	11	11	18	36
10	1.995	0.196	0.645	4.32	Moderate organic enrichment	72	Poor	14	11	14	36
14	2.140	0.195	0.635	4.26	Moderate organic enrichment	74	Fair	17	11	11	36
8	2.337	0.138	0.668	4.82	Moderate organic enrichment	74	Fair	12	12	12	40
4	1.376	0.328	0.716	4.09	Moderate organic enrichment	53	Poor	0	4	35	46
10	2.290	0.170	0.549	4.06	Moderate organic enrichment	56	Poor	9	9	18	24
8	1.184	0.539	0.377	3.93	Slight organic enrichment	56	Poor	0	11	16	26
16	2.553	0.128	0.575	4.66	Moderate organic enrichment	59	Poor	9	13	13	28
16	2.428	0.136	0.613	3.81	Moderate organic enrichment			12	12	12	24
11	2.175	0.213	0.473	5.28	Moderate organic enrichment	51	Poor	8	8	12	35
15	2.653	0.108	0.625	3.95	Slight organic enrichment	56	Poor	8	11	11	31
10	2.230	0.207	0.462	4.02	Moderate organic enrichment	84	Excellent	13	10	10	33
14	2.809	0.089	0.658	3.93	Slight organic enrichment	72	Poor	11	8	11	24
17	2.901	0.087	0.614	3.69	Slight organic enrichment	72	Poor	10	12	12	26
6	2.229	0.149	0.687	4.12	Moderate organic enrichment	110	Excellent	5	5	37	37
6	1.958	0.257	0.475	4.29	Moderate organic enrichment	111	Excellent	19	7	4	26
5	1.906	0.214	0.641	4.81	Moderate organic enrichment	108	Excellent	12	4	12	36
3	2.069	0.196	0.594	4.93	Moderate organic enrichment	108	Excellent	5	5	14	33
[illegible]	1.570	0.316	0.599	3.59	Slight organic enrichm[illegible]	61	Poor	0	22	24	26

15	2.653	0.110	0.613	4.03	Moderate organic enrichment	60	Poor	12	6	12	38
1[illegible]	2.718	0.092	0.699	4.52	Moderate organic enri[illegible]nt	58	Poor	11	7	18	25
13	2.462	0.126	0.649	4.32	Moderate organic enrich[illegible]ent	62	Poor	17	8	17	29
13	2.650	0.108	0.631	3.29	Slight organic enrichment	74	Fair	9	6	12	33
13	2.361	0.150	0.589	3.72	Slight organic enrichment	73	Fair	14	7	18	29
10	2.011	0.275	0.407	1.74	Little organic enrichment	73	Fair	12	4	12	40
11	2.489	0.142	0.545	2.64	Slight organic enrichment	71	Poor	10	7	20	23
14	2.567	0.118	0.621	3.89	Slight organic enrichment	73	Fair	8	6	17	36
13	2.593	0.115	0.623	4.27	Moderate organic enrichment	72	Poor	6	11	17	25
5	1.384	0.416	0.470	5.69	Moderate organic enrichment	54	Poor	16	16	11	26
13	2.279	0.172	0.551	5.64	Moderate organic enrichment	59	Poor	10	10	17	37
2	1.248	0.378	0.663	3.58	Slight organic enrichment	56	Poor	20	20	10	20
17	2.607	0.113	0.628	5.15	Moderate organic enrichment	61	Poor	13	9	13	34
11	1.949	0.220	0.588	5.96	Moderate organic enrichment	55	Poor	17	4	13	33
13	1.929	0.277	0.444	4.63	Moderate organic enrichment	62	Poor	13	13	16	22
6	2.063	0.174	0.691	2.86	Slight organic enrichment	51	Poor	5	11	21	32
5	1.221	0.548	0.345	5.36	Moderate organic enrichment	53	Poor	14	9	9	18
0	1.691	0.193	0.948	309.00	Slight organic enrichment	67	Poor	0	0	0	43
10	1.781	0.263	0.566	5.64	Moderate organic enrichment	53	Poor	9	5	18	41
16	2.502	0.117	0.671	2.99	Slight organic enrichment	80	Fair	9	6	18	30
18	2.517	0.143	0.525	2.89	Slight organic enrichment	86	Excellent	15	6	18	33
24	2.748	0.094	0.658	3.55	Slight organic enrichment	83	Excellent	14	7	14	36
17	2.717	0.087	0.741	3.63	Slight organic enrichment	79	Fair	18	11	26	27
15	2.587	0.108	0.669	4.12	Moderate organic enrichment	59	Poor	18	17	15	30
20	3.063	0.071	0.639	4.04	Moderate organic enrichment	56	Poor	9	7	13	26
13	2.323	0.154	0.595	3.56	Slight organic enrichment	76	Fair	11	7	19	33
14	2.738	0.134	0.449	4.52	Moderate organic enrichment	70	Poor	11	13	13	32
11	2.874	0.079	0.695	2.96	Slight organic enrichment	73	Fair	10	7	15	27
15	2.697	0.105	0.619	3.53	Slight organic enrichment	77	Fair	8	8	18	26
13	2.319	0.139	0.675	2.67	Slight organic enrichment	87	Excellent	22	4	13	26
19	2.942	0.076	0.680	3.40	Slight organic enrichment	87	Excellent	19	9	5	28
18	2.703	0.101	0.637	2.89	Slight organic enrichment	N/A	N/A	14	9	14	34
17	2.766	0.092	0.665	3.23	Slight organic enrichment	83	Excellent	19	3	11	35
22	2.851	0.085	0.657	2.86	Slight organic enrichment	90	Excellent	26	5	10	24

Predators	Unknown	total taxa	Ephemeroptera taxa	Plecoptera taxa	Trichoptera	long-lived taxa	Intolerant taxa	% tolerants	Clinger taxa	%contribution dominant taxon	% predators
18	27	11	1	0	1	4	0	2.1	6	37.1	7.2
21	15	33	6	7	5	6	6	5.8	14	27.7	12.4
33	7	30	7	2	8	6	6	11.5	13	25.6	7
25	13	32	5	4	9	8	7	5.9	15	23.6	12.5
24	10	29	3	1	5	7	4	26	10	25.8	8.4
26	8	38	3	3	11	8	6	16	18	24.6	29.4
18	9	11	0	1	0	3	1	1.8	3	80.4	1.8
21	14	28	5	2	2	6	3	0	7	43.4	20.1
22	0	6	1	1	1	2	1	1	2	57.8	2.9
28	11	37	4	5	6	8	10	15.3	14	15.3	6.4
28	11	36	4	6	9	6	8	5.2	12	22	7.5
24	10	29	2	5	8	7	8	1.6	13	37.8	11.2
21	15	33	5	4	5	9	9	0.7	12	18.3	6.5
26	19	27	3	3	7	7	5	24.7	10	24.7	9.6
26	16	38	6	4	6	10	8	5.8	15	29.3	10.1
28	9	32	3	4	8	8	8	10.1	13	15.3	13.4
29	15	41	6	2	7	10	7	0.2	17	28.9	10.2
33	13	40	5	4	8	8	8	0.04	12	25.8	10.6
8	21	10	1	1	1	3	1	0	4	69.4	1.5
23	9	22	1	4	3	4	4	0.9	6	51.2	1.5
11	6	18	1	2	2	2	2	0.4	4	53.8	0.5
14	5	21	2	2	4	3	4	0	6	36.1	1.2
13	4	24	2	3	4	4	6	0.2	7	26.7	1.4
22	17	23	2	2	6	4	4	0	8	32.6	4.1
14	11	28	3	3	7	4	7	0	12	46.7	3.3
18	7	28	4	1	5	5	3	3.1	10	28.7	8.3
11	14	36	4	3	7	8	7	1.6	14	27.5	3.5
16	8	25	3	0	5	4	3	18.2	10	26.8	3.2
9	7	7	2	0	2	1	0	1	3	48	1.3
27	12	33	2	2	6	8	4	3.9	13	27.4	9.7
32	16	19	2	1	5	5	1	0.6	8	72.5	3
25	13	32	6	2	8	7	5	26.7	12	26.7	7.3
26	12	34	4	3	9	4	5	1	12	24.3	4
23	15	26	4	2	5	5	1	42.8	9	42.6	10.7
28	11	36	6	3	6	8	4	11.9	14	21.6	20
23	10	30	5	2	3	7	3	5.6	10	41.8	11.8
29	18	38	4	2	8	9	5	0.5	17	18	14.9
24	17	42	5	2	10	10	4	0.1	20	17.3	27.7
16	0	19	1	0	5	3	1	0.2	7	27.6	25.2
33	11	35	3	2	7	10	4	1.4	14	24.9	5.8
36	0	32	1	1	6	9	4	4.8	12	26.4	17.7
33	10	21	1	0	2	7	0	13.7	7	38.7	20.3
3	7	10	2	1	3	2	1	0	6	50.6	5

24	9	34	5	3	7	6	7	5.1	14	24.6	7
[illegible]	11	28	3	2	6	[illegible]	2	5.5	12	18.6	11.3
25	4	24	4	3	6	4	6	3.8	11	21.6	7.3
30	9	33	5	3	5	5	6	3.9	12	19.3	8
25	7	28	4	2	7	5	5	2.5	12	26.7	6.6
24	8	25	4	2	4	4	4	0.4	8	50.2	6.4
33	7	28	4	1	5	5	3	3.1	10	28.7	8.3
25	8	36	6	2	6	9	6	0.5	13	25.3	5.7
22	19	36	4	3	6	9	5	3	19	21.5	6.5
21	11	19	1	1	3	2	2	5.3	5	61.5	2.3
23	3	30	5	1	7	4	3	34.4	11	34.4	3.5
20	10	10	0	0	2	2	0	0	4	49.5	3.5
22	9	32	7	3	7	6	5	23.7	12	23.7	4.3
25	8	24	3	1	7	5	3	32.1	8	32.1	5.5
28	6	32	4	3	6	7	7	0.9	12	48.9	4.7
21	11	19	2	0	4	6	1	0	11	27.2	10.4
23	27	22	0	2	3	5	2	1.7	9	73.4	6.8
14	43	7	0	0	0	4	1	0	3	27.7	2.1
23	5	22	4	1	5	2	3	0	6	44.2	15.8
18	18	33	4	6	6	6	7	0.9	12	20.8	1.6
24	3	33	5	6	7	4	7	4.9	12	31.1	5.2
17	12	42	7	7	10	6	10	13.1	15	19.6	5.6
3	14	36	5	6	6	5	7	5.1	12	17	3
4	16	32	4	4	7	5	5	16.8	11	16.6	4.4
33	13	46	4	4	12	9	9	13.5	20	15.8	16.6
26	4	27	4	3	6	5	6	0	12	29.9	3.9
24	8	38	5	1	8	5	3	4	16	33.3	23.6
22	20	41	4	1	6	11	4	0.6	17	13.9	24.7
26	15	39	5	3	7	10	7	0	16	19.9	16.4
22	13	23	3	5	5	6	6	1.2	8	25.9	9
30	9	43	4	7	8	8	8	7.8	12	16	15.8
20	9	35	7	7	4	5	8	3.2	11	21.8	16.1
24	8	37	6	7	4	7	8	2.5	11	17.9	11.5
26	10	42	5	9	8	7	11	2	12	18.9	11.5

Appendix

Sampling Locations

The information in this report is based on data collected at the sites listed below.

Station	Waterbody
AQMAC-00	McKinney Creek, Carbon County, Wyoming
AQMAC-02	Littlefield Creek, Carbon County, Wyoming
AQMAC-03	Muddy Creek, Upper, Carbon County, Wyoming
AQMAC-05	Muddy Creek, Bridger Pass, Carbon County, Wyoming
AQMAC-11	Muddy Creek, Grizzly, Carbon County, Wyoming
BGGULCH-1	Big Gulch, Carbon County, Wyoming
BGSAND-1	Big Sandstone, Carbon County, Wyoming
BIRDG-1	Bird Gulch, Carbon County, Wyoming
DIRTY-1	Dirtyman Creek, Carbon County, Wyoming
DTMT	Muddy Creek, rock xing @ Doty, Carbon County, Wyoming
EFSAVBER-1	East Fork Savery Creek @ Bear, Carbon County, Wyoming
ESAVERY-1	East Fork Savery Creek, Carbon County, Wyoming
HARTT-1	Hartt Creek, Carbon County, Wyoming
HATCH-1	Hatch Creek, Carbon County, Wyoming
HISAVERY-1	Savery Creek, below dam site, Carbon County, Wyoming
LOCO-1	Loco Creek, Carbon County, Wyoming
LSAVERY-1	Little Savery Creek, Carbon County, Wyoming
NSAVERY-1	North Fork of Savery Creek, Carbon County, Wyoming
SAVERY-1	Savery Creek, permanent sta., Carbon County, Wyoming
SLATER-1	Slater Creek, Sheehan's, Moffat County, Wyoming

Station	Latitude Degrees N	Longitude Degrees W	Elevation (meters)	Ecoregion	Comments
AQMAC-00	41.48	107.56	2158	Wyoming Basin	
AQMAC-02	41.45	107.45	2178	Wyoming Basin	T17N,R89W,SEC18
AQMAC-03	41.40	107.40	2254	Wyoming Basin	T16N,R89W,SEC4
AQMAC-05	41.47	107.49	2142	Wyoming Basin	T17N,R90W,SEC12
AQMAC-11	41.42	107.44	2203	Wyoming Basin	T17N,R89W,SEC29
BGGULCH-1	41.10	107.37	2048	Wyoming Basin	
BGSAND-1	41.14	107.35	2085	Wyoming Basin	Mouth of SF Tumalo Creek
BIRDG-1	41.24	107.36	2158	Wyoming Basin	
DIRTY-1	41.27	107.25	2243	Wyoming Basin	
DTMT	41.50	107.50	2079	Wyoming Basin	Rock Crossing at Doty Mtn.
EFSAVBER-1			2402	Wyoming Basin	EFSAVBEAR-1, at Bear Creek
ESAVERY-1			2243	Wyoming Basin	
HARTT-1	41.29	107.26	2221	Wyoming Basin	
HATCH-1	41.28	107.23	2438	Wyoming Basin	at confluence w/ Bear Creek
HISAVERY-1	41.26	107.32	2170	Wyoming Basin	
LOCO-1	41.13	107.39	2097	Wyoming Basin	mainstem alcove #3
LSAVERY-1	41.26	107.35	2170	Wyoming Basin	
NSAVERY-1	41.28	107.28	2207	Wyoming Basin	at confluence w/ East Fork
SAVERY-1	41.10	107.38	2036	Wyoming Basin	
SLATER-1			1999		

Sampling Locations

Station	Waterbody	County	State	Latitude Degrees N	Longitude Degrees W	Elevation (meters)
ADMAC-00	McKinney Creek (Low)	Carbon	Wyoming	41.482	107.474	2176
ADMAC-02	Littlefield Creek	Carbon	Wyoming	41.444	107.451	2195
ADMAC-03	Muddy Creek at Lake Draw	Carbon	Wyoming	41.387	107.403	2280
ADMAC-05	Muddy Creek at Bridge	Carbon	Wyoming	41.467	107.486	2158
ADMAC-11	Muddy Creek at Grizzly	Carbon	Wyoming	41.420	107.440	2219
BATTLE-1	Battle Creek	Carbon	Wyoming	41.004	107.239	2036
BGGULCH-1	Big Gulch	Carbon	Wyoming	41.097	107.371	2048
BGSAND-1	Big Sandstone Creek	Carbon	Wyoming	41.136	107.350	2073
DIRTY-1	Dirtyman Creek	Carbon	Wyoming	41.266	107.253	2231
DTMT-1	Muddy Creek at Rock Crossing Doty Mountain	Carbon	Wyoming	41.473	107.613	2079
EFSAVBER-1	East Fork of Savery Creek at Bear Creek	Carbon	Wyoming	41.270	107.199	2402
EFSAVERY-1	East Fork Savery Creek	Carbon	Wyoming	41.277	107.281	2205
ESAVERY-1	East Fork of Savery Creek	Carbon	Wyoming	41.119	107.254	2231
HISAVERY-1	Savery Creek, downstream from dam site	Carbon	Wyoming	41.263	107.325	2170
LIMUD-1	Little Muddy Creek	Carbon	Wyoming	41.491	107.356	2396
LOCO-1	Loco Creek	Carbon	Wyoming	41.126	107.388	2097
LSAVERY-1	Little Savery Creek	Carbon	Wyoming	41.259	107.347	2170
MCEAGLE-1	McKinney Creek at Eagle	Carbon	Wyoming	41.495	107.449	2231
NFSAVERY-1	North Fork of Savery Creek	Carbon	Wyoming	41.300	107.270	2205
NSAVERY-1	North Fork of Savery Creek	Carbon	Wyoming	41.296	107.270	2228
SAVEDAM-1	Savery Creek downstream from High Savery Dam	Carbon	Wyoming	41.274	107.305	2182
SAVERY-1	Savery Creek, permanent station	Carbon	Wyoming	41.097	107.379	2036
UPMCK-1	McKinney Creek, upper site	Carbon	Wyoming	41.492	107.355	2396
WLOCO-1	West Fork of Loco Creek	Carbon	Wyoming	unspecified	unspecified	2192

2003 Dad Station Data

note: Daily values are mean values based on continuous hourly data

Date	SpCond æS/cm	TDS g/l
17-Mar-03	634	406
18-Mar-03	616	394
19-Mar-03	634	406
20-Mar-03	584	374
21-Mar-03	683	437
22-Mar-03	807	516
23-Mar-03	923	591
24-Mar-03	973	623
25-Mar-03	1000	640
26-Mar-03	1024	655
27-Mar-03	1047	670
28-Mar-03	1020	653
29-Mar-03	873	559
30-Mar-03	796	509
31-Mar-03	1135	726
March Averages	**850**	**544**
1-Apr-03	1396	893
2-Apr-03	1404	899
3-Apr-03	1316	842
4-Apr-03	1158	741
5-Apr-03	1124	719
6-Apr-03	1062	680
7-Apr-03	1048	671
8-Apr-03	1076	688
9-Apr-03	1137	728
10-Apr-03	1165	745
11-Apr-03	1200	768
12-Apr-03	1208	773
13-Apr-03	1049	671
14-Apr-03	1033	661
15-Apr-03	982	629
16-Apr-03	860	550
17-Apr-03	781	500
18-Apr-03	708	453
19-Apr-03	680	435
20-Apr-03	670	429
21-Apr-03	682	436
22-Apr-03	697	446
23-Apr-03	700	448
24-Apr-03	722	462
25-Apr-03	756	483
26-Apr-03	730	467
27-Apr-03	786	503

28-Apr-03	814	521
29-Apr-03	732	469
30-Apr-03	698	447
April Averages	**946**	**605**
1-May-03	768	492
2-May-03	721	461
3-May-03	712	455
4-May-03	725	464
5-May-03	734	470
6-May-03	732	469
7-May-03	728	466
8-May-03	711	455
9-May-03	708	453
10-May-03	754	482
11-May-03	726	465
12-May-03	727	466
13-May-03	768	491
14-May-03	798	511
15-May-03	781	500
16-May-03	770	493
17-May-03	769	492
18-May-03	764	489
19-May-03	771	493
20-May-03	746	477
21-May-03	709	454
22-May-03	719	460
23-May-03	741	474
24-May-03	751	481
25-May-03	764	489
26-May-03	780	499
27-May-03	788	504
28-May-03	791	506
29-May-03	794	508
30-May-03	801	513
31-May-03	796	509
May Averages	**753**	**482**
1-Jun-03	814	521
2-Jun-03	833	533
3-Jun-03	932	596
4-Jun-03	1014	649
5-Jun-03	1109	710
6-Jun-03	1112	712
7-Jun-03	1293	827
8-Jun-03	1424	911
9-Jun-03	1348	863
10-Jun-03	1093	700
11-Jun-03	845	541
12-Jun-03	970	620
13-Jun-03	888	568

14-Jun-03	887	568
15-Jun-03	910	582
16-Jun-03	944	604
17-Jun-03	997	638
18-Jun-03	1062	680
19-Jun-03	1099	703
20-Jun-03	1149	735
21-Jun-03	1271	814
22-Jun-03	1468	939
23-Jun-03	1600	1024
24-Jun-03	1663	1065
25-Jun-03	1699	1088
June Averages	**1137**	**728**

2001 Dad Station Data

Note: Daily values are mean values based on continuous hourly data

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
14-Mar-01			-0.26	7.76	1024	655	99.25	11.37	217.55			
15-Mar-01			-0.25	7.70	1109	710	100.86	11.54	122.33			
16-Mar-01			-0.25	7.69	1162	743	100.42	11.48	129.38			
17-Mar-01			-0.15	7.70	1142	731	99.59	11.36	234.33			
18-Mar-01			-0.05	7.73	1100	704	100.57	11.44	276.83			
19-Mar-01			0.99	7.73	1093	699	103.00	11.39	309.75			
20-Mar-01	1.50	14.76	1.05	7.72	1021	653	103.50	11.42	397.08	29.27	1275312.14	25.98
21-Mar-01	1.53	15.73	0.83	7.70	982	628	103.59	11.50	466.38	31.19	1358851.92	26.63
22-Mar-01	1.70	19.95	1.36	7.69	899	575	101.34	11.10	594.54	39.57	1724067.47	30.92
23-Mar-01	1.92	23.51	2.36	7.66	822	526	101.90	10.88	880.54	46.62	2031436.70	33.34
24-Mar-01	2.13	28.35	3.43	7.65	828	530	100.68	10.44	720.46	56.21	2449039.34	40.47
25-Mar-01	2.23	30.97	3.89	7.68	773	494	99.34	10.16	618.83	61.41	2675803.81	41.25
26-Mar-01	2.39	37.43	4.02	7.68	774	496	101.40	10.34	816.96	74.23	3234029.93	49.99
27-Mar-01	2.55	41.29	3.68	7.69	840	537	96.99	10.03	641.92	81.87	3567184.86	59.77
28-Mar-01	2.43	37.32	2.43	7.79	858	549	91.97	9.88	472.50	74.01	3224789.28	55.23
29-Mar-01	2.43	37.19	2.01	7.81	896	573	92.26	10.02	436.04	73.74	3213089.58	57.45
30-Mar-01	2.28	32.67	3.21	7.85	934	598	92.63	9.73	363.96	64.79	2822940.29	52.63
31-Mar-01	2.18	29.71	3.94	7.88	981	628	93.44	9.63	303.50	58.91	2566944.59	50.26
March Averages	**2.11**	**29.07**	**1.79**	**7.73**	**958**	**613**	**99.04**	**10.76**	**444.60**	**57.65**	**2511957.49**	**48.01**
1-Apr-01	2.30	32.90	4.19	7.89	1008	645	92.01	9.42	311.83	65.24	2842484.81	57.18
2-Apr-01	2.60	42.92	4.43	7.90	964	617	91.52	9.31	469.08	85.11	3708463.73	71.36
3-Apr-01	2.84	51.53	4.67	7.86	920	589	92.63	9.37	501.25	102.19	4452453.71	81.73
4-Apr-01	2.96	56.28	5.68	7.87	1017	651	92.91	9.16	511.17	111.60	4862493.05	98.72
5-Apr-01	3.03	58.93	6.67	7.87	1062	680	92.41	8.89	604.08	116.86	5091459.51	107.92
6-Apr-01	3.26	69.05	5.84	7.85	1037	663	90.42	8.88	606.25	136.92	5965839.11	123.44
7-Apr-01	3.20	66.23	3.86	7.90	999	639	91.51	9.45	542.42	131.33	5722079.22	114.08
8-Apr-01	3.07	60.77	3.49	7.93	1011	647	89.67	9.35	477.54	120.50	5250097.96	105.88
9-Apr-01	2.64	43.88	4.07	7.95	1055	675	90.18	9.27	416.17	87.00	3790804.81	79.83
Date	Stage ft	Est. cfs	Temp C	pH	EC	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day

10-Apr-01	2.45	37.74	5.73	7.96	1077	690	88.03	8.66	361.46	74.83	3260550.97	70.11
11-Apr-01	2.23	31.02	5.92	7.98	1115	714	87.84	8.59	260.88	61.51	2680181.51	59.64
12-Apr-01	1.99	24.63	4.92	8.02	1134	726	87.41	8.77	219.83	48.84	2128102.86	48.18
13-Apr-01	1.81	20.67	4.42	8.04	1163	745	89.49	9.10	236.29	40.98	1785585.86	41.46
14-Apr-01	1.73	18.83	5.09	8.05	1192	763	89.84	8.98	233.42	37.34	1626784.26	38.70
15-Apr-01	1.57	15.98	5.84	8.07	1229	786	89.93	8.83	248.29	31.68	1380460.00	33.84
16-Apr-01	1.57	15.90	8.42	8.05	1257	804	89.18	8.22	234.88	31.53	1373680.84	34.46
17-Apr-01	1.40	13.47	10.69	8.06	1271	813	85.92	7.52	355.04	26.72	1164201.04	29.53
18-Apr-01	1.25	11.57	11.05	8.09	1280	819	87.45	7.52	368.83	22.94	999609.78	25.54
19-Apr-01	1.56	16.14	10.96	8.09	1273	815	93.63	8.08	121.54	32.00	1394113.22	35.41
20-Apr-01	2.25	32.12	9.07	8.02	1243	796	90.90	8.20	296.83	63.69	2775017.73	68.88
21-Apr-01	2.58	41.84	6.81	7.98	1184	758	91.07	8.68	307.50	82.97	3615105.33	85.42
22-Apr-01	2.79	49.49	6.39	7.98	970	621	91.69	8.84	350.58	98.14	4275893.06	82.75
23-Apr-01	2.58	41.73	6.64	8.01	887	568	92.73	8.89	291.88	82.75	3605394.98	63.85
24-Apr-01	2.41	36.26	8.04	8.04	823	526	92.58	8.58	201.00	71.91	3133209.24	51.44
25-Apr-01	2.25	31.44	10.74	8.05	772	494	90.10	7.83	155.58	62.34	2715990.30	41.81
26-Apr-01	2.18	29.53	13.24	8.07	789	505	90.05	7.39	155.67	58.56	2551639.33	40.19
27-Apr-01	2.44	37.31	14.38	8.07	791	506	86.93	6.96	186.25	73.99	3223737.94	50.90
28-Apr-01	2.84	51.44	14.30	8.06	769	492	83.58	6.71	341.63	102.01	4444641.98	68.22
29-Apr-01	3.14	63.92	12.79	8.04	722	462	82.42	6.84	541.00	126.75	5522514.74	79.60
30-Apr-01	3.35	73.55	11.59	8.04	675	432	84.23	7.20	629.00	145.86	6355122.70	85.60
April Averages	**2.41**	**39.24**	**7.66**	**7.99**	**1023**	**655**	**89.61**	**8.45**	**351.24**	**77.80**	**3389923.79**	**69.21**
1-May-01	3.55	83.11	11.61	8.04	645	413	80.52	6.87	703.21	164.81	7180715.88	92.48
2-May-01	3.57	84.25	7.13	8.04	605	387	77.99	7.46	922.33	167.07	7279170.73	87.85
3-May-01	3.55	82.92	2.56	8.15	590	377	85.94	9.18	753.71	164.42	7163901.07	84.33
4-May-01	3.18	65.78	6.32	8.06	574	368	84.77	8.24	495.50	130.44	5683386.50	65.18
5-May-01	2.58	41.78	9.13	7.97	657	421	86.36	7.82	305.42	82.85	3609927.43	47.35
6-May-01	3.23	68.34	8.17	7.93	693	443	86.11	7.99	369.08	135.52	5904749.87	81.65
7-May-01	3.46	78.61	9.08	7.87	707	452	87.40	8.00	336.05	155.88	6791716.10	95.79
8-May-01	3.30	70.92	11.67	7.86	699	447	84.92	7.35	244.38	140.63	6127171.82	85.41
9-May-01	3.06	60.27	12.25	7.88	696	445	83.11	7.09	202.08	119.51	5207148.24	72.32
10-May-01	3.10	62.10	13.41	7.90	686	439	83.19	6.91	185.46	123.15	5365760.57	73.43
11-May-01	3.06	60.19	13.41	7.92	657	421	83.28	6.93	178.13	119.36	5200572.43	68.26
12-May-01	3.01	58.34	15.43	7.91	639	409	81.35	6.47	161.58	115.70	5040875.46	64.24
13-May-01	2.87	52.53	15.90	7.93	632	405	79.79	6.28	151.71	104.17	4538832.35	57.27
Date	**Stage ft**	**Est. cfs**	**Temp C**	**pH**	**EC**	**TDS mg/l**	**DO %**	**DO mg/l**	**Trb ntu**	**Acre Feet**	**ft^3/day**	**Tons DS/day**
14-May-01	2.79	49.26	15.95	7.95	626	401	79.13	6.22	133.88	97.68	4255900.36	53.18

15-May-01	2.67	45.01	15.08	7.98	628	402	77.15	6.18	122.29	89.26	3889167.02	48.78
16-May-01	2.70	45.96	14.41	8.00	629	403	77.49	6.30	123.00	91.13	3970545.24	49.89
17-May-01	2.58	41.91	14.34	8.02	632	404	76.20	6.20	113.71	83.11	3620998.10	45.65
18-May-01	2.58	41.88	12.62	8.03	620	397	75.87	6.41	149.38	83.04	3618044.30	44.76
19-May-01	2.52	39.66	13.97	8.04	613	392	74.66	6.13	110.21	78.65	3426805.07	41.94
20-May-01	2.55	40.91	13.77	8.07	621	397	72.08	5.94	112.38	81.12	3534497.42	43.79
21-May-01	2.48	38.35	10.05	8.09	619	396	75.88	6.81	104.67	76.06	3313806.12	40.95
22-May-01	2.33	33.91	12.74	8.10	633	405	75.54	6.37	97.42	67.25	2930066.50	37.05
23-May-01	2.14	28.42	15.70	8.11	647	414	74.41	5.88	104.67	56.35	2455208.63	31.70
24-May-01	1.93	23.30	16.28	8.14	657	420	72.69	5.67	115.13	46.21	2013450.86	26.40
25-May-01	1.96	24.01	15.84	8.15	689	441	77.63	6.09	99.53	47.61	2074439.60	28.53
26-May-01	1.86	21.64	16.58	8.07	758	485	93.71	7.21	66.96	42.91	1869685.95	28.28
27-May-01	1.79	20.02	16.88	8.04	776	496	91.31	6.98	63.13	39.71	1730003.30	26.78
28-May-01	1.70	18.38	15.50	8.05	784	502	89.00	7.00	74.88	36.45	1588228.43	24.86
29-May-01	1.85	21.48	15.76	8.02	796	509	88.53	6.92	72.00	42.59	1855801.94	29.48
30-May-01	1.63	16.97	16.43	8.07	820	525	89.45	6.90	65.75	33.66	1466616.43	23.99
31-May-01	1.61	16.70	17.03	8.08	809	518	89.76	6.84	63.58	33.12	1443130.51	23.31
May Averages	**2.62**	**46.35**	**13.06**	**8.01**	**672**	**430**	**81.78**	**6.86**	**219.39**	**91.92**	**4004849.17**	**53.73**
1-Jun-01	1.48	14.48	17.77	8.11	813	520	87.92	6.59	60.75	28.71	1251119.06	20.29
2-Jun-01	1.36	12.74	17.34	8.13	826	529	84.53	6.39	66.38	25.26	1100682.35	18.16
3-Jun-01	1.27	11.63	16.85	8.16	848	543	84.57	6.46	62.75	23.06	1004836.38	17.01
4-Jun-01	1.29	11.86	13.61	8.21	862	551	86.20	7.06	49.75	23.53	1025001.23	17.63
5-Jun-01	1.41	13.38	13.00	8.18	878	562	88.92	7.38	59.88	26.53	1155939.72	20.25
6-Jun-01	1.23	11.21	15.34	8.19	889	569	90.42	7.13	51.71	22.23	968602.90	17.19
7-Jun-01	1.07	9.53	17.45	8.22	896	574	92.47	6.98	86.46	18.89	823180.74	14.72
8-Jun-01	1.15	10.26	17.93	8.22	891	570	91.64	6.84	52.13	20.34	886325.44	15.76
9-Jun-01	1.06	9.41	17.58	8.24	897	574	91.58	6.88	69.92	18.66	813149.66	14.56
10-Jun-01	0.91	8.37	17.83	8.28	903	578	86.49	6.62	60.50	16.59	722771.89	13.03
11-Jun-01	0.71	7.75	18.70	8.24	924	591	85.30	6.78	58.38	15.37	669840.31	12.35
June Averages	**1.17**	**10.97**	**16.67**	**8.20**	**875**	**560**	**88.19**	**6.83**	**61.69**	**21.74**	**947404.52**	**16.55**

2002 Dad Station Data

Note: Daily values are mean values based on continuous hourly data

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
25-Mar-02	0.96	18.54	-0.22	8.01	838	536	92.78	10.72	49.15	36.76	1601605.60	26.78
26-Mar-02	0.95	18.33	-0.21	8.13	820	525	93.83	10.84	61.04	36.34	1583325.68	25.92
27-Mar-02	0.98	18.93	-0.19	8.19	811	519	94.40	10.90	114.71	37.55	1635972.52	26.49
28-Mar-02	1.12	21.65	-0.16	8.25	787	504	94.96	10.95	182.38	42.94	1870735.17	29.40
29-Mar-02	1.03	19.76	-0.10	8.28	777	497	93.91	10.81	320.29	39.18	1707114.92	26.48
30-Mar-02	1.08	20.86	-0.04	8.28	760	487	94.72	10.89	442.71	41.37	1802578.27	27.35
31-Mar-02	1.02	19.71	0.66	8.30	650	416	95.85	10.81	609.71	39.08	1702673.07	22.08
March Averages	**1.02**	**19.68**	**-0.04**	**8.20**	**778**	**498**	**94.35**	**10.84**	**254.28**	**39.03**	**1700572.18**	**26.39**
1-Apr-02	1.40	27.34	1.79	8.30	675	432	97.00	10.59	807.17	54.22	2362396.90	31.82
2-Apr-02	1.64	32.26	2.80	8.31	729	466	99.27	10.55	764.13	63.98	2787430.90	40.53
3-Apr-02	1.41	27.47	2.76	8.35	722	462	98.78	10.51	616.71	54.48	2373537.93	34.21
4-Apr-02	0.96	18.43	4.32	8.40	724	464	102.48	10.47	469.75	36.55	1592573.46	23.02
5-Apr-02	1.12	21.70	5.34	8.41	731	468	103.10	10.25	476.33	43.04	1875177.02	27.38
6-Apr-02	1.46	28.53	6.27	8.39	785	502	98.91	9.60	578.92	56.58	2465214.79	38.60
7-Apr-02	1.51	29.49	6.33	8.41	862	551	97.65	9.46	513.50	58.48	2547935.13	43.81
8-Apr-02	1.57	30.74	6.00	8.44	890	570	97.57	9.53	520.54	60.96	2655850.22	47.20
9-Apr-02	1.78	35.05	6.59	8.44	950	608	98.03	9.43	583.88	69.51	3028674.28	57.46
10-Apr-02	1.80	35.50	6.94	8.44	948	607	96.51	9.21	512.21	70.39	3066903.31	58.02
11-Apr-02	1.32	25.77	5.92	8.51	954	610	99.61	9.74	326.21	51.10	2226301.56	42.37
12-Apr-02	1.40	27.24	7.05	8.29	993	636	94.71	9.04	269.95	54.01	2353367.57	46.66
13-Apr-02	1.20	23.37	8.48	7.95	1031	660	89.23	8.24	177.00	46.34	2018845.35	41.55
14-Apr-02	1.16	22.49	9.33	7.91	1042	667	86.37	7.81	170.88	44.61	1943479.55	40.41
15-Apr-02	1.25	24.32	8.90	7.92	1067	683	85.47	7.81	204.92	48.23	2101201.61	44.73
16-Apr-02	1.39	27.17	7.55	7.91	1078	690	83.15	7.86	270.79	53.87	2347250.93	50.49
17-Apr-02	1.66	32.60	5.95	7.92	1033	661	84.60	8.32	270.29	64.64	2816557.78	58.07
18-Apr-02	1.80	35.51	5.57	7.91	952	610	85.57	8.50	333.46	70.42	3068432.47	58.32
19-Apr-02	1.43	27.99	5.82	7.96	916	587	84.83	8.37	227.33	55.50	2418029.24	44.23
20-Apr-02	1.27	24.63	4.57	8.00	882	565	83.88	8.55	183.54	48.84	2127998.34	37.47

Date	Stage ft	Est. cfs	Temp C	pH	EC	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
21-Apr-02	1.07	20.66	4.43	8.03	875	560	85.79	8.78	167.79	40.97	1784956.51	31.18
22-Apr-02	0.90	17.14	5.71	8.07	885	566	85.83	8.51	157.13	33.99	1481090.33	26.15
23-Apr-02	0.77	14.61	7.54	8.10	899	575	85.65	8.11	129.13	28.97	1262201.83	22.64
24-Apr-02	0.32	5.47	7.35	8.14	921	589	83.75	7.98	118.75	10.84	472499.29	8.68
25-Apr-02	0.66	12.32	8.46	8.13	948	607	83.86	7.77	152.54	24.43	1064430.31	20.15
26-Apr-02	1.02	19.58	10.00	8.11	949	607	85.93	7.56	136.90	38.82	1691386.41	32.01
27-Apr-02	1.33	25.89	9.79	8.03	947	606	87.47	7.72	181.67	51.34	2236932.87	42.30
28-Apr-02	1.46	28.56	9.06	8.02	927	593	88.98	7.99	190.58	56.63	2467326.49	45.64
29-Apr-02	1.71	33.63	10.10	7.99	861	551	88.90	7.79	261.38	66.69	2905831.67	49.90
30-Apr-02	1.43	28.04	12.08	8.00	868	556	86.73	7.26	188.29	55.60	2422543.91	41.97
April Averages	**1.31**	**25.45**	**6.76**	**8.16**	**901.44**	**576.91**	**90.99**	**8.78**	**332.05**	**50.47**	**2198878.60**	**39.56**
1-May-02	1.30	25.38	11.65	8.03	874	559	85.83	7.26	167.17	50.33	2192878.46	38.24
2-May-02	1.41	27.58	9.65	8.04	839	537	87.52	7.75	189.75	54.69	2382858.54	39.91
3-May-02	1.43	27.99	10.03	8.06	802	513	82.63	7.25	179.04	55.50	2418320.51	38.70
4-May-02	1.15	22.36	10.26	8.10	790	505	76.63	6.70	143.08	44.34	1931828.80	30.45
5-May-02	1.13	21.78	11.17	8.11	779	498	73.31	6.27	143	43.20	1882094.65	29.25
6-May-02	1.14	22.13	11.35	8.12	790	506	74.64	6.36	128	43.89	1912095.34	30.16
7-May-02	1.15	22.19	12.41	8.14	784	502	75.64	6.29	129	44.01	1917483.81	30.01
8-May-02	1.04	20.16	9.84	8.21	776	497	79.96	7.05	116	39.97	1741484.64	26.97
9-May-02	1.02	19.66	6.77	8.22	746	477	78.54	7.48	135	38.98	1698376.86	25.27
10-May-02	1.21	23.45								46.50	2026054.26	0.00
11-May-02	1.07	20.73								41.11	1791291.60	0.00
12-May-02	0.94	18.02								35.72	1556528.95	0.00
13-May-02	0.85	16.19								32.10	1398588.44	0.00
14-May-02	0.67	12.52								24.82	1081469.54	0.00
15-May-02	0.66	12.30								24.39	1062755.52	0.00
16-May-02	0.72	13.65								27.08	1179772.76	0.00
17-May-02	0.67	12.57								24.93	1086129.84	0.00
18-May-02	0.21	3.32								6.57	286451.35	0.00
19-May-02	0.02	1.00								1.98	86400.00	0.00
20-May-02	0.02	1.00								1.98	86400.00	0.00
21-May-02	0.09	2.00								3.97	172800.00	0.00
22-May-02	0.30	5.06								10.04	437328.59	0.00
23-May-02	0.02	1.30								2.57	111997.26	0.00
24-May-02	0.02	1.00								1.98	86400.00	0.00
25-May-02	0.02	1.00								1.98	86400.00	0.00

Date	Stage ft	Est. cfs	Temp C	pH	EC	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
26-May-02	0.02	1.00								1.98	86400.00	0.00
27-May-02	0.02	1.00								1.98	86400.00	0.00
28-May-02	0.02	1.00								1.98	86400.00	0.00
29-May-02	0.02	1.00								1.98	86400.00	0.00
30-May-02	0.02	1.00								1.98	86400.00	0.00
31-May-02	0.02	1.00								1.98	86400.00	0.00
May Averages	**0.59**	**11.62**	**10.35**	**8.11**	**797.72**	**510.49**	**79.41**	**6.93**	**147.84**	**23.05**	**1004277.09**	**15.99**
1-Jun-02	0.02	1.00								1.98	86400.00	0.00
2-Jun-02	0.02	1.00								1.98	86400.00	0.00
3-Jun-02	0.02	1.00								1.98	86400.00	0.00
4-Jun-02	0.02	1.00	20.63	8.36	1172	750	107.82	7.62	55.67	1.98	86400.00	2.02
5-Jun-02	0.02	1.00	17.31	8.38	1189	761	97.11	7.34	126.71	1.98	86400.00	2.05
6-Jun-02	0.02	1.00	17.44	8.38	1238	793	94.44	7.11	35.33	1.98	86400.00	2.14
7-Jun-02	0.02	1.00	15.64	8.38	1216	778	91.80	7.17	23.44	1.98	86400.00	2.10
June Averages	**0.02**	**1.00**	**17.75**	**8.38**	**1203.73**	**770.37**	**97.79**	**7.31**	**60.29**	**1.98**	**86400.00**	**2.08**

2003 RC-3 Station Data

note: Daily values are mean values based on continuous hourly data

	Date	SpCond æS/cm	TDS g/l
	24-Mar-03	865	554
	25-Mar-03	969	620
	26-Mar-03	972	622
	27-Mar-03	900	576
	28-Mar-03	813	520
	29-Mar-03	893	572
	30-Mar-03	853	546
	31-Mar-03	903	578
	March Averages	**896**	**574**
	1-Apr-03	887	568
	2-Apr-03	877	561
	3-Apr-03	902	577
	4-Apr-03	636	407
	5-Apr-03	515	329
	6-Apr-03	425	272
	7-Apr-03	414	265
Unit Down	8-Apr-03		
Unit Down	9-Apr-03		
Unit Down	10-Apr-03		
Unit Down	11-Apr-03		
Unit Down	12-Apr-03		
Unit Down	13-Apr-03		
Unit Down	14-Apr-03		
Unit Down	15-Apr-03		
	16-Apr-03	372	238
	17-Apr-03	328	210
	18-Apr-03	350	224
	19-Apr-03	363	232
	20-Apr-03	367	235
	21-Apr-03	413	265
	22-Apr-03	366	234
	23-Apr-03	317	203
	24-Apr-03	307	196
	25-Apr-03	358	229
	26-Apr-03	500	320
	27-Apr-03	330	211
	28-Apr-03	239	153
	29-Apr-03	200	128
	30-Apr-03	284	182
	April Averages	**443**	**284**
	1-May-03	404	259

	2-May-03	986	631
	3-May-03	986	631
	4-May-03	978	626
	5-May-03	971	621
	6-May-03	998	638
	7-May-03	987	632
	8-May-03	955	611
	9-May-03	942	603
	10-May-03	932	596
	11-May-03	931	596
	12-May-03	933	597
	13-May-03	933	597
	14-May-03	936	599
	15-May-03	946	605
	16-May-03	955	611
	17-May-03	960	615
	18-May-03	962	616
	19-May-03	955	611
	20-May-03	818	524
	21-May-03	427	273
	22-May-03	447	286
	23-May-03	477	305
	24-May-03	488	312
	25-May-03	491	314
	26-May-03	502	321
	27-May-03	497	318
	28-May-03	504	323
	29-May-03	509	326
	30-May-03	521	333
	31-May-03	530	339
	May Averages	**770**	**493**
	1-Jun-03	540	345
	2-Jun-03	545	349
	3-Jun-03	515	330
Unit Down	4-Jun-03		
Unit Down	5-Jun-03		
	6-Jun-03	561	359
	7-Jun-03	554	355
	8-Jun-03	561	359
	9-Jun-03	560	358
	10-Jun-03	566	362
	11-Jun-03	565	362
	12-Jun-03	581	372
	13-Jun-03	560	358
	14-Jun-03	569	364
	15-Jun-03	581	372
	16-Jun-03	585	375
	17-Jun-03	590	378
	18-Jun-03	609	390
	19-Jun-03	616	394

20-Jun-03	632	405
21-Jun-03	627	401
22-Jun-03	622	398
23-Jun-03	614	393
24-Jun-03	596	381
25-Jun-03	581	372
26-Jun-03	596	382
27-Jun-03	593	379
28-Jun-03	606	388
29-Jun-03	594	380
30-Jun-03	615	394
June Averages	**583**	**373**
1-Jul-03	629	403
2-Jul-03	660	422
3-Jul-03	673	431
4-Jul-03	712	455
5-Jul-03	746	478
6-Jul-03	792	507
7-Jul-03	842	539
8-Jul-03	898	575
9-Jul-03	913	584
10-Jul-03	927	593
11-Jul-03	929	595
12-Jul-03	925	592
July Averages	**804**	**515**

2002 RC-3 Station Data

Note: Daily values are mean values based on continuous hourly data

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
4-Apr-02			-0.34	7.42	637	408	93.70	10.95	1000+			
5-Apr-02			-0.31	7.45	691	442	94.90	11.08	1000+			
6-Apr-02			-0.31	7.51	820	525	93.91	10.96	1000+			
7-Apr-02	2.51	51.32	-0.24	7.53	816	522	92.86	10.81	1000+	101.77	4434190.33	72.23
8-Apr-02	2.14	43.81	0.23	7.53	817	523	92.21	10.60	1000+	86.88	3785595.83	61.69
9-Apr-02	1.51	30.80	2.81	7.56	902	577	95.18	10.20	1000+	61.08	2661468.25	47.91
10-Apr-02	1.37	28.06	3.52	7.60	875	560	95.57	10.02	1000+	55.64	2424326.35	42.35
11-Apr-02	1.45	29.56	3.77	7.65	935	599	95.92	10.01	1000+	58.61	2553589.63	47.68
12-Apr-02	1.22	24.87	5.71	7.69	899	576	95.09	9.44	1000+	49.31	2148603.88	38.56
13-Apr-02	1.11	22.63	7.68	7.72	890	570	94.54	8.95	1000+	44.87	1954966.16	34.74
14-Apr-02	1.22	24.90	8.58	7.75	894	572	93.10	8.59	1000+	49.39	2151763.81	38.38
15-Apr-02	1.50	30.71	8.40	7.75	853	546	91.83	8.51	1000+	60.89	2652943.78	45.16
16-Apr-02	1.75	35.86	7.24	7.72	746	477	91.89	8.76	1000+	71.11	3098347.28	46.11
17-Apr-02	1.99	40.66	6.48	7.68	629	403	92.97	9.05	1000+	80.63	3512959.80	44.13
18-Apr-02	1.45	29.61	5.97	7.69	565	362	94.56	9.33	1000+	58.71	2558072.33	28.88
19-Apr-02	1.34	27.34	5.73	7.93	576	368	93.24	9.21	964.20	54.22	2362509.25	27.14
20-Apr-02	1.24	25.39	3.89	8.24	621	397	91.93	9.43	809.83	50.34	2193430.82	27.17
21-Apr-02	1.21	24.74	4.43	8.30	659	422	93.13	9.43	740.92	49.06	2137580.86	28.11
22-Apr-02	1.13	23.07	5.37	8.33	655	419	92.66	9.17	682.33	45.75	1993546.73	26.07
23-Apr-02	1.01	20.74	7.08	8.37	658	421	91.22	8.64	531.38	41.13	1792192.90	23.53
24-Apr-02	1.08	22.12	6.86	8.40	673	430	91.85	8.75	555.83	43.87	1911241.51	25.65
25-Apr-02	1.28	26.14	7.83	8.41	667	427	91.51	8.51	750.63	51.83	2258099.21	30.06
26-Apr-02	1.17	23.91	9.48	8.42	584	374	89.89	8.04	715.96	47.41	2065563.79	24.06
27-Apr-02	1.29	26.42	9.29	8.42	535	342	89.15	7.99	732.63	52.40	2283084.72	24.37
28-Apr-02	1.81	37.06	8.41	8.34	574	367	89.68	8.20	981.71	73.48	3201669.72	36.65
29-Apr-02	1.55	31.70	9.46	8.26	516	330	89.90	8.04	972.92	62.86	2738702.88	28.19
30-Apr-02	1.34	27.43	11.17	8.37	558	357	88.41	7.60	738.25	54.39	2369799.14	26.40
April Averages	**1.44**	**29.54**	**5.49**	**7.93**	**713**	**456**	**92.62**	**9.27**	**895.43**	**58.57**	**2551843.71**	**36.30**
1-May-02	1.56	31.83	10.55	8.47	528	338	87.85	7.64	865.42	63.12	2750240.31	28.99
2-May-02	1.66	33.91	9.32	8.47	429	274	89.82	8.06	915.50	67.24	2929548.10	25.06
3-May-02	1.34	27.38	9.14	8.47	388	248	89.75	8.08	697.33	54.29	2365610.40	18.30

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
4-May-02	1.30	26.67	9.89	8.50	451	289	90.43	8.01	525.00	52.88	2303881.48	20.76
5-May-02	1.30	26.57	10.45	8.55	481	308	89.41	7.80	514.38	52.68	2295283.53	22.05
6-May-02	1.38	28.15	10.73	8.40	462	296	91.88	7.98	570.43	55.83	2432577.87	22.46
7-May-02	1.35	27.61	11.50	8.21	428	274	92.95	7.94	553.75	54.75	2385672.29	20.40
8-May-02	1.37	27.98	9.26	8.24	411	263	93.34	8.40	558.83	55.48	2417345.10	19.84
9-May-02	1.39	28.44	8.17	8.26	384	246	94.78	8.78	631.21	56.40	2457542.38	18.83
10-May-02	1.14	23.40	8.80	8.28	365	234	93.62	8.52	429.75	46.41	2022133.09	14.73
11-May-02	1.13	23.07	9.38	8.30	372	238	94.05	8.45	359.33	45.75	1993546.73	14.82
12-May-02	1.13	23.21	9.93	8.36	401	256	95.55	8.49	353.29	46.02	2004937.18	16.02
13-May-02	1.12	22.83	11.77	8.40	443	284	95.01	8.09	337.50	45.26	1972088.58	17.45
14-May-02	1.07	21.96	11.87	8.44	514	329	93.12	7.89	381.92	43.55	1897499.48	19.46
15-May-02	1.08	22.18	12.27	8.47	480	307	92.84	7.80	398.88	43.98	1916238.61	18.34
16-May-02	1.07	21.98	11.60	8.51	430	275	92.37	7.87	344.79	43.59	1899042.70	16.31
17-May-02	1.07	21.99	12.60	8.51	437	280	93.08	7.78	338.58	43.62	1900365.47	16.59
18-May-02	1.04	21.37	14.65	8.54	434	278	91.51	7.30	494.08	42.37	1845985.23	15.99
19-May-02	1.03	21.10	15.12	8.57	435	279	91.87	7.26	441.25	41.84	1822983.87	15.84
20-May-02	1.01	20.70	15.80	8.59	506	324	91.13	7.08	465.54	41.05	1788665.53	18.05
21-May-02	1.00	20.39	12.69	8.64	455	291	89.52	7.44	341.71	40.43	1761475.41	15.99
22-May-02	1.00	20.47	7.86	8.65	425	272	93.07	8.67	581.58	40.59	1768603.63	15.00
23-May-02	0.96	19.72	9.69	8.65	413	264	94.26	8.43	444.75	39.10	1703788.28	14.04
24-May-02	0.90	18.48	11.10	8.65	410	262	92.80	8.01	403.92	36.65	1596644.52	13.06
25-May-02	0.84	17.11	12.15	8.66	437	280	88.05	7.45	333.92	33.92	1478110.31	12.90
26-May-02	0.82	16.76	13.54	8.68	451	289	78.83	6.45	61.50	33.24	1448274.67	13.05
27-May-02	0.80	16.31	14.25	8.72	461	295	73.84	5.95	48.71	32.35	1409473.64	12.96
28-May-02	0.78	15.95	14.57	8.55	518	331	84.39	6.70	370.14	31.62	1377811.33	14.23
29-May-02	0.76	15.50	14.93	8.32	569	364	97.57	7.77	278.46	30.73	1338926.31	15.21
30-May-02	0.74	15.17	17.15	8.36	571	365	96.82	7.37	276.42	30.08	1310707.38	14.94
31-May-02	0.72	14.70	18.45	8.41	576	369	95.35	7.06	281.38	29.16	1270363.13	14.61
May Averages	**1.05**	**21.42**	**12.15**	**8.48**	**454**	**291**	**91.48**	**7.74**	**397.18**	**42.48**	**1850713.13**	**16.78**
1-Jun-02	0.70	14.27	17.19	8.47	576	369	94.33	7.15	249.88	28.31	1233325.78	14.19
2-Jun-02	0.67	13.66	15.38	8.52	585	375	94.49	7.44	261.33	27.09	1180341.80	13.79
3-Jun-02	0.62	12.74	14.16	8.55	596	381	95.64	7.72	232.63	25.27	1101123.03	13.09
4-Jun-02	0.60	12.31	14.86	8.58	588	377	99.12	7.91	204.42	24.40	1063203.84	12.48
5-Jun-02	0.61	12.42	16.05	8.61	586	375	98.28	7.65	198.96	24.64	1073491.99	12.56
6-Jun-02	0.60	12.24	16.58	8.63	589	377	96.85	7.44	225.00	24.28	1057839.30	12.44
7-Jun-02	0.55	11.24	15.68	8.66	602	385	94.83	7.42	169.88	22.29	971051.39	11.67
8-Jun-02	0.51	10.46	15.61	8.69	619	396	94.29	7.39	169.67	20.74	903737.48	11.16
9-Jun-02	0.47	9.67	14.99	8.72	643	411	93.29	7.42	155.54	19.17	835174.30	10.71

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
10-Jun-02	0.44	8.99	12.99	8.75	669	428	94.97	7.90	158.29	17.82	776311.37	10.36
11-Jun-02	0.41	8.39	13.98	8.74	693	444	94.63	7.71	165.13	16.64	724870.61	10.03
12-Jun-02	0.39	7.97	15.38	8.76	708	453	94.18	7.44	167.46	15.80	688421.16	9.73
13-Jun-02	0.39	7.92	16.72	8.77	711	455	93.33	7.16	199.88	15.70	684011.95	9.71
14-Jun-02	0.37	7.56	19.79	8.80	714	457	94.51	6.79	88.43	14.98	652895.54	9.30
15-Jun-02	0.36	7.34	19.63	8.80	725	464	96.24	6.78	85.06	14.55	633902.60	9.18
16-Jun-02	0.34	7.05	20.43	8.83	742	475	94.81	6.61	75.76	13.98	609314.78	9.02
17-Jun-02	0.29	5.96	19.51	8.66	753	481	103.35	7.02	70.46	11.82	514834.03	7.73
18-Jun-02	0.24	5.04	19.51	8.66	753	481	103.35	7.02	67.69	9.99	435468.29	6.54
19-Jun-02	0.18	3.81	19.71	8.51	783	501	100.40	7.22	49.42	7.55	328923.73	5.14
20-Jun-02	0.17	3.55	17.66	8.49	788	504	94.86	7.10	45.92	7.04	306583.75	4.82
21-Jun-02	0.12	2.53	16.84	8.50	801	513	94.03	7.16	39.63	5.01	218179.13	3.49
22-Jun-02	0.06	1.37	17.06	8.48	816	522	93.33	7.07	36.29	2.71	118163.59	1.92
23-Jun-02	0.07	1.43	17.68	8.47	825	528	94.55	7.09	35.21	2.85	123969.05	2.04
24-Jun-02	0.05	1.06	19.79	8.45	838	536	94.51	6.78	38.63	2.09	91267.42	1.53
25-Jun-02	0.05	1.00	20.09	8.47	848	543	95.31	6.77	33.88	1.98	86400.00	1.46
26-Jun-02	0.05	1.00	19.81	8.50	855	548	95.58	6.83	28.71	1.98	86400.00	1.48
27-Jun-02	0.05	1.00	19.65	8.53	879	563	97.34	6.97	25.75	1.98	86400.00	1.52
28-Jun-02	0.05	1.00	19.74	8.53	905	579	97.02	6.93	22.29	1.98	86400.00	1.56
29-Jun-02	0.05	1.00	19.47	8.52	940	601	94.41	6.78	21.04	1.98	86400.00	1.62
30-Jun-02	0.05	1.00	19.12	8.51	985	630	93.63	6.76	21.04	1.98	86400.00	1.70
June Averages	**0.32**	**6.50**	**17.50**	**8.61**	**737**	**472**	**95.85**	**7.18**	**111.44**	**12.89**	**561493.53**	**8.26**
1-Jul-02	0.05	less 1cfs	19.59	8.52	1020	652	94.08	6.72	15.42			
2-Jul-02	0.05	less 1cfs	20.31	8.48	1092	699	96.40	6.77	15.42			
3-Jul-02	0.05	less 1cfs	19.20	8.49	1118	716	95.81	6.90	12.17			
4-Jul-02	0.05	less 1cfs	19.74	8.49	1166	746	99.50	7.08	12.54			
5-Jul-02	0.05	less 1cfs	20.19	8.48	1193	763	99.63	7.02	11.08			
6-Jul-02	0.05	less 1cfs	20.44	8.44	1241	794	94.99	6.62	11.04			
7-Jul-02	0.05	less 1cfs	20.51	8.37	1249	800	96.17	6.59	10.46			
8-Jul-02	0.05	less 1cfs	19.49	8.29	1263	809	95.02	6.55	9.75			
9-Jul-02	0.05	less 1cfs	14.87	8.05	1285	823	54.67	4.27	10.17			
July Averages	**0.05**	**less 1cfs**	**19.37**	**8.40**	**1181**	**756**	**91.81**	**6.50**	**12.00**			

2001 Rc-3 Station Data

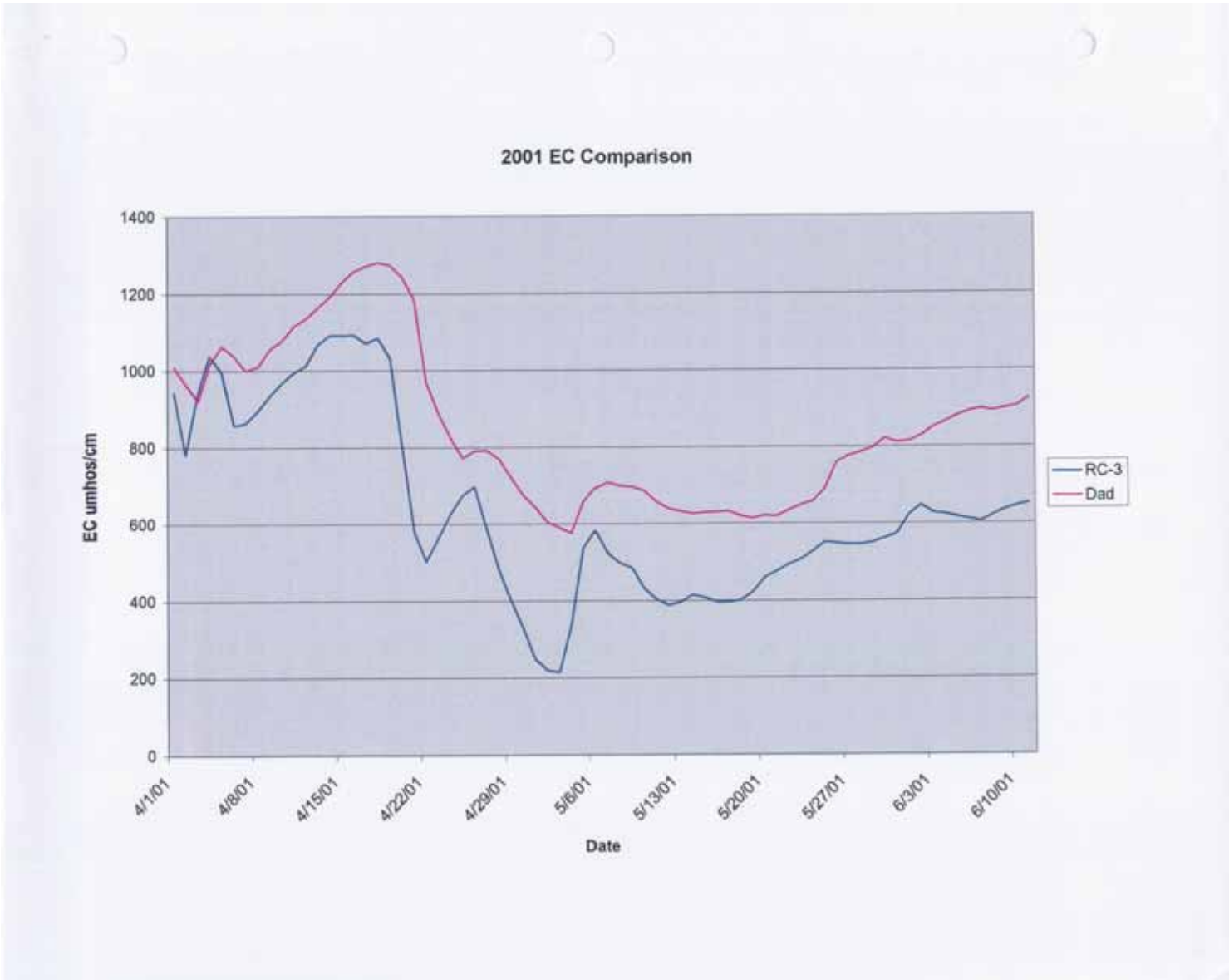
Note: Daily values are mean values based on continuous hourly data

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
30-Mar-01			-0.24	8.12	960	614	88.53	10.13	+1000 ntu			
31-Mar-01			-0.23	8.23	939	601	89.45	10.23	848.00			
March Averages			**-0.23**	**8.18**	**950**	**608**	**88.99**	**10.18**	**924.00**			
1-Apr-01			-0.24	8.29	943	603	89.59	10.25	975.00			
2-Apr-01			-0.23	8.29	781	500	86.98	9.96	+1000 ntu			
3-Apr-01			0.01	8.28	940	602	82.51	9.38	+1000 ntu			
4-Apr-01	2.04	55.54	4.39	8.29	1038	664	70.50	7.06	+1000 ntu	110.13	4798552.72	99.43
5-Apr-01	2.10	58.14	6.22	8.31	996	637	91.74	8.83	880.75	115.29	5023436.05	99.83
6-Apr-01	2.49	75.96	5.56	8.35	858	549	90.36	8.84	+1000 ntu	150.64	6563297.22	112.40
7-Apr-01	2.52	77.20	4.41	8.37	863	552	91.75	9.24	+1000 ntu	153.08	6669660.35	114.81
8-Apr-01	1.81	46.48	3.68	8.43	895	573	92.06	9.46	926.27	92.17	4015814.06	71.74
9-Apr-01	1.51	35.41	3.88	8.48	934	598	93.23	9.54	+1000 ntu	70.21	3059195.17	57.02
10-Apr-01	1.27	27.84	5.09	8.50	969	620	90.88	9.00	967.00	55.21	2405348.45	46.50
11-Apr-01	1.21	25.70	4.86	8.54	995	637	90.33	9.00	796.71	50.96	2220492.44	44.10
12-Apr-01	1.15	23.88	4.73	8.58	1013	648	90.67	9.06	667.54	47.35	2062930.51	41.70
13-Apr-01	1.07	21.52	3.81	8.61	1067	683	92.36	9.46	525.46	42.67	1859196.42	39.59
14-Apr-01	1.02	20.33	4.40	8.63	1092	699	92.09	9.28	473.75	40.32	1756562.89	38.29
15-Apr-01	1.01	19.95	5.24	8.65	1091	698	92.79	9.18	427.46	39.56	1723622.51	37.52
16-Apr-01	0.94	18.04	7.87	8.66	1093	700	91.82	8.50	357.46	35.77	1558604.77	34.00
17-Apr-01	1.10	22.51	9.62	8.67	1070	685	92.93	8.24	490.13	44.63	1944717.84	41.54
18-Apr-01	1.27	27.56	10.18	8.42	1085	695	90.64	7.73	743.95	54.65	2381159.94	51.58
19-Apr-01	1.66	40.99	10.57	7.98	1031	660	87.78	7.63	944.50	81.29	3541872.60	72.92
20-Apr-01	2.25	64.41	8.76	7.88	804	514	86.68	7.87	978.00	127.73	5565127.12	89.26
21-Apr-01	2.59	79.96	6.73	7.84	578	370	88.40	8.44	+1000 ntu	158.55	6908257.13	79.66
22-Apr-01	2.21	63.00	5.58	7.84	504	323	89.38	8.79	952.00	124.93	5443187.36	54.76
23-Apr-01	1.82	46.86	6.07	7.89	565	361	92.19	8.96	+1000 ntu	92.93	4049089.67	45.64
24-Apr-01	1.60	38.58	7.00	7.93	628	402	90.95	8.64	856.37	76.50	3333311.15	41.76
25-Apr-01	1.45	33.67	9.28	7.97	674	432	89.54	8.06	693.96	66.77	2909300.90	39.15
26-Apr-01	1.73	43.44	11.45	7.99	697	446	87.99	7.52	904.64	86.14	3753266.26	52.23
27-Apr-01	2.30	66.69	12.37	7.95	589	377	81.27	6.80	721.69	132.24	5761665.98	67.74
28-Apr-01	3.01	101.90	11.84	7.82	482	308	83.94	7.10	909.69	202.07	8804150.10	84.62

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
29-Apr-01	3.17	110.98	10.61	7.81	403	258	84.23	7.32	987.00	220.07	9588558.15	77.16
30-Apr-01	3.25	115.18	9.32	7.81	330	211	86.91	7.45	704.00	228.40	9951421.96	65.48
April Averages	**1.83**	**50.43**	**6.44**	**8.23**	**834**	**533**	**88.75**	**8.55**	**829.44**	**100.01**	**4357474.06**	**72.49**
1-May-01	2.68	85.13	9.39	7.86	249	159	86.60	7.65	712.00	168.81	7354979.99	36.54
2-May-01	2.63	82.23	7.30	7.87	220	141	90.43	8.39	+1000 ntu	163.07	7105033.79	31.18
3-May-01	2.27	66.19	3.63	7.90	215	138	92.32	8.94	+1000 ntu	131.26	5719104.05	24.55
4-May-01	0.85	16.39	6.14	7.93	338	216	92.64	8.57	790.78	32.50	1415975.80	9.54
5-May-01	1.57	44.49	8.18	8.02	538	344	89.65	8.31	805.00	88.22	3843762.98	41.25
6-May-01	2.61	81.93	7.57	8.02	582	372	90.12	8.47	977.00	162.46	7078627.52	82.17
7-May-01	2.57	80.07	8.08	8.03	523	334	90.95	8.45	946.00	158.78	6918258.74	72.15
8-May-01	2.22	63.51	9.84	8.06	498	319	89.41	7.98	+1000 ntu	125.94	5487039.02	54.61
9-May-01	2.34	68.73	10.76	8.08	485	311	88.19	7.69	+1000 ntu	136.29	5938330.35	57.51
10-May-01	2.53	77.55	12.00	8.08	432	277	88.09	7.47	+1000 ntu	153.78	6700123.39	57.81
11-May-01	2.41	71.79	12.45	8.09	404	259	88.64	7.44	+1000 ntu	142.35	6202284.12	50.02
12-May-01	2.25	64.89	13.65	8.09	389	249	87.97	7.19	940.42	128.69	5606921.57	43.48
13-May-01	2.03	55.38	14.10	8.11	395	253	87.12	7.05	851.29	109.83	4785120.44	37.76
14-May-01	1.94	51.64	14.84	8.15	415	265	86.75	6.91	796.74	102.40	4461544.67	36.93
15-May-01	1.97	52.69	13.94	8.18	408	261	86.18	6.99	780.54	104.48	4552415.49	37.04
16-May-01	1.92	50.80	13.88	8.19	396	254	86.49	7.03	704.58	100.74	4389115.59	34.72
17-May-01	1.90	49.99	13.55	8.21	396	254	86.50	7.08	621.83	99.14	4319470.56	34.16
18-May-01	1.77	45.10	12.46	8.24	401	257	86.97	7.29	570.79	89.43	3896393.62	31.19
19-May-01	1.59	38.47	13.78	8.24	421	270	86.59	7.06	476.38	76.28	3323570.70	27.95
20-May-01	1.54	36.52	12.89	8.29	460	295	85.37	7.09	482.71	72.42	3155566.92	29.00
21-May-01	1.43	32.99	10.40	8.32	476	304	88.18	7.77	424.50	65.42	2850323.13	27.06
22-May-01	1.35	30.09	12.18	8.35	493	316	87.52	7.41	358.75	59.68	2600133.61	25.60
23-May-01	1.31	29.02	14.27	8.36	506	324	85.96	6.94	342.71	57.55	2507322.17	25.33
24-May-01	1.20	25.37	15.16	8.39	527	337	84.34	6.68	340.17	50.30	2191713.55	23.04
25-May-01	1.13	23.28	15.65	8.24	552	353	88.00	6.90	321.77	46.16	2011238.12	22.15
26-May-01	1.07	21.74	15.74	8.27	549	351	98.09	7.64	302.25	43.11	1878165.51	20.57
27-May-01	1.05	21.08	15.88	8.28	546	349	96.94	7.53	299.04	41.81	1821461.92	19.83
28-May-01	1.04	20.67	14.76	8.30	545	349	96.10	7.65	298.42	40.99	1785827.10	19.44
29-May-01	1.05	21.04	15.19	8.31	550	352	95.86	7.57	304.54	41.73	1818015.93	19.96
30-May-01	1.05	21.18	15.62	8.31	561	360	95.96	7.50	387.79	42.00	1830014.39	20.52
31-May-01	0.98	19.04	16.34	8.34	573	367	95.83	7.39	285.00	37.75	1644844.12	18.81
May Averages	**1.75**	**46.74**	**12.25**	**8.16**	**453**	**290**	**89.67**	**7.55**	**649.06**	**92.69**	**4038474.16**	**36.51**
1-Jun-01	0.92	17.57	16.98	8.35	623	399	94.95	7.22	255.38	34.84	1518068.93	18.87

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
2-Jun-01	0.87	16.04	16.54	8.36	647	414	93.76	7.18	308.29	31.80	1385595.83	17.90
3-Jun-01	0.85	15.59	15.95	8.39	628	402	93.55	7.26	289.04	30.91	1346595.41	16.88
4-Jun-01	0.83	15.04	12.45	8.42	624	399	94.99	7.96	291.54	29.82	1299293.07	16.18
5-Jun-01	0.83	15.08	11.92	8.43	617	395	96.68	8.21	264.25	29.90	1302811.62	16.04
6-Jun-01	0.95	18.22	14.68	8.44	610	390	96.84	7.75	253.58	36.12	1573928.38	19.17
7-Jun-01	0.92	17.59	16.59	8.46	605	387	96.41	7.40	214.67	34.87	1519473.45	18.34
8-Jun-01	0.90	16.90	17.03	8.47	621	397	94.97	7.22	214.04	33.50	1459794.26	18.09
9-Jun-01	0.83	15.18	17.17	8.48	635	406	94.29	7.13	216.92	30.11	1311833.45	16.63
10-Jun-01	0.83	15.05	16.86	8.51	645	413	94.57	7.21	206.33	29.84	1300141.26	16.73
11-Jun-01	0.80	14.44	17.72	8.52	651	417	93.45	7.00	191.17	28.64	1248001.56	16.22
12-Jun-01	0.78	13.73	15.64	8.55	658	421	91.68	7.15	204.63	27.23	1186353.16	15.58
13-Jun-01	0.76	13.27	11.62	8.58	664	425	93.23	7.96	198.92	26.31	1146285.30	15.19
14-Jun-01	0.78	13.83	10.95	8.59	662	424	93.53	8.12	205.25	27.43	1195150.51	15.79
15-Jun-01	0.84	15.40	13.31	8.59	653	418	92.12	7.59	215.71	30.54	1330561.17	17.33
16-Jun-01	0.80	14.46	15.28	8.59	655	419	91.62	7.24	181.25	28.68	1249592.61	16.33
17-Jun-01	0.75	13.02	16.60	8.60	668	427	90.28	6.92	160.96	25.81	1124661.94	14.99
18-Jun-01	0.70	11.92	16.04	8.51	674	432	92.80	7.18	120.05	23.63	1029542.91	13.86
19-Jun-01	0.66	10.93	16.25	8.35	668	428	96.85	7.50	77.29	21.68	944575.16	12.59
20-Jun-01	0.63	10.14	17.62	8.32	677	433	95.60	7.18	74.50	20.10	875668.83	11.83
21-Jun-01	0.61	9.64	18.80	8.33	679	434	94.80	6.96	79.83	19.12	833251.16	11.29
22-Jun-01	0.60	9.59	19.74	8.34	680	435	94.13	6.78	74.13	19.01	828296.18	11.24
23-Jun-01	0.58	9.08	19.39	8.34	685	439	93.13	6.74	76.13	18.00	784479.09	10.73
24-Jun-01	0.56	8.58	19.05	8.35	691	442	93.27	6.79	77.08	17.01	741231.62	10.22
25-Jun-01	0.54	8.23	19.07	8.37	696	446	93.30	6.79	78.54	16.31	710799.39	9.88
26-Jun-01	0.53	8.01	18.57	8.37	697	446	91.70	6.75	98.96	15.88	691895.35	9.62
27-Jun-01	0.53	7.86	19.07	8.37	693	444	92.10	6.71	88.54	15.59	679256.52	9.40
28-Jun-01	0.47	6.78	20.77	8.39	696	445	92.71	6.53	73.38	13.44	585373.14	8.13
29-Jun-01	0.43	5.85	21.38	8.40	691	442	91.76	6.39	70.67	11.61	505865.03	6.97
30-Jun-01	0.43	5.76	21.63	8.41	688	440	92.02	6.38	74.71	11.42	497430.60	6.83
June Averages	**0.72**	**12.43**	**16.82**	**8.44**	**659**	**422**	**93.70**	**7.17**	**164.52**	**24.64**	**1073526.90**	**14.13**
1-Jul-01	0.40	5.16	20.72	8.43	699	447	91.68	6.45	76.04	10.24	445992.41	6.22
2-Jul-01	0.36	4.33	20.51	8.44	709	454	91.88	6.51	69.42	8.59	374178.70	5.29
3-Jul-01	0.34	3.94	21.90	8.44	721	461	89.53	6.16	71.96	7.81	340398.09	4.90
4-Jul-01	0.31	3.36	21.83	8.45	730	467	93.54	6.44	79.13	6.67	290557.79	4.23
5-Jul-01	0.28	2.96	21.27	8.47	741	474	90.95	6.33	87.13	5.88	256001.25	3.78
6-Jul-01	0.28	2.78	22.35	8.49	745	477	86.53	5.90	88.08	5.52	240556.94	3.58
7-Jul-01	0.27	2.72	21.89	8.49	747	478	86.49	5.94	91.67	5.40	235209.03	3.51
8-Jul-01	0.27	2.63	22.73	8.49	748	479	85.94	5.81	90.67	5.21	227187.17	3.39

Date	Stage ft	Est. cfs	Temp C	pH	EC umhos/cm	TDS mg/l	DO %	DO mg/l	Trb ntu	Acre Feet	ft^3/day	Tons DS/day
9-Jul-01	0.26	2.55	22.98	8.50	751	480	90.46	6.08	89.50	5.06	220502.29	3.30
10-Jul-01	0.27	2.68	22.40	8.51	754	482	88.97	6.05	87.96	5.31	231198.10	3.48
11-Jul-01	0.29	3.03	20.60	8.53	783	501	91.12	6.41	111.29	6.00	261405.92	4.09
12-Jul-01	0.33	3.87	21.73	8.53	734	469	94.44	6.51	94.42	7.68	334765.60	4.90
13-Jul-01	0.33	3.75	21.33	8.55	739	473	93.60	6.50	79.33	7.44	324199.04	4.78
14-Jul-01	0.30	3.19	20.12	8.55	741	474	91.20	6.49	74.21	6.33	275990.82	4.08
15-Jul-01	0.30	3.28	19.15	8.49	749	480	83.59	6.08	134.10	6.50	283113.71	4.23
16-Jul-01	0.29	3.11	18.18	8.60	755	483	89.65	6.64	135.79	6.17	268871.50	4.05
17-Jul-01	0.29	3.07	17.32	8.61	740	474	89.85	6.77	105.17	6.08	265010.42	3.91
18-Jul-01	0.28	2.87	17.47	8.61	750	480	89.05	6.70	98.63	5.70	248279.09	3.71
19-Jul-01	0.25	2.32	16.35	8.56	735	470	87.46	6.72	95.73	4.59	200115.61	2.93
20-Jul-01		1.47	21.63	8.37	802	513	109.58	7.58	20.62	2.92		
21-Jul-01		Less 1 cfs	19.47	8.28	823	527	98.60	7.09	26.625			
22-Jul-01		Less 1 cfs	18.79	8.28	865	553	96.68	7.04	28.83			
23-Jul-01		Less 1 cfs	18.24	8.30	899	575	97.08	7.14	30.58			
24-Jul-01		Less 1 cfs	18.70	8.29	933	597	97.00	7.07	27.42			
25-Jul-01		Less 1 cfs	19.85	8.27	982	628	96.10	6.84	31.54			
26-Jul-01		Less 1 cfs	18.87	8.29	1031	660	94.80	6.90	35.96			
27-Jul-01		Less 1 cfs	19.29	8.31	1049	671	95.28	6.86	38.50			
28-Jul-01		Less 1 cfs	18.06	8.36	1056	676	89.51	6.61	46.67			
29-Jul-01		Less 1 cfs	17.97	8.39	1095	701	87.79	6.50	45.08			
30-Jul-01		Less 1 cfs	18.37	8.38	1126	721	84.68	6.21	49.83			
31-Jul-01		Less 1 cfs	19.51	8.38	1179	755	84.14	6.03	49.54			
July Averages	**0.29**	**2.38**	**19.99**	**8.44**	**836**	**535**	**91.52**	**6.53**	**70.69**	**4.72**	**205632.00**	**3.43**
1-Aug-01		Less 1 cfs	18.17	8.38	1232	789	82.97	6.10	45.5			
2-Aug-01		Less 1 cfs	18.85	8.21	1150	736	82.91	6.00	45.7			
August Averages		**Less 1 cfs**	**18.51**	**8.29**	**1191**	**762**	**82.94**	**6.05**	**45.6**			


2001 EC Comparison
EC umhos/cm
1400
1200
1000
800
600
400
200
0
4/1/01
4/8/01
4/15/01
4/22/01
4/29/01
5/6/01
5/13/01
5/20/01
5/27/01
6/3/01
6/10/01
Date
RC-3
Dad

Dry Cow Creek

Grab Sample Data

Stream: **Dry Cow**

Date & Time: **5/13/02**

Dry Cow is dry at this time.

Grab Sample Data

Stream: **Dry Cow**

Site ID: 4DCow2

Site Coordinates: T16N, R91W, Sec. 29, NE1/4 of SW1/4

Date & Time: **4/16/02** @ 11:44

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.41 25.4= 594.614

Discharge Measurement: Visual Flow approx. Less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
114330	7.49	8.47	2.15	1.37	93.9	8.73	15.2
114335	7.47	8.47	2.15	1.37	93.9	8.73	14.1
114340	7.47	8.46	2.15	1.37	93.9	8.73	13.9
114345	7.48	8.47	2.15	1.37	93.8	8.72	13.1
114350	7.47	8.47	2.15	1.37	93.8	8.73	15
114355	7.48	8.47	2.15	1.37	93.8	8.72	12.6
114400	7.48	8.47	2.15	1.37	93.8	8.72	13
114405	7.47	8.47	2.15	1.38	93.7	8.72	13.2
114410	7.48	8.47	2.15	1.37	93.7	8.71	14
114456	7.48	8.47	2.15	1.38	93.6	8.71	13
114500	7.48	8.47	2.15	1.37	93.6	8.7	12.8
Averages	**7.48**	**8.47**	**2.15**	**1.37**	**93.77**	**8.72**	**13.63**
Lab	**n/a**	**8.50**	**2.21**	**1.69**	**n/a**	**n/a**	**12.80**
SAR=	**4.40**						

Notes:

4/16/02 Dry Cow, Light rain 4/15, Flow= less than 1 cfs, Air Temp= 3.2C, Wind Ave= 9.2 mph, Rel Hum= 41%, First sample reading due to no flow

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0417-36845
D/T REC: 4/17/02 11:00 BY: KH
DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/02	Conductivity	2.15
Time Collected	11:50	Dissolved O_2	93.8%, 8.72 mg/L
Discharge	< 1 cFS	Turbidity	~13.0 ntu
Temperature	7.48°C	pH	8.47

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 D Cow 2
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 4/25	mg/L	100.	Carbonate KH 4/19	mg/L	13
Magnesium	mg/L	100	Bicarbonate	mg/L	230
Sodium	mg/L	260	Fluoride RWH 4.17.02	mg/L	04
Potassium	mg/L	6	Chloride	mg/L	35
TDS (ROE 180) 4/18/02 Jm	mg/L	1692	Nitrate as N	mg/L	<0.1
TSS 4/18/02 Jm	mg/L	13.5	Nitrite as N	mg/L	<0.1
pH KH 4/19	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/18/02 Jm	umhos/cm	2210	Sulfate 4.18.02	mg/L	~~400~~ 990
Turbidity 4/18/02 Jm	NTU	12.8	Total Phosphate KH 4/30	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	210
			Hardness as $CaCO_3$ 4/29	mg/L	660

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts: KH 5-1-02

I hereby certify the above was analyzed by myself or my assistant.

Glenn L. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: [illegible]
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	16-Apr-2002		Lab No:	36845	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	100	4.99	Carbonate	13	0.43
Magnesium	100	8.22	Bicarbonate	230	3.77
Sodium	260	11.31	Chloride	35	0.99
Potassium	6	0.15	Fluoride	0.4	0.02
T. CATIONS		**24.67**	Nitrate as N	0	0.00
ROE 180	mg/L	1692	Nitrite as N	0	0.00
TSS	mg/L	13.5	Ortho phosphate	0	0.00
Turbidity	NTU	12.8	Sulfate	990	20.61
			T. ANIONS		**25.82**

Conductance, umhos/cm	2210	S A R (sodium Hazard)	4.40
TDS by Summation, mg/L	1617	T Alk CaCO3, mg/L	210
pH, Units	8.5	Hardness as CaCO3, mg/L	661
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	39

Analyte	Units	Result
Total Phosphate	mg/L	0.04
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.77**
Meq Cations/Sp cond/100	**1.12**
Meq Anions/Sp cond/100	**1.17**
ROE/TDS Summation	**1.05**

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})} = \mathbf{2.27\%}\ (<5\%)$$

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.73** (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = \mathbf{1.14}\ (0.8\ \text{TO}\ 1.2)$$

OVERALL =	**0.0146**	MAX. OVERALL ALLOWED =	0.0531

KWH

Grab Sample Data

Stream: **Dry Cow**

Site ID: 4drycow1

Site Coordinates: T16N, R91W, Sec. 29, NE1/4 of SW1/4

Date & Time: **4/11/01** 9:50

Elevation: 6520

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Calibrated on 4/5/01

DO Calibration: Bar Pressure Reading 23.38 X25.4= 593.852

Discharge Measurment: Visual- approx. 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
94925	3.87	8.6	2.87	1.84	92.3	9.37	34.4
94930	3.87	8.6	2.9	1.85	92.3	9.37	35.7
94935	3.87	8.6	2.91	1.86	92.3	9.36	33.1
94940	3.87	8.6	2.9	1.85	92.3	9.37	37.4
94945	3.87	8.6	2.9	1.85	92.3	9.36	37.4
94950	3.87	8.6	2.91	1.86	92.3	9.37	34.1
94955	3.88	8.6	2.86	1.83	92.2	9.36	34.7
95000	3.87	8.6	2.84	1.82	92.2	9.36	35.5
95005	3.87	8.6	2.86	1.83	92.3	9.37	37.5
95010	3.87	8.6	2.86	1.83	92.3	9.37	37.6
95015	3.87	8.6	2.88	1.84	92.2	9.36	37
95020	3.87	8.6	2.88	1.84	92.3	9.37	36.4
95025	3.83	8.6	2.91	1.86	92.3	9.37	36.3
95030	3.88	8.6	2.9	1.85	92.2	9.35	32.6
95109	3.88	8.6	2.89	1.85	92.2	9.35	37
95110	3.88	8.6	2.88	1.84	92.1	9.35	36.7
95115	3.88	8.6	2.85	1.82	92.2	9.35	37.8
Averages	**3.87**	**8.60**	**2.88**	**1.84**	**92.25**	**9.36**	**35.95**
Lab	**n/a**	**8.4**	**3.00**	**2.42**	**n/a**	**n/a**	**48.40**
SAR=	**6.115**						
Comment							

Dry Cow Creek 4/11/01 Recent precip. 4/8 and 4/9, cool and cloudy
Lab analysis attached

Dry Cow

4 D Cow 1

$Na^{+} = 410/22.99 = 17.834$

$Ca^{2+} = 110/20.04 = 5.489$

$Mg^{2+} = 140/12.15 = 11.523$

$SAR = \left(17.834/((5.489 + 11.523)/2\right)^{0.5}$

$8.506\sqrt{} = 2.9165$

$1/x = .3428$

$\times 17.834$

$= \boxed{SAR\ 6.115}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0412-29841

D/T REC: 04-12-01 11:00 CA BY:

DATE COMPLETED: 4.27.01

COLLECTION DATA & FIELD MEASUREMENTS			
Date Collected	4/11/01	Conductivity	2264
Time Collected	9:55	Dissolved O_2	9228. 9.36 mg/L
Discharge	R / cfs	Turbidity	R 35 NTU
Temperature	3.87°C	pH	8.6

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID	4 Dry Cow
Sampled By	LSRCD/Sheehan
Comments:	Dry Cow
Invoice #	VOSR
Amount	$45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SM4 4/9	mg/L	110	Carbonate SM4 4/13	mg/L	4
Magnesium	mg/L	140	Bicarbonate	mg/L	240
Sodium	mg/L	410	Fluoride EWH 4.12.01	mg/L	0.5
Potassium	mg/L	7.8	Chloride	mg/L	46
TDS (ROE 180) EWH 4.12.01	mg/L	2420	Nitrate as N	mg/L	<0.1
TSS EWH 4.17.01	mg/L	50.0	Nitrite as N	mg/L	<0.1
pH SM4 4/13	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab	umhos/cm	3000	Sulfate EWH 4.25.01	mg/L	1400
Turbidity EWH 4.12.01	NTU	48.4	Total Phosphate SM4 4/13	mg/L	0.20
			Total Alkalinity as $CaCO_3$	mg/L	210
			Hardness as $CaCO_3$ 4/20	mg/L	850

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] OK	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Dry Cow

Site ID: 3dcow0

Site Coordinates: T16N, R91W, Sec. 29, NE1/4 of SW1/4

Date & Time: 3/27/00 1015

Elevation: 6520

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 3/27/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.72 X25.4= 602.488

Discharge Measurment: Visual- approx. 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:15:05	6.59	8.59	2.9	1.85	88.8	8.53	20.8
10:15:10	6.59	8.59	2.9	1.85	88.6	8.5	16.1
10:15:15	6.59	8.59	2.9	1.85	88.6	8.51	15.3
10:15:20	6.59	8.59	2.9	1.85	88.9	8.53	20.8
10:15:25	6.59	8.59	2.9	1.85	88.9	8.54	14.5
10:15:30	6.59	8.59	2.9	1.85	88.8	8.54	20.5
10:15:35	6.59	8.59	2.9	1.85	88.7	8.51	19.9
10:15:40	6.59	8.59	2.9	1.85	88.5	8.5	26
10:15:45	6.59	8.59	2.9	1.85	88.7	8.51	16.8
10:15:50	6.6	8.59	2.9	1.85	88.4	8.48	19.9
10:15:55	6.59	8.59	2.9	1.85	88.3	8.48	18.3
10:16:00	6.6	8.59	2.9	1.85	88.4	8.48	15.5
10:16:05	6.6	8.59	2.9	1.85	88.5	8.5	18.4
10:16:10	6.6	8.59	2.9	1.85	88.6	8.51	17.3
Averages	**6.59**	**8.59**	**2.900**	**1.850**	**88.62**	**8.51**	**18.58**

Comments:

Msg: 3/27/00 Visually 1-2 cfs, Lab sample taken

SAR value = 6.192

Dry Cow 3/27/06

Na^{+1} = 470 / 22.99 = 20.444
Ca^{+2} = 140 / 20.04 = 6.986
Mg^{+2} = 180 / 12.15 = 14.148

SAR = (20.444 / (6.986 + 14.815)/2)$^{0.5}$ = 6.192
3.302 3/27/06

21.801 / 2 = 10.900 Hun

$\sqrt{10.900}$ = 3.301 Hun

1/x Hun

x 20.444

= SAR 6.192

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0328 - 03122

D/T REC: 3/28/00 1400 BY: SW

DATE COMPLETED: 4-12-2000

Date Collected		03/27/00
Time Collected		10:17
Discharge		≈ 1-2 cfs
Temperature	degrees C	
pH	Units	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Dry Cow #2
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 0328 4/3/00	mg/L	140	Total Alkalinity as $CaCO_3$ 4/3/00	mg/L	340
Magnesium	mg/L	180	Fluoride 0328 3/28/00	mg/L	0.4
Sodium 4/5/00	mg/L	470	Chloride	mg/L	53
Potassium 4/5	mg/L	9.1	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/4/00	mg/L	1100	Nitrite as N	mg/L	<0.1
TDS (ROE 180) 0328 3-31-00	mg/L	2800	Ortho Phosphate	mg/L	<0.1
TSS ES 3-30-00	mg/L	8.7	Total Phosphate 0328 4/3/00	mg/L	0.05
pH 0328 3/31/00	Units	8.4	Sulfate @ 50 X 0328 3-30-00	mg/L	1700
Conductivity, Lab 4-11-00	umhos/cm	3400	Turbidity 0328 3-28-00	NTU	9.07

Carbonate 15
Bicarbonate 380

SAR = 6.289

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts: 0328 4-13-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Dry Cow

Site ID: 5drycow9

Site Coordinates: T16N, R91W, Sec. 29, NE1/4 of SW1/4

Date & Time: 5/5/99 1030

Elevation: 6520

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/5/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.38 X25.4= 593.852

Discharge Measurment: Visual- Less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:35:20	4	8.76	3.76	2.41	94.9	9.56	27
10:35:25	4.01	8.76	3.76	2.41	94.9	9.55	25.5
10:35:30	4	8.76	3.76	2.41	94.8	9.55	23.7
10:35:35	4	8.76	3.76	2.41	94.8	9.54	25.5
10:35:40	4.01	8.76	3.76	2.41	94.8	9.54	23.3
10:35:45	4	8.76	3.76	2.41	94.8	9.55	25.4
10:35:50	4	8.76	3.76	2.41	94.8	9.55	27.9
10:35:55	4	8.76	3.76	2.41	94.8	9.55	27.2
10:36:00	4.01	8.76	3.76	2.41	94.7	9.54	25.5
10:36:05	4	8.76	3.76	2.41	94.8	9.54	26.2
10:36:10	4.01	8.76	3.76	2.41	94.8	9.55	25.5
10:36:15	4.02	8.76	3.76	2.41	94.7	9.53	25.4
10:36:20	4.02	8.76	3.76	2.41	94.7	9.53	27.1
Averages	**4.01**	**8.76**	**3.76**	**2.41**	**94.79**	**9.54**	**25.78**

Comments:

Msg: Dry Cow Sample, Visually 1 to 2 cfs, Cloudy and cool, 5/5/99,
Recent precip in last two weeks.

Grab Sample Data

Stream: Dry Cow

Site ID: 4drycow9

Site Coordinates: T16N, R91W, Sec. 29, NE1/4 of SW1/4

Date & Time: 4/7/99 1330

Elevation: 6520

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/6/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.44 X25.4= 595.376

Discharge Measurment: Visual- Less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
13:35:10	10.12	8.66	3.78	2.42	108.6	9.4	3.4
13:35:15	10.13	8.66	3.78	2.42	108.3	9.38	9.8
13:35:20	10.14	8.66	3.78	2.42	108.2	9.36	9.3
13:35:25	10.14	8.66	3.78	2.42	108.1	9.36	7.5
13:35:30	10.14	8.66	3.78	2.42	107.9	9.34	4.4
13:35:35	10.14	8.66	3.79	2.42	108.1	9.36	8.1
13:35:40	10.15	8.66	3.78	2.42	108.2	9.36	10.2
13:35:45	10.15	8.66	3.78	2.42	108.3	9.37	5.5
13:35:50	10.14	8.66	3.78	2.42	108.3	9.38	7.2
13:35:55	10.16	8.66	3.79	2.42	108.4	9.38	8.3
13:36:00	10.16	8.66	3.78	2.42	108.3	9.37	2.3
13:36:05	10.16	8.66	3.79	2.42	108.2	9.36	3.9
13:36:10	10.19	8.67	3.78	2.42	108.2	9.36	5.6
13:36:15	10.19	8.66	3.79	2.42	108.2	9.36	8.8
Averages	**10.16**	**8.66**	**3.78**	**2.42**	**108.20**	**9.36**	**6.53**

Comments:
Msg: Dry Cow Sample, Sunny and Warm, Windy, Less than 1 cfs visually

Wild Cow

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 5WCow2

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: **5/13/02** @ 11:55

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 5/13/02

DO Calibration: Bar Pressure Reading 23.92 25.4= 607.568

Discharge Measurement: Visual Flow approx. less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115440	16.41	8.82	3.02	1.93	115.3	8.9	45
115445	16.41	8.82	2.98	1.9	115.4	8.91	39
115450	16.43	8.82	3.02	1.93	115.5	8.91	35.5
115455	16.43	8.82	2.98	1.91	115.4	8.91	39
115500	16.45	8.82	3.02	1.93	115.4	8.91	38.9
115505	16.42	8.82	3.02	1.93	115.3	8.9	44.3
115510	16.45	8.82	2.99	1.91	115.3	8.9	40.5
115515	16.45	8.82	3.01	1.92	115.5	8.91	44.6
115617	16.51	8.82	2.97	1.9	116	8.94	40.7
115620	16.52	8.82	2.98	1.91	116	8.94	43
Averages	**16.45**	**8.82**	**2.999**	**1.917**	**115.51**	**8.91**	**41.05**
Lab	**n/a**	**8.7**	**3.01**	**2.14**	**n/a**	**n/a**	**28.3**
SAR=	**9.84**						

Notes:

5/13/02 Wild Cow, light recent precip on 5/11, Flow= less than 1 cfs, Lab Sample at 1200, Air Temp= 15.7C, Wind Ave= 5.2 mph, Rel Hum= 19%,

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SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0514-31594

D/T REC: 5/14/02 10 30 BY: RH

DATE COMPLETED: 5.22.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/13/02	Conductivity	3.01
Time Collected	1200	Dissolved O_2	115.3%; 9.70
Discharge	< 1 cfs	Turbidity	240.0
Temperature	16.43 °C	pH	8.82

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: SLRCon2

Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 5.14.02	mg/L	208 48	Carbonate RWH / 5/17	mg/L	61
Magnesium	mg/L	4.88 120	Bicarbonate	mg/L	950
Sodium	mg/L	46 560	Fluoride RWH 5.14.02	mg/L	2.3
otassium	mg/L	7.4	Chloride	mg/L	47
TDS (ROE 180) Hm 5/15/02	mg/L	2140	Nitrate as N	mg/L	<0.1
TSS Hm 5/15/02	mg/L	18.0	Nitrite as N	mg/L	<0.1
pH RWH 5/17	Units	8.7	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab Hm 5/14/02	umhos/cm	3010	Sulfate RWH 5.17.02	mg/L	790
Turbidity Hm 5/14/02	NTU	28.3	Total Phosphate RWH 5/15	mg/L	0.06
			Total Alkalinity as $CaCO_3$ 5/17	mg/L	880
			Hardness as $CaCO_3$ RWH 5/20	mg/L	610

	S	R	Bottle
	[ ]	[ ]	1L Plain
	[ ]	[ ]	250ml Plain
	[ ]	[ ]	250ml HNO_3
	[ ]	[ ]	250ml H_2SO_4

Proj. File: LSRCD01

Analysis:

I hereby certify this report was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail:
Internet:
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	13-May-2002		Lab No:	37594	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	48	2.40	Carbonate	61	2.03
Magnesium	120	9.87	Bicarbonate	950	15.57
Sodium	560	24.36	Chloride	47	1.33
Potassium	7.4	0.19	Fluoride	2.3	0.12
T. CATIONS		**36.81**	Nitrate as N	0	0.00
ROE 180	mg/L	2140	Nitrite as N	0	0.00
TSS	mg/L	18	Ortho phosphate	0	0.00
Turbidity	NTU	28.3	Sulfate	790	16.45
			T. ANIONS		**35.50**

Conductance, umhos/cm	3010	S A R (sodium Hazard)	9.84
TDS by Summation, mg/L	2103	T Alk CaCO3, mg/L	881
pH, Units	8.7	Hardness as CaCO3, mg/L	614
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	36

Analyte	Units	Result
Total Phosphate	mg/L	0.06
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.71**
Meq Cations/Sp cond/100	**1.22**
Meq Anions/Sp cond/100	**1.18**
ROE/TDS Summation	**1.02**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.81%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.70** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.20** (0.8 TO 1.2)

OVERALL =	**0.0105**	MAX. OVERALL ALLOWED =	0.0531

RWA

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 4WCow2

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: **4/16/02** @ 13:28

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.41 25.4= 594.614

Discharge Measurement: Visual Flow approx. 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
132610	8.98	8.76	2.98	1.9	108.7	9.71	115
132615	9	8.76	2.98	1.9	108.8	9.71	115
132620	8.99	8.76	2.97	1.9	108.6	9.7	130
132625	8.99	8.76	2.97	1.9	108.6	9.7	121
132630	8.99	8.76	2.98	1.9	108.6	9.7	108
132635	9	8.76	2.98	1.9	108.7	9.7	124
132640	9	8.76	2.98	1.9	108.7	9.7	125
132645	8.99	8.76	2.98	1.9	108.6	9.7	125
132650	9	8.76	2.98	1.9	108.6	9.69	120
132655	9	8.76	2.98	1.9	108.6	9.69	133
132700	9	8.76	2.98	1.9	108.5	9.69	127
132705	9	8.76	2.98	1.9	108.5	9.69	124
132726	9.02	8.76	2.98	1.9	108.4	9.68	114
132727	9.01	8.76	2.98	1.9	108.4	9.67	116
132802	9.03	8.76	2.98	1.9	108.5	9.68	121
132805	9.03	8.76	2.98	1.9	108.5	9.68	117
Averages	**9.00**	**8.76**	**2.98**	**1.9**	**108.58**	**9.69**	**120.94**
Lab	**n/a**	**8.7**	**3.05**	**2.088**	**n/a**	**n/a**	**159.00**
SAR=	**9.67**						

Notes:

4/16/02 Wild Cow Sample, Cold and Windy, Lab Sample @ 1330, Recent precip.- light rain on 4/15 PM, Air Temp= 4.5C, Wind Ave= 10.5 mph, Rel Hum= 45%, Flow approx. 1 cfs, Note high Cond reading

LSRCD Discharge Measurement Notes

Stream: Wild Cow Creek

Site ID: 4WCow2

Site Coordinates: T15N, R91W, Sec. 16, SE 1/4 of SE 1/4

Date & Time: 4/2/02 @ 12:45

Meter Model & Serial #: Swapper Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: n/a

Measured Discharge

3.992 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WS/RB			Measured by: LSRCD/S Sheehan Checked by: Dustin C. Guernsey
0.5	.175	—		
1.0	.400	.304	.061	
1.5	.525	.390	.102	
2.0	.550	.616	.169	
2.5	.690	.926	.319	
3.0	.825	1.212	.500	
3.5	.925	1.435	.664	
4.0	1.000	1.563	.782	
4.5	1.050	1.839	.965	
5.0	.925	.929	.430	
5.5	WS/LB			
		Total =	3.992 cfs	

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SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: C417-36847

D/T REC: 4/17/02 11:00 BY: KN

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS			
Date Collected	4/16/02	Conductivity	2.98
Time Collected	13:30	Dissolved O_2	10.62, 9.69 mg/L
Discharge	~1.83	Turbidity	~125 JL
Temperature	9.0 °C	pH	8.76

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID	9LWCOL022
Sampled By	LSRCD/S.Sheehan
Comments:	
Invoice #	VOSR
Amount	$45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 4/25	mg/L	64	Carbonate KH 4/19	mg/L	5.3
Magnesium	mg/L	110	Bicarbonate	mg/L	720
Sodium	mg/L	550	Fluoride RM 4.17.02	mg/L	2.3*
Potassium	mg/L	7	Chloride	mg/L	60
TDS (ROE 180) 4/19/02 Hm	mg/L	2088	Nitrate as N	mg/L	<0.1
TSS 4/19/02 Hm	mg/L	120	Nitrite as N	mg/L	<0.1
pH KH 4/19	Units	8.7	Ortho Phosphate	mg/L	<0.1
Conductivity KH 4/19/02 Hm	umhos/cm	2050	Sulfate 4.18.02	mg/L	960 870
Turbidity 4/18/02 Hm	NTU	159	Total Phosphate KH 4/30	mg/L	0.12
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	850
			Hardness as $CaCO_3$ 4/19	mg/L	610

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Glenn A. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
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Laramie, WY 82070
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Internet:
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	16-Apr-2002		Lab No:	36847	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	64	3.19	Carbonate	53	1.77
Magnesium	110	9.05	Bicarbonate	920	15.08
Sodium	550	23.92	Chloride	60	1.69
Potassium	7	0.18	Fluoride	2.8	0.15
T. CATIONS		**36.34**	Nitrate as N	0	0.00
ROE 180	mg/L	2088	Nitrite as N	0	0.00
TSS	mg/L	120	Ortho phosphate	0	0.00
Turbidity	NTU	159	Sulfate	870	18.11
			T. ANIONS		**36.80**

Conductance, umhos/cm	3050	S A R (sodium Hazard)	9.67
TDS by Summation, mg/L	2169	T Alk CaCO3, mg/L	843
pH, Units	8.7	Hardness as CaCO3, mg/L	613
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	36

Analyte	Units	Result
Total Phosphate	mg/L	0.12
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.68**
Meq Cations/Sp cond/100	**1.19**
Meq Anions/Sp cond/100	**1.21**
ROE/TDS Summation	**0.96**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.63%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.71** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.20** (0.8 TO 1.2)

OVERALL =	**0.0037**	MAX. OVERALL ALLOWED =	0.0531

RLH

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 4WCow2

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: **4/2/02** @ 12:20

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.62 25.4= 599.948

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 3.992 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
122020	7.18	8.7	1.520	0.970	95.1	9.01	401
122025	7.18	8.7	1.520	0.970	95.1	9.01	385
122030	7.17	8.7	1.520	0.970	95.1	9.01	346
122035	7.18	8.7	1.510	0.960	95	9	361
122040	7.17	8.7	1.520	0.970	94.9	9	344
122045	7.17	8.7	1.520	0.970	94.9	8.99	378
122050	7.17	8.7	1.510	0.960	94.9	8.99	350
122055	7.17	8.7	1.500	0.960	94.9	8.99	362
122100	7.16	8.7	1.520	0.970	94.8	8.99	358
122105	7.16	8.71	1.530	0.980	94.8	8.98	389
122110	7.15	8.71	1.510	0.970	94.7	8.98	363
122115	7.16	8.71	1.530	0.980	94.6	8.97	360
122120	7.16	8.7	1.510	0.970	94.5	8.96	361
122125	7.16	8.71	1.510	0.970	94.5	8.96	357
122130	7.16	8.7	1.520	0.970	94.6	8.97	368
122135	7.17	8.7	1.500	0.960	94.6	8.97	363
122140	7.16	8.7	1.510	0.960	94.6	8.96	348
Averages	**7.17**	**8.70**	**1.515**	**0.968**	**94.80**	**8.98**	**364.35**
Lab	**n/a**	**8.50**	**1.550**	**1.064**	**n/a**	**n/a**	**399.00**
SAR=	**4.85**						

Notes;

4/2/02 Wild Cow, No recent precip., Flow=3.992 cfs, Lab Sample at 1230,
Air Temp= 4.8C, Wind Ave= 3.1 mph, Rel Hum= 37%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0403-36567

D/T REC: 4.2.02 11:00 BY: RKH

DATE COMPLETED: 4.18.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/2/02	Conductivity	1.52
Time Collected	1230	Dissolved O_2	99.5% / 8.26 mg/L
Discharge	3.972 cfs	Turbidity	~360 NTU
Temperature	7.12°C	pH	8.21

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4WCOW2

Sampled By: LSRCD/Sheehan

Comments: Watered cow

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 4/17	mg/L	54	Carbonate 4/5	mg/L	15
Magnesium 4/17	mg/L	62	Bicarbonate 4/5	mg/L	410
Sodium 4/18	mg/L	220	Fluoride ROUSH 4/3	mg/L	0.9
Potassium 4/17	mg/L	6	Chloride	mg/L	22.8
TDS (ROE 180) 4/4/02	mg/L	1064	Nitrate as N	mg/L	0.3
TSS 4/4/02	mg/L	305	Nitrite as N	mg/L	<0.1
pH 4/5	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/4/02	umhos/cm	1550	Sulfate 4/16	mg/L	490
Turbidity 4/3/02	NTU	399	Total Phosphate 4/16	mg/L	0.38
			Total Alkalinity as $CaCO_3$ 4/5	mg/L	370
			Hardness as $CaCO_3$ 4/18	mg/L	370

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	02-Apr-2002		Lab No:	36567	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	54	2.69	Carbonate	15	0.50
Magnesium	62	5.10	Bicarbonate	410	6.72
Sodium	220	9.57	Chloride	22.8	0.64
Potassium	6	0.15	Fluoride	0.9	0.05
T. CATIONS		**17.51**	Nitrate as N	0.3	0.02
ROE 180	mg/L	1064	Nitrite as N	0	0.00
TSS	mg/L	305	Ortho phosphate	0.1	0.00
Turbidity	NTU	399	Sulfate	490	10.20
			T. ANIONS		**18.14**

Conductance, umhos/cm	1550	S A R (sodium Hazard)	4.85
TDS by Summation, mg/L	1073	T Alk CaCO3, mg/L	361
pH, Units	8.5	Hardness as CaCO3, mg/L	390
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	23

Analyte	Units	Result
Total Phosphate	mg/L	0.38
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.69**
Meq Cations/Sp cond/100	**1.13**
Meq Anions/Sp cond/100	**1.17**
ROE/TDS Summation	**0.99**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.74%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.69** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.15** (0.8 TO 1.2)

OVERALL =	**0.010485**	MAX. OVERALL ALLOWED =	5.31

RWH

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 6WCow1

Site Coordinates: T15N, R91W, Sec.16 SE1/4 of SE1/4

Date & Time: **6/20/01** 10:15

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/19/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading n/a X25.4= n/a

Discharge Measurment: Visual- Flow less than1/4cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
Comment	***Not able to collect field sample due to very low flows. Lab sample collected by "dipping" sample into containers.						
Lab	**n/a**	**9**	**3.52**	**2.48**	**n/a**	**n/a**	**73.8**
SAR=	**17.371**						

Wild Cow

6 W Cow 1

6/20/01

Na^{+} = 800/22.99 = 34.798

Ca^{2+} = 19/20.04 = .948

Mg^{2+} = 86/12.15 = 7.078

$SAR = \left(34.798 / \left((.948 + 7.078)/2 \right) \right)^{0.5}$

4.013 $\sqrt{\ }$ = 2.003

$1/x$ = .499

x 34.798 =

$\boxed{SAR = 17.371}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0121-31874

D/T REC: 12/21/01 10:05 BY: KH

DATE COMPLETED: 7.13.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/20/01	Conductivity	
Time Collected	10:15	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: WCOW

Sampled By: LSRCD/Sheehan

Comments: Lab Supply only

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 7/10	mg/L	19	Carbonate KH 6/22	mg/L	150
Magnesium	mg/L	86	Bicarbonate	mg/L	1100
Sodium SK	mg/L	800	Fluoride Cert 6.4.01	mg/L	4.4
Potassium	mg/L	6.8	Chloride	mg/L	56
TDS (ROE 180) 7/10/01 KH	mg/L	2480	Nitrate as N	mg/L	<0.1
TSS 6/26/01 KH	mg/L	25	Nitrite as N	mg/L	<0.1
pH 6/21 KH	Units	9.0	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 6/21/01 KH	umhos/cm	2630	Sulfate 6.27.01	mg/L	700
Turbidity 6/21/01 KH	NTU	73.8	Total Phosphate KH 7/3	mg/L	0.147
			Total Alkalinity as $CaCO_3$ 6/22	mg/L	1200
			Hardness as $CaCO_3$	mg/L	400

S	R	Bottle
M	[ ]	1L Plain
M	[ ]	250ml Plain
M	[ ]	250ml HNO_3
M	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KH 7.13.01

I hereby certify the above was analyzed by myself or my associates

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 6WCow1

Site Coordinates: T15N, R91W, Sec.16 SE1/4 of SE1/4

Date & Time: **6/5/01** 12:40

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/05/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.55 X25.4= 598.17

Discharge Measurment: Visual- Flow less than1cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
123950	15.38	8.92	2.65	1.69	126.8	9.88	94.3
123955	15.38	8.92	2.64	1.69	126.9	9.88	84.7
124000	15.38	8.92	2.66	1.7	126.9	9.88	85.9
124005	15.38	8.92	2.64	1.69	126.8	9.87	90.1
124010	15.38	8.92	2.65	1.69	126.7	9.86	90.5
124015	15.39	8.93	2.66	1.7	126.9	9.88	88
124020	15.4	8.92	2.65	1.69	126.8	9.87	97
124025	15.4	8.93	2.64	1.69	126.9	9.87	89
124030	15.4	8.92	2.66	1.7	127.1	9.89	90.1
124035	15.4	8.93	2.65	1.7	126.9	9.88	87.9
124040	15.41	8.92	2.65	1.69	126.9	9.87	89.2
124045	15.41	8.93	2.65	1.7	126.9	9.87	98.2
124050	15.41	8.92	2.65	1.69	126.9	9.87	97
124055	15.42	8.92	2.65	1.7	127	9.87	92.3
124100	15.42	8.92	2.65	1.7	127	9.88	90.5
Averages	**15.40**	**8.92**	**2.650**	**1.695**	**126.89**	**9.87**	**90.98**
Lab	**n/a**	**8.3**	**1.3**	**0.96**	**n/a**	**n/a**	**39.8**
SAR=	**1.107**						

Comment

Cloudy and breezy, Air Temp= 16.4C; Wind Ave= 7 mph; Recent precip mix rain/snow approx one tenth on 6/4 AM. Lab analysis attached. Trb-ntu's field sample is high due to low flow, disturbance in placing multiprobe.

Wild Cow

6 W Cow 1

Na^{+} = 64/22.99 = 2.784

Ca^{2+} = 110/20.04 = 5.487

Mg^{2+} = 87/12.15 = 7.160

$SAR = \left(2.784 / (5.487 + 7.160)/2 \right)^{0.5} =$

$6.325 \sqrt{} = 2.5148$

$1/x = .3976$

$\times 2.784 =$

$\boxed{SAR\ 1.107}$

WYOMING DEPARTMENT OF AGRICULTURE
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1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 06060-312606

D/T REC: 06-06-01 10:30 BY: CA

DATE COMPLETED: 7.3.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/5/01	Conductivity	2.65
Time Collected	12:35	Dissolved O_2	126 % 9.82
Discharge	< 1 cfs	Turbidity	39.8
Temperature	15.38°C	pH	8.72

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: WCow
Sampled By: LSRCD/Sheehan & Leuthan
Comments: Wild Cow

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SBH 6/30	mg/L	110	Carbonate SBH 6/8	mg/L	<1
Magnesium	mg/L	37	Bicarbonate	mg/L	430
Sodium 7/2	mg/L	64	Fluoride Kelt 6.6.01	mg/L	0.9
Potassium	mg/L	6.4	Chloride	mg/L	21
TDS (ROE 180) GM 6.18.01	mg/L	960	Nitrate as N	mg/L	<0.1
TSS 6/8/01	mg/L	49.2	Nitrite as N	mg/L	<0.1
pH SBH 6/8	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity Lab 6/6/01	umhos/cm	1300	Sulfate 6.7.01	mg/L	380
Turbidity 6/6/01	NTU	39.8	Total Phosphate SBH 6/30	mg/L	0.12
			Total Alkalinity as $CaCO_3$ 6/8	mg/L	350
			Hardness as $CaCO_3$ 6/21	mg/L	630

S	R	Bottle
M	1	1L Plain
M	1	250ml Plain
M	1	250ml HNO_3
M	1	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: SBH 7-3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 5WCow1

Site Coordinates: T15N, R91W, Sec.16 SE1/4 of SE1/4

Date & Time: **5/2/01** 11:17

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.55 X25.4= 598.17

Discharge Measurment: Visual- Flow 1 to 2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
111700	6.12	8.75	2.49	1.59	100.7	9.73	78
111705	6.12	8.75	2.5	1.6	101.1	9.77	77.9
111710	6.11	8.75	2.5	1.6	100.7	9.74	81.7
111715	6.11	8.75	2.52	1.61	100.5	9.71	74.9
111720	6.12	8.75	2.48	1.59	100.8	9.74	77.4
111725	6.12	8.75	2.47	1.58	100.6	9.72	80.8
111730	6.12	8.75	2.5	1.6	100.9	9.75	80.5
111735	6.12	8.75	2.5	1.6	100.7	9.73	76.5
111740	6.13	8.75	2.5	1.6	100.8	9.73	78
111745	6.12	8.75	2.52	1.61	100.7	9.73	77.8
111750	6.11	8.75	2.5	1.6	100.4	9.7	76.8
111755	6.13	8.75	2.5	1.6	100.5	9.7	79.3
111800	6.11	8.76	2.48	1.58	100.6	9.72	77.9
111805	6.12	8.75	2.5	1.6	100.9	9.74	77.1
111810	6.1	8.76	2.49	1.59	101	9.76	79.5
111815	6.14	8.75	2.5	1.6	101.3	9.79	78.3
Averages	**6.12**	**8.75**	**2.497**	**1.597**	**100.76**	**9.74**	**78.28**
Lab	**n/a**	**8.5**	**2.5**	**1.78**	**n/a**	**n/a**	**68.7**
SAR=	**8.445**						

Comment

Cloudy and cold, approx. 40-45F, Site has the highest trb-ntu's of the Muddy Creek tribs.

Wild Cow SAR

SW Cow 1

$Na^{+} = 460/22.99 = 20.007$

$Ca^{2+} = 65/20.04 = 3.244$

$Mg^{2+} = 97/12.15 = 7.984$

$SAR = \left(20.007 / \left(3.244 + 7.984\right)/2\right)^{0.5}$

$11.228/2 = 5.614$

$5.614 \sqrt{} = 2.369$

$1/x = .4220$

$\times 20.007$

$SAR = 8.445$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0501 - 30457

D/T REC: 5/4/01 10:40 BY: KH

DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/3/01	Conductivity	2.50
Time Collected	11:20	Dissolved O_2	100.5% 9.71 mg/L
Discharge	5 1-2 cfs	Turbidity	2.77 ntu
Temperature	6.12°C	pH	8.76

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 WCOW 1
Sampled By: LSRCD/Sheehan
Comments: Wild - Cow Date 5/4/01

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 5/15	mg/L	65	Carbonate KH 5/11	mg/L	24
Magnesium	mg/L	97	Bicarbonate	mg/L	850
Sodium 5/14	mg/L	460	Fluoride KH 5/4	mg/L	2.4
Potassium 5/15	mg/L	8.3	Chloride	mg/L	43
TDS (ROE 180) RWH 6.1.01	mg/L	1780	Nitrate as N	mg/L	<0.1
TSS RWH 5.18.01	mg/L	56.0	Nitrite as N	mg/L	<0.1
pH KH 5/11	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 5/9	umhos/cm	2500	Sulfate RWH 5.5.01	mg/L	630
Turbidity KH 5/4	NTU	68.7	Total Phosphate KH 5/8	mg/L	0.12
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	740
			Hardness as $CaCO_3$ 5/15	mg/L	560

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Wild Cow Creek**

Site ID: 4WCow1

Site Coordinates: T15N, R91W, Sec.16 SE1/4 of SE1/4

Date & Time: **4/11/01** 11:10

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/05/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.45 X25.4= 595.63

Discharge Measurment: Visual- Flow 1 to 2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
111000	4.01	8.72	2.52	1.61	103.1	10.58	83.2
111005	4.03	8.73	2.52	1.61	103.1	10.58	83.1
111010	4.03	8.73	2.52	1.61	103.1	10.58	80.8
111015	4.06	8.73	2.52	1.61	103.1	10.58	88
111020	4.06	8.73	2.54	1.62	103.1	10.58	84.5
111025	4.08	8.73	2.54	1.62	103.2	10.57	84.5
111030	4.08	8.73	2.53	1.62	103.2	10.57	86.9
111035	4.10	8.73	2.52	1.61	103.2	10.57	86.9
111040	4.10	8.73	2.53	1.62	103.2	10.57	86.6
111045	4.10	8.73	2.54	1.62	103.2	10.57	86.6
111050	4.20	8.73	2.5	1.6	103.1	10.58	80.2
111055	4.12	8.73	2.5	1.6	103.1	10.58	82.4
111100	4.12	8.73	2.52	1.61	103.2	10.57	83.4
111105	4.14	8.73	2.53	1.62	103.2	10.57	83.6
111110	4.14	8.73	2.54	1.62	103.2	10.57	83.6
111115	4.14	8.73	2.5	1.6	103.2	10.57	83.6
Averages	**4.09**	**8.73**	**2.52**	**1.61**	**103.16**	**10.57**	**84.24**
Lab	**n/a**	**8.50**	**2.60**	**1.88**	**n/a**	**n/a**	**89.40**
SAR=	**5.90**						

Comment

Cloudy and cool, approx. 40F, Recent precip. 4/8 and 4/9, Light precip 4/10. Lab analysis attached.

Wild Cow

4 [illegible]

Na^{+} = 380/22.99 = 16.529

Ca^{2+} = 120/20.04 = 5.988

Mg^{2+} = 118/12.15 = 9.712

$SAR = \left(16.529 / \left((5.988 + 9.712)/2\right)\right)^{0.5} =$

$7.85\sqrt{\ } = 2.80$

$1/x = .3569$

$x\ 16.529 =$

$\boxed{SAR\ 5.900}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D412-29843

D/T REC: 04-12-01 11:00 BY: CA

DATE COMPLETED: 4.24.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/11/01	Conductivity	
Time Collected	11:15	Dissolved O_2	
Discharge	2 / cfs	Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Wild Cow

Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGH 4/19	mg/L	120	Carbonate SGH 4/13	mg/L	27
Magnesium	mg/L	118	Bicarbonate	mg/L	680
Sodium	mg/L	380	Fluoride KWH 4.12.01	mg/L	1.5
Potassium	mg/L	9.3	Chloride	mg/L	34
TDS (ROE 180) KWH 4.17.01	mg/L	1880	Nitrate as N	mg/L	<0.1
TSS KWH 4.17.01	mg/L	74	Nitrite as N	mg/L	<0.1
pH SGH 4/13	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab SGH	umhos/cm	2600	Sulfate	mg/L	850
Turbidity KWH 4.12.01	NTU	89.4	Total Phosphate SGH 4/13	mg/L	0.26
			Total Alkalinity as $CaCO_3$	mg/L	600
			Hardness as $CaCO_3$ 4/20	mg/L	786

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] 0.1	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 7wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 7/19/00 1210

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 7/1900 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.84 X25.4= 605.536

Discharge Measurment: Visual- Approx. 1/2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
120930	22.25	9.04	2.290	1.460	115.6	7.93	231
120935	22.25	9.04	2.290	1.460	114.8	7.88	230
120940	22.26	9.04	2.290	1.460	114.5	7.86	226
120945	22.27	9.04	2.290	1.460	115.6	7.93	244
120950	22.29	9.04	2.290	1.460	116.1	7.96	226
120955	22.3	9.04	2.290	1.460	116.1	7.96	239
121000	22.31	9.04	2.290	1.460	115.1	7.89	259
121005	22.32	9.04	2.290	1.460	114.5	7.85	226
121010	22.33	9.04	2.290	1.460	114	7.81	251
121015	22.34	9.04	2.290	1.460	114.6	7.85	230
121020	22.35	9.04	2.290	1.460	115.2	7.89	236
121025	22.37	9.04	2.290	1.460	116	7.94	221
121030	22.38	9.04	2.290	1.460	115.5	7.91	232
121124	22.46	9.03	2.29	1.46	114.8	7.85	240
121125	22.47	9.03	2.29	1.46	114.9	7.85	227
121149	22.51	9.03	2.29	1.46	115.7	7.9	259
121150	22.51	9.03	2.29	1.46	115.6	7.9	246
121155	22.53	9.03	2.29	1.46	115	7.85	244
121200	22.53	9.02	2.29	1.46	115.4	7.88	244
121205	22.54	9.02	2.29	1.46	115.5	7.88	251
121210	22.54	9.02	2.29	1.46	115.8	7.9	256
121215	22.56	9.02	2.29	1.46	116.4	7.97	252
Averages	**22.39**	**9.03**	**2.29**	**1.46**	**115.30**	**7.89**	**239.55**

Comments:

Msg: 7/19/00 Wild Cow Creek Sample Site, Hot and Sunny 90-95F High Trb-ntu's water appears very cloudy, Low Flow approx. 1/2 cfs, Notice high pH readings.

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 6wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 6/8/00 1535

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/6/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.45 X25.4= 595.63

Discharge Measurment: Visual- Approx. 1-2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
153501	23.19	8.51	2.380	1.520	129.5	8.58	164
153505	23.19	8.51	2.410	1.540	129.4	8.58	168
153510	23.19	8.51	2.390	1.530	129.5	8.58	159
153515	23.19	8.51	2.380	1.520	129.5	8.59	168
153520	23.18	8.51	2.400	1.530	129.4	8.58	186
153525	23.19	8.51	2.430	1.550	129.3	8.58	164
153530	23.19	8.51	2.390	1.530	129.5	8.59	164
153535	23.2	8.51	2.390	1.530	129.6	8.6	168
153540	23.2	8.51	2.400	1.530	129.5	8.58	175
153545	23.2	8.51	2.360	1.510	129.6	8.59	169
153550	23.21	8.51	2.390	1.530	129.6	8.59	167
153555	23.2	8.51	2.400	1.530	129.8	8.6	178
153600	23.2	8.51	2.380	1.520	129.6	8.59	162
153605	23.21	8.51	2.330	1.490	129.6	8.59	164
153610	23.22	8.51	2.360	1.510	129.5	8.58	190
153615	23.22	8.51	2.400	1.540	129.6	8.59	162
153620	23.23	8.51	2.410	1.540	129.6	8.59	176
153625	23.24	8.51	2.400	1.540	129.7	8.59	184
153630	23.25	8.51	2.410	1.540	129.8	8.6	170
153635	23.24	8.51	2.350	1.500	129.8	8.6	173
153640	23.25	8.51	2.390	1.530	129.7	8.59	178
153714	23.28	8.51	2.370	1.510	129.7	8.59	167
153715	23.28	8.51	2.370	1.510	129.8	8.59	171
Averages	**23.22**	**8.51**	**2.387**	**1.525**	**129.59**	**8.59**	**170.74**

Comments:
Msg: 6/8/00 Wild Cow Sample Site, Approx. 1/4 cfs, Hot and Dry Condition
High Trb-ntu's water appears to be cloudy

Comments:
Msg: 6/8/00 Wild Cow Sample Site, Approx. 1/4 cfs, Hot and Dry Condition
High Trb-ntu's water appears to be cloudy

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 5wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 5/4/00 1530

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/3/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.55 X25.4= 598.17

Discharge Measurment: Visual- Approx. 1-2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
152920	22.56	8.58	2.490	1.590	121.1	8.15	46.2
152925	22.55	8.58	2.550	1.630	121	8.15	59
152930	22.56	8.58	2.480	1.590	121.1	8.16	70.5
152935	22.55	8.58	2.500	1.600	121	8.15	67.2
152940	22.56	8.58	2.540	1.630	121	8.15	64.9
152945	22.55	8.58	2.490	1.590	121.1	8.16	50.4
152950	22.56	8.58	2.530	1.620	121	8.15	35.5
152955	22.55	8.58	2.550	1.630	121.2	8.16	40.3
153000	22.55	8.58	2.510	1.600	121.3	8.17	56.7
153005	22.55	8.58	2.540	1.620	121.2	8.16	67
153010	22.55	8.58	2.510	1.600	121.1	8.16	76.5
153015	22.55	8.58	2.490	1.590	121.2	8.16	66.9
153020	22.55	8.58	2.530	1.620	121.1	8.15	82.6
153057	22.56	8.58	2.480	1.590	121.1	8.15	45
153100	22.56	8.58	2.480	1.580	121.2	8.16	38.7
Averages	**22.55**	**8.58**	**2.511**	**1.605**	**121.11**	**8.16**	**57.83**

Comments:

Msg: Wild Cow Creek 5/4/00, Approx. 1-2 cfs, Hot and Dry Conditions
No recent precip., Hot approx. 70F

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 4wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 4/13/00 1500

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/13/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.585 X25.4= 599.059

Discharge Measurment: Visual- Approx. 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
145945	15.75	8.48	2.410	1.540	105	8.13	76.8
145950	15.75	8.48	2.410	1.540	105	8.13	74.4
145955	15.76	8.48	2.410	1.540	105.1	8.13	74.5
150000	15.75	8.48	2.410	1.540	105.1	8.14	65
150005	15.75	8.48	2.410	1.540	105.1	8.14	74.6
150010	15.75	8.48	2.410	1.540	105	8.13	71.9
150015	15.75	8.49	2.410	1.540	105	8.13	68.9
150020	15.75	8.49	2.410	1.540	105	8.13	65.5
150025	15.75	8.49	2.410	1.540	105	8.13	67
150030	15.74	8.49	2.410	1.540	105	8.13	74.7
150035	15.74	8.49	2.410	1.540	105	8.13	65.2
150040	15.74	8.49	2.410	1.540	104.9	8.13	73.9
150045	15.74	8.49	2.410	1.540	104.9	8.12	69.6
150131	15.73	8.49	2.410	1.540	104.8	8.11	70.8
150135	15.73	8.49	2.410	1.540	104.7	8.11	79.2
Averages	**15.75**	**8.49**	**2.410**	**1.540**	**104.97**	**8.13**	**71.47**

Comments:
Msg: Wild Cow 4/13/00 Approx. 2 cfs, Dry and warm 65F, Partly Cloudy & windy

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 5wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 5/4/00 1530

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/3/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.55 X25.4= 598.17

Discharge Measurment: Visual- Approx. 1-2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
152920	22.56	8.58	2.490	1.590	121.1	8.15	46.2
152925	22.55	8.58	2.550	1.630	121	8.15	59
152930	22.56	8.58	2.480	1.590	121.1	8.16	70.5
152935	22.55	8.58	2.500	1.600	121	8.15	67.2
152940	22.56	8.58	2.540	1.630	121	8.15	64.9
152945	22.55	8.58	2.490	1.590	121.1	8.16	50.4
152950	22.56	8.58	2.530	1.620	121	8.15	35.5
152955	22.55	8.58	2.550	1.630	121.2	8.16	40.3
153000	22.55	8.58	2.510	1.600	121.3	8.17	56.7
153005	22.55	8.58	2.540	1.620	121.2	8.16	67
153010	22.55	8.58	2.510	1.600	121.1	8.16	76.5
153015	22.55	8.58	2.490	1.590	121.2	8.16	66.9
153020	22.55	8.58	2.530	1.620	121.1	8.15	82.6
153057	22.56	8.58	2.480	1.590	121.1	8.15	45
153100	22.56	8.58	2.480	1.580	121.2	8.16	38.7
Averages	**22.55**	**8.58**	**2.511**	**1.605**	**121.11**	**8.16**	**57.83**

Comments:

Msg: Wild Cow Creek 5/4/00, Approx. 1-2 cfs, Hot and Dry Conditions
No recent precip., Hot approx. 70F

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 3wcow0

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 3/27/00 1105

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 3/27/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.72 X25.4= 602.488

Discharge Measurment: Visual- Approx. 2-3 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:06:25	5.89	8.71	1.680	1.080	96.3	9.46	142
11:06:30	5.89	8.71	1.680	1.070	96.5	9.48	167
11:06:35	5.9	8.71	1.680	1.070	96.5	9.47	152
11:06:40	5.9	8.71	1.680	1.070	96.4	9.46	144
11:06:45	5.9	8.71	1.680	1.080	96.3	9.46	179
11:06:50	5.91	8.71	1.680	1.070	96.5	9.48	143
11:06:55	5.91	8.71	1.680	1.080	96.5	9.47	150
11:07:00	5.91	8.71	1.680	1.070	96.5	9.48	142
11:07:05	5.91	8.71	1.680	1.070	96.3	9.45	137
11:07:10	5.91	8.71	1.680	1.070	96.4	9.47	143
11:07:15	5.92	8.71	1.680	1.070	96.4	9.47	145
11:07:20	5.91	8.71	1.680	1.070	96.6	9.48	145
11:07:25	5.92	8.71	1.680	1.070	96.6	9.47	158
11:07:30	5.92	8.71	1.680	1.070	96.3	9.45	148
11:07:35	5.94	8.71	1.680	1.070	96.3	9.45	150
11:07:40	5.93	8.71	1.680	1.070	96.3	9.44	150
Averages	**5.91**	**8.71**	**1.680**	**1.072**	**96.42**	**9.47**	**149.69**

Comments:

Msg: Wild Cow Creek, high Trb-ntu, Approx. 2-3 cfs, 3/27/00

SAR value = 4.357

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0328-2212
D/T REC: 3/28/00 1:00 BY: [illegible]
DATE COMPLETED: 4-17-2000

Date Collected		03/27/00
Time Collected		11:07
Discharge		≈ 7 cfs
Temperature	degrees C	5.91
pH	Units	8.21

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Wild Cow #4
Sampled By: LSRCD/ Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium [illegible] 3-30-00	mg/L	86	Total Alkalinity as $CaCO_3$	mg/L	500
Magnesium	mg/L	76	Fluoride [illegible] 3/28/00	mg/L	1.0
Sodium 4/5/00	mg/L	230	Chloride	mg/L	23
Potassium 4/5	mg/L	7.0	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/3/00	mg/L	530	Nitrite as N	mg/L	<0.1
[illegible] 3-30-00 TDS (ROE 180)	mg/L	1300	Ortho Phosphate	mg/L	<0.1
TSS RS 3-30-00	mg/L	78	[illegible] 4-7-00 Total Phosphate	mg/L	0.11
pH [illegible] 3/31/00	Units	8.5	[illegible] Sulfate [illegible] 3-30-00	mg/L	520
4-17-00 Conductivity, Lab	umhos/cm	1800	Turbidity [illegible] 3-28-00	NYU	81.2

Carbonate 25
Bicarbonate 550

SAR = 4.357

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01
Analysts: [illegible] 4-12-00

I hereby certify the above was analyzed by myself or my assistant.

Secrion Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 9wcow9 (Macro Site)

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 9/8/99 1315

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 9/8/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.53 X25.4= 597.662

Discharge Measurment: Visual- Less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
131420	15.15	8.38	1.710	1.090	123	9.66	10
131425	15.15	8.38	1.710	1.090	123.1	9.67	10.2
131430	15.16	8.38	1.710	1.090	123.2	9.68	6.4
131435	15.16	8.38	1.710	1.090	123.2	9.68	9.6
131440	15.16	8.38	1.710	1.090	123.2	9.68	13
131445	15.17	8.38	1.710	1.090	123.1	9.66	12.2
131450	15.17	8.38	1.710	1.090	123.1	9.66	9.4
131455	15.17	8.38	1.710	1.090	123.2	9.67	10.9
131500	15.17	8.38	1.710	1.090	123.2	9.67	9.8
131505	15.17	8.38	1.710	1.090	123.2	9.67	10.3
131538	15.2	8.38	1.710	1.090	123.1	9.66	11.5
131539	15.2	8.38	1.710	1.090	123.1	9.66	10.1
131618	15.22	8.39	1.710	1.090	122.7	9.62	9.4
131620	15.22	8.39	1.710	1.090	122.8	9.63	11.1
Averages	**15.18**	**8.38**	**1.710**	**1.090**	**123.09**	**9.66**	**10.28**

Comments:

Msg: 9/8/99 Wild Cow macro sample site, Sunny and warm,
Approx. Less than 1 cfs
SAR value = 2.791

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0909-20197

D/T REC: 9/9/99 1300 BY: JLW

DATE COMPLETED:

Date Collected		9/8/99
Time Collected		12:50
Discharge		< 1 cfs
Temperature	degrees C	15.17
pH	Units	8.38

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: wildcow-99, #6
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail:
FAX: 307-

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9-23-99	mg/L	100	Total Alkalinity as $CaCO_3$ 9/14/99	mg/L	460
Magnesium 10-8-99	mg/L	110	Fluoride RWH 9-9-99	mg/L	0.4
Sodium	mg/L	190	Chloride	mg/L	30
Potassium	mg/L	8	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/12	mg/L	700	Nitrite as N	mg/L	<0.1
TDS (ROE 180) 9-14-99	mg/L	1300	Ortho Phosphate	mg/L	<0.1
TSS RS 9-10-99	mg/L	95	Total Phosphate 9/21/99	mg/L	0.12
pH 9-14-99	Units	5.5	Sulfate 9-10-99	mg/L	560
Conductivity, Lab 9-10-99	umhos/cm	1800	Turbidity 9/10/99	~~NTU~~ NYU	17

SAR = 2.791

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

10/5/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 6wcow9

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 6/4/99 1105

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/4/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.45 X25.4= 595.63

Discharge Measurment: Visual- Less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:04:50	15.01	8.54	2.300	1.470	105.7	8.28	17.3
11:04:55	15.01	8.54	2.300	1.470	105.8	8.28	18.9
11:05:00	15.01	8.54	2.300	1.470	105.7	8.27	20.3
11:05:05	15.02	8.54	2.300	1.470	105.6	8.26	17
11:05:10	15.02	8.54	2.300	1.470	105.5	8.25	16.7
11:05:15	15.02	8.54	2.300	1.470	105.5	8.26	19.1
11:05:20	15.02	8.54	2.300	1.470	105.5	8.25	17.3
11:05:25	15.03	8.54	2.300	1.470	105.4	8.25	18.4
11:05:30	15.03	8.54	2.300	1.470	105.5	8.25	19.7
11:05:35	15.05	8.54	2.300	1.470	105.4	8.24	18.7
11:05:40	15.05	8.54	2.300	1.470	105.4	8.24	19.5
Averages	**15.02**	**8.54**	**2.300**	**1.470**	**105.55**	**8.26**	**18.45**

Comments:

Msg: Wild Cow Sample Site 6/4/99, Visually less than 1 cfs, no recent precip.
Visually higher Trb-ntu's readings compared to other sites, Sunny and warm

Grab Sample Data

Stream: Wild Cow Creek

Site ID: 5wcow9

Site Coordinates: T15N, R91W, Sec. 16, SE1/4 of SE1/4

Date & Time: 5/5/99 1130

Elevation: 6490

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/5/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.38 X25.4= 593.852

Discharge Measurment: Visual- Approx. 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:29:25	4.96	8.71	2.290	1.470	102.5	10.13	111
11:29:30	4.97	8.71	2.290	1.470	102.5	10.13	119
11:29:35	4.97	8.71	2.290	1.470	102.5	10.13	124
11:29:40	4.97	8.71	2.290	1.470	102.5	10.13	124
11:29:45	4.97	8.71	2.290	1.470	102.4	10.12	122
11:29:50	4.98	8.71	2.290	1.470	102.4	10.11	121
11:29:55	4.99	8.71	2.290	1.470	102.4	10.11	114
11:30:00	4.99	8.71	2.290	1.470	102.4	10.11	123
11:30:05	4.99	8.71	2.290	1.470	102.4	10.11	119
11:30:10	5	8.71	2.290	1.470	102.4	10.11	113
11:30:15	5	8.71	2.290	1.470	102.4	10.11	110
11:30:20	5	8.71	2.290	1.470	102.4	10.11	111
11:30:25	5	8.71	2.290	1.470	102.4	10.11	110
11:30:30	5	8.71	2.290	1.470	102.4	10.11	112
11:30:35	5.03	8.71	2.290	1.470	102.2	10.09	120
11:30:40	5.03	8.71	2.290	1.470	102.3	10.09	114
Averages	**4.99**	**8.71**	**2.290**	**1.470**	**102.41**	**10.11**	**116.69**

Comments:

Msg: Wild Cow Sample Site, High Trb-ntu's, Cloudy and Cool, recent precip.- high precip last two weeks, Aprrox. 2 cfs, Water very cloudy compared to other sites.

Cow Creek

Grab Sample Data

Stream: **Cow Creek**

Site ID: 5Cow2

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 5/13/02 @ 11:15

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 w/ stirrer, SN# 30691

Calibration/ Sensors Details: Multiprobe Maintained & Calibrated 5/13/02

DO Calibration: Bar Pressure Reading 23.95 X 25.4= 608.33

Discharge Measurement: **Visual approx. 1 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
111435	12.9	8.87	3.31	2.12	101.7	8.44	15.6
111440	12.9	8.87	3.31	2.12	101.7	8.44	18.4
111445	12.89	8.87	3.31	2.12	101.7	8.44	16.7
111450	12.9	8.87	3.31	2.12	101.8	8.45	18.2
111455	12.9	8.88	3.31	2.12	101.6	8.44	16.6
111500	12.9	8.87	3.31	2.12	101.8	8.45	16.1
111505	12.91	8.88	3.31	2.12	101.8	8.44	17.1
111510	12.92	8.88	3.31	2.12	101.8	8.44	17.4
111624	12.98	8.88	3.31	2.12	101.8	8.44	16.6
111625	12.98	8.88	3.31	2.12	101.8	8.44	16.5
Averages	**12.92**	**8.88**	**3.31**	**2.12**	**101.75**	**8.44**	**16.92**
Lab	**n/a**	**8.70**	**3.58**	**2.35**	**n/a**	**n/a**	**17.60**
SAR=	**10.50**						

Notes:

5/13/02 Cow Creek, light precip 5/11, Sunny and warm, Dry, Lab Sample at 1120, Flow= approx. 1 cfs, Air Temp= 15.5C, Wind Ave= 2.7 mph, Rel Hum= 21%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0514-37593

D/T REC: 5/14/02 10:30 BY: [illegible]

DATE COMPLETED: 5.22.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/13/02	Conductivity	3.31
Time Collected	1120	Dissolved O_2	[illegible] 8.44
Discharge	~1 cfs	Turbidity	~120 [illegible]
Temperature	12.90 °C	pH	8.88

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 Cow 2
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 5.14.02	mg/L	42	Carbonate [illegible] 5/17	mg/L	77
Magnesium	mg/L	140	Bicarbonate	mg/L	1200
Sodium	mg/L	630	Fluoride RWH 5.14.02	mg/L	2.5
Potassium	mg/L	9.7	Chloride	mg/L	89
TDS (ROE 180) [illegible] 5/15/02	mg/L	2350	Nitrate as N	mg/L	<0.1
TSS 5/15/02 [illegible]	mg/L	13.1	Nitrite as N	mg/L	<0.1
pH [illegible] 5/17	Units	8.7	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab [illegible] 5/16/02	umhos/cm	3580	Sulfate 5.17.02	mg/L	750
Turbidity [illegible] 5/14/02	NTU	17.6	Total Phosphate [illegible] 5/15	mg/L	0.06
			Total Alkalinity as $CaCO_3$ 5/17	mg/L	1100
			Hardness as $CaCO_3$ RWH 5/20	mg/L	680

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Sect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Glenn L. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail:
Internet:
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	13-May-2002		Lab No:	37593	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	42	2.10	Carbonate	77	2.57
Magnesium	140	11.51	Bicarbonate	1200	19.67
Sodium	630	27.40	Chloride	89	2.51
Potassium	9.7	0.25	Fluoride	2.5	0.13
T. CATIONS		**41.26**	Nitrate as N	0	0.00
ROE 180	mg/L	2350	Nitrite as N	0	0.00
TSS	mg/L	13.1	Ortho phosphate	0	0.00
Turbidity	NTU	17.6	Sulfate	750	15.62
			T. ANIONS		**40.49**

Conductance, umhos/cm	3580	S A R (sodium Hazard)	10.50
TDS by Summation, mg/L	2330	T Alk CaCO3, mg/L	1113
pH, Units	8.7	Hardness as CaCO3, mg/L	681
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	40

Analyte	Units	Result
Total Phosphate	mg/L	0.06
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.66**
Meq Cations/Sp cond/100	**1.15**
Meq Anions/Sp cond/100	**1.13**
ROE/TDS Summation	**1.01**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.94%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.65** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.14** (0.8 TO 1.2)

OVERALL =	**0.0054**	MAX. OVERALL ALLOWED =	0.0531

RLW

Grab Sample Data

Stream: **Cow Creek**

Site ID: 4Cow22

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 4/16/02 @12:28

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 w/ stirrer, SN# 30691

Calibration/ Sensors Details: Multiprobe Maintained & Calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.54 X 25.4= 597.92

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.381 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
122655	7.22	8.61	2.14	1.37	101.6	9.52	45
122700	7.21	8.61	2.14	1.37	101.6	9.52	43.9
122705	7.21	8.61	2.14	1.37	101.6	9.52	43.1
122710	7.22	8.61	2.14	1.37	101.5	9.51	45.3
122715	7.21	8.61	2.14	1.37	101.5	9.51	44.5
122720	7.21	8.61	2.14	1.37	101.5	9.52	41.9
122725	7.21	8.61	2.14	1.37	101.5	9.51	44.2
122730	7.21	8.61	2.14	1.37	101.5	9.51	46.3
122735	7.21	8.61	2.14	1.37	101.4	9.51	44.6
122740	7.21	8.61	2.14	1.37	101.4	9.51	43.5
122745	7.21	8.61	2.14	1.37	101.4	9.5	42.5
122816	7.21	8.61	2.14	1.37	101.3	9.49	43.2
122820	7.21	8.62	2.14	1.37	101.3	9.49	42
Averages	**7.21**	**8.61**	**2.140**	**1.370**	**101.47**	**9.51**	**43.85**
Lab	**n/a**	**8.60**	**2.200**	**1.520**	**n/a**	**n/a**	**38.60**
SAR=	**5.31**						

Notes:

4/16/02 Cow Creek Light Rain 4/15 PM, Air Temp= 4.0C, Wind Ave= 15.5mph
Rel Hum= 40%, Flow= 1.381 cfs, Lab Sample at 12:30

LSRCD Discharge Measurement Notes

Stream: Cow Creek

Site ID: 4 Cow 22

Site Coordinates: T15N, R9W

Date & Time: 4/16/02 @ 12:45

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: N/a

Measured Discharge

1.381 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WS/LB			Measured by: LSRCD/S Sheehan Checked by: Owen C. Jeanger
.5	.125	—		
1.0	.250	.241	.030	
1.5	.550	.473	.130	
2.0	.725	.556	.202	
2.5	.725	1.353	.490	
3.0	.600	.836	.251	
3.5	.425	.619	.132	
4.0	.350	.832	.146	
4.5	.175	—		
5.0	.100	—		
5.4	WS/RB			
		Total =	1.381	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0417-36846

D/T REC: 4/17/02 11:00 BY: KH

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/02	Conductivity	2.14
Time Collected	12:30	Dissolved O_2	101.5%, 9.52 mg/L
Discharge	1.381 cfs	Turbidity	~44.0 ntu
Temperature	7.21 °C	pH	8.61

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4Cow22
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 4/25	mg/L	77	Carbonate SRH 4/19	mg/L	29
Magnesium	mg/L	100	Bicarbonate	mg/L	550
Sodium	mg/L	300	Fluoride RDH 4.17.02	mg/L	1.6
Potassium	mg/L	7	Chloride	mg/L	49
TDS (ROE 180) 4/18/02 Jm	mg/L	1520	Nitrate as N	mg/L	<0.1
TSS 4/18/02 Jm	mg/L	45.0	Nitrite as N	mg/L	<0.1
pH SRH 4/19	Units	8.6	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/18/02 Jm	umhos/cm	2200	Sulfate 4.18.02	mg/L	~~800~~ 730
Turbidity 4/18/02 Jm	NTU	38.6	Total Phosphate SRH 4/30	mg/L	0.06
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	500
			Hardness as $CaCO_3$	mg/L	600

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts

I hereby certify the above was analyzed by myself or my assistant.

Glenn L. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

LSRCD Discharge Measurement Notes

Stream: Cow Creek

Site ID: 4 Cow 22

Site Coordinates: T15N, R9W

Date & Time: 4/16/02 @ 12:45

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: N/a

Measured Discharge

1.381 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/S Sheeler Checked by: Owen C. Jeanger
.5	.125	—		
1.0	.250	.241	.030	
1.5	.550	.473	.130	
2.0	.725	.556	.202	
2.5	.725	1.353	.490	
3.0	.600	.836	.251	
3.5	.425	.619	.132	
4.0	.350	.832	.146	
4.5	.175	—		
5.0	.100	—		
5.4	WE/RB			
		Total =	1.381	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0417-36846

D/T REC: 4/17/02 11:00 BY: KH

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/02	Conductivity	2.14
Time Collected	12:30	Dissolved O_2	101.5% 9.52
Discharge	1.381 cfs	Turbidity	~440 ntu
Temperature	7.21 °C	pH	8.61

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4Cow22
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SPH 4/25	mg/L	77	Carbonate SPH 4/19	mg/L	29
Magnesium	mg/L	100	Bicarbonate	mg/L	550
Sodium	mg/L	300	Fluoride RDH 4.17.02	mg/L	1.6
Potassium	mg/L	7	Chloride	mg/L	49
TDS (ROE 180) 4/18/02 Gm	mg/L	1520	Nitrate as N	mg/L	<0.1
TSS 4/18/02 Gm	mg/L	45.0	Nitrite as N	mg/L	<0.1
pH SPH 4/19	Units	8.6	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/18/02 Gm	umhos/cm	2200	Sulfate 4.18.02	mg/L	~~800~~ 730
Turbidity 4/18/02 Gm	NTU	38.6	Total Phosphate SPH 4/30	mg/L	0.06
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	500
			Hardness as $CaCO_3$	mg/L	600

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Glenn L. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail:
Internet:
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	16-Apr-2002		Lab No:	36846	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	77	3.84	Carbonate	29	0.97
Magnesium	100	8.22	Bicarbonate	550	9.01
Sodium	300	13.05	Chloride	49	1.38
Potassium	7	0.18	Fluoride	1.6	0.08
T. CATIONS		**25.29**	Nitrate as N	0	0.00
ROE 180	mg/L	1520	Nitrite as N	0	0.00
TSS	mg/L	45	Ortho phosphate	0	0.00
Turbidity	NTU	38.6	Sulfate	730	15.20
			T. ANIONS		**26.65**

Conductance, umhos/cm	2200	S A R (sodium Hazard)	5.31
TDS by Summation, mg/L	1564	T Alk CaCO3, mg/L	500
pH, Units	8.6	Hardness as CaCO3, mg/L	604
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	35

Analyte	Units	Result
Total Phosphate	mg/L	0.06
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.69**
Meq Cations/Sp cond/100	**1.15**
Meq Anions/Sp cond/100	**1.21**
ROE/TDS Summation	**0.97**

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})} = \mathbf{2.60\%}\ (<5\%)$$

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.71** (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = \mathbf{1.18}\ (0.8 \text{ TO } 1.2)$$

OVERALL =	**0.0157**	MAX. OVERALL ALLOWED =	0.0531

Rivt

Grab Sample Data

Stream: **Cow Creek**

Site ID: 4Cow2

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: **4/2/02** @11:20

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 w/ stirrer, SN# 30691

Calibration/ Sensors Details: Multiprobe Maintained & Calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.54 X 25.4= 597.92

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 4.505 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
111945	2.65	8.7	1.478	0.946	95.1	10.13	443
111950	2.66	8.7	1.478	0.946	95	10.12	418
111955	2.66	8.7	1.482	0.948	94.9	10.11	429
112000	2.66	8.7	1.482	0.948	94.9	10.11	428
112005	2.67	8.7	1.483	0.949	95	10.11	444
112010	2.67	8.7	1.484	0.949	95	10.12	449
112015	2.67	8.7	1.479	0.946	95	10.12	434
112020	2.68	8.7	1.479	0.946	95	10.11	431
112025	2.68	8.7	1.478	0.946	95	10.12	427
112030	2.68	8.7	1.479	0.946	94.9	10.11	438
112035	2.7	8.7	1.48	0.947	94.9	10.1	439
112108	2.72	8.7	1.48	0.947	94.7	10.07	433
112110	2.72	8.7	1.478	0.946	94.7	10.08	428
Averages	**2.68**	**8.70**	**1.480**	**0.947**	**94.93**	**10.11**	**433.92**
Lab	**n/a**	**8.40**	**1.510**	**1.032**	**n/a**	**n/a**	**490.00**
SAR=	**3.03**						

Notes:

4/2/02 Cow Creek, Sunny and cool, no recent precip, Air Temp= 5.5C,
Wind Ave= 2. Mph, Rel Hum= 38%, Lab Sample at 1130, Flow= 4.505cfs

LSRCD Discharge Measurement Notes

Stream: Cow Creek

Site ID: 4Cow2

Site Coordinates: T15N, R91W, Sec 8, NW1/4 of NW1/4

Date & Time: 4/2/02 @ 11:45

Meter Model & Serial #: Swoffer Flow Meter - model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: n/a

Measured Discharge

4.505 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			Measured by: LSRCD/ [illegible] Shoder Checked by: Gwen C. Juenger
0.5	.125	/		
1.0	.200	.548	.055	
1.5	.225	.936	.105	
2.0	.300	.793	.119	
2.5	.410	1.135	.233	
3.0	.425	1.349	.287	
3.5	.550	1.608	.442	
4.0	.725	1.467	.532	
4.5	.850	1.892	.804	
5.0	.875	1.416	.620	
5.5	.700	1.798	.629	
6.0	.490	1.637	.401	
6.5	.300	1.487	.223	
7.0	.250	.442	.055	
7.5	WE/LB			
		Total	4.505 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0403-3656

D/T REC: 4.2.02 11:00 BY: RAH

DATE COMPLETED: 4.18.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/2/02	Conductivity	1483
Time Collected	1130	Dissolved O_2	95.0% / 10.12
Discharge	4.505 cfs	Turbidity	~430 ntu
Temperature	2.66	pH	8.2

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 4 Cow 2
Sampled By: LSRCD / Sheehan
Comments: Cow Creek
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 4/17	mg/L	66	Carbonate 4/5	mg/L	15
Magnesium	mg/L	88	Bicarbonate	mg/L	430
Sodium 4/18	mg/L	160	Fluoride ROSEH 4/3	mg/L	0.9
Potassium	mg/L	8	Chloride	mg/L	25.7
TDS (ROE 180) 4/4/02	mg/L	1032	Nitrate as N	mg/L	<0.1
TSS 4/4/02	mg/L	483	Nitrite as N	mg/L	<0.1
pH 4-5	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/4/02	umhos/cm	1510	Sulfate 4X	mg/L	450
Turbidity 4/3/02	NTU	490	Total Phosphate 4/16	mg/L	0.41
			Total Alkalinity as $CaCO_3$ 4/5	mg/L	380
			Hardness as $CaCO_3$	mg/L	530

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@mail.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	02-Apr-2002		Lab No:	36566	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	66	3.29	Carbonate	15	0.50
Magnesium	88	7.24	Bicarbonate	430	7.05
Sodium	160	6.96	Chloride	25.7	0.72
Potassium	8	0.20	Fluoride	0.9	0.05
T. CATIONS		**17.69**	Nitrate as N	0	0.00
ROE 180	mg/L	1032	Nitrite as N	0	0.00
TSS	mg/L	483	Ortho phosphate	0	0.00
Turbidity	NTU	490	Sulfate	450	9.37
			T. ANIONS		**17.69**

Conductance, umhos/cm	1510	S A R (sodium Hazard)	3.03
TDS by Summation, mg/L	1025	T Alk CaCO3, mg/L	378
pH, Units	8.4	Hardness as CaCO3, mg/L	527
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	31

Analyte	Units	Result
Total Phosphate	mg/L	0.41
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.68**
Meq Cations/Sp cond/100	**1.17**
Meq Anions/Sp cond/100	**1.17**
ROE/TDS Summation	**1.01**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.01%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.68** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.17** (0.8 TO 1.2)

OVERALL =	8.67E-05	MAX. OVERALL ALLOWED =	5.31

RWH

Grab Sample Data

Stream: **Cow Creek**

Site ID: 3Cow2

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 3/26/02 @10:50

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 w/ stirrer, SN# 30691

Calibration/ Sensors Details: Multiprobe Maintained & Calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.78 X 25.4= 604.012

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 6.772cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
105000	0	9.11	1.198	0.767	79	9.14	648
105005	-0.01	9.12	1.198	0.767	79	9.15	520
105010	-0.01	9.12	1.198	0.766	79.1	9.16	668
105015	0	9.12	1.197	0.766	79.2	9.17	590
105020	0	9.12	1.197	0.766	79.4	9.19	549
105025	0	9.12	1.197	0.766	79.4	9.19	561
105030	0	9.12	1.197	0.766	79.5	9.2	605
105035	0	9.12	1.196	0.765	79.6	9.21	543
105040	0	9.12	1.196	0.765	79.5	9.2	582
105045	0	9.12	1.196	0.765	79.6	9.2	624
105050	0	9.12	1.196	0.765	79.5	9.2	610
105055	0	9.12	1.196	0.765	79.5	9.2	588
105100	0.01	9.12	1.196	0.765	79.6	9.21	622
105105	0.01	9.12	1.195	0.765	79.6	9.21	605
105132	0.01	9.14	1.194	0.764	79.6	9.21	567
105135	0.01	9.12	1.194	0.764	79.8	9.22	586
Averages	**0.00**	**9.12**	**1.196**	**0.765**	**79.43**	**9.19**	**591.75**
Lab	**n/a**	**8.90**	**1.240**	**0.996**	**n/a**	**n/a**	**952.00**
SAR=	**12.86**						

Comment

3/26/02 Cow Creek, Snow present, ancor ice, Road wet/slick, Windy & cool
Air Temp= 5.2C, Wind Ave= 6.2 mph, Rel Hum= 50% Lab Sample @ 11:00

LSRCD Discharge Measurement Notes

Stream: Cow Creek

Site ID: 3Cow2

Site Coordinates: T15N, R91W, Sec. 8 NW1/4 of NW1/4

Date & Time: 3/26/02 @ 11:15

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 calibrated

Outside Gage Reading: n/a

Measured Discharge

6.772 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/S Shaker checked by: Dwen C. Duenger
1.0	.150	.165	.025	
2.0	.250	.464	.116	
3.0	.310	.756	.234	
4.0	.350	1.416	.496	
5.0	.375	1.408	.528	
6.0	.500	1.394	.697	
7.0	.600	1.576	.946	
8.0	.600	1.600	.960	
9.0	.600	1.444	.866	
10.0	.525	1.359	.713	
11.0	.475	1.172	.557	
12.0	.475	.868	.412	
13.0	.325	.683	.222	
14.0	WE/RB			
		Total =	6.772	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0327-36500

D/T REC: 03-27-02 11:00 BY: CA

DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/26/02	Conductivity	1.198
Time Collected	11:00	Dissolved O_2	29.42 / 9.19 mg/L
Discharge		Turbidity	~500 ntu
Temperature	0.00 C	pH	9.12

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID	Cow Crk
Sampled By	LSRCD/Sheehan
Comments:	3 Cow 2
Invoice #	VOSR
Amount	$45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KSH 4/17	mg/L	12 25	Carbonate KSH 3/28	mg/L	36
Magnesium	mg/L	13 23	Bicarbonate	mg/L	440
Sodium 4/18	mg/L	270 260	Fluoride RWH 3.27.02	mg/L	1.4
Potassium	mg/L	39 6	Chloride	mg/L	43
TDS (ROE 180) Dm 3/28/02	mg/L	996	Nitrate as N	mg/L	0.3
TSS Dm 3/28/02	mg/L	500	Nitrite as N	mg/L	<0.1
pH KSH 3/28	Units	8.9	Ortho Phosphate	mg/L	0.1
Conductivity, Lab Dm 3/27/02	umhos/cm	1240	Sulfate	mg/L	150
Turbidity Dm 3/27/02	NTU	952	Total Phosphate KSH 4/16	mg/L	0.76
			Total Alkalinity as $CaCO_3$ 3/28	mg/L	420
			Hardness as $CaCO_3$ 4/18	mg/L	83 ~~160~~ RWH

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: Dm 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cow Creek**

Site ID: 6Cow1

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: **6/5/01** 11:25

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/05/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.65 X25.4= 600.71

Discharge Measurment: Visual- Flow approx 1/4 to 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
112415	14.62	9.06	2.84	1.82	136	10.73	16.8
112420	14.62	9.06	2.87	1.83	136.2	10.75	25.9
112425	14.62	9.06	2.87	1.84	136.3	10.75	28.8
112430	14.63	9.06	2.85	1.82	136.2	10.74	27.7
112435	14.66	9.06	2.84	1.82	136	10.72	21.6
112440	14.66	9.06	2.84	1.81	136	10.72	26.3
112445	14.63	9.06	2.87	1.84	136	10.73	21.6
112450	14.62	9.06	2.88	1.84	135.9	10.72	17.8
112455	14.61	9.06	2.85	1.82	135.7	10.71	25.7
112500	14.61	9.06	2.83	1.81	135.6	10.7	22.6
112505	14.6	9.06	2.84	1.81	135.5	10.69	22.3
112510	14.59	9.06	2.85	1.82	135.6	10.7	20
112515	14.6	9.06	2.87	1.84	135.6	10.7	23.6
112520	14.59	9.06	2.86	1.83	135.7	10.71	23.4
112525	14.59	9.06	2.83	1.81	135.9	10.73	25
Averages	**14.62**	**9.06**	**2.853**	**1.824**	**135.88**	**10.72**	**23.27**
Lab	**n/a**	**9.10**	**2.800**	**2.130**	**n/a**	**n/a**	**20.40**
SAR=	**6.753**						

Comment

Partly cloudy and breezy, Approx 70F Due to very low flows sampled in pool may have affected ph and DO readings. Lab analysis attached.

Cow Creek

6 Cow Crk

Na^{+} = 440/22.99 = 19.139

Ca^{2+} = 25/20.04 = 1.248

Mg^{2+} = 180/12.15 = 14.815

$SAR = (19.139 / (1.248 + 14.815)/2)^{0.5}$

8.0315 $\sqrt{}$ = 2.8337

1/x = .3528

x 19.139 =

SAR 6.753

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0606-31264
D/T REC: 06-06-01 10:30 BY: CA
DATE COMPLETED: 7.3.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/5/01	Conductivity	2.84
Time Collected	11:30	Dissolved O_2	135.5%, 10.69 mg/l
Discharge	< 1 cfs	Turbidity	
Temperature	14.61 °C	pH	7.06

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cow Crk
Sampled By: LSRCD/Sheehan & Lanthan
Comments: Sampled "pool"

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SBH 6/20	mg/L	25	Carbonate HRH 6/8	mg/L	110
Magnesium	mg/L	180	Bicarbonate	mg/L	620
Sodium 7/2	mg/L	440	Fluoride RWH 6.6.01	mg/L	2.4
Potassium	mg/L	12	Chloride	mg/L	66
TDS (ROE 180) GM 6/18/01	mg/L	2130	Nitrate as N	mg/L	<0.1
TSS JM 6/8/01	mg/L	16	Nitrite as N	mg/L	<0.1
pH SBH 6/2	Units	9.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 6/6/01 JM	umhos/cm	2800	Sulfate 6.7.01	mg/L	970
Turbidity 6/6/01 JM	NTU	20.4	Total Phosphate SBH 6/20	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 6/8	mg/L	690
			Hardness as $CaCO_3$ 6/21	mg/L	800

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts: SBH 7-3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cow Creek**

Site ID: 5Cow1

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: **5/2/01** 10:43

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.55 X25.4= 598.17

Discharge Measurment: Visual- Flow 1 to 2 cfs

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
104250	6.44	8.61	2.5	1.6	99.2	9.51	23.7
104255	6.44	8.61	2.47	1.58	98.7	9.46	23.5
104300	6.45	8.61	2.49	1.59	98.7	9.46	22.5
104305	6.45	8.61	2.49	1.59	99.1	9.5	22
104310	6.44	8.61	2.5	1.6	98.8	9.47	22.6
104315	6.44	8.61	2.49	1.59	99	9.49	23.7
104320	6.44	8.61	2.47	1.58	98.8	9.47	23.3
104325	6.45	8.61	2.49	1.59	98.7	9.46	23.5
104330	6.44	8.61	2.48	1.58	98.7	9.46	23.5
104335	6.44	8.61	2.48	1.59	98.6	9.45	23.9
104340	6.44	8.61	2.49	1.59	98.6	9.45	23.1
104345	6.44	8.61	2.48	1.59	98.7	9.46	22.9
104350	6.44	8.62	2.48	1.59	98.5	9.44	23.2
104355	6.44	8.61	2.47	1.58	98.4	9.43	22.7
104400	6.44	8.61	2.47	1.58	98.5	9.44	23.7
Averages	**6.44**	**8.61**	**2.483**	**1.588**	**98.73**	**9.46**	**23.19**
Lab	**n/a**	**8.4**	**2.500**	**1.840**	**n/a**	**n/a**	**19.3**
SAR=	**5.401**						

Comment

Cloudy and cool, no recent precip. Lab analysis attached.

Cow Crk SAR

5 Cow \

Na^{+1} = 360/22.99 = 15.659

Ca^{+2} = 73/20.04 = 3.643

Mg^{+2} = 160/12.15 = 13.169

$SAR = (15.659 / (3.643 + 13.169)/2)^{.5}$

16.812/2 = 8.406

$8.406\sqrt{} = 2.899$

1/x = .3449

x 15.659

= SAR 5.401

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0304-30459

D/T REC: 5/4/01 10:40 BY: KH

DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/2/01	Conductivity	2.47
Time Collected	10:55	Dissolved O_2	98.6%, 9.77 [illegible]
Discharge	≈1-2 cfs	Turbidity	≈23.5 ntu
Temperature	6.45°C	pH	8.62

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 Cow 1
Sampled By: LSRCD/Sheehan
Comments: Cow Creek

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SDH 5/15	mg/L	73	Carbonate SDH 5/11	mg/L	19
Magnesium	mg/L	160	Bicarbonate	mg/L	700
Sodium 5/14	mg/L	360	Fluoride SDH 5/11	mg/L	1.9
Potassium 5/15	mg/L	9.7	Chloride	mg/L	52
TDS (ROE 180) RWH 6.6.01	mg/L	1840	Nitrate as N	mg/L	<0.1
TSS RWH 5.18.01	mg/L	34.0	Nitrite as N	mg/L	<0.1
pH SDH 5/11	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 5/9	umhos/cm	2500	Sulfate RWH 5.5.01	mg/L	770
Turbidity SDH 5/4	NTU	19.3	Total Phosphate SDH 5/8	mg/L	0.07
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	600
			Hardness as $CaCO_3$ 5/15	mg/L	840 ~~[illegible]~~

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cow Creek**

Site ID: 4Cow1

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: **4/11/01** 10:26

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensor Details: Calibrated H20 4/5/01

DO Calibration: Bar Pressure Reading 23.45 x25.4= 595.63

Discharge Measurement: Visual- approx. 2-3 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
102520	3.54	8.78	2.46	1.57	103	10.59	24.6
102525	3.56	8.77	2.44	1.56	103	10.59	27.3
102530	3.58	8.77	2.47	1.58	103	10.59	27.6
102535	3.58	8.77	2.46	1.57	103.1	10.59	26.3
102540	3.59	8.77	2.44	1.56	103.1	10.59	27.5
102545	3.6	8.77	2.4	1.54	103.1	10.59	26.6
102550	3.61	8.77	2.38	1.52	103.1	10.59	28.1
102555	3.61	8.77	2.38	1.52	103	10.58	26.2
102600	3.62	8.77	2.4	1.53	103.1	10.58	28
102605	3.61	8.77	2.48	1.58	103	10.58	29.7
102610	3.62	8.77	2.49	1.59	103.1	10.59	26.4
102615	3.64	8.77	2.4	1.54	103.1	10.58	27.8
102620	3.65	8.77	2.38	1.52	103.2	10.58	27.5
102625	3.65	8.77	2.46	1.57	103.2	10.58	28
102630	3.66	8.77	2.49	1.59	103.2	10.58	31.4
Averages	**3.61**	**8.77**	**2.44**	**1.56**	**103.09**	**10.59**	**27.53**
Lab	**n/a**	**8.5**	**2.5**	**1.92**	**n/a**	**n/a**	**33.4**
SAR=	**5.239**						

Comments:

Cow Creek 4/11/01, Cloudy and cool approx. 40F, Recent precip. 4/8 and 4/9. Light precip 4/10. Lab analysis attached.

Cow Creek

4 Cow 1

$Na^+ = 340/22.99 = 14.789$

$Ca^{2+} = 105/20.04 = 5.240$

$Mg^{2+} = 130/12.15 = 10.700$

$SAR = (14.789/((5.240 + 10.700)/2))^{0.5}$

$7.97\sqrt{\ } = 2.823$

$1/x = .3542$

$\times 14.789 =$

$\boxed{SAR\ 5.237}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0412 - 29842
D/T REC: 04-12-01 11:00 BY: CA
DATE COMPLETED: 4.24.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/11/01	Conductivity	2.49
Time Collected	10.40	Dissolved O_2	103.28/10.58 mg/L
Discharge	≈2-3 cFs	Turbidity	≈27 ntu
Temperature	3.62	pH	8.77

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID	Cow Creek
Sampled By	LSRCD/Sheehan
Comments:	Cow Creek
Invoice #	VOSR
Amount	$45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SSH 4/19	mg/L	105	Carbonate SSH 4/13	mg/L	26
Magnesium	mg/L	130	Bicarbonate	mg/L	480
Sodium	mg/L	340	Fluoride RWH 4.12.01	mg/L	1.2
Potassium	mg/L	7.9	Chloride	mg/L	45
TDS (ROE 180) RWH 4.17.01	mg/L	1920	Nitrate as N	mg/L	0.2
TSS RWH 4.17.01	mg/L	32	Nitrite as N	mg/L	<0.1
pH SSH 4/13	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab	umhos/cm	2500	Sulfate	mg/L	860
Turbidity RWH 4.12.01	NTU	33.4	Total Phosphate SSH 4/13	mg/L	0.14
			Total Alkalinity as $CaCO_3$	mg/L	440
			Hardness as $CaCO_3$ 4/20	mg/L	800

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

CA

Sect. File: LSRCD01 Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cow Creek**

Site ID: 3Cowcr1

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: **3/19/01** 11:15

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 3/19/01

DO Calibration: Bar Pressure Reading 23.85 x25.4= 605.79

Discharge Measurement: Visual- approx. 2-3 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
111230	0.33	8.75	2.22	1.42	81.7	9.35	153
111235	0.33	8.75	2.24	1.43	81.6	9.34	153
111240	0.34	8.75	2.27	1.45	81.7	9.35	164
111245	0.34	8.75	2.24	1.43	81.6	9.33	174
111250	0.32	8.75	2.28	1.46	81.5	9.33	149
111255	0.34	8.75	2.27	1.45	81.6	9.33	183
111300	0.33	8.75	2.26	1.45	81.7	9.35	175
111305	0.34	8.77	2.22	1.42	81.7	9.35	175
111310	0.34	8.76	2.19	1.4	82.1	9.38	168
111315	0.33	8.75	2.26	1.44	81.8	9.37	176
111320	0.33	8.76	2.25	1.44	81.8	9.36	155
111325	0.33	8.75	2.25	1.44	81.8	9.36	179
111330	0.34	8.75	2.26	1.44	81.8	9.36	167
111335	0.33	8.75	2.26	1.44	81.8	9.36	167
111340	0.34	8.75	2.25	1.44	81.8	9.36	164
Averages	**0.33**	**8.75**	**2.248**	**1.437**	**81.73**	**9.35**	**166.80**
Lab	**n/a**	**8.60**	**2.300**	**1.610**	**n/a**	**n/a**	**152.00**
SAR=	**7.14**						

Comment

Msg: 3/19/01 Cow Creek Sample, Cool and Windy, approx. 40F, Snow covering on ground, Ice on banks, Visual 3-4 cfs, Lab analysis attached.

Cow Creek

3 Control

$Na^{+1} = 380/22.99 = 16.529$

$Ca^{+2} = 58/20.04 = 2.894$

$Mg^{+2} = 95/12.15 = 7.819$

$SAR = \left(16.529/\left((2.894 + 7.819)/2\right)\right)^{0.5} =$

$5.3565^{\sqrt{\ }} = 2.3144$

$1/x = .4320$

$y\ 16.529 =$

SAR 7.142

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D320-21518

D/T REC: D320 01 10.45 BY: CA

DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/19/01	Conductivity	2.25
Time Collected	11:15	Dissolved O_2	9.36 mg/L
Discharge	≈ 3-4 cfs	Turbidity	≈ 147 NTU
Temperature	34°C	pH	8.25

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 3 COW 1

Sampled By: LSRCD / Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KGH 3/30	mg/L	58	Carbonate KGH 3/23	mg/L	31
Magnesium	mg/L	95	Bicarbonate	mg/L	730
Sodium	mg/L	380	Fluoride KGH 3.26.01	mg/L	1.8
Potassium	mg/L	8.2	Chloride	mg/L	56
TDS (ROE 180) KGH 3.23.01	mg/L	1610	Nitrate as N	mg/L	< 0.1
TSS KGH 3.23.01	mg/L	214	Nitrite as N	mg/L	< 0.1
pH KGH 3/23	Units	8.6	Ortho Phosphate	mg/L	< 0.1
Conductivity, Lab	umhos/cm	2300	Sulfate	mg/L	516
Turbidity KGH 3.26.01	NTU	152	Total Phosphate KGH 3/27	mg/L	0.25
			Total Alkalinity as $CaCO_3$ KGH 3/23	mg/L	650
			Hardness as $CaCO_3$ 3/30	mg/L	540

% SAR = 7.1/2

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

CF

Elect. File: LSRCD01

Analysts: KGH 9/2/01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Cow Creek

Site ID: 5cowcr0

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 5/4/00 1500

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 5/3/00

DO Calibration: Bar Pressure Reading 23.6 x25.4= 599.44

Discharge Measurement: Visual- approx. 1-2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
145940	23.51	8.56	2.460	1.570	130.9	8.68	44.6
145945	23.52	8.56	2.460	1.570	131	8.68	38.1
145950	23.52	8.56	2.460	1.570	131.1	8.69	46.6
145955	23.53	8.56	2.460	1.570	131.1	8.69	43.8
150000	23.53	8.56	2.460	1.570	131.1	8.69	46.6
150005	23.54	8.56	2.460	1.570	131.1	8.69	41.7
150010	23.54	8.56	2.460	1.570	131.2	8.69	43.6
150015	23.54	8.56	2.460	1.570	131	8.68	43.9
150020	23.54	8.56	2.460	1.570	131.1	8.69	44.9
150025	23.54	8.56	2.460	1.570	131.3	8.7	42.7
150030	23.54	8.56	2.460	1.570	131.1	8.69	43.2
150035	23.55	8.56	2.460	1.570	131.2	8.69	48.2
150040	23.55	8.56	2.460	1.570	131.2	8.69	46.6
150117	23.57	8.56	2.460	1.570	131.3	8.7	41.7
150120	23.58	8.56	2.460	1.570	131.4	8.71	46.7
Averages	**23.54**	**8.56**	**2.460**	**1.570**	**131.14**	**8.69**	**44.19**

Comments:

Msg: Cow Creek Sample Site 5/4/00, Approx. 1-2 cfs, Hot and dry no recent precip.

Grab Sample Data

Stream: Cow Creek

Site ID: 4cowcr0

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 4/13/00 1431

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 4/13/00

DO Calibration: Bar Pressure Reading 23.61 x25.4= 599.69

Discharge Measurement: Visual- approx. 1-2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
143030	14.97	8.52	2.300	1.470	107.9	8.51	66.6
143035	14.97	8.52	2.300	1.470	108	8.51	67.1
143040	14.97	8.52	2.300	1.470	107.9	8.51	69.2
143045	14.97	8.52	2.300	1.470	107.9	8.51	66.7
143050	14.97	8.52	2.300	1.470	107.9	8.51	67
143055	14.98	8.52	2.300	1.470	107.8	8.5	67.5
143100	14.98	8.52	2.300	1.470	107.8	8.49	65.4
143105	14.98	8.52	2.300	1.470	107.8	8.49	66.1
143110	14.98	8.52	2.300	1.470	107.8	8.5	66
143115	14.98	8.52	2.300	1.470	107.7	8.49	67.2
143120	14.99	8.52	2.300	1.470	107.7	8.49	66.8
143125	14.99	8.52	2.300	1.470	107.7	8.48	69.5
143130	14.99	8.52	2.300	1.470	107.7	8.48	68.7
143135	14.99	8.52	2.300	1.470	107.6	8.48	67.1
143140	15	8.52	2.300	1.470	107.6	8.48	70.3
143145	15	8.52	2.300	1.470	107.6	8.48	70.4
143150	15	8.52	2.300	1.470	107.5	8.47	70.1
143155	15	8.52	2.300	1.470	107.6	8.48	69.6
143238	15.03	8.52	2.300	1.470	107.4	8.46	71.9
143240	15.03	8.52	2.300	1.470	107.5	8.46	70.6
Averages	**14.99**	**8.52**	**2.300**	**1.470**	**107.72**	**8.49**	**68.19**

Comments:

Msg: Cow Creek Sample Site 4/13/00, Approx. 1-2 cfs, Sunny and Dry, high ntu's

Grab Sample Data

Stream: Cow Creek

Site ID: 3CowCrk0

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 3/27/00 10:30 11:00

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 3/27/00

DO Calibration: Bar Pressure Reading 23.72 x25.4= 591.82

Discharge Measurement: Visual- approx. 2-3 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:44:50	5.81	8.68	2.070	1.330	96.5	9.48	79.4
10:44:55	5.81	8.68	2.070	1.330	96.3	9.46	77.7
10:45:00	5.82	8.68	2.070	1.320	96.3	9.46	77
10:45:05	5.81	8.68	2.070	1.320	96.2	9.45	78.1
10:45:10	5.82	8.68	2.070	1.320	96.2	9.45	75.3
10:45:15	5.82	8.68	2.070	1.320	96.5	9.48	81.1
10:45:20	5.82	8.68	2.070	1.320	96.4	9.47	78.9
10:45:25	5.82	8.68	2.070	1.320	96.3	9.46	79.1
10:45:30	5.82	8.68	2.070	1.320	96.3	9.46	75.2
10:45:35	5.82	8.68	2.070	1.330	96.5	9.48	76.6
10:45:40	5.82	8.68	2.070	1.330	96.2	9.46	78.8
10:45:45	5.82	8.68	2.070	1.320	96.2	9.44	79.4
10:45:50	5.83	8.68	2.070	1.320	96.5	9.48	79.8
Averages	**5.82**	**8.68**	**2.070**	**1.323**	**96.34**	**9.46**	**78.18**

Comments:

Msg: Cow Creek Sample Site, Cool, Approx. 2-3 cfs, 3/27/00, Cow Creek showing much higher Trb-ntu than other sampled creeks.

SAR value = 5.107

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0328-23123		23123
D/T REC: 3/28/00 1400	BY: [illegible]	
DATE COMPLETED: 4-12-2000		
Date Collected		03/27/00
Time Collected		10:45
Discharge		≈ 2-3 cfs
Temperature	degrees C	
pH	Units	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID	Cow Creek #3
Sampled By	LSRCD / Sheehan
Comments:	
Invoice #	
Amount	$45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium [illegible] 3-30-00	mg/L	98	Total Alkalinity as $CaCO_3$	mg/L	450
Magnesium	mg/L	110	Fluoride [illegible] 3/28/00	mg/L	1.0
Sodium 4/5/00	mg/L	310	Chloride	mg/L	37
Potassium 4/5	mg/L	7.1	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/8/00	mg/L	700	Nitrite as N	mg/L	<0.1
TDS (ROE 180) [illegible] 3-30-00	mg/L	1700	Ortho Phosphate	mg/L	<0.1
TSS [illegible] 3-30-00	mg/L	53	Total Phosphate [illegible] 4/7/00	mg/L	0.08
pH [illegible] 3/31/00	Units	8.5	Sulfate (@ 10x) [illegible] 3-30-00	mg/L	9[illegible]
Conductivity, Lab 4-11-00 [illegible]	umhos/cm	2400	Turbidity 3-28-00 [illegible]	NYU	59.4

Carbonate 23
Bicarbonate 500

US SAR = 5.107

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01 Analysts: [illegible] 4-12-00

I hereby certify the above was analyzed by myself or my assistant.

Secrion Supervisor

Kenneth L. McMillan, Laboratory Manager

Cow Creek

Na^{+1} = 310 / 22.99 = 13.484

Ca^{+2} = 78 / 20.04 = 3.890

Mg^{+2} = 110 / 12.13 = 9.053

SAR = (13.484) / ((3.890 + 9.053)/2)$^{.5}$ = **5.107**

2.040 3/27/14

Grab Sample Data

Stream: Cow Creek

Site ID: 6cowcr9

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 6/4/99 1040

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 6/4/99

DO Calibration: Bar Pressure Reading 23.43 x25.4= 595.122

Discharge Measurement: Visual- approx. less than 1/2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:39:40	13.14	8.45	2.050	1.310	110.6	9.02	8.1
10:39:45	13.14	8.45	2.050	1.310	110.7	9.03	8.4
10:39:50	13.15	8.45	2.050	1.310	110.7	9.03	7.9
10:39:55	13.15	8.45	2.050	1.310	110.6	9.02	8.2
10:40:00	13.17	8.45	2.050	1.310	110.6	9.01	7.9
10:40:05	13.17	8.44	2.050	1.310	110.5	9.01	8.1
10:40:10	13.16	8.45	2.050	1.310	110.5	9.01	8.3
10:40:15	13.16	8.45	2.050	1.310	110.3	8.99	9.1
10:40:20	13.16	8.45	2.050	1.310	110.4	9	8.1
10:40:25	13.17	8.45	2.050	1.310	110.5	9	7.8
10:40:30	13.18	8.45	2.050	1.310	110.5	9	8.6
10:40:35	13.19	8.45	2.040	1.310	110.5	9	8.1
Averages	**13.16**	**8.45**	**2.049**	**1.310**	**110.53**	**9.01**	**8.22**

Comments:

Msg: Cow Creek Sample Site 6/4/99, Visual less than 1/2 cfs, Sunny and warm

Grab Sample Data

Stream: Cow Creek

Site ID: 5cowcr9

Site Coordinates: T15N, R91W, Sec. 8, NW1/4 of NW1/4

Date & Time: 5/5/99 1100

Elevation: 6480

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensor Details: Calibrated H20 5/5/99

DO Calibration: Bar Pressure Reading 23.38 x25.4= 593.85

Discharge Measurement: Visual- approx. 2-3 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:01:25	3.62	8.69	2.94	1.88	107.1	10.94	42.1
11:01:30	3.62	8.69	2.94	1.88	107.3	10.95	46.5
11:01:35	3.62	8.69	2.94	1.88	107.4	10.96	47
11:01:40	3.62	8.69	2.94	1.88	107.4	10.96	48.5
11:01:45	3.62	8.69	2.94	1.88	107.4	10.97	45.6
11:01:50	3.62	8.69	2.94	1.88	107.5	10.97	43.9
11:01:55	3.62	8.7	2.94	1.88	107.5	10.97	46.4
11:02:00	3.62	8.7	2.94	1.88	107.5	10.98	45.7
11:02:05	3.63	8.7	2.94	1.88	107.7	10.99	43.6
11:02:10	3.62	8.7	2.94	1.88	107.8	11	44.8
11:02:15	3.62	8.71	2.94	1.88	107.9	11.01	44.6
11:02:20	3.62	8.71	2.94	1.88	108	11.02	45.2
11:02:25	3.63	8.72	2.94	1.88	108.3	11.05	43.1
11:02:30	3.63	8.72	2.94	1.88	108.3	11.06	42.8
11:02:35	3.62	8.73	2.94	1.88	108.1	11.04	42.2
11:02:40	3.62	8.73	2.94	1.88	108.2	11.04	39.1
11:02:45	3.62	8.74	2.94	1.88	108.3	11.06	40.7
11:02:50	3.62	8.74	2.94	1.88	108.3	11.06	40.8
11:02:55	3.63	8.74	2.94	1.88	108.4	11.07	39.7
11:03:00	3.62	8.74	2.94	1.88	108.5	11.07	42.4
11:03:05	3.63	8.74	2.94	1.88	108.5	11.07	46.4
11:03:10	3.63	8.74	2.94	1.88	108.5	11.08	38.3
11:03:15	3.63	8.74	2.94	1.88	108.5	11.07	40.1
Averages	**3.62**	**8.71**	**2.940**	**1.880**	**107.93**	**11.02**	**43.46**

Comments:

Msg: Cow Creek Sample Site 5/5/99, Cloudy and cool, Rain/snow pm of 5/4, Approx. 2-3 cfs visual, Precip last two weeks

Cherokee Creek

Grab Sample Data

Stream: **Cherokee Creek** *(macro)*

Site ID: 8Chero2M

Site Coordinates: Lat 41° 14′ 51.98″ Long 107° 34′ 05.93″

Date & Time: **8/14/02** @ 11:01

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 8/14/02

DO Calibration: Bar Pressure Reading 23.48 X25.4= 596.392

Discharge Measurement: Visual approx. 1/4 to 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
110055	16.29	8.07	1.55	0.99	90.8	6.95	16.8
110100	16.29	8.07	1.55	0.99	90.6	6.93	18.7
110105	16.29	8.07	1.55	0.99	90.6	6.93	17.1
110110	16.3	8.07	1.55	0.99	90.7	6.94	20.1
110115	16.3	8.07	1.55	0.99	90.8	6.94	17.3
110120	16.31	8.07	1.55	0.99	90.7	6.93	19.4
110125	16.31	8.07	1.55	0.99	90.7	6.93	17.4
110130	16.31	8.07	1.55	0.99	90.7	6.93	16.3
110135	16.31	8.07	1.55	0.99	90.7	6.93	17.6
110140	16.33	8.07	1.55	0.99	90.6	6.92	17.8
110145	16.33	8.07	1.55	0.99	90.6	6.92	14.5
110150	16.33	8.07	1.55	0.99	90.6	6.92	16
110155	16.34	8.07	1.55	0.99	90.8	6.93	17.5
110200	16.33	8.07	1.55	0.99	90.8	6.94	19
110205	16.34	8.07	1.55	0.99	90.6	6.92	19.7
110210	16.34	8.07	1.55	0.99	90.6	6.92	19.5
110215	16.34	8.07	1.55	0.99	90.6	6.92	17.4
110220	16.35	8.07	1.55	0.99	90.8	6.93	16.6
110225	16.35	8.07	1.55	0.99	90.7	6.92	19.7
110310	16.38	8.07	1.56	0.99	90.8	6.93	22.2
110315	16.39	8.08	1.55	0.99	90.7	6.92	18.9
Averages	**16.33**	**8.07**	**1.55**	**0.99**	**90.69**	**6.93**	**18.07**
Lab	**n/a**	**8.4**	**1.59**	**1.15**	***n/a***	***n/a***	**3.74**
SAR=	**1.76**						

Notes:

8/14/02 Cherokee Creek Macro, Hot and Dry, No recent precip., Lab Sample @ 11:15, Air Temp= 24.4C, Wind Ave= 3.3 mph, Rel Hum= 18%, Flow= approx. 1/4 to 1/2 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0815-39539

D/T REC: 8/15/02 10:15 BY: KN

DATE COMPLETED: 8/27/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	8/14/02	Conductivity	1.55
Time Collected	11:15	Dissolved O_2	90.2%, 6.93 mg/L
Discharge	~¼ CFS	Turbidity	~19.0
Temperature	16.29°C	pH	8.07

Sample ID: BChero2M

Sampled By: LSRCD/Sheehan

Comments: macro

Invoice #: VOSR

Amount: $45.00

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT
Calcium RWH 8/22	mg/L	130
Magnesium	mg/L	100
Sodium	mg/L	110
Potassium	mg/L	12
TDS (ROE 180) Ann 8/16/02	mg/L	1150 RWH
TSS Ann 8/19/02	mg/L	3.20
pH	Units	8.4
Conductivity, 25C Ann 8/14/02	umhos/cm	1590
Turbidity Ann 8/16/02	NTU	3.74

PARAMETER	UNITS	RESULT
Carbonate RWH 8/16/02	mg/L	15
Bicarbonate	mg/L	410
Fluoride RWH 8/15/02	mg/L	1.5
Chloride	mg/L	77
Nitrate as N	mg/L	<0.1
Nitrite as N	mg/L	<0.1
Ortho Phosphate	mg/L	<0.1
Sulfate RWH 8/16	mg/L	550
Total Phosphate RWH 8/22	mg/L	0.04
Total Alkalinity as $CaCO_3$ RWH 8/16	mg/L	360
Hardness as $CaCO_3$ RWH 8/27	mg/L	740

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 14-Aug-2002 **Lab No:** 39539

CATIONS	mg/L	meq/L
Calcium	130	6.49
Magnesium	100	8.22
Sodium	110	4.78
Potassium	12	0.31
T. CATIONS		**19.80**
ROE 180	mg/L	1150
TSS	mg/L	3.20
Turbidity	NTU	3.74

ANIONS	mg/L	meq/L
Carbonate	15	0.50
Bicarbonate	410	6.72
Chloride	27	0.76
Fluoride	1.5	0.08
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	550	11.45
T. ANIONS		**19.51**

Conductance, umhos/cm		1590
TDS by Summation, mg/L		1147
pH, Units		8.4
Total Coliform	per 100 ml	

Analyte	Units	Result
Total Phosphate	mg/L	0.04
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

S A R (sodium Hazard)	1.76
T Alk CaCO3, mg/L	361
Hardness as CaCO3, mg/L	736
Hardness as CaCO3, gr/gal	43

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.72
Meq Cations/Sp cond/100	1.25
Meq Anions/Sp cond/100	1.23
ROE/TDS Summation	1.00

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.74%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.72** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.24** (0.8 TO 1.2)

OVERALL =	0.0043	MAX. OVERALL ALLOWED =	0.0531

RLH

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 6Chero2

Site Coordinates: Lat 41 14 51.98 Long 107 34 05.93

Date & Time: **6/18/02** @ 10:07

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 6/18/02

DO Calibration: Bar Pressure Reading 23.48 X25.4= 596.392

Discharge Measurement: Visual approx. 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
100650	15.64	7.86	1.432	0.917	94.7	7.35	2.1
100655	15.65	7.86	1.432	0.917	94.8	7.35	3.8
100700	15.66	7.86	1.432	0.917	94.9	7.36	2.4
100705	15.66	7.87	1.433	0.917	94.9	7.36	2.1
100710	15.66	7.86	1.433	0.917	94.9	7.36	2.5
100715	15.67	7.87	1.433	0.917	94.9	7.36	2.4
100720	15.68	7.87	1.432	0.917	94.9	7.35	1.7
100725	15.68	7.87	1.433	0.917	94.9	7.35	1.7
100730	15.68	7.87	1.433	0.917	94.9	7.36	2.3
100735	15.69	7.87	1.433	0.917	94.8	7.35	2
100740	15.69	7.87	1.433	0.917	94.9	7.35	2.2
100745	15.7	7.87	1.433	0.917	94.9	7.35	1.9
100750	15.7	7.87	1.433	0.917	94.9	7.35	2.8
100755	15.71	7.87	1.433	0.917	94.8	7.34	2.2
100800	15.71	7.87	1.433	0.917	94.9	7.35	2.4
100805							
Averages	**15.68**	**7.87**	**1.433**	**0.917**	**94.87**	**7.35**	**2.24**
Lab	**n/a**	**8.20**	**1.500**	**1.052**	**n/a**	**n/a**	**2.05**
SAR=	**1.57**						

Notes:

6/18/02 Cherokee Creek, Very Dry no recent precip., Lab Sample at 10:15
Flow= approx. 1/2 cfs, Air Temp= 23.5C, Wind Ave= 7.5mph, Rel Hum= 17%
**Dp Gul, Dcow, Wcow, were all dry at this time of sampling

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D6 19-38270

D/T REC: 06-19-02 10:30 BY: CA

DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/18/02	Conductivity	1.433
Time Collected	10:15	Dissolved O_2	94.9% / 2.35 mg/l
Discharge	~½ cFS	Turbidity	~2.2 ntu
Temperature	15.70 °C	pH	7.87

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 6 Chevo 2

Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT
Calcium RLH 6.19.02	mg/L	100
Magnesium	mg/L	94
Sodium	mg/L	91
Potassium	mg/L	7.7
TDS (ROE 180) RLH 6/20/02	mg/L	1052
TSS tkm 6/20/02	mg/L	1.60
pH SDH 6/21	Units	8.2
Conductivity, Lab 6/19	umhos/cm	1500
Turbidity 6/19	NTU	2.05

PARAMETER	UNITS	RESULT
Carbonate SDH 6/21	mg/L	0
Bicarbonate	mg/L	440
Fluoride RLH 6.19.02	mg/L	1.2
Chloride	mg/L	24
Nitrate as N	mg/L	<0.1
Nitrite as N	mg/L	<0.1
Ortho Phosphate	mg/L	<0.1
Sulfate 6.21.02	mg/L	480
Total Phosphate SDH 6/21	mg/L	0.04
Total Alkalinity as $CaCO_3$ 6/21	mg/L	360
Hardness as $CaCO_3$ RLH 6.25.02	mg/L	640

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 18-Jun-2002 | **Lab No:** 38270

CATIONS	mg/L	meq/L
Calcium	100	4.99
Magnesium	94	7.73
Sodium	91	3.96
Potassium	7.7	0.20
T. CATIONS		**16.87**
ROE 180	mg/L	1052
TSS	mg/L	1.60
Turbidity	NTU	2.05

ANIONS	mg/L	meq/L
Carbonate	0	0.00
Bicarbonate	440	7.21
Chloride	24	0.68
Fluoride	1.2	0.06
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	480	9.99
T. ANIONS		**17.94**

Conductance, umhos/cm	1500
TDS by Summation, mg/L	1014
pH, Units	8.2
Total Coliform per 100 ml	

S A R (sodium Hazard)	1.57
T Alk CaCO3, mg/L	361
Hardness as CaCO3, mg/L	637
Hardness as CaCO3, gr/gal	37

Analyte	Units	Result
Total Phosphate	mg/L	0.04
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.70
Meq Cations/Sp cond/100	1.12
Meq Anions/Sp cond/100	1.20
ROE/TDS Summation	1.04

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **3.07%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.68** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.16** (0.8 TO 1.2)

OVERALL =	0.0179	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 5Chero2

Site Coordinates: Lat 41 14 51.98 Long 107 34 05.93

Date & Time: **5/13/02** @ 12:35

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 5/13/02

DO Calibration: Bar Pressure Reading 23.7 X25.4= 601.98

Discharge Measurement: Visual approx. 1cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
123310	18.79	8.28	1.49	0.953	95.5	7	3.8
123315	18.79	8.28	1.489	0.952	95.5	7	3.2
123320	18.8	8.28	1.485	0.95	95.5	7	3.2
123325	18.8	8.28	1.487	0.951	95.5	7	3.4
123330	18.8	8.27	1.49	0.953	95.6	7.01	3.5
123335	18.8	8.28	1.489	0.953	95.4	7	3.2
123340	18.81	8.28	1.49	0.953	95.5	7	2.8
123345	18.81	8.28	1.492	0.954	95.5	7	2.8
123350	18.82	8.28	1.486	0.951	95.5	7	3.1
123355	18.82	8.28	1.491	0.954	95.5	6.99	3.3
123400	18.82	8.28	1.486	0.951	95.5	6.99	3.4
123405	18.83	8.28	1.49	0.954	95.4	6.99	3.1
123552	18.9	8.28	1.489	0.952	95.3	6.97	3.5
123555	18.9	8.28	1.486	0.951	95.3	6.97	3.4
Averages	**18.82**	**8.28**	**1.489**	**0.952**	**95.46**	**6.99**	**3.26**
Lab	**n/a**	**8.40**	**1.480**	**1.060**	**n/a**	**n/a**	**3.10**
SAR=	**1.59**						

Notes:

5/13/02 Cherokee Creek, Sunny and warm very dry Spring, Recent light rain on 5/11, Lab Sample at 12:40, Flow approx 1-2 cfs, Air Temp= 18.7C, Wind Ave= 3.1mph, Rel Hum= 19%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0514-37595

D/T REC: 5/14/02 10:30 BY: KH

DATE COMPLETED: 5.22.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/13/02	Conductivity	1426
Time Collected	12:40	Dissolved O_2	95.5%; 6.77 mg/L
Discharge	~1-2 cfs	Turbidity	<5.0 NTU
Temperature	18.87°C	pH	8.28

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 5 Chevo 2

Sampled By: LSRCD/Sheehan

Comments:

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RLH 5.14.02	mg/L	110	Carbonate KH 5/17	mg/L	10
Magnesium	mg/L	100	Bicarbonate	mg/L	420
Sodium	mg/L	96	Fluoride RLH 5.14.02	mg/L	1.1
otassium	mg/L	8.5	Chloride	mg/L	23
S (ROE 180) 5/15/02	mg/L	1060	Nitrate as N	mg/L	<0.1
TSS Bm 5/15/02	mg/L	3,20	Nitrite as N	mg/L	<0.1
pH KH 5/17	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab Bm 5/16/02	umhos/cm	1480	Sulfate 5.17.02	mg/L	460
Turbidity Bm 5/14/02	NTU	3.10	Total Phosphate KH 5/15	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 5/17	mg/L	360
			Hardness as $CaCO_3$ RLH 5/20	mg/L	690

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Act. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Glenn A. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail:
Internet:
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	13-May-2002		Lab No:	37595	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	110	5.49	Carbonate	10	0.33
Magnesium	100	8.22	Bicarbonate	420	6.88
Sodium	96	4.18	Chloride	23	0.65
Potassium	8.5	0.22	Fluoride	1.1	0.06
T. CATIONS		**18.11**	Nitrate as N	0	0.00
ROE 180	mg/L	1060	Nitrite as N	0	0.00
TSS	mg/L	3.20	Ortho phosphate	0	0.00
Turbidity	NTU	3.10	Sulfate	460	9.58
			T. ANIONS		**17.50**

Conductance, umhos/cm	1480	S A R (sodium Hazard)	1.59
TDS by Summation, mg/L	1015	T Alk CaCO3, mg/L	361
pH, Units	8.4	Hardness as CaCO3, mg/L	686
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	40

Analyte	Units	Result
Total Phosphate	mg/L	0.04
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.72**
Meq Cations/Sp cond/100	**1.22**
Meq Anions/Sp cond/100	**1.18**
ROE/TDS Summation	**1.04**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.70%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.69** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.20** (0.8 TO 1.2)

OVERALL =	**0.0097**	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 4Chero22

Site Coordinates: Lat 41 14 51.98 Long 107 34 05.93

Date & Time: **4/17/02** @ 9:55

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.24 X25.4= 590.296

Discharge Measurement: Visual approx. 1-2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
95345	5.26	8.12	1.54	0.98	87.2	8.54	2.7
95350	5.26	8.12	1.54	0.98	87.4	8.55	2.8
95355	5.24	8.12	1.5	0.96	87.2	8.54	3.5
95400	5.24	8.11	1.54	0.98	87.1	8.52	3
95405	5.24	8.12	1.5	0.96	86.9	8.51	3.8
95410	5.24	8.12	1.54	0.98	86.9	8.51	3.3
95415	5.24	8.12	1.48	0.94	86.9	8.51	2.8
95420	5.24	8.12	1.54	0.98	86.8	8.5	1.6
95425	5.23	8.12	1.46	0.93	86.8	8.5	3.2
95430	5.24	8.12	1.52	0.97	86.8	8.5	2.2
95435	5.24	8.12	1.48	0.94	86.7	8.49	3
95440	5.23	8.12	1.47	0.94	86.7	8.49	3.2
95527	5.24	8.12	1.5	0.96	86.5	8.47	3.2
95530	5.24	8.12	1.53	0.98	86.5	8.47	1.6
Averages	**5.24**	**8.12**	**1.510**	**0.963**	**86.89**	**8.51**	**2.85**
Lab	**n/a**	**8.20**	**1.550**	**1.132**	**n/a**	**n/a**	**3.66**
SAR=	**1.45**						

Notes:

4/17/02 Cherokee Creek, Windy and Partly Cloudy, Lab Sample at 10:00, Flow= 1-2cfs, Air Temp= 11.1C, Wind Ave= 8.1mph, Rel Hum= 36%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0418-368468

D/T REC: 04-18-02 12.00 BY: GA

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/17/02	Conductivity	1.54
Time Collected	1000	Dissolved O_2	86.7%, 8.51
Discharge	2-1-2 cfs	Turbidity	~2.5 NTU
Temperature	5.26 °C	pH	8.12

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 Chem 22
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KSH 4/25	mg/L	120	Carbonate KSH 4/19	mg/L	0
Magnesium	mg/L	100	Bicarbonate	mg/L	460
Sodium	mg/L	89	Fluoride Rpt 4.18.02	mg/L	1.2
Potassium	mg/L	6	Chloride	mg/L	28
TDS (ROE 180) 4/19/02	mg/L	1132	Nitrate as N	mg/L	<0.1
TSS 4/19/02 KSH	mg/L	5.60	Nitrite as N	mg/L	<0.1
pH KSH 4/19	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/19/02	umhos/cm	1550	Sulfate 4.19.02	mg/L	550
Turbidity 4/18/02 KSH	NTU	3.66	Total Phosphate KSH 4/30	mg/L	0.03
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	380
			Hardness as $CaCO_3$ 4/29	mg/L	710

S	R	Bottle
1	1	1L Plain
1	1	250ml Plain
1	1	250ml HNO_3
1	1	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KSH 5-1-02

I hereby certify the above was analyzed by myself or my assistant.

Glenn A. Ashmore
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 17-Apr-2002 | **Lab No:** 36868

CATIONS	mg/L	meq/L
Calcium	120	5.99
Magnesium	100	8.22
Sodium	89	3.87
Potassium	6	0.15
T. CATIONS		**18.24**
ROE 180	mg/L	1132
TSS	mg/L	5.60
Turbidity	NTU	3.66

ANIONS	mg/L	meq/L
Carbonate	0	0.00
Bicarbonate	460	7.54
Chloride	28	0.79
Fluoride	1.2	0.06
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	550	11.45
T. ANIONS		**19.84**

Conductance, umhos/cm		1550
TDS by Summation, mg/L		1120
pH, Units		8.2
Total Coliform	per 100 ml	

S A R (sodium Hazard)	1.45
T Alk CaCO3, mg/L	377
Hardness as CaCO3, mg/L	711
Hardness as CaCO3, gr/gal	42

Analyte	Units	Result
Total Phosphate	mg/L	0.03
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.73**
Meq Cations/Sp cond/100	**1.18**
Meq Anions/Sp cond/100	**1.28**
ROE/TDS Summation	**1.01**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **4.22%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.72** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.23** (0.8 TO 1.2)

OVERALL =	**0.024828**	MAX. OVERALL ALLOWED =	5.31

RKH

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 4Chero2

Site Coordinates: Lat 41 14 51.98 Long 107 34 05.93

Date & Time: **4/3/02** @ 11:20

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.5 X25.4= 596.9

Discharge Measurement: Visual approx. 1-2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
111835	8.88	8.39	1.272	0.814	88.5	8.01	22.3
111840	8.89	8.38	1.271	0.813	88.5	8.01	23.5
111845	8.89	8.39	1.272	0.814	88.4	8	32.8
111850	8.89	8.39	1.27	0.813	88.4	8	30.9
111855	8.89	8.39	1.272	0.814	88.4	8	24.5
111900	8.89	8.39	1.271	0.813	88.5	8.01	24.8
111905	8.89	8.39	1.272	0.814	88.5	8.01	31.3
111910	8.9	8.39	1.272	0.814	88.5	8.01	23.1
111915	8.9	8.39	1.271	0.813	88.4	8	27.1
111920	8.9	8.39	1.272	0.814	88.4	8	27.5
111925	8.91	8.39	1.27	0.813	88.3	7.99	22
111930	8.91	8.39	1.269	0.812	88.3	7.99	21.7
111935	8.91	8.39	1.272	0.814	88.3	7.99	23.9
112008	8.93	8.39	1.273	0.815	88.1	7.96	22.9
112010	8.93	8.39	1.274	0.815	88.1	7.96	28.8
Averages	**8.90**	**8.39**	**1.272**	**0.814**	**88.37**	**8.00**	**25.81**
Lab	**n/a**	**8.30**	**1.290**	**0.904**	**n/a**	**n/a**	**25.80**
SAR=	**4.40**						

Notes:

4/02/02 Cherokee Creek, Windy and cool, no recent precip., Snow & Ice present along creek, Flow= 1-2cfs, Lab Sample at 11:30, Air Temp= 8.1C, Wind Ave= 8.3mph, Rel Hum= 37%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0404-366604

D/T REC: 0404-02 11:30 BY: CA

DATE COMPLETED: 4.18.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/3/02	Conductivity	1.272
Time Collected	11:30	Dissolved O_2	88.5%/8.01
Discharge	~1-2 cfs	Turbidity	~27.5 ntu
Temperature	8.89°C	pH	8.37

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4Chero2
Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 4/17	mg/L	26	Carbonate 4/5	mg/L	<1
Magnesium	mg/L	53	Bicarbonate	mg/L	200
Sodium 4/18	mg/L	170	Fluoride 4/4	mg/L	1.1
Potassium	mg/L	4	Chloride	mg/L	11.8
TDS (ROE 180) 4/5/02	mg/L	904	Nitrate as N	mg/L	1.2
TSS 4/5/02	mg/L	16.0	Nitrite as N	mg/L	<0.1
pH 4/5	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/3/02	umhos/cm	1290	Sulfate 15X	mg/L	5.20
Turbidity 4/4/02	NTU	25.8	Total Phosphate 4/16	mg/L	0.13
			Total Alkalinity as $CaCO_3$ 4/5	mg/L	160
			Hardness as $CaCO_3$ 4/18	mg/L	280

S	R	Bottle
| |	| |	1L Plain
| |	| |	250ml Plain
| |	| |	250ml HNO_3
| |	| |	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

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Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	03-Apr-2002		Lab No:	36604	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	26	1.30	Carbonate	0	0.00
Magnesium	53	4.36	Bicarbonate	200	3.28
Sodium	170	7.39	Chloride	11.8	0.33
Potassium	4	0.10	Fluoride	1.1	0.06
T. CATIONS		**13.15**	Nitrate as N	1.2	0.09
ROE 180	mg/L	904	Nitrite as N	0	0.00
TSS	mg/L	16	Ortho phosphate	0	0.00
Turbidity	NTU	25.8	Sulfate	520	10.83
			T. ANIONS		**14.58**

Conductance, umhos/cm		1290	S A R (sodium Hazard)	4.40
TDS by Summation, mg/L		885	T Alk CaCO3, mg/L	164
pH, Units		8.3	Hardness as CaCO3, mg/L	283
Total Coliform	per 100 ml		Hardness as CaCO3, gr/gal	17

Analyte	Units	Result
Total Phosphate	mg/L	0.13
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.70**
Meq Cations/Sp cond/100	**1.02**
Meq Anions/Sp cond/100	**1.13**
ROE/TDS Summation	**1.02**

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})} = \mathbf{5.15\%}\ (<5\%)$$

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.69** (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = \mathbf{1.07}\ (0.8\ \text{TO}\ 1.2)$$

OVERALL =	**0.032898**	MAX. OVERALL ALLOWED =	5.31

Lab

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 8Chero1M

Site Coordinates: Lat 41° 14′ 51.98″ Long 107° 34′ 05.93″

Date & Time: **8/15/01** 11:42

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 8/15/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.73 X25.4= 602.742

Discharge Measurment: Visual- Flow less than 1cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
114205	18.7	8.61	1.368	0.875	94.8	6.97	10.7
114210	18.7	8.61	1.368	0.875	94.6	6.96	9.1
114215	18.7	8.61	1.368	0.875	94.5	6.96	10.2
114220	18.7	8.61	1.368	0.875	94.5	6.95	9.4
114225	18.71	8.61	1.368	0.875	94.6	6.96	10.2
114230	18.71	8.61	1.368	0.875	94.6	6.96	11.4
114235	18.71	8.61	1.368	0.875	94.6	6.96	13.9
114240	18.72	8.61	1.368	0.875	94.6	6.96	9.7
114245	18.72	8.61	1.368	0.875	94.4	6.94	10.1
114250	18.73	8.61	1.368	0.875	94.5	6.95	10.6
114255	18.73	8.61	1.368	0.875	94.6	6.96	10
114300	18.73	8.61	1.368	0.875	94.5	6.95	9
114305	18.73	8.61	1.368	0.875	94.4	6.94	8.5
114346	18.76	8.62	1.368	0.875	94.5	6.94	10.3
114350	18.76	8.61	1.368	0.875	94.5	6.94	9.8
Averages	**18.72**	**8.61**	**1.368**	**0.875**	**94.55**	**6.95**	**10.19**
Lab	**n/a**	**8.30**	**1.340**	**964mg/L**	**n/a**	**n/a**	**6.33**
SAR=	**1.287**						

Comment

Recent precip Aug 7-15 PM Thunderstorms, Air Temp= 20.5C; Wind Ave= 2.4 mph; Rel Hum= 40%; Lab analysis attached.

Cherokee Creek

B Chevalm

$Na^+ = 74/22.99 = 3.219$

$Ca^{2+} = 99/20.04 = 4.940$

$Mg^{2+} = 92/12.15 = 7.572$

$SAR = \left(3.219 / ((4.940 + 7.572)/2) \right)^{0.5} =$

$6.256 \sqrt{\ } \doteq 2.501$

$1/x = .3998$

$\times 3.219 =$

$SAR = 1.287$

WYOMING DEPARTMENT OF AGRICULTURE
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0816-33262

D/T REC: 05-16-01 1024 BY: CA

DATE COMPLETED: 8.24.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	8/15/01	Conductivity	1.368
Time Collected	1310	Dissolved O_2	77.5% 6.55 mg/L
Discharge	< 1/2 cfs	Turbidity	≈ 7.5 ntu
Temperature	18.70 °C	pH	8.01

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID	Chero-M
Sampled By	LSRCD/Sheehan
Comments:	Macro Site
Invoice #	VOSR
Amount	$45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 8/21	mg/L	99	Carbonate SRH 8/20	mg/L	0
Magnesium	mg/L	92	Bicarbonate	mg/L	370
Sodium	mg/L	74	Fluoride RWH 8.16.01	mg/L	0.9
Potassium	mg/L	9.2	Chloride	mg/L	26
TDS (ROE 180) 8/20/01 Jm	mg/L	964	Nitrate as N	mg/L	< 0.1
TSS 8/16/01 Jm	mg/L	7.60	Nitrite as N	mg/L	< 0.1
pH SRH 8/23	Units	8.3	Ortho Phosphate	mg/L	< 0.1
Conductivity, Lab 8/16/01 Jm	umhos/cm	1340	Sulfate 8.17.01	mg/L	440
Turbidity 8/16/01 Jm	NTU	6.33	Total Phosphate SRH 8/23	mg/L	0.12
			Total Alkalinity as $CaCO_3$ 8/20	mg/L	300
			Hardness as $CaCO_3$ 8/21	mg/L	630

S	R	Bottle
☑	[ ]	1L Plain
☑	[ ]	250ml Plain
☑	[ ]	250ml HNO_3
☑	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 6Chero1

Site Coordinates: T15N, R91W, Sec.25 NE1/4 of NE1/4

Date & Time: **6/20/01** 10:55

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/19/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.70 X25.4= 601.98

Discharge Measurment: Visual- Flow less than 1/2cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
105410	18.24	7.91	1.291	0.826	86.7	6.43	34.3
105415	18.24	7.9	1.29	0.826	86.9	6.44	33.1
105420	18.25	7.91	1.29	0.825	86.6	6.43	32.8
105425	18.25	7.91	1.29	0.826	86.5	6.42	34.2
105430	18.25	7.91	1.29	0.826	86.5	6.42	33.6
105435	18.26	7.92	1.291	0.826	86.4	6.41	32.8
105440	18.27	7.92	1.291	0.826	86.5	6.42	36.5
105445	18.27	7.92	1.291	0.826	86.3	6.4	33.7
105450	18.28	7.91	1.29	0.826	86.4	6.4	34
105455	18.28	7.92	1.291	0.826	86.4	6.41	32.5
105500	18.29	7.92	1.291	0.826	86.5	6.41	32.7
105505	18.3	7.92	1.29	0.826	86.5	6.41	33.4
105510	18.3	7.92	1.291	0.826	86.6	6.42	34.3
105515	18.3	7.92	1.29	0.826	86.5	6.41	34.7
105520	18.31	7.92	1.291	0.826	86.5	6.41	33.1
Averages	**18.27**	**7.92**	**1.291**	**0.826**	**86.52**	**6.42**	**33.71**
Lab	**n/a**	**8.2**	**1.300**	**0.928**	**n/a**	**n/a**	**6.04**
SAR=	**1.182**						

Comment

Sunny and Hot, approx 80F, No recent precip. Lab analysis attached

Cherokee Creek
6 Chero 1
6/20/01

$Na^+ = 67/22.99 = 2.914$

$Ca^{2+} = 100/20.04 = 4.990$

$Mg^{2+} = 87/12.15 = 7.160$

$SAR = (2.914/((4.990 + 7.160)/2))^{0.5}$

$6.075\ V = 2.465$

$1/x = .4057$

$x = 2.914$

$\boxed{SAR\ 1.182}$

WYOMING DEPARTMENT OF AGRICULTURE
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Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0621-31873

D/T REC: 6/21/01 10:00 BY: KH

DATE COMPLETED: 7.13.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/20/01	Conductivity	1.291
Time Collected	1100	Dissolved O_2	86.5%, 6.41 mg/L
Discharge	<1 cfs	Turbidity	2.33 NTU
Temperature	18.27°C	pH	7.92

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cherok

Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 7/10	mg/L	100	Carbonate KH 6/27	mg/L	0
Magnesium	mg/L	87	Bicarbonate	mg/L	410
Sodium	mg/L	67	Fluoride Ruth 6.28.01	mg/L	0.9
Potassium	mg/L	6.3	Chloride	mg/L	20
TDS (ROE 180) 7/6/01	mg/L	928	Nitrate as N	mg/L	<0.1
TSS 6/26/01 Ann	mg/L	8.0	Nitrite as N	mg/L	<0.1
pH KH 6/22	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 6/22/01	umhos/cm	1300	Sulfate 6.28.01	mg/L	350
Turbidity 6/21/01 Ann	NTU	0.04	Total Phosphate KH 7/3	mg/L	0.04
			Total Alkalinity as $CaCO_3$ KH 6/22	mg/L	340
			Hardness as $CaCO_3$	mg/L	610

S	R	Bottle
M	1	1L Plain
M	1	250ml Plain
M	1	250ml HNO_3
M	1	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KH 7-13-01

I hereby certify the above work analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 6Chero1

Site Coordinates: T15N, R91W, Sec.25 NE1/4 of NE1/4

Date & Time: **6/5/01** 12:02

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/5/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.45 X25.4= 595.63

Discharge Measurment: Visual- Flow less than 1/2cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
120150	15.74	8.22	1.308	0.837	87.4	6.77	93.2
120155	15.74	8.22	1.309	0.837	87.4	6.77	97.3
120200	15.74	8.22	1.31	0.838	87.5	6.78	86.6
120205	15.74	8.22	1.31	0.838	87.3	6.77	90.1
120210	15.75	8.22	1.305	0.835	87.2	6.75	86.4
120215	15.74	8.22	1.305	0.835	87.2	6.76	86.1
120220	15.75	8.22	1.305	0.835	87.3	6.77	99.9
120225	15.75	8.22	1.304	0.835	87.3	6.76	81.7
120230	15.75	8.22	1.305	0.835	87.3	6.76	85.7
120317	15.77	8.21	1.307	0.835	87.1	6.74	71
120320	15.77	8.21	1.305	0.835	87.1	6.74	70.1
Averages	**15.75**	**8.22**	**1.307**	**0.836**	**87.28**	**6.76**	**86.19**
Lab	**n/a**	**8.90**	**2.700**	**1.844**	**n/a**	**n/a**	**72.60**
SAR=	**13.244**	*****note high SAR**					
Comment							
	During sampling cattle use upstream turbidity affected, Sunny and warm approx 65F, recent precip rain/snow mix 6/4 AM						
120905	15.96	8.21	1.305	0.835	87.6	6.76	31.3
120910	15.96	8.2	1.308	0.837	87.9	6.78	31.6
120915	15.96	8.21	1.308	0.837	87.5	6.75	36.9
120920	15.96	8.21	1.304	0.834	87.6	6.76	31.1
120925	15.96	8.21	1.304	0.835	87.6	6.76	32.8
Averages	**15.96**	**8.21**	**1.306**	**0.836**	**87.64**	**6.76**	**32.74**

Comment- Resample site at 12:09 turbidity dropped significantly

Cherokee Creek

6 Chero 1

$Na^{+} = 570/22.99 = 24.793$

$Ca^{2+} = 25/20.04 = 1.248$

$Mg^{2+} = 70/12.15 = 5.761$

$SAR = \left(24.793/(1.248 + 5.761)/2 \right)^{0.5}$

$3.5045 \sqrt{} = 1.8720$

$1/x = .5341$

$x \; 24.793 =$

$\boxed{SAR \quad 13.244}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
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Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 010010-31267

D/T REC: 010-010-01 10:30 BY: DA

DATE COMPLETED: 7.3.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/5/01	Conductivity	1.310
Time Collected	12:05	Dissolved O_2	8.2 mg/L, 6.3
Discharge	< 1/4 CFS	Turbidity	72 NTU
Temperature	15.74°C	pH	8.12

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Chero
Sampled By: LSRCD/Sheehan & Lathum
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 6/20	mg/L	25	Carbonate SRH 6/8	mg/L	94
Magnesium	mg/L	70	Bicarbonate	mg/L	1000
Sodium 7/2	mg/L	570	Fluoride KH 6.6.01	mg/L	4.1
Potassium	mg/L	5.3	Chloride	mg/L	45
TDS (ROE 180) GH 6.18.01	mg/L	1844	Nitrate as N	mg/L	<0.1
TSS DP 6/8/01	mg/L	22.7	Nitrite as N	mg/L	<0.1
pH SRH 6/8	Units	8.9	Ortho Phosphate	mg/L	0.1
Conductivity, Lab 6/8/01 SRH	umhos/cm	2700	Sulfate 6.7.01	mg/L	470
Turbidity 6/6/01 SRH	NTU	72.6	Total Phosphate SRH 6/20	mg/L	0.09
			Total Alkalinity as $CaCO_3$ 6/8	mg/L	990
			Hardness as $CaCO_3$ 6/21	mg/L	350

S	R	Bottle
☑	☐	1L Plain
☑	☐	250ml Plain
☑	☐	250ml HNO_3
☑	☐	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: SRH 7-3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 5Chero1

Site Coordinates: T15N, R91W, Sec.25 NE1/4 of NE1/4

Date & Time: **5/2/01** 11:48

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.41 X25.4= 594.614

Discharge Measurment: Visual- Flow less than 1cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
114705	5.14	8.48	1.342	0.858	102.5	10.14	22.6
114710	5.14	8.47	1.341	0.858	102.7	10.16	25.4
114715	5.14	8.48	1.342	0.859	102.7	10.17	24.2
114720	5.13	8.48	1.345	0.86	102.6	10.15	25.1
114725	5.13	8.48	1.345	0.861	102.9	10.19	24.5
114730	5.14	8.48	1.348	0.862	102.9	10.18	22.9
114735	5.14	8.48	1.348	0.863	102.7	10.16	30.5
114740	5.14	8.48	1.344	0.86	102.3	10.12	23.6
114745	5.14	8.48	1.345	0.86	102.4	10.13	23.7
114750	5.15	8.48	1.344	0.86	102.2	10.11	24.7
114755	5.15	8.48	1.348	0.863	102.5	10.14	24.1
114800	5.14	8.48	1.346	0.861	102.5	10.14	24.4
114805	5.15	8.48	1.346	0.861	102.7	10.16	23.7
114810	5.15	8.48	1.347	0.862	102.5	10.14	25.1
114815	5.15	8.47	1.345	0.86	102.7	10.16	26.3
Averages	**5.14**	**8.48**	**1.345**	**0.861**	**102.59**	**10.15**	**24.72**
Lab	**n/a**	**8.2**	**1.400**	**0.976**	**n/a**	**n/a**	**3.14**
SAR=	**1.285**						

Comment

Snowing during sampling may explain difference in field and lab trb-ntu's sample readings. Lab analysis attached

Cherokee Creek

5 Chero 1

$Na^{+} = 75/22.99 = 3.262$

$Ca^{2+} = 110/20.04 = 5.489$

$Mg^{2+} = 90/12.15 = 7.407$

$SAR = (3.262/(5.489 + 7.407)/2)^{0.5} =$

$6.448\sqrt{\ } = 2.539$

$1/2 = .3938$

$\times 3.262$

$SAR = 1.285$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: C504-304 58

D/T REC: 5/4/01 10:40 BY: KH

DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/2/01	Conductivity	1.346
Time Collected	11:55	Dissolved O_2	102.58, 10.14 mg/l
Discharge	<1 cfs	Turbidity	2.25 ntu
Temperature	5.15°C	pH	8.48

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 Cher01
Sampled By: LSRCD/Sheehan
Comments: Cherokee Crk.

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 5/15	mg/L	110	Carbonate SRH 5/11	mg/L	-0-
Magnesium	mg/L	90	Bicarbonate	mg/L	410
Sodium 5/14	mg/L	75	Fluoride SRH 5/4	mg/L	1.0
Potassium 5/15	mg/L	5.9	Chloride	mg/L	21
TDS (ROE 180) RWH 6.1.01	mg/L	976	Nitrate as N	mg/L	<0.1
TSS RWH 5.18.01	mg/L	3.0	Nitrite as N	mg/L	<0.1
pH SRH 5/11	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 5/4	umhos/cm	1400	Sulfate RWH 5.5.01	mg/L	390
Turbidity SRH 5/4	NTU	3.14	Total Phosphate SRH 5/8	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	330
			Hardness as $CaCO_3$ 5/15	mg/L	640

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Cherokee Creek**

Site ID: 4Chero1

Site Coordinates: T15N, R91W, Sec.25 NE1/4 of NE1/4

Date & Time: **4/16/01** 10:45

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/16/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.72 X25.4= 602.488

Discharge Measurment: Visual- Flow less than 2-3cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
104455	11.31	8.12	1.406	0.9	102.9	8.87	5.5
104500	11.31	8.12	1.413	0.904	102.9	8.87	5.2
104505	11.32	8.12	1.412	0.904	102.9	8.88	4.7
104510	11.33	8.12	1.41	0.902	102.9	8.87	5.4
104515	11.32	8.12	1.406	0.9	103	8.89	6.1
104520	11.33	8.12	1.412	0.904	103.2	8.9	5.7
104525	11.34	8.12	1.411	0.903	103.1	8.89	6.9
104530	11.34	8.12	1.41	0.902	102.9	8.87	5
104535	11.35	8.12	1.409	0.902	102.8	8.86	6.3
104540	11.35	8.12	1.414	0.905	102.6	8.85	5.4
104545	11.36	8.12	1.414	0.905	102.7	8.85	4.5
104550	11.37	8.12	1.413	0.904	102.6	8.84	3.7
104555	11.37	8.12	1.409	0.901	102.7	8.85	7.7
104600	11.37	8.13	1.412	0.903	102.8	8.86	6.8
104605	11.38	8.12	1.403	0.898	102.9	8.86	3.5
Averages	**11.34**	**8.12**	**1.410**	**0.902**	**102.86**	**8.87**	**5.49**
Lab	**n/a**	**8.3**	**1.400**	**1.050**	**n/a**	**n/a**	**4.16**
SAR=	**1.399**						

Comment

Sunny and warm, approx. 50-60F, Recent rain on 4/12
Lab analysis attached

Cherokee Co. K

4 check 1

Na^{+} = 84/22.99 = 3.654

Ca^{2+} = 120/20.04 = 5.988

Mg^{2+} = 93/12.15 = 7.654

$SAR = (3.654/((5.988+7.654)/2)^{0.5}$ =

6.821 $\sqrt{}$ = 2.611

1/x = .3828

x 3.654 =

SAR 1.399

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0117-29932

D/T REC: 04-17-01 10:30 BY: CA

DATE COMPLETED: 5-31-01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/01	Conductivity	1.410
Time Collected	10:50	Dissolved O_2	102.9% / 8.97 mg/L
Discharge	0 / CFS	Turbidity	≥ 5.3 NTU
Temperature	11:31 °C	pH	8.17

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cherc

Sampled By: LSRCD / Sheehan

Comments: Cherokee Crk.

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SBH 4/19	mg/L	120	Carbonate SBH 4/20	mg/L	8
Magnesium	mg/L	9.3	Bicarbonate	mg/L	410
Sodium	mg/L	84	Fluoride RWH 4.17.01	mg/L	1.1
Potassium	mg/L	6.3	Chloride	mg/L	21
TDS (ROE 180) RWH 4.17.01	mg/L	1050	Nitrate as N	mg/L	<0.1
TSS RWH 5.5.01	mg/L	7.0	Nitrite as N	mg/L	<0.1
pH SBH 4/20	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/23	umhos/cm	1400	Sulfate	mg/L	1/26
Turbidity RWH 4.17.01	NTU	4.16	Total Phosphate SBH 4/30	mg/L	~~0.2~~ 0.16
			Total Alkalinity as $CaCO_3$ 4/20	mg/L	350
			Hardness as $CaCO_3$ 4/20	mg/L	680

S	R	Bottle
[X]	[ ]	1L Plain
[X]	[ ]	250ml Plain
[X]	[ ]	250ml HNO_3
[X]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Cherokee Creek

Site ID: 8Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 8/8/00 1015

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: Calibrated 8/8/00

DO Calibration: Bar Pressure Reading 23.75 x25.4= 603.25

Discharge Measurment: Visual- Less than 1/4 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:22:35	24.86	8.44	1.338	0.856	88.6	6.42	11.6
10:22:40	24.86	8.44	1.338	0.856	88.6	6.42	11.2
10:22:45	24.86	8.44	1.338	0.856	88.5	6.41	8.9
10:22:50	24.86	8.46	1.338	0.856	88.5	6.41	7.2
10:22:55	24.88	8.46	1.338	0.856	88.6	6.42	10.5
10:23:00	24.88	8.46	1.342	0.859	88.6	6.42	11.6
10:23:05	24.9	8.44	1.342	0.859	88.5	6.41	8.8
10:23:10	24.91	8.44	1.342	0.859	88.5	6.41	10.5
10:23:15	24.91	8.45	1.342	0.859	88.5	6.41	9.4
10:23:20	24.92	8.46	1.342	0.859	88.5	6.41	9.6
10:23:25	24.92	8.46	1.34	0.858	88.6	6.42	10.8
10:23:30	24.94	8.46	1.34	0.858	88.6	6.42	11.5
10:23:35	24.94	8.46	1.342	0.859	88.5	6.41	11.9
10:23:40	24.94	8.46	1.342	0.859	88.5	6.41	10.8
Averages	**24.90**	**8.45**	**1.340**	**0.858**	**88.54**	**6.41**	**10.31**

Comments:

Msg: Cherokee Creek Sample Site, 8/8/00, Sunny and Warm, Macro Site

SAR value = 3.557

Chemtech 8/8/97

Ca^{2+}	20.04	Calcium
Mg^{2+}	12.15	Magnesium
Na^{+}	22.99	Sodium

Na^{+}: = 173 / 22.99 = 7.525

Mg^{2+}: = 73 / 12.15 = 6.008

Ca^{2+}: = 59 / 20.04 = 2.944

$$SAR = \frac{NA^{+}}{\left(\frac{Ca^{2+} + Mg^{2+}}{2}\right)^{0.5}} = \frac{7.525}{2.116} = 3.557$$

8/8/97

8.25

Na^{+}: = 44 / 22.99 = 2.008

Ca^{2+}: = 100 / 20.04 = 4.990

Mg^{2+}: = 59 / 12.15 = 4.691

$$SAR = \frac{2.008}{\left(\frac{4.990 + 4.691}{2}\right)^{0.5}} = .949$$

8/8/97

Na^{+} = 51 / 22.99 = 2.218

Ca^{2+} = 146 / 20.04 = 6.986

Mg^{2+} = 81 / 12.15 = 6.667

$$SAR = \frac{2.218}{\left(\frac{6.986 + 6.667}{2}\right)^{0.5}} = .849$$

2.613

9/5/97

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 26102

D/T REC: 08/09/00 1030 BY: E

DATE COMPLETED: 8.25.00

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	8/9/00	Conductivity	
Time Collected	10:23	Dissolved O_2	
Discharge	2 1/4 cfs	Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cherokee-M
Sampled By: LSRCD/ Sheehan
Comments: Sampled at Macro-Site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium EE 8/16	mg/L	~~49~~ 59	Carbonate EE 8/18	mg/L	18
Magnesium	mg/L	~~25~~ 73	Bicarbonate EE	mg/L	530
Sodium	mg/L	~~105~~ 173	Fluoride filed 8.9.00	mg/L	2.9
Potassium	mg/L	~~3.6~~ 5.7	Chloride	mg/L	17
TDS (ROE 180) EE 8.9	mg/L	880.	Nitrate as N	mg/L	<0.1
TSS EE 8-9	mg/L	7.0	Nitrite as N	mg/L	<0.1
pH EE 8/8	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab EE 8/14	umhos/cm	1400.	Sulfate 8.10.00	mg/L	340
Turbidity EE 8.9.00	NTU	8.9	Total Phosphate EE 8/15	mg/L	~~0.05~~ 0.12
			Total Alkalinity as $CaCO_3$	mg/L	460
			Hardness as $CaCO_3$ 8/17	mg/L	230

SAR = 3.557

S	R	Bottle
[ ]	[x]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[x]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Cherokee Creek

Site ID: 7Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 7/19/00 1235

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 7/19/00

DO Calibration: Bar Pressure Reading 24.00 x25.4= 609.60

Discharge Measurment: Visual- 1/4 to 1/2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
123715	27.16	8.32	1.333	0.853	107.8	6.75	13.5
123720	27.17	8.32	1.333	0.853	108.1	6.76	15
123725	27.17	8.32	1.333	0.853	108.2	6.76	15
123730	27.19	8.32	1.333	0.853	108.8	6.81	15.2
123735	27.19	8.32	1.333	0.853	108.6	6.79	15.2
123740	27.2	8.32	1.333	0.853	108.5	6.79	21.2
123745	27.2	8.32	1.333	0.853	108.6	6.79	14.2
123750	27.21	8.32	1.333	0.853	108.4	6.77	15.7
123755	27.2	8.32	1.333	0.853	108.7	6.79	15.7
123800	27.2	8.32	1.333	0.853	108.7	6.79	19.6
123913	27.24	8.32	1.333	0.853	107.7	6.72	17.2
123915	27.24	8.32	1.333	0.853	108.2	6.76	17.3
Averages	**27.20**	**8.32**	**1.333**	**0.853**	**108.36**	**6.77**	**16.23**

Comments:

Msg: Cherokee Sample, 7/19/00, Hot and dry, no recent precip. Low cfs approx. 1/4 to 1/2 cfs, difficult to get credible trb sample due to low flow and disturbance of site while setting h20

Grab Sample Data

Stream: Cherokee Creek

Site ID: 6Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 6/8/00 1600

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 6/6/00

DO Calibration: Bar Pressure Reading 23.57 x25.4= 598.678

Discharge Measurment: Visual- 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
155735	21.31	7.79	1.208	0.773	68.1	4.73	27.5
155740	21.3	7.79	1.204	0.771	68.4	4.75	37.2
155745	21.32	7.79	1.204	0.77	68.5	4.75	22.8
155750	21.32	7.79	1.211	0.775	68.7	4.77	19.7
155755	21.33	7.79	1.205	0.771	68.7	4.77	37.5
155800	21.33	7.79	1.209	0.774	68.8	4.78	26.9
155805	21.33	7.79	1.207	0.772	69	4.79	14.4
155810	21.33	7.79	1.209	0.774	69.2	4.8	13.5
155815	21.34	7.79	1.208	0.773	69.4	4.81	22.8
155820	21.34	7.8	1.208	0.773	69.8	4.84	20.4
155825	21.34	7.8	1.206	0.772	69.7	4.84	18.6
155830	21.34	7.8	1.206	0.772	69.7	4.84	13.7
155835	21.34	7.8	1.208	0.773	69.8	4.85	15.9
155840	21.34	7.8	1.208	0.773	70.1	4.86	17.3
155845	21.34	7.8	1.207	0.772	70	4.86	21.3
155850	21.34	7.8	1.207	0.772	70.1	4.87	19.8
155855	21.34	7.8	1.202	0.769	70.4	4.89	16.6
155900	21.34	7.8	1.21	0.775	70.8	4.91	12.8
155905	21.33	7.8	1.208	0.773	70.5	4.89	13.2
160003	21.37	7.81	1.211	0.773	71.8	4.98	13.8
160005	21.37	7.81	1.206	0.772	71.8	4.98	12.5
Averages	**21.34**	**7.80**	**1.207**	**0.772**	**69.68**	**4.84**	**19.91**

Comments:

Msg: Cherokee Creek Sample, Approx. 1 cfs, Higher trb-ntu due to cattle above sampling site. Hot and dry, Note low DO readings may not be correct.

Grab Sample Data

Stream: Cherokee Creek

Site ID: 5Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 5/4/00 1610

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 5/3/00

DO Calibration: Bar Pressure Reading 23.4 x25.4= 594.36

Discharge Measurment: Visual- 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
161020	22.14	8.26	1.215	0.778	112.2	7.61	9.8
161025	22.14	8.26	1.212	0.776	112.1	7.6	10.2
161030	22.14	8.26	1.212	0.775	112.2	7.6	21.4
161035	22.14	8.26	1.217	0.779	112	7.6	22.6
161040	22.14	8.26	1.22	0.78	112	7.6	29.7
161045	22.13	8.26	1.211	0.775	112	7.6	18.6
161050	22.13	8.26	1.209	0.774	112.1	7.6	4.4
161055	22.14	8.26	1.211	0.775	112.1	7.61	10.8
161100	22.13	8.26	1.216	0.778	112.1	7.61	12.6
161105	22.14	8.26	1.219	0.78	112	7.6	14.5
161110	22.13	8.26	1.21	0.774	112	7.6	12.4
161115	22.14	8.26	1.211	0.775	111.9	7.59	12.3
161120	22.14	8.26	1.215	0.777	111.9	7.59	8.4
161125	22.14	8.26	1.217	0.779	111.9	7.59	8.6
161130	22.14	8.26	1.219	0.78	111.8	7.59	18.9
161135	22.13	8.26	1.217	0.779	111.8	7.58	11.3
161140	22.13	8.26	1.217	0.779	111.8	7.59	7.3
161145	22.13	8.26	1.21	0.774	111.7	7.58	6.1
161150	22.12	8.26	1.21	0.774	111.8	7.59	6.8
161155	22.13	8.26	1.219	0.78	111.9	7.59	5.4
161200	22.12	8.26	1.218	0.78	111.9	7.59	7.9
161205	22.11	8.26	1.21	0.774	111.7	7.58	10.7
161210	22.11	8.26	1.211	0.775	111.6	7.57	10.8
Averages	**22.13**	**8.26**	**1.214**	**0.777**	**111.93**	**7.59**	**12.24**

Comments:

Msg: Cherokee Creek Sample 5/4/00, Approx 2 cfs, Hot and dry, no recent precip

Grab Sample Data

Stream: Cherokee Creek

Site ID: 4Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 4/14/00 1035

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 4/13/00

DO Calibration: Bar Pressure Reading 23.24 x25.4= 590.296

Discharge Measurment: Visual- 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
103455	9.83	8.27	1.269	0.812	102.5	8.97	5.7
103500	9.84	8.27	1.272	0.814	102.6	8.98	9.7
103505	9.84	8.27	1.27	0.813	102.5	8.97	8.6
103510	9.84	8.28	1.268	0.811	102.5	8.97	7.9
103515	9.85	8.28	1.269	0.812	102.7	8.99	8.1
103520	9.86	8.27	1.276	0.816	102.6	8.98	6.5
103525	9.86	8.28	1.28	0.819	102.6	8.97	11.6
103530	9.87	8.28	1.279	0.818	102.5	8.96	11.4
103535	9.88	8.28	1.28	0.819	102.6	8.97	8.6
103540	9.89	8.28	1.277	0.817	102.6	8.97	7.5
103545	9.89	8.28	1.273	0.815	102.6	8.97	9.8
103550	9.89	8.28	1.27	0.813	102.7	8.97	9.9
103636	9.96	8.28	1.28	0.819	102.8	8.97	7.6
103640	9.98	8.28	1.274	0.815	102.8	8.97	9.7
103645	9.99	8.28	1.269	0.812	102.8	8.97	10.3
Averages	**9.88**	**8.28**	**1.274**	**0.815**	**102.63**	**8.97**	**8.86**

Comments:

Msg: Cherokee Creek 4/14/00, Partly Cloudy and cool, no recent precip
approx. 1 to 2 cfs visually

Grab Sample Data

Stream: Cherokee Creek

Site ID: 3Chero0

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 3/27/00 1045

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 3/27/00

DO Calibration: Bar Pressure Reading 23.18 x25.4= 588.722

Discharge Measurment: Visual- less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:29:40	7.19	8.61	0.991	0.634	108.3	10.09	27
11:29:45	7.2	8.61	0.991	0.634	108.3	10.09	13.8
11:29:50	7.2	8.61	0.991	0.634	108.4	10.1	23.7
11:29:55	7.19	8.61	0.991	0.634	108.4	10.1	25.3
11:30:00	7.19	8.61	0.991	0.634	108.4	10.1	13.7
11:30:05	7.2	8.61	0.991	0.634	108.4	10.08	7.4
11:30:10	7.2	8.61	0.991	0.634	108.1	10.07	20.9
11:30:15	7.2	8.61	0.991	0.634	108.3	10.09	15.2
11:30:20	7.2	8.61	0.991	0.634	108.3	10.09	19
11:30:25	7.2	8.61	0.991	0.634	108.3	10.09	25
11:30:30	7.19	8.61	0.991	0.634	108.2	10.08	17.4
11:30:35	7.2	8.61	0.991	0.634	108.2	10.07	19.1
11:30:40	7.2	8.61	0.991	0.634	108	10.06	8.5
11:30:45	7.2	8.61	0.991	0.634	108	10.06	20.7
11:30:50	7.2	8.61	0.991	0.634	108.1	10.07	23.7
11:30:55	7.2	8.62	0.991	0.634	107.9	10.05	24
11:31:00	7.21	8.61	0.991	0.634	107.7	10.03	20
Averages	**7.20**	**8.61**	**0.99**	**0.63**	**108.19**	**10.08**	**19.08**

Comments:

Msg: 3/27/00 Cherokee Creek Sample, Visually less than 1 cfs, Cloudy and cool

SAR value = .949

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0330-23125
D/T REC: 3/29/00 1100 BY: [illegible]
DATE COMPLETED: 4-12-2000

Date Collected		3/28/00
Time Collected		1145
Discharge		<1 cps
Temperature	degrees C	7.20
pH	Units	8.61

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cherokee Creek #5
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium [illegible] 3-30-00	mg/L	100	Total Alkalinity as $CaCO_3$ 3/31/00	mg/L	280
Magnesium	mg/L	57	Fluoride [illegible] 3/30/00	mg/L	0.7
Sodium 4/5	mg/L	48	Chloride	mg/L	17
Potassium 4/5/00	mg/L	5.4	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/3/00	mg/L	480	Nitrite as N	mg/L	<0.1
[illegible] 3-31-00 TDS (ROE 180)	mg/L	740	Ortho Phosphate	mg/L	<0.1
TSS RS 3-30-00	mg/L	12	[illegible] 4-7-00 Total Phosphate	mg/L	0.20
pH [illegible] 3-31-00	Units	8.5	@10X Sulfate [illegible] 3-30-00	mg/L	310
4-11-00 Conductivity, Lab	umhos/cm	1000	Turbidity [illegible] 3-30-00	NTU	11.1

Carbonate 13
Bi Carbonate 310

SAR = .947

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01
Analysts: [illegible] 4-12-00

I hereby certify the above was analyzed by myself or my assistant.

Secrion Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Cherokee Creek

Site ID: 9Chero9

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 9/8/99 1135

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: Calibrated 9/8/99

DO Calibration: Bar Pressure Reading 25.53 x25.4= 598.17

Discharge Measurment: Visual- 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
113425	11.41	8.37	1.201	0.769	98.4	8.46	62.1
113430	11.41	8.37	1.201	0.769	98.4	8.45	61.6
113435	11.42	8.38	1.201	0.769	98.4	8.46	59.9
113440	11.42	8.38	1.201	0.769	98.4	8.46	61.2
113445	11.42	8.37	1.201	0.769	98.4	8.46	60
113450	11.42	8.38	1.202	0.769	98.4	8.45	63.1
113455	11.43	8.37	1.202	0.769	98.4	8.46	60.5
113500	11.43	8.38	1.202	0.769	98.5	8.46	63.7
113605	11.46	8.38	1.202	0.769	98.5	8.46	60.3
113607	11.46	8.38	1.201	0.769	98.5	8.45	55.9
113637	11.47	8.38	1.202	0.769	98.5	8.45	62.2
113640	11.47	8.38	1.201	0.769	98.5	8.45	58.6
Averages	**11.44**	**8.38**	**1.201**	**0.769**	**98.44**	**8.46**	**60.76**

Comments:

Msg: Cherokee Creek Sample Site, 9/8/99, Sunny and Warm, Macro Site

SAR value = .849

Grab Sample Data

Stream: Cherokee Creek

Site ID: 7Chero9

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 7/12/99 1105

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: Calibrated 7/12/99

DO Calibration: Bar Pressure Reading 23.70 x25.4= 601.98

Discharge Measurment: Visual- 1/4 to 1/2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:04:15	18.29	8.21	1.242	0.795	88	6.51	10.8
11:04:20	18.29	8.21	1.242	0.795	88	6.51	4.9
11:04:25	18.29	8.21	1.243	0.795	88.1	6.52	7.8
11:04:30	18.3	8.21	1.243	0.796	88	6.51	8.4
11:04:35	18.31	8.21	1.244	0.796	88	6.51	8.1
11:04:40	18.29	8.21	1.24	0.793	88.1	6.52	7.6
11:04:45	18.3	8.21	1.237	0.791	88.1	6.52	12.2
11:04:50	18.31	8.21	1.24	0.793	88.1	6.52	7.6
11:04:55	18.31	8.21	1.243	0.795	88.1	6.51	8.2
11:05:00	18.32	8.21	1.243	0.795	88	6.51	7.3
11:05:05	18.32	8.21	1.244	0.796	88.1	6.51	6.3
11:05:10	18.34	8.22	1.237	0.792	88	6.5	3.7
11:05:15	18.34	8.22	1.24	0.794	88	6.5	4.3
11:05:20	18.36	8.22	1.244	0.796	87.9	6.49	7.6
11:05:25	18.36	8.22	1.243	0.796	87.9	6.49	14.8
Averages	**18.32**	**8.21**	**1.242**	**0.795**	**88.03**	**6.51**	**7.97**

Comments:

Msg: Cherokee Creek Sample 7/12/99 Hot and Sunny, approx 1/2 cfs, precip. July 15 & 16,

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0909-20198

D/T REC: 9/9/99 1300 BY: JW

DATE COMPLETED:

Date Collected		9/8/99
Time Collected		10:50
Discharge		<1 cfs
Temperature	degrees C	15.7
pH	Units	8.24

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Cherokee-99, #7
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail:
FAX: 307-

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9-23-99	mg/L	140	Total Alkalinity as $CaCO_3$	mg/L	350
Magnesium 10-8-99	mg/L	81	Fluoride KAH 9.9.99	mg/L	0.7
Sodium	mg/L	51	Chloride	mg/L	16
Potassium	mg/L	6.7	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 14/13	mg/L	680	Nitrite as N	mg/L	<0.1
TDS (ROE 180) 9/24 9/24/99	mg/L	890	Ortho Phosphate	mg/L	<0.1
TSS 9-10-99 25	mg/L	72	Total Phosphate 9/24 9/24/99	mg/L	0.14
pH 9-7-99	Units	8.3	Sulfate 9-10-99	mg/L	380
Conductivity, Lab KS 10-7-99	umhos/cm	1200	Turbidity 9-10-99	~~NTU~~	38

SAR = .847

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

10/5/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Cherokee Creek

Site ID: 5Chero9

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 5/5/99 1145

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 5/5/99

DO Calibration: Bar Pressure Reading 23.38 x25.4= 593.85

Discharge Measurment: Visual- 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
11:45:20	3.95	8.59	0.952	0.609	99.5	10.16	9.8
11:45:25	3.97	8.6	0.952	0.609	99.5	10.15	8.7
11:45:30	3.96	8.6	0.953	0.609	99.5	10.15	9.6
11:45:35	3.97	8.59	0.951	0.609	99.3	10.13	10.3
11:45:40	3.97	8.6	0.953	0.61	99.4	10.14	7
11:45:45	3.97	8.59	0.951	0.608	99.4	10.14	9.6
11:45:50	3.98	8.59	0.953	0.61	99.4	10.14	7.2
11:45:55	3.97	8.59	0.953	0.61	99.4	10.14	17.6
11:46:00	3.97	8.58	0.953	0.61	99.2	10.12	10
11:46:05	3.97	8.6	0.95	0.608	99.3	10.13	6.3
11:46:10	4	8.6	0.951	0.608	99.2	10.11	8.8
11:46:15	3.99	8.59	0.948	0.607	99.2	10.11	10.2
Averages	**3.97**	**8.59**	**0.952**	**0.609**	**99.36**	**10.14**	**9.59**

Comments:

Msg: Cherokee Creek Sample 5/5/99, Approx. 1-2 cfs, Cloudy and cool, High precip

Grab Sample Data

Stream: Cherokee Creek

Site ID: 4Chero9

Site Coordinates: T15N, R91W, Sec. 25, NE1/4 of NE1/4

Date & Time: 4/7/99 1545

Elevation: 6660

Multiprobe Model & Serial #: Hydrolab H20 30691

Calibration/ Sensors Details: Calibrated 4/6/99

DO Calibration: Bar Pressure Reading 22.24 x25.4= 564.896

Discharge Measurment: Visual- 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
15:39:30	13.16	8.46	1.155	0.739	98.3	7.64	5.7
15:39:35	13.17	8.46	1.155	0.739	98.3	7.63	6.4
15:39:40	13.16	8.46	1.156	0.739	98.4	7.64	5.8
15:39:45	13.17	8.46	1.156	0.739	98.4	7.64	6.1
15:39:50	13.17	8.46	1.156	0.739	98.3	7.63	6.4
15:39:55	13.17	8.46	1.156	0.739	98.3	7.63	6.7
15:40:00	13.17	8.46	1.156	0.739	98.3	7.63	5.1
15:40:05	13.17	8.46	1.156	0.74	98.3	7.63	7
15:40:10	13.17	8.46	1.156	0.74	98.3	7.63	5.1
15:40:15	13.17	8.46	1.156	0.74	98.3	7.63	5.8
15:40:20	13.17	8.46	1.156	0.739	98.3	7.63	6.9
15:40:25	13.17	8.46	1.156	0.74	98.2	7.63	7.4
15:40:30	13.17	8.46	1.156	0.739	98.2	7.62	6.2
15:40:35	13.18	8.46	1.156	0.74	98.2	7.62	6.7
15:40:40	13.18	8.46	1.156	0.74	98.2	7.62	5.1
Averages	**13.17**	**8.46**	**1.156**	**0.739**	**98.29**	**7.63**	**6.16**

Comments:

Msg: 4/7/99 Cherokee Creek Sample, Cloudy and windy, Visually approx. 1 cfs
Precip on April 2 & 3.

Deep Creek

Grab Sample Data

Stream: **Deep Creek**

Site ID: 4DpCrk22

Site Coordinates: T13N, R91W, Sec10 SE1/4 of NE1/4

Date & Time: **4/17/02** @ 11:08

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.5 X25.4= 596.9

Discharge Measurement: Visual approx. 2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
110740	6.8	8.29	1.251	0.801	100.6	9.58	195
110745	6.81	8.29	1.251	0.801	100.5	9.58	221
110750	6.81	8.29	1.251	0.801	100.5	9.58	194
110755	6.8	8.29	1.252	0.801	100.5	9.57	200
110800	6.8	8.29	1.251	0.801	100.4	9.57	210
110805	6.79	8.29	1.252	0.801	100.4	9.56	190
110810	6.8	8.29	1.251	0.801	100.4	9.56	207
110905	6.79	8.29	1.252	0.801	100.1	9.54	208
110910	6.79	8.29	1.252	0.801	100	9.53	216
110915	6.8	8.29	1.252	0.801	100.1	9.54	222
110920	6.8	8.29	1.252	0.801	100.1	9.54	220
110925	6.79	8.29	1.252	0.801	100	9.53	224
110930	6.79	8.29	1.252	0.801	100.1	9.54	224
110935	6.8	8.29	1.252	0.801	100.1	9.54	230
110940	6.8	8.29	1.252	0.801	100.1	9.54	228
Averages	**6.80**	**8.29**	**1.252**	**0.801**	**100.26**	**9.55**	**212.60**
Lab	**n/a**	**8.30**	**1.300**	**0.844**	**n/a**	**n/a**	**231.00**
SAR=	**2.88**						

Notes:

4/17/02 Deep Creek, Windy and Cloudy, Light rain precip on 4/15 PM
Lab Sample at 11:15, Flow approx. 1-2 cfs, Air Temp= 12.8C,
Wind Ave= 17.6mph, Rel Hum= 37%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: D218-36869

D/T REC: 04-18-02 12:00 BY: CA

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/17/02	Conductivity	1.251
Time Collected	11:15	Dissolved O_2	100.7% 9.55 mg/L
Discharge	~2 cfs	Turbidity	~205. NTU
Temperature	6.80 °C	pH	8.29

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 Dp Crk 22
Sampled By: 25RCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 4/25	mg/L	62	Carbonate KH 4/9	mg/L	<0
Magnesium	mg/L	56	Bicarbonate	mg/L	180
Sodium	mg/L	130	Fluoride KH 4.18.02	mg/L	0.3
Potassium	mg/L	4	Chloride	mg/L	27
TDS (ROE 180) HM 4/19/02	mg/L	844	Nitrate as N	mg/L	0.5
TSS 4/19/02 HM	mg/L	206	Nitrite as N	mg/L	<0.1
pH KH 4/9	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity HM 4/19/02	umhos/cm	1300	Sulfate 4.19.02	mg/L	560
Turbidity 4/18/02 HM	NTU	231	Total Phosphate KH 4/30	mg/L	0.15
			Total Alkalinity as $CaCO_3$ 4/9	mg/L	150
			Hardness as $CaCO_3$ 4/09	mg/L	380

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

ect. File: LSRCD01

Analysts: KH 5-1-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@[illegible]
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	17-Apr-2002		Lab No:	36869	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	62	3.09	Carbonate	0	0.00
Magnesium	56	4.61	Bicarbonate	180	2.95
Sodium	130	5.65	Chloride	27	0.76
Potassium	4	0.10	Fluoride	0.3	0.02
T. CATIONS		**13.46**	Nitrate as N	1	0.07
ROE 180	mg/L	844	Nitrite as N	0	0.00
TSS	mg/L	206	Ortho phosphate	0	0.00
Turbidity	NTU	231	Sulfate	500	10.41
			T. ANIONS		**14.21**

Conductance, umhos/cm	1300	S A R (sodium Hazard)	2.88
TDS by Summation, mg/L	869	T Alk CaCO3, mg/L	148
pH, Units	8.3	Hardness as CaCO3, mg/L	385
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	23

Analyte	Units	Result
Total Phosphate	mg/L	0.15
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.65**
Meq Cations/Sp cond/100	**1.04**
Meq Anions/Sp cond/100	**1.09**
ROE/TDS Summation	**0.97**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **2.72%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.67** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.06** (0.8 TO 1.2)

OVERALL =	**0.0171**	MAX. OVERALL ALLOWED =	0.0531

RicH

Grab Sample Data

Stream: **Deep Creek**

Site ID: 4DpCrk2

Site Coordinates: T13N, R91W, Sec10 SE1/4 of NE1/4

Date & Time: **4/2/02 @ 14:08**

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.77 X25.4= 603.758

Discharge Measurement: Visual approx. 1-2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
140640	8.37	8.26	1.98	1.27	99.2	9.17	404
140645	8.37	8.26	1.98	1.27	99.1	9.16	394
140650	8.37	8.26	1.98	1.27	99	9.15	403
140655	8.38	8.26	1.98	1.27	99	9.15	356
140700	8.37	8.26	1.98	1.27	98.9	9.14	385
140705	8.38	8.26	1.98	1.27	98.8	9.13	423
140710	8.38	8.26	1.98	1.27	98.7	9.12	399
140715	8.38	8.26	1.98	1.27	98.7	9.12	411
140720	8.38	8.26	1.98	1.27	98.7	9.12	431
140725	8.38	8.26	1.98	1.27	98.6	9.11	419
140730	8.38	8.26	1.98	1.27	98.5	9.11	411
140735	8.38	8.26	1.98	1.27	98.5	9.1	396
140740	8.39	8.26	1.98	1.27	98.4	9.1	396
140745	8.39	8.26	1.98	1.27	98.5	9.1	396
140811	8.39	8.26	1.98	1.27	98.3	9.08	423
140815	8.39	8.22	1.98	1.27	98.6	9.11	411
Averages	**8.38**	**8.26**	**1.980**	**1.270**	**98.72**	**9.12**	**403.63**
Lab	**n/a**	**8.10**	**2.000**	**1.520**	**n/a**	**n/a**	**1814.00**
SAR=	**3.92**						

Notes:

4/02/02 Deep Creek, Warm and Windy, Lab Sample at 14:15, Flow=1-2cfs
Air Temp= 8.8C, Wind Ave 5.9mph, Rel Hum 35%
****Notice high Lab Sample trb-ntu compared to Field Sample

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0403-36568

D/T REC: 4.2.02 11:00 BY: RLH

DATE COMPLETED: 4.18.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/2/02	Conductivity	1.98
Time Collected	1415	Dissolved O_2	28.7%/9.12 mg/L
Discharge	~1-2 cfs	Turbidity	~ 400 NTU
Temperature	8.37°C	pH	8.26

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 4 Dp Crk 2
Sampled By: LSRCD/Sheehan
Comments: Deep Crk.
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGH 4/17	mg/L	99	Carbonate SGH 4/5	mg/L	0
Magnesium ↓	mg/L	98	Bicarbonate ↓	mg/L	140
Sodium 4/18	mg/L	230	Fluoride SGH RLH 4/3	mg/L	0.3
Potassium ↓	mg/L	7	Chloride	mg/L	27.0
TDS (ROE 180) 4/4/02 Hm	mg/L	1520	Nitrate as N	mg/L	1.8
TSS 4/4/02 Hm	mg/L	1220	Nitrite as N	mg/L	<0.1
pH SGH 4/5	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/4/02 Hm	umhos/cm	2000	Sulfate 10X	mg/L	950
Turbidity Hm 4/3/02	NTU	1814	Total Phosphate SGH 4/16	mg/L	0.77
			Total Alkalinity as $CaCO_3$ 4/5	mg/L	120
			Hardness as $CaCO_3$ 4/18	mg/L	650

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts SGH 4.18.02

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Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

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Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	02-Apr-2002		Lab No:	36568	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	99	4.94	Carbonate	0	0.00
Magnesium	98	8.06	Bicarbonate	140	2.29
Sodium	230	10.00	Chloride	27	0.76
Potassium	7	0.18	Fluoride	0.3	0.02
T. CATIONS		**23.18**	Nitrate as N	1.8	0.13
ROE 180	mg/L	1520	Nitrite as N	0	0.00
TSS	mg/L	1220	Ortho phosphate	0	0.00
Turbidity	NTU	1814	Sulfate	950	19.78
			T. ANIONS		**22.98**
Conductance, umhos/cm		2000	S A R (sodium Hazard)		3.92
TDS by Summation, mg/L		1482	T Alk CaCO3, mg/L		115
pH, Units		8.1	Hardness as CaCO3, mg/L		651
Total Coliform	per 100 ml		Hardness as CaCO3, gr/gal		38

Analyte	Units	Result
Total Phosphate	mg/L	0.77
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.76**
Meq Cations/Sp cond/100	**1.16**
Meq Anions/Sp cond/100	**1.15**
ROE/TDS Summation	**1.03**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.44%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.74** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.15** (0.8 TO 1.2)

OVERALL =	**0.002808**	MAX. OVERALL ALLOWED =	5.31

Rent

Grab Sample Data

Stream: **Deep Creek**

Site ID: 5DpCrk1

Site Coordinates: T13N, R91W, Sec.10 SE1/4 of NE1/4

Date & Time: **5/2/01** 12:45

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.7 X25.4= 601.98

Discharge Measurment: Visual- Flow approx. 1cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
124510	8.25	8.67	3.15	2.02	119.9	11.03	23.7
124515	8.25	8.67	3.15	2.02	119	10.95	23.5
124520	8.25	8.67	3.15	2.02	119	10.95	25.2
124525	8.25	8.67	3.15	2.01	119.3	10.97	26.4
124530	8.26	8.67	3.15	2.01	119.5	10.99	27.5
124535	8.26	8.67	3.15	2.01	119.1	10.95	27.9
124540	8.25	8.67	3.15	2.02	119	10.95	28.3
124545	8.26	8.67	3.15	2.01	119.4	10.98	26.5
124550	8.26	8.68	3.15	2.01	119.6	11	25.9
124555	8.26	8.67	3.15	2.01	119	10.94	27.1
124600	8.25	8.67	3.15	2.02	119.3	10.97	28.1
124605	8.25	8.67	3.15	2.02	119.1	10.93	28.9
124610	8.25	8.67	3.15	2.01	118.8	10.92	27.1
124648	8.26	8.67	3.15	2.02	119.5	10.99	24.7
124650	8.25	8.67	3.15	2.02	119.6	10.99	28.3
Averages	**8.25**	**8.67**	**3.15**	**2.02**	**119.27**	**10.97**	**26.61**
Lab	**n/a**	**8.2**	**3.2**	**2.66**	**n/a**	**n/a**	**19**
SAR=	**5.909**						

Comment

Light rain/snow while sampling. Cloudy and cool. Lab analysis attached.

Deep Creek

5 Dp (ck)

$NA^+ = 440/22.99 = 19.139$

$Ca^{2+} = 140/20.04 = 6.986$

$Mg^{2+} = 170/12.15 = 13.992$

$SAR = (19.139/((6.986 + 13.992)/2)^{0.5} =$

$\sqrt{10.489} = 3.238$

$1/x = .309$

$\times 19.139$

$\boxed{SAR = 5.907}$

WYOMING DEPARTMENT OF AGRICULTURE
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Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0504-30455
D/T REC: 5/4/01 10:40 BY: KH
DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/2/01	Conductivity	3.15
Time Collected	12:55	Dissolved O_2	11.42/10.78 mg/l
Discharge	≈1 cfs	Turbidity	≈26 ntu
Temperature	8.26 °C	pH	8.67

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 Dp Crk 1
Sampled By: LSRCD/Sheehan
Comments: Deep Crk.

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 5/15	mg/L	140	Carbonate SRH 5/11	mg/L	-0
Magnesium ↓	mg/L	170	Bicarbonate ↓	mg/L	360
Sodium 5/14	mg/L	440	Fluoride SRH 5/4	mg/L	0.6
Potassium 5/15	mg/L	9.2	Chloride	mg/L	88
TDS (ROE 180) RWH 5.18.01	mg/L	2660	Nitrate as N	mg/L	0.2
TSS RWH 5.18.01	mg/L	22.0	Nitrite as N	mg/L	<0.1
pH SRH 5/4	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 5/9	umhos/cm	3200	Sulfate RWH 5.5.01	mg/L	~~240~~ 1500
Turbidity SRH 5/4	NTU	19.0	Total Phosphate SRH 5/8	mg/L	0.02
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	300
			Hardness as $CaCO_3$ 5/15	mg/L	1050

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Deep Creek**

Site ID: 4DpCrk1

Site Coordinates: T13N, R91W, Sec.10 SE1/4 of NE1/4

Date & Time: **4/11/01** 15:15

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 4/05/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.62 X25.4= 599.95

Discharge Measurment: Visual- Flow approx. 2-3cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
151440	10.3	8.43	2.14	1.37	87.9	7.71	95.7
151445	10.46	8.42	2.14	1.37	90.3	7.88	81.4
151450	10.5	8.42	2.14	1.37	94.6	8.25	75.3
151455	10.51	8.42	2.14	1.37	94.9	8.28	76
151500	10.5	8.42	2.14	1.37	94.9	8.28	70.3
151505	10.51	8.42	2.14	1.37	94.1	8.21	75.4
151510	10.51	8.42	2.14	1.37	92.4	8.02	97.6
151515	10.51	8.42	2.14	1.37	89.9	7.85	74.4
151520	10.52	8.42	2.14	1.37	87.9	7.63	74.5
151525	10.52	8.42	2.14	1.37	85.7	7.48	75.2
151530	10.52	8.42	2.14	1.37	84.1	7.34	75.6
151535	10.53	8.42	2.14	1.37	82.3	7.18	75.3
151540	10.54	8.42	2.14	1.37	81.1	7.07	74.6
151545	10.54	8.42	2.14	1.37	79.6	6.94	74.3
151550	10.54	8.42	2.14	1.37	78.6	6.85	73.9
Averages	**10.50**	**8.42**	**2.140**	**1.370**	**87.89**	**7.66**	**77.97**
Lab	**n/a**	**8.30**	**2.200**	**1.760**	**n/a**	**n/a**	**126.00**
SAR=	**4.033**						

Comment

Cloudy and cool, approx. 40F, Recent precip 4/8 and 4/9. Light rain 4/10. Lab analysis attached.

Deep Creek

4 Dp Crk 1

Na^{+} = $250/22.77$ = 10.874

Ca^{2+} = $110/20.04$ = 5.490

Mg^{2+} = $110/12.15$ = 9.053

SAR $(10.874/((5.490+9.053)/2))^{0.5}$ =

7.2715 $^{0.5}$ = 2.696

$1/x$ = .3708

x 10.874 =

SAR 4.033

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Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0412-29844

D/T REC: 04-12-01 11:00 BY: CA

DATE COMPLETED: 4.24.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/11/01	Conductivity	2.14
Time Collected	15:15	Dissolved O_2	99.4%, 8.3 mg/L
Discharge	0.2 cfs	Turbidity	275 NTU
Temperature	10.5 C	pH	8.42

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 Dp Crk 1

Sampled By: LSRCD/Sheehan

Comments: Deep Creek

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 4/19	mg/L	110	Carbonate SRH 4/13	mg/L	2
Magnesium	mg/L	110	Bicarbonate ↓	mg/L	260
Sodium	mg/L	250	Fluoride RWH 4.12.01	mg/L	0.4
Potassium	mg/L	6.4	Chloride	mg/L	37
TDS (ROE 180) RWH 4.17.01	mg/L	1760	Nitrate as N	mg/L	1.0
TSS RWH 4.17.01	mg/L	128	Nitrite as N	mg/L	<0.1
pH SRH 4/13	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab ↓	umhos/cm	2200	Sulfate	mg/L	960
Turbidity RWH 4.12.01	NTU	126	Total Phosphate SRH 4/13	mg/L	0.19
			Total Alkalinity as $CaCO_3$ ↓	mg/L	210
			Hardness as $CaCO_3$ 4/20	mg/L	730

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Deep Creek

Site ID: 4dpcrk0

Site Coordinates: T13N, R91W, Sec. 10, SE1/4 of NE1/4

Date & Time: 4/14/00 1135

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/13/00 Calibrated

DO Calibration: Bar Pressure Reading 23.48 X25.4= 596.39

Discharge Measurment: Visual- approx. 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
113435	12.95	8.31	3.33	2.13	102	8.32	76.6
113440	12.93	8.31	3.33	2.13	102.1	8.33	74.6
113445	12.94	8.31	3.33	2.13	102.1	8.33	72.6
113450	12.96	8.31	3.33	2.13	102	8.32	77.1
113455	12.95	8.31	3.33	2.13	101.9	8.32	78.4
113500	12.96	8.31	3.33	2.13	102.1	8.33	73.2
113505	12.97	8.31	3.33	2.13	102	8.32	74.8
113510	12.99	8.31	3.33	2.13	102	8.32	73
113515	12.99	8.31	3.33	2.13	102	8.31	81.9
113520	12.98	8.31	3.33	2.13	102	8.32	72.3
113525	12.98	8.31	3.33	2.13	102	8.32	72.7
113530	12.98	8.31	3.33	2.13	102.2	8.33	75.3
113535	12.99	8.31	3.33	2.13	102	8.31	72.2
113540	13	8.31	3.33	2.13	101.9	8.31	71.1
113545	13	8.31	3.33	2.13	101.8	8.3	74.8
113622	13.04	8.31	3.33	2.13	102.1	8.32	79
113625	13.04	8.31	3.33	2.13	101.8	8.29	73.2
113630	13.05	8.31	3.33	2.13	101.8	8.29	77.6
Averages	**12.98**	**8.31**	**3.33**	**2.13**	**101.99**	**8.32**	**75.02**

Comments:

Msg: Deep Creek 4/14/00 Warm and partly cloudy, Approx 1 cfs, high ntu's, no recent precip. Notice high Cond and Trb readings

Grab Sample Data

Stream: Deep Creek

Site ID: 3dpcrk0

Site Coordinates: T13N, R91W, Sec. 10, SE1/4 of NE1/4

Date & Time: 3/30/00 10:45

Elevation: 6340

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 3/27/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.75 X25.4= 603.25

Discharge Measurment: Visual- approx. 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:46:50	4.62	8.64	3.25	2.08	105.6	10.66	27.7
10:46:55	4.62	8.64	3.26	2.08	105.7	10.67	27.8
10:47:00	4.62	8.64	3.26	2.08	105.3	10.63	28.6
10:47:05	4.63	8.64	3.26	2.08	105.7	10.67	28.8
10:47:10	4.62	8.64	3.26	2.08	105.4	10.64	28.3
10:47:15	4.62	8.64	3.26	2.08	105.5	10.65	27.6
10:47:20	4.62	8.64	3.26	2.08	105.4	10.64	27.3
10:47:25	4.62	8.64	3.26	2.08	105.7	10.67	30.1
10:47:30	4.62	8.64	3.26	2.08	105.6	10.65	28.5
10:47:35	4.61	8.64	3.26	2.08	105.5	10.65	26.2
10:47:40	4.61	8.64	3.26	2.08	105.3	10.63	27.9
10:47:45	4.62	8.64	3.26	2.08	105.5	10.65	27
10:47:50	4.61	8.64	3.26	2.08	105.3	10.63	26.4
10:47:55	4.61	8.65	3.26	2.08	105	10.61	26.8
10:48:00	4.61	8.64	3.26	2.08	105.5	10.65	27.4
Averages	**4.62**	**8.64**	**3.26**	**2.08**	**105.47**	**10.65**	**27.76**

Comments:

Msg: 3/30/00 Deep Creek Sample, Windy and cool, recent percip on 3/28/00

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0329-231310

D/T REC: 3/29/00 1100 BY: SAH

DATE COMPLETED: 4-13-2000

Date Collected		3/28/00
Time Collected		1715
Discharge		~1-2 cfs
Temperature	degrees C	
pH	Units	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Deep Creek #6
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SAR 3-30-00	mg/L	150	Total Alkalinity as $CaCO_3$ 3/31/00	mg/L	330
Magnesium	mg/L	200	Fluoride SAR 3/30/00	mg/L	0.4
Sodium 4-5	mg/L	460	Chloride	mg/L	63
Potassium	mg/L	7.9	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/1/00	mg/L	1200	Nitrite as N	mg/L	<0.1
TDS (ROE 180) SAR 3-30-00	mg/L	3000	Ortho Phosphate	mg/L	<0.1
TSS RS 3-30-00	mg/L	28	Total Phosphate SAR 4-7-00	mg/L	<0.02
pH SAR 3-30-00	Units	8.4	Sulfate (@ 100x) SAR 3-30-00	mg/L	1700
Conductivity, Lab 4-11-00	umhos/cm	3500	Turbidity SAR 3-30-00	NTU	14.2

Carbonate 18
Bicarbonate 360

SAR = 5.283

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts: SAR 4-12-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Deep Gulch

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 5DpGul2

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **5/13/02** @ 10:28

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 5/13/02

DO Calibration: Bar Pressure Reading 23.85 X25.4= 605.79

Discharge Measurement: Visual Flow approx. Less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
102720	10.83	8.29	2.39	1.52	72.2	6.3	130
102725	10.84	8.3	2.41	1.54	71.9	6.27	129
102730	10.85	8.29	2.36	1.51	72	6.29	132
102735	10.84	8.3	2.4	1.53	71.7	6.26	131
102740	10.86	8.3	2.36	1.51	71.7	6.26	134
102745	10.87	8.3	2.41	1.54	71.5	6.24	132
102750	10.86	8.3	2.36	1.51	71.4	6.24	130
102755	10.86	8.3	2.39	1.53	71.4	6.24	132
102800	10.86	8.3	2.39	1.52	71.3	6.23	133
102805	10.87	8.3	2.4	1.54	71.3	6.22	136
102810	10.89	8.3	2.37	1.52	71.3	6.22	136
102835	10.91	8.3	2.43	1.55	71.1	6.2	143
102837	10.91	8.3	2.4	1.53	71.2	6.2	140
102920	10.95	8.31	2.39	1.53	70.7	6.16	153
102925	10.96	8.31	2.38	1.52	70.7	6.16	157
Averages	**10.88**	**8.30**	**2.39**	**1.53**	**71.43**	**6.23**	**136.53**
Lab	**n/a**	**8.10**	**2.40**	**1.77**	**n/a**	**n/a**	**2371.00**
SAR=	**3.15**						

Notes:

5/13/02 Deep Gulch, Sunny and warm, light precip 5/11, Flow= less 1cfs,
Lab Sample at 10:30, Air Temp= 13.4C, Wind Ave= 7.4 mph, Rel Hum= 25%
Cattle present, water high ntus due to cattle.
***Notice very high Trb-ntu Lab Sample

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0514-37592

D/T REC: 5/14/02 10:30 BY: KH

DATE COMPLETED: 5.22.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/13/02	Conductivity	2.40
Time Collected	1030	Dissolved O_2	71.3%, 6.12
Discharge	< 1 cFS	Turbidity	~130
Temperature	10.86 °C	pH	8.30

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 5 Dp Gul 2
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium Rev'd 5.14.02	mg/L	180	Carbonate KH 5/17	mg/L	0
Magnesium	mg/L	180	Bicarbonate	mg/L	850
Sodium	mg/L	250	Fluoride Rev'd 5.14.02	mg/L	1.4
Potassium	mg/L	11	Chloride	mg/L	33
TDS (ROE 180) Bm 5/15/02	mg/L	1770	Nitrate as N	mg/L	<0.1
TSS 5/15/02 Bm	mg/L	1810	Nitrite as N	mg/L	<0.1
pH KH 5/17	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab Bm 5/14/02	umhos/cm	2400	Sulfate 5.17.02	mg/L	870
Turbidity Bm 5/14/02	NTU	2371 Rev'd	Total Phosphate KH 5/15	mg/L	1.1
			Total Alkalinity as $CaCO_3$ 5/17	mg/L	700
			Hardness as $CaCO_3$ Rev'd 5/20	mg/L	1200

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

ect. File: LSRCD01

Analysts

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: [illegible]
Internet: http://wyagric.state.wy.us/ashlb/ashlb.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	13-May-2002		Lab No:	37592	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	180	8.98	Carbonate	0	0.00
Magnesium	180	14.80	Bicarbonate	850	13.93
Sodium	250	10.87	Chloride	33	0.93
Potassium	11	0.28	Fluoride	1.4	0.07
T. CATIONS		**34.94**	Nitrate as N	0	0.00
ROE 180	mg/L	1770	Nitrite as N	0	0.00
TSS	mg/L	1810	Ortho phosphate	0	0.00
Turbidity	NTU	2371	Sulfate	870	18.11
			T. ANIONS		**33.05**

Conductance, umhos/cm	2400	S A R (sodium Hazard)	3.15
TDS by Summation, mg/L	1943	T Alk CaCO3, mg/L	697
pH, Units	8.1	Hardness as CaCO3, mg/L	1190
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	70

Analyte	Units	Result
Total Phosphate	mg/L	1.1
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.74**
Meq Cations/Sp cond/100	**1.46**
Meq Anions/Sp cond/100	**1.38**
ROE/TDS Summation	**0.91**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **2.78%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.81** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.42** (0.8 TO 1.2)

OVERALL =	**0.0159**	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 4DpGul22

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **4/16/02** @ 11:04

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 4/16/02

DO Calibration: Bar Pressure Reading 23.3 X25.4= 591.82

Discharge Measurement: Visual Flow approx. 1-2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
110320	6.56	8.32	1.86	1.19	99.3	9.41	21.7
110325	6.57	8.32	1.86	1.19	99.3	9.41	25.9
110330	6.58	8.32	1.86	1.19	99.3	9.41	29.5
110335	6.59	8.32	1.86	1.19	99.2	9.4	32
110340	6.59	8.32	1.86	1.19	99.2	9.4	31.6
110345	6.59	8.32	1.86	1.19	99.2	9.4	27.6
110350	6.6	8.32	1.86	1.19	99.2	9.39	16.1
110355	6.6	8.32	1.86	1.19	99.2	9.39	35.3
110400	6.6	8.32	1.86	1.19	99.2	9.4	28.4
110405	6.61	8.32	1.86	1.19	99.2	9.39	30
110410	6.62	8.32	1.86	1.19	99.2	9.39	30.5
110415	6.62	8.32	1.86	1.19	99.2	9.38	34
110420	6.63	8.32	1.86	1.19	99.2	9.39	30.5
110425	6.63	8.32	1.86	1.19	99.2	9.39	31.9
110430	6.63	8.32	1.86	1.19	99.2	9.38	33.9
110525	6.69	8.32	1.86	1.19	99.1	9.36	26.4
110530	6.69	8.32	1.86	1.19	99.1	9.36	31.4
Averages	**6.61**	**8.32**	**1.860**	**1.190**	**99.21**	**9.39**	**29.22**
Lab	**n/a**	**8.50**	**1.910**	**1.364**	**n/a**	**n/a**	**21.70**
SAR=	**2.71**						

Notes:

4/16/02 Deep Gulch, light rain on 4/15, Flow= approx. 1-2 cfs, Lab Sample at 1110, Air Temp= 3.5C, Wind Ave= 11.5 mph, Rel Hum= 51%

LSRCD Discharge Measurement Notes

Stream: Deep Gulch

Site ID: 4Dpgu2

Site Coordinates: T16N, R9W, Sec. 27, NE¼ of SE¼

Date & Time: 4/2/02 @ 10:20

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: n/a

Measured Discharge

1.176 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WS/RB			
.5	.325	.746	.121	
1.0	.425	.843	.179	
1.5	.510	.725	.185	
2.0	.400	.958	.192	
2.5	.400	.916	.183	
3.0	.475	.731	.174	
3.5	.475	.598	.142	
4.0	.275	✓		
4.5	WS/LB			
		Total	1.176 cfs	

Measured by: LSRCD / S Shanken
Recorded by: Gwen Quenzer

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D417-36,844

D/T REC: 4/17/02 11:00 BY: KM

DATE COMPLETED: 5.1.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/02	Conductivity	1.86
Time Collected	11:10	Dissolved O_2	99.2%, 9.38 mg/L
Discharge	~1-2 cfs	Turbidity	~30.0 NTU
Temperature	6.60°C	pH	8.32

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 Dp GW22
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KM 4/25	mg/L	100	Carbonate KM 4/19	mg/L	25
Magnesium	mg/L	120	Bicarbonate	mg/L	510
Sodium	mg/L	170	Fluoride RWM 4.17.02, 5.1.02	mg/L	~~1.0~~ 1.0
Potassium	mg/L	7	Chloride	mg/L	~~26~~ 26
TDS (ROE 180) KM 4/24/02	mg/L	1364	Nitrate as N	mg/L	~~<0.1~~ <0.1
TSS 4/14/02 Hm	mg/L	15.0	Nitrite as N	mg/L	~~<0.1~~ <0.1
pH KM 4/19	Units	8.5	Ortho Phosphate	mg/L	~~<0.1~~ <0.1
Conductivity KM 4/18/02 Hm	umhos/cm	1910	Sulfate 5.1.02	mg/L	~~630~~ 630
Turbidity 4/18/02 Hm	NTU	31.7	Total Phosphate KM 4/30	mg/L	0.03
			Total Alkalinity as $CaCO_3$ 4/19	mg/L	460
			Hardness as $CaCO_3$ 4/29	mg/L	740

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KM 5-1-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: [illegible]
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	16-Apr-2002		Lab No:	36844	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	100	4.99	Carbonate	25	0.83
Magnesium	120	9.87	Bicarbonate	510	8.36
Sodium	170	7.39	Chloride	26	0.73
Potassium	7	0.18	Fluoride	1	0.05
T. CATIONS		**22.43**	Nitrate as N	0	0.00
ROE 180	mg/L	1364	Nitrite as N	0	0.00
TSS	mg/L	15	Ortho phosphate	0	0.00
Turbidity	NTU	21.7	Sulfate	630	13.12
			T. ANIONS		**23.09**

Conductance, umhos/cm	1910	S A R (sodium Hazard)	2.71
TDS by Summation, mg/L	1330	T Alk CaCO3, mg/L	460
pH, Units	8.5	Hardness as CaCO3, mg/L	744
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	44

Analyte	Units	Result
Total Phosphate	mg/L	0.03
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.71**
Meq Cations/Sp cond/100	**1.17**
Meq Anions/Sp cond/100	**1.21**
ROE/TDS Summation	**1.03**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.46%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.70** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.19** (0.8 TO 1.2)

OVERALL =	**0.0085**	MAX. OVERALL ALLOWED =	0.0531

RLH

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 4DpGul2

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **4/2/02** @ 9:50

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.54 X25.4= 597.916

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow = 1.176 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
94935	1.63	8.59	1.376	0.88	94	10.27	124
94940	1.63	8.59	1.375	0.88	94	10.27	129
94945	1.63	8.59	1.374	0.879	94	10.27	129
94950	1.63	8.59	1.372	0.878	94	10.27	117
94955	1.63	8.59	1.378	0.882	94	10.27	119
95000	1.63	8.59	1.374	0.879	94	10.27	124
95005	1.63	8.59	1.372	0.878	94	10.27	133
95010	1.63	8.6	1.375	0.88	93.8	10.25	135
95015	1.65	8.6	1.375	0.88	93.8	10.25	126
95020	1.64	8.6	1.375	0.88	94	10.25	126
95025	1.65	8.6	1.376	0.881	93.8	10.24	114
95030	1.64	8.59	1.373	0.879	93.8	10.25	122
95035	1.64	8.6	1.378	0.882	93.7	10.24	121
95040	1.65	8.6	1.374	0.879	93.7	10.24	119
95109	1.65	8.6	1.375	0.88	93.5	10.21	136
95110	1.66	8.6	1.376	0.88	93.9	10.25	117
Averages	**1.64**	**8.60**	**1.375**	**0.880**	**93.88**	**10.25**	**124.44**
Lab	**n/a**	**8.30**	**1.410**	**0.992**	**n/a**	**n/a**	**116.00**
SAR=	**2.22**						

Notes:

4/2/02 Big Gulch, Sunny and cool, no recent precip., Snow pack 67%,
Flow= 1.176cfs, Lab Sample at 10:00, Air Temp= 5.1C, Wind Ave= 3.3 mph
Rel Hum= 23%

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0403 - 36565

D/T REC: 4.2.02 11:00 BY: RWH

DATE COMPLETED: 4.18.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/2/02	Conductivity	1.375
Time Collected	10:00	Dissolved O_2	93.8% / 10.25 mg
Discharge	1.176 cfs	Turbidity	~126 NTU
Temperature	1.63°C	pH	8.59

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 4 Dp Gw 2
Sampled By: LSRCD/Sheehan
Comments: Deep Well

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 4/17	mg/L	77	Carbonate RWH 4.5	mg/L	9
Magnesium ↓	mg/L	88	Bicarbonate ↓	mg/L	360
Sodium 4/18	mg/L	120	Fluoride RWH 4/3	mg/L	0.6
Potassium ↓	mg/L	8	Chloride	mg/L	17.5
TDS (ROE 180) 4/4/02 RM	mg/L	992	Nitrate as N	mg/L	<0.1
TSS RM 4/4/02	mg/L	86.0	Nitrite as N	mg/L	<0.1
pH RWH 4.5.02	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab RM 4/4/02	umhos/cm	1410	Sulfate 10× ↓	mg/L	490
Turbidity 4/3/02 RM	NTU	116.0	Total Phosphate RWH 4/16	mg/L	0.14
			Total Alkalinity as $CaCO_3$ 4/5	mg/L	310
			Hardness as $CaCO_3$ 4/18	mg/L	550

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts RWH 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
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Laramie, WY 82070
E-mail: aslab@wissc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	02-Apr-2002		Lab No:	36565	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	77	3.84	Carbonate	9	0.30
Magnesium	88	7.24	Bicarbonate	360	5.90
Sodium	120	5.22	Chloride	17.5	0.49
Potassium	8	0.20	Fluoride	0.6	0.03
T. CATIONS		**16.50**	Nitrate as N	0	0.00
ROE 180	mg/L	992	Nitrite as N	0	0.00
TSS	mg/L	86	Ortho phosphate	0	0.00
Turbidity	NTU	116	Sulfate	490	10.20
			T. ANIONS		**16.93**

Conductance, umhos/cm	1410	S A R (sodium Hazard)	2.22
TDS by Summation, mg/L	987	T Alk CaCO3, mg/L	310
pH, Units	8.3	Hardness as CaCO3, mg/L	555
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	32

Analyte	Units	Result
Total Phosphate	mg/L	0.14
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.70**
Meq Cations/Sp cond/100	**1.17**
Meq Anions/Sp cond/100	**1.20**
ROE/TDS Summation	**1.00**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.27%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.70** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.19** (0.8 TO 1.2)

OVERALL =	**0.007491**	MAX. OVERALL ALLOWED =	5.31

RWH

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 6DpGul1

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **6/20/01** 9:45

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/19/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading n/a X25.4= n/a

Discharge Measurment: Visual- Flow less than 1/4 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
Comment							
***Not able to collect field water sample due to very low flows. Lab sample collected by "dipping" sample into containers. Cattle along creek during sampling.							
Lab	**n/a**	**8.30**	**2.300**	**1.570**	**n/a**	**n/a**	**47.80**
SAR=	**3.406**						

Deep GWell

6 Dp GW1

6/20/01

Na^{+1} = 240/22.99 = 10.439

Ca^{+2} = 96/20.04 = 4.790

Mg^{+2} = 170/12.15 = 13.992

$SAR = \left(10.439 / \left((4.790 + 13.992)/2\right)\right)^{0.5}$

$9.391\sqrt{\ } = 3.0644$

$1/x = .3263$

$\times 10.439 =$

SAR 3.406

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0621-31875

D/T REC: 6/21/01 10:00 BY: KH

DATE COMPLETED: 7.13.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/20/01	Conductivity	
Time Collected	9:45	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Dp Gal
Sampled By: LSRCD / Sheehan
Comments: Lab Sample only

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT
Calcium KH 7/10	mg/L	96
Magnesium	mg/L	170
Sodium	mg/L	240
Potassium	mg/L	13
TDS (ROE 180) 7/10/01	mg/L	1570
TSS 6/26/01 dm	mg/L	40
pH KH 6/22	Units	8.3
Conductivity, Lab 6/22 KH	umhos/cm	2300
Turbidity 6/21/01 dm	NTU	47.8

PARAMETER	UNITS	RESULT
Carbonate KH 6/22	mg/L	8
Bicarbonate	mg/L	710
Fluoride Ext 6.21.01	mg/L	1.6
Chloride	mg/L	29
Nitrate as N	mg/L	<0.1
Nitrite as N	mg/L	<0.1
Ortho Phosphate	mg/L	<0.1
Sulfate 6.22.01	mg/L	770
Total Phosphate KH 7/3	mg/L	0.05
Total Alkalinity as $CaCO_3$ 6/22	mg/L	600
Hardness as $CaCO_3$	mg/L	940

S	R	Bottle
[X]	[ ]	1L Plain
[X]	[ ]	250ml Plain
[X]	[ ] KH	250ml HNO_3
[X]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KH 7/3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 6DpGul1

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **6/5/01** 10:40

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/5/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.5 X25.4= 596.90

Discharge Measurment: Visual- Flow less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
103945	11.92	8.33	2.3	1.47	93.3	7.83	149
103950	11.92	8.33	2.3	1.47	93.3	7.84	147
103955	11.93	8.33	2.3	1.47	93.3	7.83	152
104000	11.93	8.33	2.3	1.47	93.3	7.83	148
104005	11.94	8.33	2.3	1.47	93.2	7.83	144
104010	11.94	8.33	2.3	1.47	93.3	7.83	140
104015	11.94	8.33	2.3	1.47	93.3	7.83	141
104020	11.95	8.33	2.3	1.47	93.5	7.85	133
104025	11.95	8.33	2.3	1.47	93.5	7.84	137
104030	11.96	8.33	2.3	1.47	93.4	7.84	150
104035	11.96	8.33	2.3	1.47	93.4	7.83	128
104040	11.96	8.33	2.3	1.47	93.4	7.83	145
104045	11.97	8.33	2.3	1.47	93.4	7.83	135
104050	11.97	8.33	2.3	1.47	93.4	7.83	137
104055	11.98	8.33	2.3	1.47	93.4	7.83	132
Averages	**11.95**	**8.33**	**2.300**	**1.470**	**93.36**	**7.83**	**141.20**
Lab	**n/a**	**8.30**	**2.300**	**1.776**	**n/a**	**n/a**	**121.00**
SAR=	**3.345**						

Comment

Sunny and warm, approx 70F, Little wind, Trouble with turbidity due to placement of multiprobe. Cattle had just been drinking at site.

Drop Gulch

6 Dp GW 1

Na^{+} = 240/22.99 = 10.439

Ca^{2+} = 110/20.04 = 5.489

Mg^{2+} = 170/12.15 = 13.992

$SAR\ (10.439 / (5.489 + 13.992)/2)^{0.5} =$

$9.741\ \sqrt{} = 3.120$

$1/x = .3204$

$\times 10.439 =$

$SAR = 3.345$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D6D6-31263

D/T REC: 06-06-01 10:30 BY: CA

DATE COMPLETED: 7-3.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/5/01	Conductivity	2.30
Time Collected	10:45	Dissolved O_2	73.7%, 7.93 mg/L
Discharge	less 1.5	Turbidity	<
Temperature	11.99°C	pH	8.33

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Dp GW

Sampled By: LSRCD/Sheehan/Lauthen

Comments: 6 Dp GW

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SBH 6/20	mg/L	110	Carbonate SBH 6/8	mg/L	9
Magnesium	mg/L	170	Bicarbonate	mg/L	700
Sodium 7/2	mg/L	240	Fluoride Rwt 6.6.01	mg/L	1.6
Potassium	mg/L	11	Chloride	mg/L	29
TDS (ROE 180) SBH 6/13/01	mg/L	1776	Nitrate as N	mg/L	<0.1
TSS Hm 6/8/01	mg/L	93.5	Nitrite as N	mg/L	<0.1
pH SBH 6/8	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab Hm 6/6/01	umhos/cm	2300	Sulfate 6.7.01	mg/L	770
Turbidity 6/6/01 Hm	NTU	13.1	Total Phosphate SBH 6/20	mg/L	0.03
			Total Alkalinity as $CaCO_3$ 6/8	mg/L	590
			Hardness as CaCO3 9.31	mg/L	970

S	R	Bottle
M		1L Plain
M		250ml Plain
M		250ml HNO_3
M		250ml H_2SO_4

Elect. File: LSRCD01

Analysts: SBH 7-3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 5DpGul1

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **5/2/01** 10:00

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.4 X25.4= 594.36

Discharge Measurment: Visual- Flow less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
95945	6.13	8.24	2.01	1.29	98.3	9.46	2.9
95950	6.13	8.25	1.99	1.27	98.4	9.47	3.7
95955	6.13	8.25	2.01	1.29	98.6	9.49	3.3
100000	6.13	8.25	2.02	1.29	98.4	9.46	3.6
100005	6.13	8.25	2.06	1.32	98.8	9.5	3.4
100010	6.13	8.25	2.02	1.29	98.6	9.48	3.4
100015	6.13	8.25	1.99	1.27	98.4	9.46	3.5
100020	6.13	8.25	2.06	1.32	98.5	9.47	3.4
100025	6.14	8.25	2.02	1.29	98.8	9.5	3.3
100030	6.13	8.26	2	1.28	98.9	9.51	3.6
100035	6.14	8.26	1.99	1.27	98.5	9.47	3.3
100040	6.14	8.26	2.02	1.29	98.6	9.48	4
100045	6.13	8.26	2.05	1.31	98.8	9.5	3.4
100050	6.13	8.26	2.06	1.32	98.3	9.45	3.6
100055	6.14	8.26	2.08	1.33	98.3	9.45	4
100100	6.13	8.26	2.03	1.3	98.5	9.47	4
Averages	**6.13**	**8.25**	**2.026**	**1.296**	**98.54**	**9.48**	**3.53**
Lab	**n/a**	**8.2**	**2.100**	**1.540**	**n/a**	**n/a**	**2.79**
SAR=	**2.767**						

Comment

Cool and cloudy, no recent precip. Flow less than 1 cfs, Lab analysis attached.

Dorp Gwch SAR

5 Dp GW 1

$Na^{+} = 190/22.99 = 8.264$

$Ca^{2+} = 110/20.04 = 5.489$

$Mg^{2+} = 150/12.15 = 12.346$

$SAR = \left(8.264 / \left(5.489 + 12.346 \right)/2 \right)^{.5} =$

$\sqrt{8.9125} = 2.986$

$1/x = .3349$

$\times\ 8.264$

$SAR = 2.767$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: C504-30460

D/T REC: 5/4/01 10:40 BY: dh

DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/3/01	Conductivity	2.02
Time Collected	10:45	Dissolved O_2	98.0%, 9.5 mg/L
Discharge	<1 cfs	Turbidity	23.4
Temperature	6.13°C	pH	8.27

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: SDpGW1
Sampled By: LSRCD/Sheehan
Comments: Deep Gulch

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SDH 5/15	mg/L	110	Carbonate SDH 5/11	mg/L	0
Magnesium	mg/L	150	Bicarbonate	mg/L	570
Sodium 5/14	mg/L	190	Fluoride SDH 5/4	mg/L	1.3
Potassium 5/15	mg/L	8.4	Chloride	mg/L	25
TDS (ROE 180) RWH 6.1.01	mg/L	1540	Nitrate as N	mg/L	<0.1
TSS RWH 5.18.01	mg/L	2.0	Nitrite as N	mg/L	<0.1
pH SDH 5/11	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 5/9	umhos/cm	2,100	Sulfate RWH 5.5.01	mg/L	680
Turbidity SDH 5/4	NTU	2.79	Total Phosphate SDH 5/18	mg/L	0.03
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	470
			Hardness as $CaCO_3$ 5/15	mg/L	890

S	R	Bottle
☑	[ ]	1L Plain
☑	[ ]	250ml Plain
☑	[ ]	250ml HNO_3
☑	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Deep Gulch**

Site ID: 4dpgul1

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: **4/11/01** 9:07

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/5/01 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.22 X25.4= 589.788

Discharge Measurment: Visual- approx. 1 to 2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
90620	2.33	8.57	1.95	1.24	99.4	10.48	5
90625	2.32	8.57	1.95	1.24	99.3	10.48	5.1
90630	2.33	8.57	1.95	1.24	99.3	10.47	5
90635	2.32	8.57	1.94	1.24	99.3	10.47	4.6
90640	2.33	8.57	1.94	1.24	99.3	10.47	5.2
90645	2.33	8.57	1.94	1.24	99.2	10.46	4.8
90650	2.33	8.57	1.94	1.24	99.1	10.45	6.4
90655	2.33	8.57	1.94	1.24	99.1	10.45	5
90700	2.32	8.57	1.94	1.24	99.1	10.45	4.7
90705	2.32	8.57	1.94	1.24	99.1	10.45	5.2
90710	2.33	8.57	1.95	1.24	99.1	10.45	5.1
90715	2.33	8.57	1.94	1.24	99.1	10.45	4.7
90720	2.33	8.57	1.94	1.24	99.1	10.45	4.8
90725	2.33	8.57	1.94	1.24	99	10.45	5.6
90801	2.32	8.58	1.94	1.24	99	10.44	5.8
90805	2.33	8.57	1.94	1.24	99	10.44	5.4
Averages	**2.33**	**8.57**	**1.94**	**1.24**	**99.16**	**10.46**	**5.15**
Lab	**n/a**	**8.4**	**2.00**	**1.50**	**n/a**	**n/a**	**5.27**
SAR=	**2.523**						
Comment							

Deep Gulch 4/11/01, Cloudy and Cool, Recent precip. 4/8 & 4/9 AM Rain/Snow Mix- Approx. 40F

Drop GW-6

4 Dp GW 1

Na^{+} = 170/22.99 = 7.395

Ca^{2+} = 130/20.04 = 6.487

Mg^{2+} = 130/12.15 = 10.700

$SAR = (7.395/((6.487+10.700)/2))^{0.5}$ =

$= \sqrt{2.931} = 2.931$

$1/x = .3411$

$\times 7.395$

$= SAR\ 2.523$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES

1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0412-29840

D/T REC: 04-12-01 11:00 CA BY:

DATE COMPLETED: 4.024.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/11/01	Conductivity	1.94
Time Collected	9:15	Dissolved O_2	99.1% 10.45 mg/L
Discharge	83 cfs	Turbidity	≈ 45 ntu
Temperature	2.32 °C	pH	8.57

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID	Dp Gul
Sampled By	LSRCD / Sheehan
Comments:	Deep Gulch
Invoice #	VOSR
Amount	$45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SM4 4/19	mg/L	130	Carbonate SM4 4/13	mg/L	15
Magnesium	mg/L	130	Bicarbonate	mg/L	540
Sodium	mg/L	170	Fluoride RWA 4.12.01	mg/L	1.1
Potassium	mg/L	7.7	Chloride	mg/L	24
TDS (ROE 180) RWA 4.17.01	mg/L	1500	Nitrate as N	mg/L	<0.1
TSS RWA 4.17.01	mg/L	4.2	Nitrite as N	mg/L	<0.1
pH SM4 4/13	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab	umhos/cm	2000	Sulfate	mg/L	670
Turbidity RWA 4/12/01	NTU	527	Total Phosphate SM4 4/13	mg/L	0.05
			Total Alkalinity as $CaCO_3$	mg/L	470
			Hardness as $CaCO_3$ 4/20	mg/L	860

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Deep Gulch

Site ID: 7dpgul0

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 7/19/00 1150

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 7/19/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.84 X25.4= 605.536

Discharge Measurment: Visual- less than 1/4 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115045	21.29	8.35	2.340	1.500	71.2	4.98	5.6
115050	21.31	8.35	2.340	1.500	71.2	4.97	5.7
115055	21.32	8.35	2.340	1.500	71.1	4.97	5.7
115100	21.34	8.35	2.340	1.500	71.2	4.97	5.8
115105	21.35	8.35	2.340	1.500	71.3	4.98	5.7
115110	21.37	8.35	2.340	1.500	71.3	4.97	5.9
115115	21.39	8.35	2.340	1.500	71.2	4.97	5.8
115120	21.4	8.35	2.340	1.500	71.3	4.97	5.8
115125	21.41	8.34	2.340	1.500	71.3	4.97	5.8
115130	21.43	8.34	2.340	1.500	71.3	4.97	5.8
115135	21.44	8.34	2.340	1.500	71.2	4.96	5.7
115140	21.46	8.34	2.340	1.500	71.2	4.96	5.8
115145	21.47	8.34	2.350	1.500	71.1	4.95	5.8
115218	21.57	8.34	2.350	1.500	70.5	4.9	5.9
115220	21.57	8.34	2.340	1.500	70.6	4.91	5.8
Averages	**21.41**	**8.35**	**2.341**	**1.500**	**71.13**	**4.96**	**5.77**

Comments:

Msg: 7/19/00 Deep Gulch, Very Low Flow approx. 1/4 cfs, hot & dry, no recent precip., observed fish in pools. DO readings may not be correct- due to low flows

Grab Sample Data

Stream: Deep Gulch

Site ID: 5dpgul0

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 5/4/00 1420

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/3/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.47 X25.4= 596.138

Discharge Measurment: Visual- approx. 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
142040	23.45	8.26	1.970	1.260	106.1	7.02	10.6
142045	23.45	8.26	1.920	1.220	106.1	7.02	8.8
142050	23.45	8.26	1.970	1.260	106.2	7.03	11.6
142055	23.45	8.26	1.920	1.230	105.9	7	9.3
142100	23.45	8.26	1.970	1.260	106	7.01	8.9
142105	23.45	8.26	1.930	1.230	106.3	7.03	7.7
142110	23.45	8.26	1.940	1.240	105.9	7	14.9
142115	23.44	8.26	1.970	1.260	106	7	10.3
142120	23.44	8.26	1.930	1.230	106.2	7.03	9.6
142125	23.44	8.26	1.970	1.260	106.1	7.02	8.7
142130	23.44	8.26	1.940	1.240	106	7.02	10.7
142135	23.45	8.26	1.970	1.260	106.2	7.03	12.3
142140	23.46	8.26	1.930	1.240	106.3	7.03	10.2
142145	23.46	8.26	1.970	1.260	106.3	7.03	10.3
142150	23.46	8.26	1.930	1.230	106.1	7.02	9.3
142155	23.46	8.26	1.940	1.240	105.7	6.99	11
142200	23.46	8.26	1.970	1.260	105.7	6.99	9.1
142239	23.48	8.26	1.930	1.230	106.3	7.02	11.4
142240	23.48	8.26	1.920	1.230	106.3	7.02	11.4
142245	23.49	8.26	1.960	1.250	106.1	7.02	9.4
142250	23.49	8.26	1.960	1.250	106.3	7.03	13.2
Averages	**23.46**	**8.26**	**1.948**	**1.245**	**106.10**	**7.02**	**10.41**

Comments:

Grab Sample Data

Stream: Deep Gulch

Site ID: 4dpgul0

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 4/13/00 1345

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/13/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.5 X25.4= 596.90

Discharge Measurment: Visual- approx. 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
134650	16.38	8.22	2.000	1.280	100.5	7.66	15.6
134655	16.39	8.22	2.000	1.280	100.2	7.64	15.5
134700	16.39	8.22	2.000	1.280	100.5	7.66	25.7
134705	16.39	8.22	2.000	1.280	100.6	7.67	18.4
134710	16.39	8.23	2.000	1.280	100.5	7.66	16.8
134715	16.4	8.22	2.000	1.280	100.4	7.65	18.1
134720	16.4	8.22	2.000	1.280	100.6	7.67	26.3
134725	16.4	8.23	2.000	1.280	100.5	7.66	19.5
134730	16.41	8.23	2.000	1.280	100.4	7.65	17.2
134735	16.41	8.23	2.000	1.280	100.5	7.66	17.3
134740	16.41	8.23	2.000	1.280	100.3	7.64	18
134745	16.41	8.23	2.000	1.280	100.4	7.65	17.8
134750	16.41	8.23	2.000	1.280	100.6	7.67	19.1
134755	16.41	8.23	2.000	1.280	100.4	7.65	17.6
134800	16.41	8.23	2.000	1.280	100.4	7.65	16.4
134805	16.41	8.23	2.000	1.280	100.3	7.65	17.5
134845	16.41	8.23	2.000	1.280	100.2	7.64	15.9
134850	16.42	8.23	2.000	1.280	100.1	7.63	16.2
Averages	**16.40**	**8.23**	**2.000**	**1.280**	**100.41**	**7.65**	**18.27**

Comments:

Msg: Sunny and warm, approx. 65F, Very Dry, water clear, Visual 1-2 cfs

Grab Sample Data

Stream: Deep Gulch

Site ID: 3dpgul0

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 3/27/00 950

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 3/27/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.72 X25.4= 602.488

Discharge Measurment: Visual- approx. 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
9:49:20	4.11	8.58	1.57	1	94.6	9.74	27.5
9:49:25	4.11	8.58	1.57	1	94.4	9.71	23.7
9:49:30	4.11	8.58	1.57	1	94.6	9.73	26
9:49:35	4.11	8.58	1.57	1	94.6	9.73	25.5
9:49:40	4.11	8.58	1.57	1	94.5	9.72	23.2
9:49:45	4.11	8.58	1.57	1	94.3	9.7	25.2
9:49:50	4.11	8.58	1.57	1	94.3	9.7	23
9:49:55	4.12	8.58	1.57	1	94.5	9.72	22.5
9:50:00	4.12	8.58	1.57	1	94.4	9.71	23.8
9:50:05	4.12	8.58	1.57	1	94.3	9.7	24.1
9:50:10	4.12	8.58	1.57	1	94.3	9.71	30
9:50:15	4.12	8.58	1.57	1	94.3	9.7	25.2
9:50:20	4.12	8.58	1.57	1	94.2	9.7	25.6
9:50:25	4.12	8.58	1.57	1	94.3	9.7	26.1
9:50:30	4.13	8.58	1.57	1	94.2	9.66	23.9
9:50:35	4.13	8.59	1.57	1	94	9.67	22.2
Averages	**4.12**	**8.58**	**1.570**	**1.000**	**94.36**	**9.71**	**24.84**

Comments:

3/27/00 Deep Gulch, visually 1-2 cfs, cloudy and cool

SAR value = 2.221

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0328-23121		
D/T REC: 3/28/00 1400 BY: [illegible]		
DATE COMPLETED: 4-12-2000		
Date Collected		03/27/00
Time Collected		9:55
Discharge		≈ 1-2 cfs
Temperature	degrees C	
pH	Units	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID	Deep Gulch #1
Sampled By	LSRCD/Sheehan
Comments:	
Invoice #	
Amount	$45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium [illegible] 3/31/00	mg/L	120	Total Alkalinity as $CaCO_3$ 3/31/00	mg/L	420
Magnesium	mg/L	110	Fluoride [illegible] 3/28/00	mg/L	0.8
Sodium 4-5/00	mg/L	140	Chloride	mg/L	21
Potassium 4-5-00	mg/L	6.0	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 4/3/00	mg/L	750	Nitrite as N	mg/L	<0.1
[illegible] 3-31-00 TDS (ROE 180)	mg/L	1300	Ortho Phosphate	mg/L	<0.1
TSS RS 3-30-00	mg/L	16	Total Phosphate [illegible] 4/7/00	mg/L	0.04
pH [illegible] 3-31-00	Units	8.3	@10% Sulfate [illegible] 3-30-00	mg/L	580
[illegible] Conductivity, Lab 4/11/00	umhos/cm	1600	Turbidity [illegible] 3-28-00	NTU	15.8

Carbonate 6
Bi Carbonate 500

SAR = 2.221

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: **LSRCD01** Analysts: [illegible] 4/12/00

I hereby certify the above was analyzed by myself or my assistant.

Secrion Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Deep Gulch

Site ID: 9dpgul9-macro

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 9/8/99 1500

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 9/8/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.84 X25.4= 605.536

Discharge Measurment: Visual- less than 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
150025	20.03	8.37	1.760	1.130	112	8	11.8
150030	20.03	8.37	1.760	1.130	112	8	11.6
150035	20.03	8.37	1.760	1.130	111.9	7.99	11.8
150040	20.03	8.37	1.760	1.130	112	8	13.3
150045	20.03	8.37	1.760	1.130	112	8	13
150050	20.03	8.37	1.760	1.130	112.1	8	13.1
150055	20.04	8.37	1.760	1.130	112.1	8	12.2
150100	20.03	8.37	1.760	1.130	111.9	7.99	12.2
150105	20.04	8.37	1.760	1.130	111.9	7.99	12.5
150110	20.04	8.37	1.760	1.130	112	7.99	13.4
150154	20.05	8.38	1.760	1.130	111.7	7.97	12.6
150155	20.05	8.38	1.760	1.130	111.7	7.97	11.6
Averages	**20.04**	**8.37**	**1.760**	**1.130**	**111.94**	**7.99**	**12.43**

Comments:

Msg: 9/8/99 Deep Gulch, Less than 1 cfs, Sunny and warm

SAR value = 1.939

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0909 - 20199

D/T REC: 9/9/99 1300 BY: RW

DATE COMPLETED:

Date Collected		9/8/99
Time Collected		14:50
Discharge		<1 cfs
Temperature	degrees C	20.02
pH	Units	8.37

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Deep Gulch-99, #8
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail:
FAX: 307-

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9/23/99	mg/L	110	Total Alkalinity as $CaCO_3$ 9/14/99	mg/L	410
Magnesium 10-11-99	mg/L	140	Fluoride RWH 9.9.99	mg/L	0.7
Sodium	mg/L	130	Chloride	mg/L	27
Potassium	mg/L	11	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/12	mg/L	850	Nitrite as N	mg/L	<0.1
TDS (ROE 180) 9/14-99	mg/L	1400	Ortho Phosphate	mg/L	<0.1
TSS 9-10-99	mg/L	6.5	Total Phosphate 9/21/99	mg/L	0.14
pH 9-14-99	Units	8.5	Sulfate 9-10-99	mg/L	690
Conductivity, Lab 10-7-99	umhos/cm	1800	Turbidity 9-10-99	~~NTU~~	7.5

SAR = 1.939

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

9/15/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Deep Gulch

Site ID: 7dpgul9

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 7/21/99 1005

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 7/15/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.7 X25.4= 601.98

Discharge Measurment: Visual- approx. 1/4 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:04:15	16.05	8.44	1.860	1.190	120.2	8.98	3
10:04:20	16.05	8.44	1.900	1.220	120.2	8.98	1.7
10:04:25	16.06	8.44	1.870	1.200	120.3	8.99	2.3
10:04:30	16.06	8.44	1.910	1.220	120.4	8.99	2
10:04:35	16.07	8.44	1.910	1.220	120.3	8.99	3.5
10:04:40	16.07	8.44	1.900	1.220	120.2	8.98	3
10:04:45	16.07	8.44	1.850	1.180	120.2	8.98	1.7
10:04:50	16.07	8.44	1.850	1.180	120.2	8.98	3.5
10:04:55	16.08	8.44	1.870	1.190	120.3	8.98	2.5
10:05:00	16.08	8.44	1.850	1.180	120.2	8.98	1.2
10:05:05	16.09	8.44	1.860	1.190	120.2	8.98	2.7
10:05:10	16.1	8.44	1.850	1.180	120.2	8.97	1.7
10:05:15	16.11	8.44	1.910	1.220	120.4	8.98	2.2
10:05:20	16.12	8.44	1.840	1.180	120.3	8.98	1.9
Averages	**16.08**	**8.44**	**1.874**	**1.198**	**120.26**	**8.98**	**2.35**

Comments:
Msg: Deep Gulch Sunny and Hot, Less tha 1/4 cfs, precip July 15 & 16

Grab Sample Data

Stream: Deep Gulch

Site ID: 6dpgul9

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 6/4/99 1005

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/3/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.4 X25.4= 594.36

Discharge Measurment: Visual- approx. 1 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
400	12.15	8.32	1.760	1.130	97.7	8.14	5.5
405	12.16	8.32	1.760	1.120	97.7	8.14	5.1
410	12.16	8.32	1.760	1.130	97.6	8.14	5.3
415	12.16	8.32	1.760	1.120	97.6	8.13	2.5
420	12.17	8.32	1.760	1.120	97.6	8.13	2.6
425	12.17	8.32	1.760	1.130	97.6	8.13	6
430	12.17	8.32	1.760	1.130	97.5	8.12	6.8
435	12.17	8.32	1.760	1.130	97.6	8.13	4.9
440	12.17	8.32	1.760	1.130	97.6	8.13	6.9
445	12.18	8.32	1.760	1.130	97.5	8.12	2.9
450	12.19	8.32	1.760	1.130	97.4	8.12	3.4
455	12.19	8.32	1.760	1.120	97.4	8.11	2
500	12.19	8.32	1.760	1.130	97.4	8.11	2.5
506	12.19	8.32	1.760	1.130	97.5	8.12	9.9
611	12.23	8.32	1.760	1.130	97.6	8.12	5
615	12.24	8.32	1.760	1.130	97.5	8.11	8
Averages	**12.18**	**8.32**	**1.760**	**1.128**	**97.55**	**8.13**	**4.96**

Comments:

Msg: Deep Gulch 6/4/99 Sunny and warm, cfs less than 1 cfs

Grab Sample Data

Stream: Deep Gulch

Site ID: 5dpgul9

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 5/5/99 1005

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/51/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.38 X25.4= 593.85

Discharge Measurment: Visual- approx. 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
10:04:40	2.77	8.54	1.680	1.070	95.7	10.05	6.7
10:04:45	2.77	8.54	1.700	1.090	95.7	10.05	5.3
10:04:50	2.77	8.54	1.680	1.070	95.6	10.04	7.7
10:04:55	2.77	8.54	1.630	1.040	95.7	10.05	7.4
10:05:00	2.77	8.54	1.650	1.050	95.6	10.04	12
10:05:05	2.77	8.54	1.700	1.090	95.6	10.04	4.2
10:05:10	2.77	8.54	1.710	1.090	95.5	10.03	3.1
10:05:15	2.77	8.54	1.650	1.060	95.5	10.03	6
10:05:20	2.78	8.55	1.680	1.070	95.6	10.03	9.5
10:05:25	2.77	8.54	1.650	1.050	95.6	10.04	9.4
10:05:30	2.77	8.55	1.690	1.080	95.6	10.04	13.4
10:05:35	2.78	8.55	1.640	1.050	95.5	10.03	8.5
10:05:40	2.78	8.54	1.640	1.050	95.5	10.03	12.5
10:05:45	2.78	8.54	1.660	1.060	95.6	10.03	10.1
10:05:50	2.79	8.55	1.650	1.060	95.5	10.03	11.9
10:05:55	2.79	8.54	1.700	1.090	95.5	10.02	7
10:06:00	2.78	8.55	1.680	1.070	95.6	10.03	8.9
Averages	**2.78**	**8.54**	**1.670**	**1.067**	**95.58**	**10.04**	**8.45**

Comments:

High precip last two weeks, Cloudy and cool, Visually- 1-2 cfs

Grab Sample Data

Stream: Deep Gulch

Site ID: 4dpgul9

Site Coordinates: T16N, R91W, Sec. 27, NE1/4 of SE1/4

Date & Time: 4/7/99 1255

Elevation: 6600

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/6/99 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.4 X25.4= 594.36

Discharge Measurment: Visual- approx. 1 to 2 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
12:54:20	12.58	8.32	2.010	1.290	92.8	7.65	17.4
12:54:25	12.59	8.32	2.020	1.290	92.7	7.64	21.1
12:54:30	12.59	8.32	2.010	1.290	92.6	7.64	23.5
12:54:35	12.59	8.32	2.010	1.290	92.5	7.63	18.1
12:54:40	12.6	8.32	2.010	1.290	92.5	7.63	17.6
12:54:45	12.6	8.32	2.010	1.290	92.5	7.62	15.3
12:54:50	12.6	8.32	2.010	1.290	92.3	7.61	18.9
12:54:55	12.6	8.32	2.010	1.290	92.3	7.61	20.6
12:55:00	12.61	8.32	2.010	1.290	92.4	7.61	20.1
12:55:05	12.61	8.32	2.010	1.290	92.5	7.62	26.3
12:55:10	12.61	8.32	2.010	1.290	92.6	7.63	24.5
12:55:15	12.61	8.32	2.010	1.290	92.6	7.63	20.5
12:55:20	12.63	8.32	2.010	1.290	92.3	7.6	24.3
12:55:25	12.64	8.32	2.010	1.290	92.2	7.6	15
Averages	**12.60**	**8.32**	**2.011**	**1.290**	**92.49**	**7.62**	**20.23**

Comments:

Msg: Windy, Sunny and warm, Visual- approx. 1 cfs,
Approx. 2 inches snow April 2 & 3,

Muddy Creek at Baggs

Grab Sample Data

Stream: **Muddy Creek at Baggs Site**

Site ID: 3MudBag2

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: **3/26/02** @ 14:47

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.78 25.4= 604.012

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 19.712 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
144640	5.33	8.49	0.614	0.393	97.7	9.8	61.6
144645	5.38	8.47	0.615	0.393	98.7	9.89	66.5
144650	5.41	8.48	0.614	0.393	99.2	9.93	63.2
144655	5.45	8.48	0.614	0.393	99.9	10	65.5
144700	5.48	8.48	0.614	0.393	100.2	10.01	66.8
144705	5.52	8.47	0.614	0.393	100.4	10.03	65.7
144710	5.54	8.47	0.615	0.393	100.5	10.02	65.8
144715	5.57	8.48	0.615	0.393	100.6	10.04	67.9
144720	5.59	8.48	0.615	0.393	100.5	10.01	63.3
144725	5.6	8.48	0.615	0.393	100.6	10.03	65.7
144730	5.62	8.48	0.615	0.393	100.7	10.03	60.2
144735	5.63	8.49	0.614	0.393	100.6	10.01	71.3
144740	5.64	8.48	0.615	0.393	100.9	10.04	66.8
144804	5.68	8.48	0.614	0.393	99.9	9.94	61.5
144805	5.68	8.49	0.614	0.393	100	9.95	60.3
Averages	**5.54**	**8.48**	**0.614**	**0.393**	**100.03**	**9.98**	**64.81**
Lab	**n/a**	**8.40**	**0.640**	**0.416**	**n/a**	**n/a**	**42.50**
SAR=	**4.66**						

Notes:

3/26/02 Muddy Creek at Baggs, Partly Cloudy and Cool, Air Temp= 5.5C, Wind Ave= 6.6mph, Rel Hum= 50%, Lab Sample at 14:40, Flow= 19.712cfs

LSRCD Discharge Measurement Notes

Stream: Muddy Creek @ Baggs

Site ID: 3 MudBag 2

Site Coordinates: T13N, R91W, Sec. 28, SE 1/4 of NE 1/4

Date & Time: 3/26/02 @ 1440

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: n/a

Measured Discharge

19.712 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			
1.0	1.0	.445	.445	
2.0	1.2	1.237	1.484	
3.0	1.3	1.988	2.584	
4.0	1.175	1.829	2.149	
5.0	1.2	1.786	2.143	
6.0	.850	1.677	1.425	
7.0	.890	1.754	1.561	
8.0	.950	1.532	1.455	
9.0	.925	1.538	1.423	
10.0	.950	.968	.920	
11.0	1.00	.776	.776	
12.0	.950	.824	.783	
13.0	1.050	.541	.568	
14.0	1.0	.544	.544	
15.0	1.075	.466	.501	
16.0	1.075	.482	.518	
17.0	1.010	.246	.248	
18.0	.750	.247	.185	
18.7	WE/LB			
		Total =	19.712 cfs	

* Due to high turbidity while sampling - experienced difficulty with flow meter sensor while obtaining vel readings.

Measured by: LSRCD / S Sheahan

Checked by: Dwm C Jurgen

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0327-36497

D/T REC: 03-27-02 11:00 BY: CA

DATE COMPLETED: 5.20.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/26/02	Conductivity	.614
Time Collected	1445	Dissolved O_2	100.62, 9.90 mg/L
Discharge	19,712 cfs	Turbidity	64.81
Temperature	5.5 °C	pH	8.48

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: MC @ Baggs
Sampled By: LSRCD / Sheehan
Comments: muddy Creek @ Baggs

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 4/17	mg/L	26 ~~100~~ RLH 5.17	Carbonate 3-28	mg/L	2
Magnesium	mg/L	10 ~~31~~	Bicarbonate	mg/L	180
Sodium 4/12	mg/L	110 ~~100~~	Fluoride RLH 3.27.02	mg/L	0.5
Potassium	mg/L	3.4 ~~7~~	Chloride	mg/L	16
TDS (ROE 180) RLH 3/28/02	mg/L	416	Nitrate as N	mg/L	0.6
TSS RLH 3/28/01	mg/L	4910	Nitrite as N	mg/L	<0.1
pH 3/28	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab RLH 3/27/02	umhos/cm	640	Sulfate	mg/L	140 ~~130~~ RLH
RLH 3/27/02 Turbidity	NTU	4,250 clear with 1:10 dilution	@2x Total Phosphate 4/16	mg/L	2.9
			Total Alkalinity as $CaCO_3$ 3/28	mg/L	150
			Hardness as $CaCO_3$ 4/18	mg/L	38 ~~40~~ RLH

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts RLH 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	26-Mar-2002		Lab No:	36497	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	26	1.30	Carbonate	2	0.07
Magnesium	10	0.82	Bicarbonate	180	2.95
Sodium	110	4.78	Chloride	16	0.45
Potassium	3.4	0.09	Fluoride	0.5	0.03
T. CATIONS		**6.99**	Nitrate as N	0.6	0.04
ROE 180	mg/L	416	Nitrite as N	0	0.00
TSS	mg/L	4910	Ortho phosphate	0	0.00
Turbidity	NTU	4250	Sulfate	140	2.91
			T. ANIONS		**6.45**

Conductance, umhos/cm	640	S A R (sodium Hazard)	4.65
TDS by Summation, mg/L	397	T Alk CaCO3, mg/L	151
pH, Units	8.4	Hardness as CaCO3, mg/L	106
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	6

Analyte	Units	Result
Total Phosphate	mg/L	2.9
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.65**
Meq Cations/Sp cond/100	**1.09**
Meq Anions/Sp cond/100	**1.01**
ROE/TDS Summation	**1.05**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **4.01%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.62** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.05** (0.8 TO 1.2)

OVERALL =	**0.0237**	MAX. OVERALL ALLOWED =	0.0531

Kjw

Grab Sample Data

Stream: **Muddy Creek at South Bridge**

Site ID: 3MudSouth2

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: **3/26/02** @ 13:08

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/26/02

DO Calibration: Bar Pressure Reading 23.78 25.4= 604.012

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 17.893 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130635	5.97	7.83	0.774	0.495	96.3	9.49	654
130640	6.09	7.41	0.763	0.488	96.4	9.49	950
130645	6.13	8.03	0.807	0.516	97	9.53	988
130650	6.17	8.09	0.804	0.515	97.9	9.6	533
130655	6.21	7.95	0.807	0.516	98	9.61	752
130700	6.23	8.06	0.807	0.516	98.1	9.61	609
130705	6.24	8.08	0.807	0.516	98.1	9.61	506
130710	6.28	8.04	0.808	0.517	98.2	9.61	497
130715	6.29	8.03	0.807	0.516	98.2	9.6	480
130720	6.31	8.08	0.807	0.516	98.2	9.6	474
130725	6.31	8.08	0.807	0.516	98.3	9.62	463
130730	6.31	8.08	0.807	0.516	98.5	9.63	455
130735	6.3	8.09	0.807	0.516	98.6	9.64	448
130805	6.3	8.1	0.807	0.516	99	9.68	409
130810	6.3	8.1	0.807	0.516	99.1	9.69	404
Averages	**6.23**	**8.00**	**0.802**	**0.513**	**97.99**	**9.60**	**574.80**
Lab	**n/a**	**8.10**	**0.820**	**0.544**	**n/a**	**n/a**	**1063.00**
SAR=	**1.56**						

Notes:

3/26/02 Muddy Creek at South Bridge, Partly Cloudy and Cool, Lab Sample at 13:00, Air Temp= 5.4C, Wind Ave= 6.4mph, Rel Hum= 52%, Flow=17.893

LSRCD Discharge Measurement Notes

Stream: Muddy Creek @ South Bridge

Site ID: 3 Mud South 2

Site Coordinates: T13N, R91W, Sec. 28, SE 1/4 of NE 1/4

Date & Time: 3/26/02 @ 13:10

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/26/02 Calibration

Outside Gage Reading: n/a

Measured Discharge

17.893 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.5	WE/LB			Measured by: LSRCD/S Sheehan Checked by: Gwen C. Jeager
1.5	1.175	.702	.825	
2.5	1.900	.536	1.018	
3.5	1.500	1.221	1.832	
4.5	1.375	1.590	2.186	
5.5	1.450	1.619	2.348	
6.5	1.225	1.260	1.544	
7.5	1.050	1.979	2.078	
8.5	1.000	1.704	1.704	
9.5	.990	1.795	1.777	
10.5	1.010	1.566	1.582	
11.5	.875	1.071	.937	
12.5	.600	.104	.062	
13.5	.300	—		
14.0	WE/RB			
		Total =	17.893	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0327-36498

D/T REC: 03-27-02 11:00 BY: CA

DATE COMPLETED: 5.20.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/26/02	Conductivity	.807
Time Collected	13:00	Dissolved O_2	99%, 9.68 mg/L
Discharge	17.893 cfs	Turbidity	
Temperature	6.30 °C	pH	8.1

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: MC So.
Sampled By: LSRCD/Sheehan
Comments: muddy crk @ So Bridge

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGH 4/17	mg/L	74 ~~100~~ RWH 5.17	Carbonate SGH 3/28	mg/L	~~0~~
Magnesium	mg/L	28 ~~34~~	Bicarbonate	mg/L	180
Sodium 4/18	mg/L	62 ~~58~~	Fluoride RWH 3.27.02	mg/L	0.3
Potassium	mg/L	6.4 ~~9~~	Chloride	mg/L	12
TDS (ROE 180) 3/28/02	mg/L	544	Nitrate as N	mg/L	0.1
TSS Hm 3/28/02	mg/L	1113 mg/L	Nitrite as N	mg/L	<0.1
pH SGH 3/28	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity Lab Hm 3/27/02	umhos/cm	820	Sulfate	mg/L	280
Turbidity Hm 3/27/02	NTU	1063	Total Phosphate SGH 4/16	mg/L	0.77
			Total Alkalinity as $CaCO_3$ 3/28	mg/L	150
			Hardness as $CaCO_3$ 3/18	mg/L	300 RWH

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: SGH 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

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Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	26-Mar-2002		Lab No:	36498	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	74	3.69	Carbonate	0	0.00
Magnesium	28	2.30	Bicarbonate	180	2.95
Sodium	62	2.70	Chloride	12	0.34
Potassium	6.4	0.16	Fluoride	0.3	0.02
T. CATIONS		**8.86**	Nitrate as N	0.1	0.01
ROE 180	mg/L	544	Nitrite as N	0	0.00
TSS	mg/L	1113	Ortho phosphate	0	0.00
Turbidity	NTU	1063	Sulfate	280	5.83
			T. ANIONS		**9.14**

Conductance, umhos/cm	820	S A R (sodium Hazard)	1.56
TDS by Summation, mg/L	551	T Alk CaCO3, mg/L	148
pH, Units	8.1	Hardness as CaCO3, mg/L	300
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	18

Analyte	Units	Result
Total Phosphate	mg/L	0.77
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.66**
Meq Cations/Sp cond/100	**1.08**
Meq Anions/Sp cond/100	**1.11**
ROE/TDS Summation	**0.99**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.59%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.67** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.10** (0.8 TO 1.2)

OVERALL =	**0.0097**	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Muddy Creek (Dad Perm Site)**

Site ID: 3Dad2

Site Coordinates: T16N, R92W, Sec. 29, NE1/4 of SE1/4

Date & Time: **3/26/02** @ 12:20

Elevation: 6510

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 3/25/02

DO Calibration: Bar Pressure Reading 23.55 25.4= 598.17

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 7.632 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
0	-0.25	8.11	850	544	95.10	10.99	41
10000	-0.25	8.11	852	545	94.50	10.93	38
20000	-0.25	8.11	853	546	93.30	10.79	39
30000	-0.25	8.11	852	545	92.90	10.74	39
40000	-0.25	8.11	850	544	93.60	10.82	38
50000	-0.25	8.11	847	542	93.00	10.75	40
60000	-0.25	8.11	843	540	93.50	10.81	41
70000	-0.25	8.11	840	538	93.60	10.82	41
80000	-0.23	8.11	835	535	93.00	10.75	42
90000	-0.21	8.12	828	530	93.10	10.75	42
100000	-0.20	8.11	822	526	93.90	10.84	48
110000	-0.18	8.11	814	521	93.70	10.81	58
120000	-0.18	8.11	804	515	93.40	10.78	59
130000	-0.12	8.11	794	508	93.60	10.78	69
140000	-0.07	8.11	783	501	93.40	10.74	60
150000	-0.09	8.11	773	495	92.80	10.68	73
160000	-0.13	8.13	771	493	93.10	10.73	97
170000	-0.21	8.15	775	496	93.40	10.78	115
180000	-0.24	8.16	785	502	94.10	10.88	95
190000	-0.25	8.17	797	510	94.60	10.93	90
200000	-0.25	8.17	810	519	94.80	10.96	78
210000	-0.24	8.17	823	527	94.60	10.93	77
220000	-0.24	8.17	836	535	95.00	10.98	75
230000	-0.25	8.17	844	540	96.00	11.10	70
Averages	**-0.21**	**8.13**	**820**	**525**	**93.83**	**10.84**	**61**
Lab	**n/a**	**8.1**	**830**	**540**	**n/a**	**n/a**	**32.7**

WYOMING DEPARTMENT OF AGRICULTURE
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1174 Snowy Range Road
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Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D327-36499

D/T REC: D3-27-02 11:00 BY: CA

DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/26/02	Conductivity	
Time Collected	12:20	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Dad

Sampled By: LSRCD/Sheehan

Comments: Dad Sta.

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium BJH 4/17	mg/L	81	Carbonate BJH 3/28	mg/L	0
Magnesium	mg/L	28	Bicarbonate	mg/L	180
Sodium 4/8	mg/L	55	Fluoride RWN 3.27.02	mg/L	0.3
Potassium	mg/L	8	Chloride	mg/L	11
TDS (ROE 180) 3/26/02 3/27	mg/L	540	Nitrate as N	mg/L	0.1
TSS BJH 3/28/02	mg/L	38	Nitrite as N	mg/L	<0.1
pH BJH 3/28	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab BJH 3/27/02	umhos/cm	830	Sulfate	mg/L	280
Turbidity BJH 3/27/02	NTU	32.7	Total Phosphate BJH 4/16	mg/L	0.12
			Total Alkalinity as $CaCO_3$ 3/28	mg/L	150
			Hardness as $CaCO_3$ 3/18	mg/L	320

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: BJH 4-18-02

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

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Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	26-Mar-2002		Lab No:	36499	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	81	4.04	Carbonate	0	0.00
Magnesium	28	2.30	Bicarbonate	180	2.95
Sodium	55	2.39	Chloride	11	0.31
Potassium	8	0.20	Fluoride	0.3	0.02
T. CATIONS		**8.94**	Nitrate as N	0.1	0.01
ROE 180	mg/L	540	Nitrite as N	0	0.00
TSS	mg/L	38	Ortho phosphate	0	0.00
Turbidity	NTU	32.7	Sulfate	280	5.83
			T. ANIONS		**9.11**

Conductance, umhos/cm	830	S A R (sodium Hazard)	1.34
TDS by Summation, mg/L	552	T Alk CaCO3, mg/L	148
pH, Units	8.1	Hardness as CaCO3, mg/L	318
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	19

Analyte	Units	Result
Total Phosphate	mg/L	0.12
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.65**
Meq Cations/Sp cond/100	**1.08**
Meq Anions/Sp cond/100	**1.10**
ROE/TDS Summation	**0.98**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.95%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.66** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.09** (0.8 TO 1.2)

OVERALL =	**0.005809**	MAX. OVERALL ALLOWED =	5.31

RCH

Wyoming Department of Agriculture
Analytical Services
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Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	26-Mar-2002		Lab No:	36500	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	12	0.60	Carbonate	36	1.20
Magnesium	13	1.07	Bicarbonate	440	7.21
Sodium	270	11.74	Chloride	43	1.21
Potassium	3.9	0.10	Fluoride	1.4	0.07
T. CATIONS		**13.51**	Nitrate as N	0.3	0.02
ROE 180 mg/L		996	Nitrite as N	0	0.00
TSS mg/L		500	Ortho phosphate	0	0.00
Turbidity NTU		952	Sulfate	150	3.12
			T. ANIONS		**12.84**

Conductance, umhos/cm	1240	S A R (sodium Hazard)	12.86
TDS by Summation, mg/L	746	T Alk CaCO3, mg/L	421
pH, Units	8.9	Hardness as CaCO3, mg/L	83
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	5

Analyte	Units	Result
Total Phosphate	mg/L	0.76
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	**0.80**
Meq Cations/Sp cond/100	**1.09**
Meq Anions/Sp cond/100	**1.04**
ROE/TDS Summation	**1.34**

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **2.54%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.60** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.06** (0.8 TO 1.2)

OVERALL =	**0.0144**	MAX. OVERALL ALLOWED =	0.0531

RLW

Grab Sample Data

Stream: **Muddy Creek at Baggs Site**

Site ID: 6MudBag1

Site Coordinates: T13N, R91W, Sec.28 SE1/4 of NE1/4

Date & Time: **6/19/01** 14:18

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 6/19/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.95 X25.4= 608.33

Discharge Measurment: Visual- Flow approx 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
141715	21.04	8.15	1.77	1.13	127.1	8.99	43.3
141720	21.05	8.15	1.77	1.13	127.2	9	44.6
141725	21.05	8.15	1.77	1.13	127.2	9	44.4
141730	21.04	8.15	1.77	1.13	127.3	9	46.1
141735	21.04	8.15	1.77	1.13	127.3	9.01	37.6
141740	21.05	8.15	1.77	1.13	127.3	9	37.8
141745	21.04	8.15	1.77	1.13	127.3	9.01	35.8
141750	21.05	8.16	1.77	1.13	127.4	9.01	40.7
141755	21.05	8.15	1.77	1.13	127.2	9	40.5
141800	21.06	8.15	1.77	1.13	127.1	8.99	35.5
141805	21.06	8.15	1.77	1.13	127.1	8.99	40.6
141810	21.07	8.15	1.77	1.13	127.1	8.99	38.5
141815	21.07	8.16	1.77	1.13	127.1	8.99	34.8
141820	21.07	8.16	1.77	1.13	127.1	8.99	36.8
141825	21.08	8.15	1.77	1.13	127.1	8.98	36.3
Averages	**21.05**	**8.15**	**1.770**	**1.130**	**127.19**	**9.00**	**39.55**
Lab	**n/a**	**8.30**	**1.770**	**1.196**	**n/a**	**n/a**	**27.50**
SAR=	**5.071**						

Comment

Sunny and hot, approx 80F, No Breeze, No recent precip
Lab analysis attached

Muddy Creek @ Baggs

6 Mud Bag 1

6/19/01

$Na^{+1} = 240/22.99 = 10.439$

$Ca^{+2} = 89/20.04 = 4.441$

$Mg^{+2} = 49/12.15 = 4.033$

$SAR = \left(10.437/\left((4.441 + 4.033)/2\right)\right)^{0.5}$

$4.237\sqrt{} = 2.0583$

$1/x = .4858$

$\times 10.437 =$

SAR = 5.071

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0620-31825

D/T REC: 06-20-01 10:15 BY: CA

DATE COMPLETED: 7.13.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/19/01	Conductivity	1.77
Time Collected	1425	Dissolved O_2	1271R, 8.98mg/L
Discharge	≈1 cfs	Turbidity	≈38 ntu
Temperature	21.06°C	pH	8.15

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Mud Bgg
Sampled By: LSRCD/Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium LSH 7/10	mg/L	89	Carbonate LSH 6/22	mg/L	~~0~~
Magnesium ↓	mg/L	49	Bicarbonate ↓	mg/L	310
Sodium 6/21	mg/L	240	Fluoride RWH 6.21.01	mg/L	0.6
Potassium 6/20	mg/L	6.2	Chloride	mg/L	~~42~~ 130
TDS (ROE 180) 7/4/01 Gm	mg/L	1196	Nitrate as N	mg/L	0.1
TSS 6/25/01 Gm	mg/L	47	Nitrite as N	mg/L	<0.1
pH LSH 6/22	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 6/21/01 Hm	umhos/cm	1770	Sulfate 6.22.01	mg/L	420
Turbidity 6/21/01 Gm	NTU	27.5	Total Phosphate LSH 7/3	mg/L	0.10
			Total Alkalinity as $CaCO_3$ 6/22	mg/L	250
			Hardness as $CaCO_3$	mg/L	420

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ] CA	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: LSH 7/13/01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek at Baggs Site**

Site ID: 6MudBag1

Site Coordinates: T13N, R91W, Sec.28 SE1/4 of NE1/4

Date & Time: **6/5/01** 14:23

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 6/5/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.75 X25.4= 603.25

Discharge Measurment: Swoffer Flow Meter model 3000 **Flow= 8.917 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
142230	16.42	8.48	1.007	0.644	102.2	7.91	75.8
142235	16.42	8.48	1.007	0.644	102.2	7.9	70.3
142240	16.42	8.48	1.007	0.644	102.1	7.89	74.6
142245	16.43	8.48	1.007	0.644	102.1	7.89	74.9
142250	16.44	8.48	1.007	0.644	102.1	7.89	74.9
142255	16.44	8.48	1.007	0.644	102	7.89	79.1
142300	16.43	8.48	1.007	0.644	102.1	7.89	74.4
142305	16.43	8.48	1.007	0.644	102	7.88	72.8
142310	16.43	8.48	1.007	0.644	102	7.89	79.6
142315	16.44	8.48	1.007	0.644	102	7.88	70.1
142320	16.44	8.48	1.007	0.644	102	7.88	68.8
142407	16.47	8.48	1.007	0.644	102	7.88	73.1
142410	16.47	8.48	1.007	0.644	101.9	7.87	74.8
Averages	**16.44**	**8.48**	**1.007**	**0.644**	**102.05**	**7.89**	**74.09**
Lab	**n/a**	**8.40**	**1.000**	**0.704**	**n/a**	**n/a**	**81.80**
SAR=	**1.96**						

Comment

Sunny and warm, Windy, Recent precip rain/snow mix 6/4 AM

LSRCD Discharge Measurement Notes

Stream: Muddy Creek @ Baggs

Site ID: 6MudBag1

Site Coordinates: T13N, R91W, Sec. 28 SE¼ of NE¼

Date & Time: 6/5/01 @ 15:30

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: Calibrated 6/5/01

Outside Gage Reading: N/A

Measured Discharge

8.917 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	EW/RB			Discharge measured by: T Sheehan LSRCD
1.0	.350	.137	.048	
2.0	.725	.209	.152	
3.0	.825	1.095	.903	
4.0	.910	1.760	1.602	
5.0	.850	1.616	1.374	
6.0	.775	1.964	1.522	
7.0	.610	1.743	1.063	
8.0	.600	.997	.598	
9.0	.600	1.146	.688	
10.0	.600	.712	.427	
11.0	.625	.209	.131	
12.0	.670	.422	.283	
13.0	.775	.162	.126	
14.0	.500	—	—	
15.0	EW/LB			
		Total =	8.917 cfs	

Checked by:

Muddy Creek @ Baggs

6 Mud Bag 1

6/5/01

$Na^{+1} = 87/22.99 = 3.784$

$Ca^{+2} = 90/20.04 = 4.491$

$Mg^{+2} = 36/12.15 = 2.963$

$SAR = \left(3.784 / \left(4.491 + 2.963 \right)/2 \right)^{0.5} =$

$3.727^{0.5} = 1.931$

$1/x = .518$

$x\ 3.784 =$

SAR 1.960

WYOMING DEPARTMENT OF AGRICULTURE
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 01010-31265

D/T REC: 01-010-01 10:30 BY: CA

DATE COMPLETED: 7.3.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	6/5/01	Conductivity	1.007
Time Collected	14:25	Dissolved O_2	102.8% 7.88 mg/L
Discharge		Turbidity	= 74 NTU
Temperature	16.44°C	pH	8.48

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Mud @ Baggs
Sampled By: LSRCD/Sheehan & Lawhon
Comments: 6 mud bags !

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT
Calcium SH 6/30	mg/L	90
Magnesium	mg/L	36
Sodium 7/2	mg/L	87
Potassium	mg/L	4.4
TDS (ROE 180) 6.18.01	mg/L	704
TSS AM 6/8/01	mg/L	76
pH SH 6/8	Units	8.4
Conductivity, Lab 6/8/01	umhos/cm	1000
Turbidity 6/6/01	NTU	51.8

PARAMETER	UNITS	RESULT
Carbonate SH 6/8	mg/L	10
Bicarbonate	mg/L	280
Fluoride RW# 6.6.01	mg/L	0.3
Chloride	mg/L	27
Nitrate as N	mg/L	<0.1
Nitrite as N	mg/L	<0.1
Ortho Phosphate	mg/L	<0.1
Sulfate 6.7.01	mg/L	250
Total Phosphate SH 6/30	mg/L	0.07
Total Alkalinity as $CaCO_3$ 6/8	mg/L	250
Hardness as $CaCO_3$ 6/21	mg/L	370

S	R	Bottle
M	1	1L Plain
M	1	250ml Plain
M	1	250ml HNO_3
M	1	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KSH 7-3-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek at Baggs Site**

Site ID: 5MudBag1

Site Coordinates: T13N, R91W, Sec.28 SE1/4 of NE1/4

Date & Time: **5/2/01** 13:48

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 5/2/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.8 X25.4= 604.52

Discharge Measurment: Visual- High Flows, approx. 150 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
134735	9.97	8.12	0.834	0.534	93.2	8.34	419
134740	9.97	8.12	0.834	0.534	93.2	8.35	428
134745	9.97	8.13	0.834	0.534	93.5	8.37	430
134750	9.97	8.13	0.834	0.534	93.3	8.36	444
134755	9.97	8.13	0.835	0.534	93.4	8.37	444
134800	9.97	8.13	0.835	0.534	93.5	8.37	431
134805	9.97	8.13	0.834	0.534	93.4	8.36	416
134810	9.97	8.13	0.835	0.534	93.4	8.36	419
134815	9.97	8.13	0.834	0.534	93.3	8.35	417
134820	9.97	8.14	0.834	0.534	93.3	8.35	419
134917	9.98	8.15	0.834	0.534	93.5	8.37	425
134920	9.98	8.15	0.834	0.534	93.5	8.37	440
Averages	**9.97**	**8.13**	**0.834**	**0.534**	**93.38**	**8.36**	**427.67**
Lab	**n/a**	**8**	**0.860**	**0.600**	**n/a**	**n/a**	**1356.00**
SAR=	**1.376**						

Comment

Snowing during sampling. High Flows not able to collect discharge measurement. Water very turbid. Lab analysis attached.

Muddy at Baggs

5 Mud Bag 1

$NA^{+} = 63/22.99 = 2.740$

$Ca^{2+} = 98/20.04 = 4.890$

$Mg^{2+} = 37/12.15 = 3.045$

$SAR = \left(2.740 / \left((4.890 + 3.045)/2\right)^{.5}\right)$

$\sqrt{3.9675} = 1.9918$

$1/x = .5020$

$\times 2.740$

SAR = 1.376

WYOMING DEPARTMENT OF AGRICULTURE
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0504-30456

D/T REC: 5/4/01 10:40 BY: KH

DATE COMPLETED: 6.25.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	5/2/01	Conductivity	.834
Time Collected	1750	Dissolved O_2	93.5% / 8.37 mg/L
Discharge	≈150 cfs	Turbidity	≈420 NTU
Temperature	9.97 °C	pH	8.13

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 5 Mud Bags 1
Sampled By: LSRCD / Sheehan
Comments: Muddy @ Baggs
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 5/15	mg/L	98 ~~105~~	Carbonate KH 5/11	mg/L	0
Magnesium ↓	mg/L	37	Bicarbonate ↓	mg/L	230
Sodium 5/14	mg/L	636	Fluoride KH 5/4	mg/L	0.3
Potassium ↓ 5/15	mg/L	5.6	Chloride	mg/L	11
TDS (ROE 180) RWP 6.1.01	mg/L	600	Nitrate as N	mg/L	<0.1
TSS RWP 5.18.01	mg/L	1560	Nitrite as N	mg/L	<0.1
pH KH 5/4	Units	8.0	Ortho Phosphate ↓	mg/L	<0.1
Conductivity, Lab 5/9	umhos/cm	860	Sulfate RWP 5.5.01	mg/L	~~63~~ 240
Turbidity KH 5/4	NTU	1356	Total Phosphate KH 5/8	mg/L	0.50
			Total Alkalinity as $CaCO_3$ 5/11	mg/L	190
			Hardness as $CaCO_3$ 5/15	mg/L	400

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek at Baggs Site**

Site ID: 4MudBag1

Site Coordinates: T13N, R91W, Sec.28 SE1/4 of NE1/4

Date & Time: **4/16/01** 14:11

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H2O Multiprobe w/ stirrer SN# 30691

Calibration/ Sensors Details: 4/16/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.98 X25.4= 609.092

Discharge Measurment: Visual- High Flows

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
141025	10.6	8.2	1.61	1.03	92.3	8.17	290
141030	10.6	8.21	1.61	1.03	92.3	8.17	294
141035	10.61	8.21	1.61	1.03	92.3	8.17	276
141040	10.61	8.21	1.61	1.03	92.3	8.17	268
141045	10.61	8.21	1.61	1.03	92.3	8.17	285
141050	10.61	8.21	1.61	1.03	92.2	8.17	287
141055	10.61	8.21	1.61	1.03	92	8.15	175
141100	10.61	8.21	1.61	1.03	92.1	8.15	150
141105	10.61	8.21	1.61	1.03	92.1	8.15	183
141110	10.61	8.21	1.61	1.03	92.1	8.16	286
141115	10.61	8.21	1.61	1.03	92.2	8.16	283
141120	10.61	8.21	1.61	1.03	92.2	8.16	288
141125	10.62	8.21	1.61	1.03	92.1	8.16	283
141130	10.62	8.21	1.61	1.03	92.2	8.16	271
141205	10.62	8.21	1.61	1.03	92.2	8.16	295
Averages	**10.61**	**8.21**	**1.610**	**1.030**	**92.19**	**8.16**	**260.93**
Lab	**n/a**	**8.40**	**1.600**	**1.250**	**n/a**	**n/a**	**291.00**
SAR=	**3.03**						

Comment

Water visually "higher trb-ntu's" than tribs. Sunny and Warm approx. 50-60F
Lab analysis attached.

Muddy @ Baggs

4 mud Bag 1

Na^{+} = 170/22.99 = 7.395

Ca^{2+} = 120/20.04 = 5.988

Mg^{2+} = 72/12.15 = 5.926

$SAR = \left(7.395 / ((5.988 + 5.926)/2 \right)^{0.5} =$

$5.957 \sqrt{} = 2.441$

$1/x = .4097$

$x \; 7.395 =$

$\boxed{SAR \; 3.030}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0417-29931

D/T REC: 04-17-01 10:30 BY: CA

DATE COMPLETED: 5-31-01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/01	Conductivity	161
Time Collected	1420	Dissolved O_2	92.1% / 8.15 mg/L
Discharge		Turbidity	290 NTU
Temperature	10.6	pH	8.21

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Muddy @ Baggs
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGH 4/19	mg/L	120	Carbonate SGH 4/20	mg/L	11
Magnesium	mg/L	72	Bicarbonate	mg/L	280
Sodium	mg/L	170	Fluoride RWH 4.17.01	mg/L	0.5
Potassium	mg/L	7.6	Chloride	mg/L	27
TDS (ROE 180) RWH 4.17.01	mg/L	1250	Nitrate as N	mg/L	0.1
TSS RWH	mg/L	324	Nitrite as N	mg/L	<0.1
pH SGH 4/20	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/25	umhos/cm	1600	Sulfate	mg/L	560
Turbidity RWH 4.17.01	NTU	291	Total Phosphate SGH 4/30	mg/L	0.20
			Total Alkalinity as $CaCO_3$ 4/20	mg/L	240
			Hardness as $CaCO_3$ 4/20	mg/L	600

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ] OK	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

DataSonde 4a 37411 Grab Sample
Log File Name : Muddy at Baggs
Setup Date (MMDDYY) : 032301
Setup Time (HHMMSS) : 153310
Starting Date (MMDDYY) : 032301
Starting Time (HHMMSS) : 154500
Stopping Date (MMDDYY) : 032301
Stopping Time (HHMMSS) : 161500
Interval (HHMMSS) : 000500
Sensor warmup (HHMMSS) : 000200
Circltr warmup (HHMMSS) : 000200

Date MMDDYY	Time HHMMSS	Temp øC	pH Units	SpCond mS/cm	TDS g/l	DO% Sat	DO mg/l	Turb NTU
32301	154500	6.01	8.05	0.697	0.446	95.8	9.49	999999
32301	155000	6.06	8.06	0.692	0.443	95.3	9.43	999999
32301	155500	6.11	8.07	0.687	0.44	95.3	9.42	999999
32301	160000	6.15	8.08	0.682	0.437	95.6	9.44	999999
32301	160500	6.18	8.08	0.679	0.434	95.9	9.46	999999
32301	161000	6.21	8.08	0.674	0.432	95.7	9.44	999999
Averages		**6.12**	**8.07**	**0.685**	**0.439**	**95.6**	**9.45**	**999999**

Recovery finished at 032301 162429

Note: Used 800 turbidity standard and reading exceeded this standard. Very high ntus

Grab Sample Data

Stream: **Muddy Creek @ Baggs**

Site ID: 3mudbag1

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: **3/19/01** 1310

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 3/19/01 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.98 X25.4= 609.09

Discharge Measurment: Visual 3-4 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130945	4.05	8.45	1.349	0.863	92.5	9.64	362
130950	4.05	8.46	1.343	0.86	92.3	9.63	376
130955	4.06	8.46	1.343	0.859	92.3	9.63	344
131000	4.05	8.46	1.349	0.863	92.4	9.63	369
131005	4.06	8.46	1.35	0.864	92.4	9.63	349
131037	4.07	8.46	1.351	0.864	92.3	9.62	331
131040	4.06	8.46	1.347	0.862	92.3	9.63	326
131045	4.06	8.46	1.344	0.86	92.3	9.63	394
131050	4.07	8.46	1.347	0.862	92.4	9.63	380
131055	4.06	8.46	1.344	0.86	92.4	9.63	341
131100	4.07	8.46	1.348	0.862	92.4	9.63	324
131105	4.06	8.46	1.351	0.865	92.4	9.63	342
131110	4.07	8.46	1.342	0.859	92.3	9.62	381
131115	4.07	8.46	1.349	0.863	92.3	9.62	333
131157	4.07	8.47	1.352	0.865	92.3	9.61	332
131200	4.08	8.47	1.343	0.86	92.2	9.61	374
Averages	**4.06**	**8.46**	**1.347**	**0.862**	**92.34**	**9.63**	**353.63**

Msg: 3.19.01, Muddy at Baggs Site, Snow cover on ground, Very little ice, Visual approx. 3-4 cfs, High trb. Reading, Cool and windy approx. 40F, Lab sample 1320 Trb visual red colored water. **SAR= 4.449**

Muddy @ Baggs 3/19/01

Na^+: $190/22.99 = 8.264$

Ca^{2+}: $69/20.04 = 3.443$

Mg^{2+}: $42/12.15 = 3.457$

$SAR = 8.264 / \left((3.443 + 3.457)/2 \right)^{0.5} =$

$8.264 / 1.8574 > \boxed{4.449}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES

1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0320-29517

D/T REC: 3-20-01 10:45 BY: CA

DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	3/19/01	Conductivity	1.350
Time Collected	1320	Dissolved O_2	9.63 mg/L
Discharge	≈3	Turbidity	≈ 360
Temperature	4.05°C	pH	8.46

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 3 Mud Bag 2

Sampled By: LSRCD / Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: ~~$45.00~~ 90.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KWH 3/30	mg/L	69	Carbonate KWH 3-23	mg/L	8
Magnesium	mg/L	42	Bicarbonate	mg/L	300
Sodium	mg/L	190	Fluoride KWH 3.20.01	mg/L	0.7
Potassium	mg/L	4.9	Chloride	mg/L	36
TDS (ROE 180) KWH 3.23.01	mg/L	~~210~~ 944	Nitrate as N	mg/L	0.3
TSS KWH 3.23.01	mg/L	730	Nitrite as N	mg/L	<0.1
pH KWH 3/23	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 3/23	umhos/cm	1400	Sulfate	mg/L	590
Turbidity KWH 3.20.01	NTU	678	Total Phosphate KWH 3/27	mg/L	0.36
			Total Alkalinity as $CaCO_3$ 3/23	mg/L	260
			Hardness as $CaCO_3$ 3/30	mg/L	340

SAR = 4.449

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

OK

Fact. File: LSRCD01

Analysts: KWH 4/2/01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES

1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0125-28710

D/T REC: 01/25/01 BY: JS

DATE COMPLETED: 3.19.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	1-24-01	Conductivity	
Time Collected	1205	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Muddy @ Baggs
Sampled By: Jay Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SAR 1/31	mg/L	77	Carbonate SAR 1/31	mg/L	0
Magnesium 1	mg/L	46	Bicarbonate 1	mg/L	380
Sodium 1/1	mg/L	310	Fluoride Kelt 1.25.01	mg/L	1.0
Potassium 1	mg/L	2.4	Chloride	mg/L	240
TDS (ROE 180)	mg/L	1300	Nitrate as N	mg/L	0.9
TSS	mg/L	980	Nitrite as N	mg/L	<0.1
pH SAR 1/31	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 1/30	umhos/cm	2100	Sulfate	mg/L	420
Turbidity Kelt 1.25.01	NTU	7.50	Total Phosphate SAR 2/3	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 1/31	mg/L	310
			Hardness as $CaCO_3$	mg/L	380

SAR = 6.903

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Maidy @ Buffi 1-24-01

Na^+: $310/22.99 = 13.484$

Ca^{2+}: $77/20.04 = 3.842$

Mg^{2+}: $46/12.15 = 3.786$

$SAR = (13.484/((3.842 + 3.786)/2)^{0.5} =$

$(13.484/1.9533) = \boxed{6.903}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 96101

D/T REC: 08/09/00 1030 BY: E

DATE COMPLETED: 8.25.00

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	8/8/00	Conductivity	
Time Collected	11:15	Dissolved O_2	
Discharge	2 1/4 cfs	Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Mud @ Baggs-M
Sampled By: LSRCD- Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 8/16	mg/L	~~59~~ 49	Carbonate 8/18	mg/L	7
Magnesium	mg/L	~~25~~ 25	Bicarbonate	mg/L	330
Sodium	mg/L	~~173~~ 105	Fluoride Lwt 8.9.00	mg/L	1.1
Potassium	mg/L	~~5.9~~ 3.6	Chloride	mg/L	48
TDS (ROE 180) EE 8.9.00	mg/L	500.	Nitrate as N	mg/L	<0.1
TSS EE 8.9.00	mg/L	~~300.~~ 16.	Nitrite as N	mg/L	<0.1
pH 8/18	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab EE 8/14	umhos/cm	860.	Sulfate	mg/L	99
Turbidity EE 8.9.00	NTU	57.	Total Phosphate 8/15	mg/L	~~0.12~~ 0.08
			Total Alkalinity as $CaCO_3$ 8/18	mg/L	280
			Hardness as $CaCO_3$ 8/17	mg/L	450

SAR = 3.044

S	R	Bottle
[ ]	[x]	1L Plain
[ ]	[x]	250ml Plain
[ ]	[x]	250ml HNO_3
[ ]	[x]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Muddy Creek @ Baggs

Site ID: 7mudbag0

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: 7/19/00 1330

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 7/19/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.95 X25.4= 608.33

Discharge Measurment: Visual- Approx. 3-4 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
133430	19.64	8.49	0.557	0.356	123.9	9.06	69.1
133435	19.65	8.49	0.557	0.356	124.3	9.09	87
133440	19.65	8.49	0.557	0.356	124.1	9.08	59.5
133445	19.66	8.49	0.557	0.356	124.1	9.07	60.9
133450	19.66	8.49	0.557	0.356	124.3	9.08	65.8
133455	19.66	8.49	0.557	0.356	124	9.06	68.1
133500	19.66	8.49	0.557	0.356	124.2	9.08	66.4
133505	19.67	8.49	0.557	0.356	124	9.06	29.9
133510	19.68	8.49	0.557	0.356	124.1	9.07	63
133515	19.68	8.49	0.557	0.356	124	9.06	32.9
133520	19.68	8.49	0.557	0.356	124	9.06	67.5
133525	19.69	8.49	0.557	0.356	124	9.06	46.2
133530	19.68	8.48	0.557	0.356	124.2	9.07	80.1
133535	19.69	8.48	0.557	0.356	124	9.06	62.1
133620	19.71	8.48	0.557	0.356	124.1	9.06	37.4
133625	19.71	8.48	0.557	0.356	124	9.05	72.3
Averages	**19.67**	**8.49**	**0.557**	**0.356**	**124.08**	**9.07**	**60.51**

Comments:

Msg: 7/19/00 Muddy at Baggs, Approx. 3-4 cfs, Hot and dry, no recent precip, no Muddy Creek flow only irrigation returns

Grab Sample Data

Stream: Muddy Creek @ Baggs

Site ID: 6mudbag0

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: 6/9/00 1530

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 6/6/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.6 X25.4= 599.44

Discharge Measurment: Visual- Approx. 2-3 cfs

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
152840	18.17	8.1	1.54	0.98	106.3	7.86	77.9
152845	18.16	8.1	1.54	0.98	106.4	7.87	68.1
152850	18.16	8.1	1.53	0.98	106.4	7.87	68.1
152855	18.17	8.1	1.54	0.98	106.2	7.85	72.7
152900	18.16	8.1	1.54	0.98	106.2	7.85	81.8
152905	18.16	8.1	1.54	0.98	106.2	7.85	75
152910	18.16	8.1	1.54	0.98	106.3	7.85	70.9
152915	18.17	8.1	1.54	0.98	106.2	7.85	70.1
152920	18.16	8.1	1.54	0.98	106.2	7.85	75.6
152925	18.16	8.1	1.54	0.98	106.3	7.86	70.8
152930	18.16	8.1	1.54	0.98	106.2	7.85	76.8
152935	18.16	8.1	1.54	0.98	106.2	7.85	71.9
152940	18.16	8.1	1.54	0.98	106.2	7.85	68.2
153029	18.16	8.1	1.54	0.98	106.2	7.85	64.6
153030	18.16	8.1	1.54	0.98	106.2	7.85	64.6
Averages	**18.16**	**8.10**	**1.539**	**0.980**	**106.25**	**7.85**	**71.81**

Comments:

Msg: 6/9/00 Approx. 2-3 cfs, No recent precip, Cloudy and cool, High Trb-ntu

Grab Sample Data

Stream: Muddy Creek @ Baggs

Site ID: 5mudbag0

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: 5/9/00 955

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 5/3/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.77 X25.4= 603.758

Discharge Measurment: Swoffer Model 3000 Flow Meter **17.03 cfs**

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
95430	9.11	8.56	0.98	0.627	97.4	8.88	192
95435	9.11	8.56	0.98	0.627	97.4	8.89	193
95440	9.1	8.56	0.98	0.627	97.4	8.88	197
95445	9.1	8.56	0.98	0.627	97.4	8.88	201
95450	9.11	8.56	0.98	0.627	97.4	8.88	197
95455	9.11	8.56	0.98	0.627	97.4	8.88	208
95500	9.11	8.56	0.98	0.627	97.5	8.89	196
95505	9.12	8.56	0.98	0.627	97.4	8.88	191
95510	9.12	8.56	0.98	0.627	97.5	8.89	183
95515	9.12	8.56	0.98	0.627	97.5	8.89	209
95520	9.11	8.56	0.981	0.627	97.5	8.89	207
95525	9.12	8.56	0.98	0.627	97.5	8.89	204
95530	9.12	8.56	0.98	0.627	97.4	8.88	190
95624	9.13	8.56	0.981	0.627	97.5	8.88	195
95625	9.13	8.56	0.981	0.627	97.4	8.88	189
Averages	**9.11**	**8.56**	**0.980**	**0.627**	**97.44**	**8.88**	**196.80**

Comments:

Msg: 5/9/00 Muddy at Baggs Site. Recent Rain 5/7&8/00 approx. 1/2 to 1 inch
Flow: Total cfs 17.013, Widht 17.5 ft.

Grab Sample Data

Stream: Muddy Creek @ Baggs

Site ID: 4mudbag0

Site Coordinates: T13N, R91W, Sec. 28, SE1/4 of NE1/4

Date & Time: 4/3/00 1645

Elevation: 6280

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 4/3/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.95 X25.4= 608.33

Discharge Measurment: Swoffer Model 3000 Flow Meter **20.506 cfs**

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
16:43:20	8.52	8.61	1.392	0.891	99.9	9.3	214
16:43:25	8.53	8.61	1.393	0.891	100	9.3	229
16:43:30	8.52	8.61	1.393	0.891	100.2	9.32	258
16:43:35	8.52	8.61	1.393	0.891	100.2	9.32	232
16:43:40	8.52	8.61	1.392	0.891	100.1	9.31	256
16:43:45	8.53	8.61	1.393	0.891	99.6	9.26	247
16:43:50	8.53	8.61	1.393	0.891	99.8	9.28	267
16:43:55	8.53	8.61	1.393	0.891	99.9	9.29	262
16:44:00	8.53	8.61	1.393	0.891	99.9	9.29	255
16:44:05	8.53	8.61	1.393	0.891	99.8	9.28	232
16:44:10	8.52	8.61	1.392	0.891	99.7	9.28	255
16:44:15	8.52	8.61	1.393	0.891	99.6	9.27	261
16:44:20	8.53	8.61	1.393	0.891	99.5	9.26	278
16:44:25	8.53	8.61	1.392	0.891	99.8	9.28	263
16:44:30	8.53	8.61	1.393	0.891	99.6	9.27	288
16:44:35	8.53	8.61	1.393	0.892	99.7	9.27	268
16:44:40	8.53	8.61	1.393	0.891	99.4	9.24	253
16:44:45	8.53	8.61	1.393	0.891	99.3	9.24	306
Averages	**8.53**	**8.61**	**1.393**	**0.891**	**99.78**	**9.28**	**256.89**

Comments:

Msg: 4/3/00 Muddy at Baggs, High trb-ntu, recent percip. Approx. one inch snow A.M. of 4/2

Flow: 20.506, Width 17.3 ft **SAR value = 2.782**

Muddy @ Loggs

Na^+ = 105 / 22.99 = 4.567
Ca^{2+} = 49 / 20.04 = 2.445
Mg^{2+} = 25 / 12.15 = 2.058

SAR = (4.567) / ((2.445 + 2.058)/2)$^{0.5}$ = 3.044
1.500 8/8/00

Na^+ = 150 / 22.99 = 6.525
Ca^{2+} = 110 / 20.04 = 5.490
Mg^{2+} = 67 / 12.15 = 5.514

SAR = (6.525) / ((5.490 + 5.514)/2)$^{0.5}$ = 2.782
2.346 4/3/00

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0404-23105

D/T REC: @ 4/4/00 1100 BY: KH

DATE COMPLETED: 4-24-2000

Date Collected		04/03/00
Time Collected		14:10
Discharge		
Temperature	degrees C	
pH	Units	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Muddy @ Baggs #10
Sampled By: LSRCD / Sheehan
Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KB 4/19/00	mg/L	110	Total Alkalinity as $CaCO_3$ KH 4/7/00	mg/L	250
Magnesium L	mg/L	67	Fluoride RWH 4.4.00	mg/L	0.4
Sodium KB 4-5-00	mg/L	150	Chloride	mg/L	26
Potassium L	mg/L	5.6	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ KH 4/21	mg/L	550	Nitrite as N	mg/L	<0.1
TDS (ROE 180) KB 4-7-00	mg/L	1100	Ortho Phosphate	mg/L	<0.1
TSS FS 4/5/00	mg/L	215	Total Phosphate KB 4-7-00	mg/L	0.14
pH KB 4-7-00	Units	8.4	Sulfate RWH 4.5.00	mg/L	570
Conductivity, Lab 4-11-00	umhos/cm	1500	Turbidity KB 4-5-00	NTU	236

SAR = 2.782

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts: KB 4-24-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Littlefield Creek

Grab Sample Data

Stream: **Littlefield Creek** *(macro)*

Site ID: AQMAC-02

Site Coordinates: Lat- 41° 26′ 36.59″ Long- 107° 27′ 03.47″

Date & Time: **9/24/02** @ 13:21

Elevation: 7200

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 23.13 25.4= 587.502

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .416 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
132020	13.35	8.47	0.481	0.308	109	8.79	10.3
132025	13.35	8.47	0.482	0.308	108.9	8.78	8.4
132030	13.35	8.47	0.481	0.308	108.9	8.78	7.6
132035	13.36	8.47	0.482	0.308	108.8	8.77	6.6
132040	13.36	8.47	0.481	0.308	108.8	8.77	9.7
132045	13.36	8.47	0.482	0.308	108.7	8.77	7.9
132050	13.37	8.47	0.482	0.308	108.7	8.76	9
132055	13.37	8.47	0.482	0.308	108.7	8.76	9.8
132100	13.38	8.47	0.482	0.308	108.6	8.75	3.9
132105	13.38	8.47	0.482	0.308	108.6	8.75	5.1
132110	13.38	8.47	0.481	0.308	108.6	8.75	10.5
132133	13.39	8.48	0.481	0.308	108.4	8.73	13.3
132135	13.39	8.47	0.481	0.308	108.4	8.73	8.8
132140	13.4	8.48	0.482	0.308	108.5	8.74	8.2
132145	13.4	8.48	0.481	0.308	108.4	8.74	9.4
132150	13.4	8.46	0.481	0.308	108.6	8.73	7.1
132155	13.4	8.47	0.482	0.308	108.4	8.73	9.6
132200	13.41	8.48	0.481	0.308	108.3	8.72	2.8
Averages	**13.38**	**8.47**	**0.482**	**0.308**	**108.63**	**8.75**	**8.22**
Lab	**n/a**	**8.5**	**0.49**	**0.328**	**n/a**	**n/a**	**6.45**
SAR=	**0.39**						

Notes:

Littlefield Creek (AQMAC-05) 9/24/02, Sunny and Warm, Recent precip., 9/19, Lab Sample @ 13:30, Air Temp= 20.01C, Wind Ave= 13 mph, Rel Hum= 15%, Flow= .416 cfs

LSRCD Discharge Measurement Notes

Stream: Littlefield Creek

Site ID: AQMAC-02 macro

Site Coordinates: 41° 26' 36.59" ; 107° 27' 03.47"

Date & Time: 9/24/02 @ 12:30

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

.416 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			Measured by: LSRCD/S Sheehan Checked by: Gwen C. Juenger
0.5	.200	.445	.045	
1.0	.200	1.246	.125	
1.5	.200	1.620	.162	
2.0	.200	.669	.067	
2.5	.175	.190	.017	
3.0	WE/LB			
		Total	.416 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0925-40307
D/T REC: 09-25-02 10:00 BY: CA
DATE COMPLETED: 10/1/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/24/02	Conductivity	.482
Time Collected	1330	Dissolved O_2	108.42, 8.74 mg
Discharge	<1 cfs	Turbidity	~8.0
Temperature	13.38°	pH	8.47

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 9L field 2m
Sampled By: LSRCD/ Sheehan
Comments: macro

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/26/02	mg/L	66	Carbonate LSH 9/27	mg/L	9
Magnesium	mg/L	12	Bicarbonate	mg/L	160
Sodium	mg/L	13	Fluoride RWH 9/25/02	mg/L	0.2
Potassium	mg/L	3.7	Chloride	mg/L	2.8
TDS (ROE 180) HM 9/26/02	mg/L	328	Nitrate as N	mg/L	<0.1
TSS HM 9/26/02	mg/L	15	Nitrite as N	mg/L	<0.1
pH LSH 9/27	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/25	umhos/cm	490	Sulfate	mg/L	100
Turbidity 9/25	NTU	6.45	Total Phosphate LSH 9/26	mg/L	0.05
			Total Alkalinity as $CaCO_3$ 9/27	mg/L	140
			Hardness as $CaCO_3$ RWH 9/27	mg/L	210

S	R	Bottle
[ ]	[✓]	1L Plain
[ ]	[✓]	250ml Plain
[ ]	[✓]	250ml HNO_3
[ ]	[✓]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan
Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	23-Sep-2002		Lab No:	40307	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	66	3.29	Carbonate	9	0.30
Magnesium	12	0.99	Bicarbonate	160	2.62
Sodium	13	0.57	Chloride	2.8	0.08
Potassium	3.7	0.09	Fluoride	0.2	0.01
T. CATIONS		**4.94**	Nitrate as N	0	0.00
ROE 180	mg/L	328	Nitrite as N	0	0.00
TSS	mg/L	15	Ortho phosphate	0	0.00
Turbidity	NTU	6.45	Sulfate	100	2.08
			T. ANIONS		**5.09**

Conductance, umhos/cm	490	S A R (sodium Hazard)	0.39
TDS by Summation, mg/L	285	T Alk CaCO3, mg/L	146
pH, Units	8.5	Hardness as CaCO3, mg/L	214
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	13

Analyte	Units	Result
Total Phosphate	mg/L	
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.87
Meq Cations/Sp cond/100	1.01
Meq Anions/Sp cond/100	1.04
ROE/TDS Summation	1.15

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 1.53% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.68 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.02 (0.8 TO 1.2)

OVERALL =	0.0087	MAX. OVERALL ALLOWED =	0.0531

LDH

Grab Sample Data

Stream: **Littlefield Creek**

Site ID: AQMAC-02

Site Coordinates: Lat- 41° 26′ 36.59″ Long- 107° 27′ 03.47″

Date & Time: **9/24/01** 11:04

Elevation: 7200

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/17/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.35 X 25.4= 593.09

Discharge Measurement: Visual- Flow approx 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
110335	7.97	8.43	0.477	0.305	124.8	11.51	12.6
110340	7.98	8.43	0.48	0.307	124.8	11.51	6
110345	7.97	8.43	0.476	0.305	124.7	11.51	4
110350	7.98	8.43	0.477	0.305	124.6	11.5	4.5
110355	7.99	8.43	0.478	0.305	124.7	11.5	7.9
110400	7.99	8.43	0.478	0.305	124.5	11.48	2.6
110405	7.98	8.43	0.48	0.307	124.5	11.49	9.4
110410	7.99	8.43	0.476	0.304	124.6	11.49	7.4
110415	7.99	8.43	0.48	0.307	124.6	11.49	4
110420	8	8.43	0.478	0.306	124.6	11.49	0.7
110447	8	8.43	0.481	0.308	124.6	11.49	0
110450	8	8.43	0.479	0.307	124.8	11.5	10.1
Averages	**7.99**	**8.43**	**0.478**	**0.306**	**124.65**	**11.50**	**5.77**
Lab	**n/a**	**8.30**	**0.490**	**340mg/L**	**n/a**	**n/a**	**3.37**
SAR=	**0.334**						

Comment

Sunny and warm, Air Temp= 23.3C; Wind Ave= 4.2 mph; Rel Hum= 13%; Sampleed riffle may contributed to high DO %sat reading, Lab analysis attached.

Littlefield Creek

AQMAC-02

Na^{+} = 12/22.99 = .522

Ca^{2+} = 78/20.04 = 3.892

Mg^{2+} = 12/12.15 = .988

$SAR = \left(.522 / ((3.892 + .988)/2)\right)^{0.5}$

2.44 √ = 1.562

1/x = .6401

x .522 =

SAR .334

WYOMING DEPARTMENT OF AGRICULTURE
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0925-34138

D/T REC: 09-25-01 11:00 BY: CA

DATE COMPLETED: 10.10.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/24/01	Conductivity	.477
Time Collected	11:10	Dissolved O_2	129.58, 11.49 mg/L
Discharge	<1 CFS	Turbidity	
Temperature	7.98°C	pH	8.43

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: L Field-M
Sampled By: LSRCD/Sheehan
Comments: [illegible]

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 10/3	mg/L	78	Carbonate SRH 9/28	mg/L	2
Magnesium	mg/L	12	Bicarbonate	mg/L	180
Sodium	mg/L	12	Fluoride 9/25	mg/L	0.2
Potassium	mg/L	3.7	Chloride	mg/L	3.2
TDS (ROE 180) 9/27/01 Jm	mg/L	349	Nitrate as N	mg/L	<0.1
TSS 9/26/01 Jm	mg/L	<1 mg/L	Nitrite as N	mg/L	<0.1
pH SRH 9/28	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/25/01 Jm	umhos/cm	490	Sulfate	mg/L	98
Turbidity 9/25/01 Jm	NTU	3.37	Total Phosphate 10/9	mg/L	0.02
			Total Alkalinity as $CaCO_3$ 9/28	mg/L	150
			Hardness as $CaCO_3$	mg/L	240

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ] CA	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Littlefield Creek

Site ID: Aqmac-02

Site Coordinates: T17N, R89W, Sec. 17, NW1/4 of SW1/4

Date & Time: 9/27/00 11:50

Elevation: 7200

Multiprobe Model & Serial #: Hydrolab H20 #30691

Calibration/ Sensors Details: 9/26/00 Maintained and Calibrated

DO Calibration: Bar Pressure Reading 23.35 X25.4= 593.09

Discharge Measurment: Swoffer Model 3000 **Flow 1.058 cfs**

Gage Reading: N/A

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
114955	7.45	8.42	0.471	0.301	105.6	9.87	23.8
115000	7.45	8.42	0.471	0.301	105.5	9.86	28.6
115005	7.46	8.42	0.47	0.301	105.5	9.86	29.5
115010	7.46	8.42	0.471	0.301	105.5	9.86	25.8
115015	7.46	8.42	0.471	0.301	105.6	9.86	26
115020	7.46	8.42	0.471	0.301	105.5	9.86	28.5
115025	7.47	8.42	0.471	0.301	105.5	9.86	24.9
115030	7.47	8.42	0.471	0.301	105.5	9.86	25.4
115035	7.48	8.42	0.471	0.301	105.4	9.85	24.7
115040	7.48	8.42	0.471	0.301	105.5	9.85	25.4
115045	7.49	8.42	0.471	0.301	105.5	9.85	26.4
115050	7.49	8.42	0.471	0.301	105.5	9.85	27.5
115055	7.49	8.42	0.471	0.301	105.5	9.85	26.4
115100	7.49	8.42	0.471	0.301	105.5	9.85	25.3
115105	7.5	8.42	0.471	0.301	105.4	9.84	27.2
115110	7.5	8.42	0.471	0.301	105.4	9.84	27.1
115115	7.54	8.42	0.471	0.301	105.3	9.82	23.1
115120	7.54	8.42	0.471	0.301	105.3	9.82	26.8
Averages	**7.48**	**8.42**	**0.471**	**0.301**	**105.47**	**9.85**	**26.24**

Comments:

Recent snow 9/22, 23, 24, Sunny & warm approx. 65- 70F,
Flow 1.058 **SAR value = .323**

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0928 - 27074

D/T REC: 09/28/00 1100 BY: [illegible]

DATE COMPLETED: 10-12-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/27/00	Conductivity	1470
Time Collected	11:55	Dissolved O_2	105.8%, 9.84 mg/L
Discharge	≈1.2 CFS	Turbidity	≈ 25.0 NTU
Temperature	7.45 °C	pH	8.42

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMAC-02
Sampled By: LSRCD/Sheehan
Comments: Littlefield Crk.

UPS Address: 285 N Peniand
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KB 9/28	mg/L	68	Carbonate KB 9/29	mg/L	3
Magnesium 9/29	mg/L	12	Bicarbonate	mg/L	170
Sodium 10/3	mg/L	11	Fluoride KB 9/28	mg/L	0.2
Potassium	mg/L	3.4	Chloride	mg/L	3.8
TDS (ROE 180) KB 10/2	mg/L	340	Nitrate as N	mg/L	<0.1
TSS KB 10/2	mg/L	8.5	Nitrite as N	mg/L	<0.1
pH KB 9/29	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab KB 10/2	umhos/cm	490	Sulfate	mg/L	103
Turbidity KB 9/28	NTU	14.0	Total Phosphate KB 10/6	mg/L	0.07
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	150
			Hardness as $CaCO_3$ 10/2	mg/L	220

S	R	Bottle
[ ]	[X]	1L Plain
[ ]	[X]	250ml Plain
[ ]	[X]	250ml HNO_3
[ ]	[X]	250ml H_2SO_4

Select. File: LSRCD01

Analysts: KB 10-12-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Littlefield Creek**

Site ID: Aqmac-02

Site Coordinates: T17N, R89W, Sec. 17, NW1/4 of SW1/4

Date & Time: **10/4/99** 12:45

Elevation: 7200

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed

DO Calibration: Bar Pressure Reading 23.35 X 25.4= 593.09

Discharge Measurment: Swoffer Flow Meter model 2100-14 **flow 1.882 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
124425	6.85	8.45	0.509	0.326	119	11.29	41.4
124430	6.86	8.45	0.517	0.331	119	11.28	39.8
124435	6.86	8.45	0.508	0.325	119	11.28	44.5
124440	6.86	8.45	0.518	0.331	119	11.28	41.2
124445	6.86	8.45	0.51	0.326	119	11.28	40.2
124450	6.86	8.45	0.517	0.331	118.9	11.27	41.8
124455	6.86	8.45	0.512	0.328	119	11.28	43.7
124500	6.87	8.45	0.517	0.331	118.9	11.27	41
124505	6.87	8.46	0.517	0.331	118.9	11.27	43.9
124510	6.88	8.46	0.509	0.326	119	11.28	42.6
124515	6.88	8.45	0.511	0.327	119	11.27	35.3
124520	6.89	8.46	0.51	0.326	119.4	11.31	38.7
124525	6.88	8.46	0.515	0.329	119.2	11.29	42.3
124530	6.88	8.46	0.521	0.333	119	11.28	41.3
124535	6.89	8.46	0.519	0.332	118.9	11.26	37.2
124540	6.89	8.46	0.517	0.331	118.9	11.26	41.1
124545	6.89	8.46	0.519	0.332	118.9	11.26	40.8
124624	6.91	8.46	0.517	0.331	118.7	11.24	37.9
124625	6.91	8.46	0.519	0.332	118.7	11.24	40.9
124630	6.92	8.46	0.517	0.331	118.9	11.25	37.5
124635	6.93	8.46	0.509	0.326	118.8	11.25	39.3
Averages	**6.88**	**8.46**	**0.515**	**0.329**	**118.96**	**11.27**	**40.59**

Comments:

Msg. Sunny and warm, less than 1 cfs visual

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 1005 - 20784

D/T REC: 10/5/99 1430 BY: JLW

DATE COMPLETED: 12-17-1999

Date Collected		10/4/99
Time Collected		1250
Discharge		~~21~~ cfs
Temperature	degrees C	6.87
pH	Units	8.46

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AGMAC-02, Little Field CMK
Sampled By: Sheehan / LSRCD
Comments: Sample #21

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGA 10-11-99	mg/L	81	Total Alkalinity as $CaCO_3$ 10/12	mg/L	170
Magnesium 10-8-99	mg/L	14	Fluoride Ewt 10.5.99	mg/L	0.7
Sodium 10-13	mg/L	18	Chloride	mg/L	4.2
Potassium 10-14	mg/L	4.0	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/12	mg/L	260	Nitrite as N	mg/L	<0.1
TDS (ROE 180) SG3 10-11-99	mg/L	370	Ortho Phosphate	mg/L	<0.1
TSS RS KWd 99	mg/L	12	Total Phosphate SG3 4/26/99	mg/L	0.26
pH SG2 10/12/99	Units	8.4	Sulfate Ewt 10.5.99	mg/L	130
Conductivity, Lab 10/12/99	umhos/cm	550	Turbidity Ewt 10.5.99	NYU	21

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

SGA 12/16/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Muddy Creek at Lake Draw

Grab Sample Data

Stream: **Muddy Creek (Lake Draw Site)** *(macro)*

Site ID: AQMAC-03

Site Coordinates: Lat- 41° 23´ 11.80˝ Long- 107° 24´ 09.68˝

Date & Time: **9/25/02** @ 13:10

Elevation: 7480

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 22.75 25.4= 577.85

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.212 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130925	7.81	8.1	0.464	0.297	104.9	9.46	6.4
130930	7.81	8.1	0.464	0.297	104.8	9.46	6.5
130935	7.81	8.1	0.464	0.297	104.7	9.45	7.3
130940	7.81	8.1	0.464	0.297	104.6	9.44	8.6
130945	7.82	8.1	0.464	0.297	104.6	9.44	10.8
130950	7.82	8.1	0.464	0.297	104.6	9.44	7.6
130955	7.82	8.1	0.464	0.297	104.7	9.45	10.9
131000	7.83	8.1	0.464	0.297	104.8	9.45	6.4
131005	7.83	8.1	0.464	0.297	104.7	9.45	8.8
131010	7.83	8.1	0.464	0.297	104.8	9.46	9.1
131015	7.83	8.1	0.464	0.297	104.7	9.45	7.8
131020	7.83	8.1	0.464	0.297	104.7	9.44	6.8
131025	7.84	8.1	0.464	0.297	104.7	9.44	6.9
131054	7.85	8.11	0.465	0.297	104.3	9.41	8.3
131055	7.85	8.11	0.465	0.297	104.4	9.41	6.2
131100	7.85	8.1	0.464	0.297	104.2	9.4	7.2
131105	7.86	8.11	0.464	0.297	104.2	9.39	9.5
Averages	**7.83**	**8.10**	**0.464**	**0.297**	**104.61**	**9.44**	**7.95**
Lab	**n/a**	**8.3**	**0.470**	**0.320**	**n/a**	**n/a**	**6.85**
SAR=	**0.16**						

Notes:

Muddy Creek (Lake Draw) 9/25/02, Partly Cloudy and Cool, Recent precip. 9/19, Lab Sample @ 13:00, Air Temp= 19.6C, Wind Ave= 2.7 mph, Rel Hum= 24%, Flow= 1.212 cfs

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Lake Draw)

Site ID: AQMAC-03 MACD

Site Coordinates: 41° 23' 11.80"; 107° 24' 09.68"

Date & Time: 9/25/02 @ 14:05

Meter Model & Serial #: Swoffer Flow Meter-Model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

1.212 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/S Sheeta Checked by: Gwen C. Fuenzer
0.5	.310	.141	.022	
1.0	.300	.452	.068	
1.5	.350	1.287	.225	
2.0	.400	1.467	.293	
2.5	.375	1.396	.262	
3.0	.300	.341	.342	
3.5	WE/RB			
		Total	1.212 cfs	

Grab Sample Data

Stream: **Muddy Creek (Lake Draw Site)** *(macro)*

Site ID: AQMAC-03

Site Coordinates: Lat- 41° 23' 11.80" Long- 107° 24' 09.68"

Date & Time: **9/25/02** @ 13:10

Elevation: 7480

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 22.75 25.4= 577.85

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.212 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130925	7.81	8.1	0.464	0.297	104.9	9.46	6.4
130930	7.81	8.1	0.464	0.297	104.8	9.46	6.5
130935	7.81	8.1	0.464	0.297	104.7	9.45	7.3
130940	7.81	8.1	0.464	0.297	104.6	9.44	8.6
130945	7.82	8.1	0.464	0.297	104.6	9.44	10.8
130950	7.82	8.1	0.464	0.297	104.6	9.44	7.6
130955	7.82	8.1	0.464	0.297	104.7	9.45	10.9
131000	7.83	8.1	0.464	0.297	104.8	9.45	6.4
131005	7.83	8.1	0.464	0.297	104.7	9.45	8.8
131010	7.83	8.1	0.464	0.297	104.8	9.46	9.1
131015	7.83	8.1	0.464	0.297	104.7	9.45	7.8
131020	7.83	8.1	0.464	0.297	104.7	9.44	6.8
131025	7.84	8.1	0.464	0.297	104.7	9.44	6.9
131054	7.85	8.11	0.465	0.297	104.3	9.41	8.3
131055	7.85	8.11	0.465	0.297	104.4	9.41	6.2
131100	7.85	8.1	0.464	0.297	104.2	9.4	7.2
131105	7.86	8.11	0.464	0.297	104.2	9.39	9.5
Averages	**7.83**	**8.10**	**0.464**	**0.297**	**104.61**	**9.44**	**7.95**
Lab	**n/a**	**8.3**	**0.470**	**0.320**	**n/a**	**n/a**	**6.85**
SAR=	**0.16**						

Notes:

Muddy Creek (Lake Draw) 9/25/02, Partly Cloudy and Cool, Recent precip. 9/19, Lab Sample @ 13:00, Air Temp= 19.6C, Wind Ave= 2.7 mph, Rel Hum= 24%, Flow= 1.212 cfs

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Lake Draw)

Site ID: AQMAC-03 MACIS

Site Coordinates: 41° 23' 11.80"; 107° 24' 09.68"

Date & Time: 9/25/02 @ 14:05

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

1.212 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/J Sheeda Checked by: Gwen C. Juengen
0.5	.310	.141	.022	
1.0	.300	.452	.068	
1.5	.350	1.287	.225	
2.0	.400	1.467	.293	
2.5	.375	1.396	.262	
3.0	.300	.341	.342	
3.5	WE/RB			
		Total	1.212 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0926-40320
D/T REC: 09-26-02 10:30 BY: CA
DATE COMPLETED: 10/1/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/25/02	Conductivity	
Time Collected	1300	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 9 Lake 2M
Sampled By: LSRCD/Sheehan
Comments: Macro AQMAC-
Invoice #: VOSR
Amount: $45.00

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/26	mg/L	83	Carbonate LRH 9/27	mg/L	2
Magnesium	mg/L	5.4	Bicarbonate	mg/L	200
Sodium	mg/L	5.7	Fluoride RWH 9/26/02	mg/L	0.2
Potassium	mg/L	3.8	Chloride	mg/L	2.5
TDS (ROE 180) Jm 9/27/02	mg/L	320	Nitrate as N	mg/L	<0.1
TSS Jm 9/27/02	mg/L	14.8	Nitrite as N	mg/L	<0.1
pH LRH 9/27	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/26	umhos/cm	470	Sulfate	mg/L	73
Turbidity	NTU	6.85	Total Phosphate LRH 9/26	mg/L	0.20
			Total Alkalinity as $CaCO_3$ 9/27	mg/L	170
			Hardness as $CaCO_3$ RWH 9/27	mg/L	230

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

CA

Elect. File: LSRCD01 Analysis:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan
Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 23-Sep-2002 **Lab No:** 40320

CATIONS	mg/L	meq/L
Calcium	83	4.14
Magnesium	5.4	0.44
Sodium	5.7	0.25
Potassium	3.8	0.10
T. CATIONS		**4.93**
ROE 180	mg/L	320
TSS	mg/L	14.8
Turbidity	NTU	6.85

ANIONS	mg/L	meq/L
Carbonate	2	0.07
Bicarbonate	200	3.28
Chloride	2.5	0.07
Fluoride	0.2	0.01
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	73	1.52
T. ANIONS		**4.95**

Conductance, umhos/cm	470
TDS by Summation, mg/L	274
pH, Units	8.3
Total Coliform per 100 ml	

S A R (sodium Hazard)	0.16
T Alk CaCO3, mg/L	167
Hardness as CaCO3, mg/L	230
Hardness as CaCO3, gr/gal	13

Analyte	Units	Result
Total Phosphate	mg/L	
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.68
Meq Cations/Sp cond/100	1.05
Meq Anions/Sp cond/100	1.05
ROE/TDS Summation	1.17

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 0.14% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.68 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.05 (0.8 TO 1.2)

OVERALL =	0.0008	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Muddy Creek (Lake Draw Site)**

Site ID: AQMAC-03

Site Coordinates: Lat- 41° 23′ 11.80″ Long- 107° 24′ 09.68″

Date & Time: **9/26/01** 13:21

Elevation: 7480

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/17/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.93 X 25.4= 582.422

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .849 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
132020	11.54	8.28	0.461	0.295	126.3	10.52	4.9
132025	11.54	8.28	0.464	0.297	126.3	10.52	8.8
132030	11.54	8.28	0.467	0.299	126.1	10.51	6.7
132035	11.54	8.28	0.459	0.294	126.6	10.55	2.9
132040	11.54	8.28	0.459	0.293	126.6	10.54	6.6
132045	11.54	8.28	0.466	0.298	126.5	10.54	5.8
132050	11.55	8.28	0.465	0.297	126.5	10.54	5.3
132055	11.55	8.28	0.461	0.295	126	10.49	5.2
132100	11.55	8.28	0.466	0.298	126.2	10.5	5.9
132105	11.55	8.28	0.466	0.298	125.7	10.47	2.8
132110	11.55	8.28	0.468	0.299	126	10.5	4.1
132115	11.55	8.28	0.461	0.295	125.9	10.48	2.8
132120	11.55	8.28	0.46	0.294	126.4	10.53	3.2
132125	11.55	8.28	0.461	0.295	126.2	10.5	6.5
132130	11.55	8.28	0.457	0.292	126	10.49	9.7
Averages	**11.55**	**8.28**	**0.463**	**0.296**	**126.22**	**10.51**	**5.41**
Lab	**n/a**	**8.30**	**0.480**	**328mg/L**	**n/a**	**n/a**	**8.71**
SAR=	**0.163**						

Comment

Sunny, warm and dry, Recent precip rain 9/17/01, Air Temp= 25.8C; Wind Ave= 5.1 mph; Rel Hum= 13%; Lab analysis attached.

Muddy Creek (Lake Drain)

AQMAC-03

Na^{+} = $5.7/22.99$ = .248

Ca^{2+} = $83/20.04$ = 4.142

Mg^{2+} = $56/12.15$ = .461

$$SAR = \left(.248 / \left((4.142 + .461)/2 \right) \right)^{0.5}$$

$2.302\sqrt{\ }$ = 1.5170

$1/x$ = .6591

$\times$ .248 =

SAR = .163

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0927-371199

DT REC: 09-27-01 10:20 BY: CA

DATE COMPLETED: 10.23.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/26/01	Conductivity	.465
Time Collected	13:30	Dissolved O_2	125.3% 10.73 mg/L
Discharge		Turbidity	
Temperature	11.55°C	pH	8.28

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Lake-M
Sampled By: LSRCD/Sheehan
Comments: micro-52.7°C

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VQSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 10/3	mg/L	83	Carbonate 9/28	mg/L	0
Magnesium	mg/L	5.6	Bicarbonate	mg/L	210
Sodium	mg/L	5.7	Fluoride 10.17.01	mg/L	0.2
Potassium	mg/L	4.2	Chloride	mg/L	3.0
TDS (ROE 180) 9/28/01	mg/L	328	Nitrate as N	mg/L	<0.1
TSS 9/28/01	mg/L	13.6	Nitrite as N	mg/L	<0.1
pH 9/28	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 10/4/01	umhos/cm	480	Sulfate	mg/L	78
Turbidity 10/4/01	NTU	8.71	Total Phosphate 10/9	mg/L	0.07
			Total Alkalinity as $CaCO_3$ 9/28	mg/L	170
			Hardness as $CaCO_3$	mg/L	230

* Time of analysis exceeded maximum holding time.

S	R	Bottle
M	1	1L Plain
M	1	250ml Plain
M	1	250ml HNO_3
M	1	250ml H_2SO_4

Elect File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek/ Lake Draw**

Site ID: Aqmac-03

Site Coordinates: T16N, R89W, Sec. 3, SE1/4 of SW1/4

Date & Time: **9/27/00** 13:06

Elevation: 7480

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 9/26/00

DO Calibration: Bar Pressure Reading 23.0 X 25.4= 584.20

Discharge Measurment: Swoffer Flow Meter model 3000 **flow= 1.269 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130510	10.01	8.17	0.52	0.333	104.4	9.03	13.1
130515	10.02	8.16	0.52	0.333	104.5	9.04	15.6
130520	10.02	8.17	0.52	0.333	104.4	9.03	6.7
130525	10.02	8.17	0.52	0.332	104.5	9.04	13.8
130530	10.02	8.16	0.52	0.333	104.5	9.04	13.6
130535	10.02	8.17	0.52	0.333	104.4	9.03	31.3
130540	10.02	8.17	0.52	0.333	104.4	9.03	0
130545	10.03	8.17	0.52	0.332	104.5	9.04	32.1
130550	10.02	8.17	0.52	0.333	104.4	9.04	7
130555	10.03	8.17	0.52	0.333	104.3	9.02	22.7
130600	10.03	8.17	0.52	0.332	104.3	9.02	7.6
130605	10.03	8.17	0.52	0.332	104.3	9.02	14.1
130610	10.03	8.17	0.52	0.332	104.4	9.03	8.6
130615	10.04	8.17	0.52	0.333	104.2	9.01	30.9
130620	10.04	8.17	0.52	0.333	104.3	9.02	21.1
130625	10.05	8.17	0.52	0.332	104.3	9.02	30.9
Averages	**10.03**	**8.17**	**0.520**	**0.333**	**104.38**	**9.03**	**16.82**

Comments:

Msg: Aqmac-03, 9/27/00 Sunny and warm, Recent snow/rain 9/22, 23, 24, Approx. 65-70F, Reach visually good condition.

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0928-27075

D/T REC: 9/28/00 1100 BY: LW

DATE COMPLETED: 10-12-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/27/00	Conductivity	
Time Collected	1:00	Dissolved O_2	
Discharge	0.1-2 cfs	Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMAC-03

Sampled By: LSRCD/Sheehan

Comments: Lake Draw - muddy crk

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KB 9/28	mg/L	96	Carbonate KB 9/29	mg/L	~~0~~
Magnesium 9/29	mg/L	7.5	Bicarbonate	mg/L	210
Sodium 10/3	mg/L	4	Fluoride KB 9/28	mg/L	0.2
Potassium	mg/L	4.1	Chloride	mg/L	3.8
TDS (ROE 180) ID 10/2	mg/L	440	Nitrate as N	mg/L	<0.1
TSS ID 10/2	mg/L	16	Nitrite as N	mg/L	<0.1
pH KB 9/29	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab KB 10/2	umhos/cm	570	Sulfate 2X	mg/L	120
Turbidity KB 9/28	NTU	9.9	Total Phosphate KB 10/6	mg/L	0.35
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	170
			Hardness as $CaCO_3$ 10/2	mg/L	270

S	R	Bottle
[ ]	[✓]	1L Plain
[ ]	[✓]	250ml Plain
[ ]	[✓]	250ml HNO_3
[ ]	[✓]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KB 10-13-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek/ Lake Draw**

Site ID: Aqmac-03

Site Coordinates: T16N, R89W, Sec. 3, SE1/4 of SW1/4

Date & Time: **10/4/99** 13:50

Elevation: 7480

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 10/3/99

DO Calibration: Bar Pressure Reading 23.0 X 25.4= 584.20

Discharge Measurment: Swoffer Flow Meter model 2100-14 **flow= 1.429 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
135237	8.07	8.29	0.473	0.302	98.4	8.93	11.2
135240	8.07	8.29	0.473	0.302	98.4	8.93	21.2
135245	8.07	8.29	0.473	0.302	98.5	8.93	11.2
135250	8.08	8.29	0.473	0.302	98.4	8.92	10
135255	8.08	8.29	0.473	0.302	98.4	8.93	11.6
135300	8.07	8.29	0.473	0.302	98.4	8.93	14
135305	8.08	8.29	0.473	0.302	98.5	8.93	0.2
135310	8.09	8.3	0.473	0.302	98.4	8.92	8.9
135315	8.08	8.29	0.473	0.302	98.4	8.92	0
135320	8.08	8.29	0.473	0.302	98.4	8.92	0.8
135325	8.09	8.29	0.473	0.302	98.4	8.92	5.7
135330	8.09	8.29	0.473	0.302	98.4	8.92	11.8
135352	8.09	8.3	0.473	0.302	98.4	8.92	9.9
135355	8.09	8.26	0.473	0.302	98.7	8.95	20.7
135400	8.09	8.29	0.473	0.302	98.4	8.91	12.3
135405	8.1	8.29	0.473	0.302	98.3	8.91	20.9
Averages	**8.08**	**8.29**	**0.473**	**0.302**	**98.43**	**8.92**	**10.65**

Comments:

Msg. Upper Muddy Creek Site, Aqmac-03, 10/4/99 Sunny and Warm
Total cfs 1.429

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 1005 - 20781

D/T REC: 10/5/99 1420 BY: JLW

DATE COMPLETED: 12-17-1999

Date Collected		10/4/99
Time Collected		1255
Discharge		< 1 cfs
Temperature	degrees C	8.07
pH	Units	8.29

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: GQMAC-03, Upper Muddy
Sampled By: Sheehan / LSRCD
Comments: Sample #23

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #:
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 10-4-99	mg/L	91	Total Alkalinity as $CaCO_3$ 10/5	mg/L	180
Magnesium 10-8-99	mg/L	6.2	Fluoride RWH 10.5.99	mg/L	< 0.1
Sodium 10-13	mg/L	9.4	Chloride	mg/L	3.3
Potassium 10-14	mg/L	4.3	Nitrate as N	mg/L	< 0.1
Hardness as $CaCO_3$ 10/12	mg/L	250	Nitrite as N	mg/L	< 0.1
TDS (ROE 180) 10-11-99	mg/L	350	Ortho Phosphate	mg/L	< 0.1
TSS RS 10/6/99	mg/L	10	Total Phosphate 10/24/99	mg/L	0.18
pH 11/8/99	Units	8.3	Sulfate RWH 10.5.99	mg/L	93
Conductivity, Lab 11/8/99	umhos/cm	560	Turbidity RWH 10.5.99	NTU	4.3

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

11/17/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Muddy Creek at Grizzly

Grab Sample Data

Stream: **Muddy Creek (Grizzly Site)** *(macro)*

Site ID: AQMAC-11

Site Coordinates: Lat- 41° 25' 10.31" Long- 107° 26' 22.13"

Date & Time: **9/25/02** @ 11:57

Elevation: 7280

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 22.92 25.4= 582.168

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .819 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115630	9.93	8.48	0.446	0.285	107.4	9.28	3.6
115635	9.92	8.48	0.446	0.285	107.4	9.28	4.1
115640	9.93	8.48	0.446	0.285	107.3	9.28	3.3
115645	9.92	8.48	0.446	0.285	107.3	9.28	3.2
115650	9.93	8.48	0.446	0.285	107.3	9.27	3.9
115655	9.93	8.48	0.446	0.285	107.3	9.27	3.6
115700	9.93	8.48	0.446	0.285	107.2	9.27	3.3
115705	9.93	8.48	0.446	0.285	107.3	9.27	3.6
115710	9.93	8.48	0.446	0.285	107.2	9.26	3.7
115715	9.93	8.48	0.446	0.285	107.1	9.25	4.8
115720	9.93	8.48	0.446	0.285	107.1	9.25	3.3
115725	9.93	8.48	0.446	0.285	107.1	9.25	4.2
115730	9.93	8.48	0.446	0.285	107	9.25	4.4
115735	9.93	8.48	0.446	0.285	107	9.25	3.4
115740	9.93	8.48	0.446	0.285	107	9.24	3.7
115820	9.93	8.48	0.446	0.285	106.8	9.23	3.7
115825	9.94	8.48	0.446	0.286	106.9	9.24	3.9
115830	9.94	8.48	0.446	0.285	106.7	9.22	3.2
Averages	**9.93**	**8.48**	**0.45**	**0.29**	**107.13**	**9.26**	**3.72**
Lab	**n/a**	**8.6**	**0.45**	**0.344**	**n/a**	**n/a**	**2.93**
SAR=	**0.17**						

Notes:

Muddy Creek (Grizzly Site) AQMAC-11 9/25/02, Partly Cloudy and Cool
Lab Sample @ 1220, Air Temp= 19.3C, Wind Ave= 1.3 mph, Rel Hum= 25%
Flow= .819 cfs, Recent precip.- 9/19.

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Grizzly)

Site ID: AQMAC-11 macro

Site Coordinates: 41° 25' 10.31"; 107° 26' 22.13"

Date & Time: 9/25/02 @ 10:40

Meter Model & Serial #: Swoffer Flow Meter-model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

.819 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/S Steeken Checked by: Dwen C. Juenger
0.5	.300	.459	.069	
1.0	.375	1.388	.260	
1.5	.325	1.287	.209	
2.0	.325	.912	.148	
2.5	.350	.453	.079	
3.0	.325	.262	.043	
3.5	.210	.104	.011	
4.0	WE/RB			
		Total	.819 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0926-40319

D/T REC: 09-26-02 10:30 BY: CA

DATE COMPLETED: 10/1/01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/25/02	Conductivity	.446
Time Collected	1220	Dissolved O_2	102.1%, 9.25mg/l
Discharge	.819 cfs	Turbidity	~3.5 n.t.u.
Temperature	9.93 °C	pH	8.48

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 9 Gris 2 M

Sampled By: LSRCD/Sheehan

Comments: Macro AQMAC-II Gris34

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium EWA 9/26	mg/L	79	Carbonate SBH 9/27	mg/L	14
Magnesium	mg/L	5.8	Bicarbonate	mg/L	160
Sodium	mg/L	5.9	Fluoride	mg/L	0.3
Potassium	mg/L	3.8	Chloride	mg/L	2.7
TDS (ROE 180) BMA 9/27/02	mg/L	344	Nitrate as N	mg/L	<0.1
TSS BMA 9/26/02	mg/L	2.8	Nitrite as N	mg/L	<0.1
pH SBH 9/27	Units	8.6	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/26	umhos/cm	450	Sulfate	mg/L	78
Turbidity	NTU	2.93	Total Phosphate SBH 9/26	mg/L	0.15
			Total Alkalinity as $CaCO_3$ 9/27	mg/L	160
			Hardness as $CaCO_3$ EWA 9/27	mg/L	220

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 23-Sep-2002 **Lab No:** 40319

CATIONS	mg/L	meq/L	ANIONS	mg/L	meq/L
Calcium	79	3.94	Carbonate	14	0.47
Magnesium	5.8	0.48	Bicarbonate	160	2.62
Sodium	5.9	0.26	Chloride	2.7	0.08
Potassium	3.8	0.10	Fluoride	0.3	0.02
T. CATIONS		**4.77**	Nitrate as N	0	0.00
ROE 180	mg/L	344	Nitrite as N	0	0.00
TSS	mg/L	2.8	Ortho phosphate	0	0.00
Turbidity	NTU	2.93	Sulfate	78	1.62
			T. ANIONS		**4.80**

Conductance, umhos/cm	450	S A R (sodium Hazard)	0.17
TDS by Summation, mg/L	268	T Alk CaCO3, mg/L	155
pH, Units	8.6	Hardness as CaCO3, mg/L	221
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	13

Analyte	Units	Result
Total Phosphate	mg/L	
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.76
Meq Cations/Sp cond/100	1.06
Meq Anions/Sp cond/100	1.07
ROE/TDS Summation	1.28

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 0.33% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.60 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.06 (0.8 TO 1.2)

OVERALL =	0.0019	MAX. OVERALL ALLOWED =	0.0531

RDH

Grab Sample Data

Stream: **Muddy Creek (Grizzly Site)**

Site ID: AQMAC-11

Site Coordinates: Lat- 41° 25′ 10.31″ Long- 107° 26′ 22.13″

Date & Time: **9/24/01** 12:08

Elevation: 7280

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/17/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.26 X 25.4= 590.804

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .820 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
120745	9.85	8.68	0.488	0.312	140.4	12.32	2.6
120750	9.86	8.68	0.488	0.312	141	12.39	2.5
120755	9.86	8.68	0.489	0.313	140.4	12.33	2.4
120800	9.85	8.69	0.488	0.312	140.5	12.34	2.7
120805	9.86	8.69	0.487	0.311	140.9	12.38	3.3
120810	9.85	8.69	0.488	0.312	140.3	12.33	3.2
120815	9.86	8.69	0.487	0.312	140.8	12.37	3.4
120820	9.87	8.69	0.492	0.314	140.7	12.36	3.2
120825	9.87	8.69	0.489	0.312	140.5	12.34	2.8
120830	9.87	8.69	0.491	0.314	140.1	12.3	2.5
120835	9.87	8.69	0.489	0.313	140.1	12.31	2.3
120858	9.87	8.69	0.486	0.311	140	12.29	3.7
120900	9.87	8.69	0.491	0.314	140	12.29	3
Averages	**9.86**	**8.69**	**0.489**	**0.312**	**140.44**	**12.33**	**2.89**
Lab	**n/a**	**8.50**	**0.440**	**300mg/L**	**n/a**	**n/a**	**1.67**
SAR=	**0.214**						

Comment

Sunny and warm, Air Temp= 25.3C; Wind Ave= 2.5 mph; Rel Hum= 13%;
Lab analysis attached. Recent precip rain 9/17/01. Heavy algae at sample site

Muddy Creek (Grigsby Site)

AQMAC-11

Na^{+} = $8/22.99$ = .348

Ca^{2+} = $94/20.04$ = 4.691

Mg^{2+} = $7.3/12.15$ = .601

$$SAR = \left(.348 / \left((4.691 + .601)/2 \right) \right)^{0.5}$$

$2.646\sqrt{\ }$ = 1.626

$1/x$ = .615

x .348 =

SAR .214

Page 11

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0125-34137

D/T REC: 09-25-01 11:00 BY: DA

DATE COMPLETED: 10.10.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/24/01	Conductivity	.489
Time Collected	12:10	Dissolved O_2	130.7% 12.3 mg/L
Discharge	.820 cfs	Turbidity	
Temperature	7.85.2	pH	8.68

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Gr13-M
Sampled By: LSRCD/Sheehan
Comments: March 5th

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9/24/01 10/3	mg/L	94	Carbonate 9/28	mg/L	11
Magnesium	mg/L	7.3	Bicarbonate	mg/L	190
Sodium	mg/L	8	Fluoride 9/25	mg/L	0.2
Potassium	mg/L	3.8	Chloride	mg/L	3.7
TDS (ROE 180) 9/27/01	mg/L	300	Nitrate as N	mg/L	<0.1
TSS 9/26/01	mg/L	<1 mg/L	Nitrite as N	mg/L	<0.1
pH 9/28	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/26/01	umhos/cm	440	Sulfate	mg/L	87
Turbidity 9/25/01	NTU	1.67	Total Phosphate 10/9	mg/L	0.06
			Total Alkalinity as $CaCO_3$ 9/28	mg/L	180
			Hardness as $CaCO_3$	mg/L	270

S	R	Bottle
✓	1	1L Plain
✓	1	250ml Plain
✓	1	250ml HNO_3
✓	1	250ml H_2SO_4

Elect File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek (Grizzly Site)**

Site ID: Aqmac-11

Site Coordinates: T17N, R89W, Sec.29, SW1/4 of NE1/4

Date & Time: **9/26/00** 12:15

Elevation: 7280

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed 9/26/00

DO Calibration: Bar Pressure Reading 23.15 X 25.4=588.01

Discharge Measurment: Swoffer Flow Meter model 3000 **Flow= 1.63 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
121430	6.47	8.49	0.651	0.416	111.7	10.6	11.5
121435	6.48	8.5	0.651	0.416	111.7	10.6	16.5
121440	6.48	8.5	0.651	0.416	111.7	10.6	8.5
121445	6.48	8.5	0.651	0.416	111.7	10.6	17.3
121450	6.48	8.5	0.651	0.416	111.7	10.59	8
121455	6.49	8.5	0.651	0.416	111.7	10.59	14.2
121500	6.49	8.5	0.651	0.416	111.7	10.59	12.7
121505	6.49	8.5	0.651	0.416	111.8	10.6	7.7
121510	6.49	8.5	0.651	0.416	111.8	10.6	11.9
121515	6.5	8.5	0.651	0.416	111.8	10.6	10.7
121520	6.5	8.5	0.651	0.416	111.8	10.6	18.8
121525	6.5	8.5	0.651	0.416	111.7	10.59	12.1
121530	6.5	8.5	0.651	0.416	111.7	10.59	6.4
121535	6.51	8.5	0.651	0.416	111.7	10.58	7.6
121540	6.51	8.5	0.651	0.416	111.7	10.58	6.9
121545	6.51	8.5	0.651	0.416	111.7	10.59	13.8
121550	6.51	8.5	0.651	0.416	111.7	10.59	15.4
121555	6.52	8.5	0.651	0.416	111.7	10.59	10
121600	6.51	8.5	0.651	0.416	111.7	10.59	12
121654	6.54	8.5	0.651	0.416	111.7	10.58	11.1
121655	6.54	8.5	0.651	0.416	111.7	10.58	15
121700	6.55	8.5	0.651	0.416	111.7	10.57	16.5
Averages	**6.50**	**8.50**	**0.651**	**0.416**	**111.72**	**10.59**	**12.03**

Comments:

Aqmac-11, 9/26/00, Recent Snow 9/22 & 23 & 24, Snow Melting, Approx. 60F
Elev. 7280

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0927-270316

D/T REC: 9/27/00 1130 **BY:** KH

DATE COMPLETED: 10-12-00

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/26/00	Conductivity	.651
Time Collected	12:22	Dissolved O_2	111.7% 10.59 mg/L
Discharge	≈1.2 cfs	Turbidity	≈10.0
Temperature	6.48°C	pH	8.3

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMAC-11

Sampled By: LSRCD/Sheehan

Comments: (01339) Muddy Crk

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KB 9/28	mg/L	110	Carbonate KB 9/29	mg/L	9
Magnesium 9/29	mg/L	12	Bicarbonate	mg/L	180
Sodium 10/3	mg/L	12	Fluoride KB 9/27	mg/L	0.2
Potassium	mg/L	3.8	Chloride	mg/L	7.5
TDS (ROE 180) KB 10-2	mg/L	480	Nitrate as N	mg/L	<0.1
TSS EC 10/2	mg/L	4.4	Nitrite as N	mg/L	<0.1
pH KB 9/29	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab KB 10/2	umhos/cm	670 ~~640~~	Sulfate 10X 9/28	mg/L	180
Turbidity KB 9/27	NTU	8.08	Total Phosphate KB 10/6	mg/L	0.19
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	160
			Hardness as $CaCO_3$ 10/2	mg/L	320

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KB 10-12-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek (Grizzly Site)**

Site ID: Aqmac-11

Site Coordinates: T17N, R89W, Sec.29, SW1/4 of NE1/4

Date & Time: **10/4/99** 13:22

Elevation: 7280 13:22

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed

DO Calibration: Bar Pressure Reading 23.2 X 25.4= 589.28

Discharge Measurment: Swoffer Flow Meter model 2100-14 **Flow = 1.664 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
132115	6.7	8.63	0.623	0.399	99.8	9.43	9.6
132120	6.7	8.63	0.624	0.399	99.9	9.44	6.9
132125	6.71	8.64	0.618	0.396	99.8	9.43	7
132130	6.71	8.63	0.62	0.396	99.9	9.44	9.7
132135	6.71	8.64	0.614	0.393	99.9	9.44	7.2
132140	6.71	8.64	0.613	0.392	99.9	9.44	8.1
132145	6.72	8.64	0.622	0.398	99.9	9.44	8.5
132150	6.72	8.64	0.622	0.398	100	9.44	7.1
132155	6.72	8.64	0.623	0.399	99.9	9.44	6.9
132200	6.72	8.64	0.62	0.397	100	9.44	9.4
132205	6.72	8.64	0.618	0.396	99.9	9.44	8.6
132210	6.72	8.63	0.624	0.399	100	9.44	7.8
132215	6.73	8.64	0.626	0.4	99.9	9.44	8.3
132239	6.74	8.64	0.619	0.396	99.9	9.43	8
132240	6.74	8.64	0.623	0.399	99.9	9.43	8
132245	6.74	8.64	0.624	0.399	99.9	9.43	8.1
Averages	**6.72**	**8.64**	**0.621**	**0.397**	**99.91**	**9.44**	**8.08**

Comments:

Grizzly Site, Aqmac-11, 10/4/99, 7280 ft. elev., sunny and warm

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 1005 - 20785

D/T REC: 10/5/99 1430 **BY:** SLO

DATE COMPLETED: 12-17-99

Date Collected		10/4/99
Time Collected		1525
Discharge		<1 cfs
Temperature	degrees C	6.71
pH	Units	8.64

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMC-11, Grizzly, Sample #22
Sampled By: Sheehan/LSRCD
Comments:

UPS Address: 441 Penland
Phone: 307-383-7860 **E-mail:** lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #
Amount $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SB 10-11-99	mg/L	110	Total Alkalinity as $CaCO_3$ 10/12	mg/L	200
Magnesium 10-8-99	mg/L	14	Fluoride RWH 10.5.99	mg/L	<0.1
Sodium 10-13	mg/L	14	Chloride	mg/L	6.4
Potassium 10-14	mg/L	4.6	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/12	mg/L	330	Nitrite as N	mg/L	<0.1
TDS (ROE 180) SB 10-12-99	mg/L	480	Ortho Phosphate	mg/L	<0.1
TSS BS 10/6/99	mg/L	4	Total Phosphate SB 10/26/99	mg/L	0.14
pH SB 10/8/99	Units	8.5	Sulfate RWH 10.15.99	mg/L	160
Conductivity, Lab (2) 10/12/99	umhos/cm	680	Turbidity RWH 10.5.99	NYU	4.1

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

SB 12/16/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Muddy Creek at Bridger Pass

Grab Sample Data

Stream: **Muddy Creek (Bridger Pass)** *(macro)*

Site ID: AQMAC-05

Site Coordinates: Lat- 41° 28′ 00.82″ Long- 107° 29′ 07.73″

Date & Time: **9/23/02** @ 13:17

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 23.3 25.4= 591.82

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.044 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
131650	10.94	8.2	0.572	0.366	106.7	9.15	51
131655	10.94	8.2	0.572	0.366	106.6	9.14	41.2
131700	10.95	8.2	0.572	0.366	106.6	9.14	44.8
131705	10.95	8.2	0.572	0.366	106.5	9.13	39.9
131710	10.96	8.2	0.572	0.366	106.5	9.13	33.9
131715	10.95	8.2	0.572	0.366	106.4	9.12	47.5
131720	10.96	8.2	0.572	0.366	106.2	9.11	44.9
131725	10.96	8.2	0.572	0.366	106.2	9.1	42.4
131730	10.96	8.17	0.572	0.366	106.5	9.13	45.6
131735	10.96	8.2	0.572	0.366	106.2	9.11	36.2
131815	10.98	8.2	0.572	0.366	105.9	9.08	43.9
131820	10.98	8.2	0.572	0.366	105.9	9.07	54.3
Averages	**10.96**	**8.20**	**0.57**	**0.37**	**106.35**	**9.12**	**43.80**
Lab	**n/a**	**8.3**	**0.58**	**0.38**	**n/a**	**n/a**	**32.2**
SAR=	**0.50**						

Notes:

Muddy Creek (Bridger Pass) AQMAC-05, 9/23/02, Sunny and Warm,
Lab Sample @ 13:15, Air Temp= 17.1C, Wind Ave= 4.8 mph, Rel Hum=15%
Flow= 1.044 cfs

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Bridger Pass)

Site ID: AQMAC-05 macro

Site Coordinates: 41° 28' 00.82"; 107° 29' 07.73"

Date & Time: 9/23/02 @ 13:45

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

1.044 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Measured by: LSRCD/S Sheehan Checked by: Dwen C. Grenger
0.5	.250	.114	.014	
1.0	.300	.150	.023	
1.5	.325	.739	.120	
2.0	.425	1.378	.293	
2.5	.425	1.152	.245	
3.0	.450	1.379	.310	
3.5	.425	.144	.031	
4.0	.150	.102	.008	
4.6	WE/RB			
		Total	1.044 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0924-40281 (281)

D/T REC 09-24-02 13:30 BY: JH

DATE COMPLETED: 10/1/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/23/02	Conductivity	.572
Time Collected	13:15	Dissolved O_2	105.9%, 9.07 mg/L
Discharge	~1 cfs	Turbidity	~35.0
Temperature	10.96°C	pH	8.20

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 359
Baggs, WY 82321

Sample ID: 7 Bridges 2 m
Sampled By: LSRCD/Sheehan
Comments: Malo

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/26	mg/L	72	Carbonate RWH 9/27	mg/L	0
Magnesium	mg/L	17	Bicarbonate	mg/L	180
Sodium	mg/L	18	Fluoride RWH 9/24/02	mg/L	0.2
Potassium BM 9/25/02	mg/L	4.3	Chloride	mg/L	5.2
TDS (ROE 180)	mg/L	380	Nitrate as N	mg/L	<0.1
TSS BM 9/25/02	mg/L	27.0	Nitrite as N	mg/L	<0.1
pH RWH 9/27	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/25	umhos/cm	580	Sulfate 9/25	mg/L	150
Turbidity 9/24	NTU	32.2	Total Phosphate RWH 9/26	mg/L	0.09
			Total Alkalinity as $CaCO_3$ 9/27	mg/L	150
			Hardness as $CaCO_3$ RWH 9/27	mg/L	250

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Select File: LSRCD01

Analysis: Kenneth L. McMillan

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	23-Sep-2002		Lab No:	40281	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	72	3.59	Carbonate	0	0.00
Magnesium	17	1.40	Bicarbonate	180	2.95
Sodium	18	0.78	Chloride	5.2	0.15
Potassium	4.3	0.11	Fluoride	0.2	0.01
T. CATIONS		**5.88**	Nitrate as N	0	0.00
ROE 180	mg/L	380	Nitrite as N	0	0.00
TSS	mg/L	27.0	Ortho phosphate	0	0.00
Turbidity	NTU	32.2	Sulfate	150	3.12
			T. ANIONS		**6.23**

Conductance, umhos/cm		580	S A R (sodium Hazard)	0.50
TDS by Summation, mg/L		355	T Alk CaCO3, mg/L	148
pH, Units		8.3	Hardness as CaCO3, mg/L	250
Total Coliform	per 100 ml		Hardness as CaCO3, gr/gal	15

Analyte	Units	Result
Total Phosphate	mg/L	0.09
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.66
Meq Cations/Sp cond/100	1.01
Meq Anions/Sp cond/100	1.07
ROE/TDS Summation	1.07

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 2.86% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.61 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.04 (0.8 TO 1.2)

OVERALL =	0.0168	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Muddy Creek (Bridger Pass)**

Site ID: AQMAC-05

Site Coordinates: Lat- 41° 28′ 00.82″ Long- 107° 29′ 07.73″

Date & Time: **9/24/01** 10:00

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/17/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.42 X 25.4= 594.868

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 2.452 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
100005	8.17	8.38	0.54	0.345	98.1	8.98	24.5
100010	8.16	8.38	0.539	0.345	98.2	9.01	28.3
100015	8.16	8.38	0.54	0.345	98.1	9	26.2
100020	8.16	8.38	0.538	0.344	98.3	9.02	29
100025	8.16	8.38	0.54	0.345	98.2	9.01	21.8
100030	8.15	8.38	0.543	0.347	98	9	29.1
100035	8.16	8.38	0.54	0.345	97.9	8.99	26.4
100040	8.16	8.38	0.541	0.346	97.7	8.96	23.1
100045	8.15	8.38	0.542	0.347	97.7	8.97	22.3
100050	8.16	8.38	0.541	0.346	97.7	8.96	26.2
100055	8.17	8.38	0.538	0.344	97.7	8.96	24.4
100100	8.17	8.38	0.54	0.346	97.6	8.96	29.8
100105	8.17	8.38	0.539	0.345	97.7	8.97	22
100110	8.17	8.38	0.54	0.345	97.7	8.96	25.7
100123	8.17	8.38	0.544	0.348	97.3	8.95	27.2
Averages	**8.16**	**8.38**	**0.540**	**0.346**	**97.86**	**8.98**	**25.73**
Lab	**n/a**	**8.30**	**0.450**	**388mg/L**	**n/a**	**n/a**	**13.10**
SAR=	**0.508**						

Comment

Sunny and warm, Air Temp= 18.4C; Wind Ave= .8 mph; Rel Hum= 23%;
Lab analysis attached.

Muddy Creek @ Bridge

AQMAC-05

Na^{+} = 19/22.99 = .826

Ca^{2+} = 78/20.04 = 3.892

Mg^{2+} = 17/12.15 = 1.399

$SAR = \left(.826 / \left((3.892 + 1.399)/2 \right) \right)^{0.5}$

$2.646 \sqrt{} = 1.6264$

$1/x = .6148$

$\times .826 =$

$\boxed{SAR\ .508}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0925-34140

D/T REC: 09-25-01 11:00 BY: CA

DATE COMPLETED: 10.10.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/24/01	Conductivity	.540
Time Collected	10:10	Dissolved O_2	97.2%, 8.25
Discharge	2.452 cfs	Turbidity	
Temperature	8.19	pH	8.38

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Bridge-M

Sampled By: LSRCD/Sheehan

Comments:

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SRH 10/3	mg/L	78	Carbonate SRH 9/28	mg/L	0
Magnesium	mg/L	17	Bicarbonate	mg/L	180
Sodium	mg/L	19	Fluoride SRH 9/25	mg/L	0.2
Potassium	mg/L	4.2	Chloride	mg/L	5.0
TDS (ROE 180) 9/27/01 SRH	mg/L	388	Nitrate as N	mg/L	<0.1
TSS 9/27/01 SRH	mg/L	9.60	Nitrite as N	mg/L	<0.1
pH SRH 9/28	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/26/01 SRH	umhos/cm	450	Sulfate DX 9/26	mg/L	130
Turbidity 9/25/01 SRH	NTU	13.1	Total Phosphate 10/3	mg/L	0.02
			Total Alkalinity as $CaCO_3$ 9/28	mg/L	150
			Hardness as $CaCO_3$	mg/L	270

S	R	Bottle
M	1	1L Plain
M	1	250ml Plain
M	1	250ml HNO_3
M	1	250ml H_2SO_4

Elect File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek (Bridger Pass)**

Site ID: Aqmac-05

Site Coordinates: T17N, R90W, Sec. 12, NW1/4 of NW1/4

Date & Time: **9/20/00** 13:03

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 9/17/00

DO Calibration: Bar Pressure Reading 23.2 X 25.4= 589.28

Discharge Measurment: Swoffer Flow Meter model 3000 **flow= 1.882 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
130215	12.08	8.44	0.518	0.331	107.3	8.93	
130220	12.08	8.44	0.518	0.331	107.4	8.93	
130230	12.02	8.44	0.518	0.332	106.4	8.86	18.3
130235	12.08	8.44	0.518	0.331	104.8	8.72	57.3
130240	12.09	8.44	0.518	0.331	105.7	8.79	32.2
130245	12.09	8.44	0.518	0.331	106.6	8.87	38.5
130250	12.09	8.44	0.518	0.331	106.8	8.88	31.2
130255	12.09	8.44	0.517	0.331	107.2	8.91	54.9
130300	12.09	8.44	0.517	0.331	107.3	8.92	
130305	12.1	8.44	0.517	0.331	107.4	8.93	41.5
130348	12.11	8.44	0.517	0.331	107.2	8.92	38.4
130350	12.11	8.44	0.517	0.331	107.2	8.92	26.8
130355	12.11	8.44	0.518	0.331	107.1	8.9	61
130400	12.11	8.44	0.517	0.331	107	8.9	52.9
130405	12.12	8.42	0.518	0.331	107.1	8.9	43
130509	12.14	8.44	0.517	0.331	107.7	8.95	53.6
130510	12.14	8.44	0.517	0.331	107.7	8.95	49.7
Averages	**12.10**	**8.44**	**0.518**	**0.331**	**106.94**	**8.89**	**42.81**

Comments:

Msg. Bridger Pass Site, Aqmac-05, Sunny and cool, 9/20/00, Light rain on 9/19 pm, Trb may be higher due to disturbance while deploying unit.
Flow = 1.882 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0921-26935

D/T REC: 09/21/00 1100 BY: [illegible]

DATE COMPLETED: 10-9-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/20/00	Conductivity	.518
Time Collected	1:15	Dissolved O_2	102.2% 8.9 mg/L
Discharge	≈2 cfs	Turbidity	≈35
Temperature	12.12°C	pH	8.44

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMAC-05

Sampled By: LSRCD / Sheehan

Comments: Bridge Site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9/28	mg/L	60	Carbonate 9/29	mg/L	5
Magnesium 9/29	mg/L	18	Bicarbonate	mg/L	130
Sodium 10/3	mg/L	20	Fluoride 9/21/00	mg/L	0.2
Potassium	mg/L	2.5	Chloride	mg/L	5.2
TDS (ROE 180) 9/23 KO	mg/L	360	Nitrate as N	mg/L	<0.1
TSS 10 9-23	mg/L	37	Nitrite as N	mg/L	<0.1
pH 9/29	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 10/04	umhos/cm	530	Sulfate 10X	mg/L	150
Turbidity 9/21	NTU	42.3	Total Phosphate 10/6	mg/L	0.11
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	120
			Hardness as $CaCO_3$ 10/2	mg/L	220

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: 10-9-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek (Bridger Pass)**

Site ID: Aqmac-05

Site Coordinates: T17N, R90W, Sec. 12, NW1/4 of NW1/4

Date & Time: **10/4/99** 12:00

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 10/3/99

DO Calibration: Bar Pressure Reading 23.35 X 25.4= 593.09

Discharge Measurment: Swoffer Flow Meter model 1200-14 **flow= 5.557 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115940	4.49	8.42	0.662	0.424	116	11.68	29.5
115945	4.48	8.43	0.672	0.43	116	11.67	26.6
115950	4.49	8.43	0.675	0.432	116.1	11.68	27.7
115955	4.49	8.43	0.666	0.426	115.9	11.67	33
120000	4.49	8.43	0.665	0.426	116	11.68	28
120005	4.5	8.43	0.675	0.432	115.8	11.66	27.1
120010	4.5	8.43	0.671	0.429	116	11.67	27.4
120015	4.5	8.43	0.666	0.426	116	11.67	28.3
120020	4.51	8.43	0.669	0.428	116	11.67	28.5
120025	4.51	8.43	0.674	0.431	115.9	11.65	29.6
120030	4.51	8.43	0.675	0.432	116	11.67	24.7
120104	4.52	8.44	0.675	0.432	115.9	11.66	30.6
120105	4.52	8.44	0.676	0.432	116	11.67	31.3
120110	4.53	8.44	0.672	0.43	116	11.66	30.7
120115	4.53	8.44	0.667	0.427	115.9	11.66	24.2
120120	4.53	8.44	0.672	0.43	116	11.66	28.3
120125	4.53	8.45	0.668	0.427	115.9	11.65	25.3
120130	4.53	8.44	0.665	0.425	115.9	11.65	32.2
120135	4.54	8.45	0.67	0.428	115.9	11.65	25.1
Averages	**4.51**	**8.43**	**0.670**	**0.429**	**115.96**	**11.66**	**28.32**

Comments:

Bridger Pass Site, 10/4/99 Sunny and Warm, Total flow = 5.557cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 1005 - 20783

D/T REC: 10/5/99 1430 **BY:** RW

DATE COMPLETED: 12-17-1999

Date Collected		10/4/99
Time Collected		1210
Discharge		≈ 4 cfs
Temperature	degrees C	4.49
pH	Units	8.45

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID AQMAC-05, Bridger, #20
Sampled By Sheehan/LSRCD
Comments:

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #
Amount $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SGB 10-11-99	mg/L	96	Total Alkalinity as $CaCO_3$ LW 10/8	mg/L	190
Magnesium 10-8-99	mg/L	24	Fluoride RWH 10.5.99	mg/L	0.3
Sodium 10-13	mg/L	28	Chloride	mg/L	7.7
Potassium 10-14	mg/L	3.8	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/12	mg/L	340	Nitrite as N	mg/L	<0.1
TDS (ROE 180) SGB 10-11-99	mg/L	490	Ortho Phosphate	mg/L	<0.1
TSS 10/6/99 LS	mg/L	23	Total Phosphate SGB 4/26/99	mg/L	0.06
pH SGB 10/8/99	Units	8.5	Sulfate RWH 10.15.99	mg/L	210
Conductivity, Lab VC 10/12/99	umhos/cm	710	Turbidity RWH 10.5.99	NTU	16

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

SGB 12/16/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

McKinney Creek

Grab Sample Data

Stream: **McKinney Creek (lower site)** *(macro)*

Site ID: AQMAC-00

Site Coordinates: Lat- 41° 28´ 53.42˝ Long- 107° 28´ 26.53˝

Date & Time: **9/23/02** @ 12:42

Elevation: 7140

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 23.32 25.4= 592.328

Discharge Measurement: Visual Flow approx. less than 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
124205	13.06	8.23	0.487	0.312	106.9	8.6	24.9
124210	13.04	8.23	0.488	0.312	106.8	8.6	25.2
124215	13.04	8.23	0.488	0.312	106.5	8.57	25.7
124220	13.05	8.23	0.488	0.312	106.3	8.55	25.4
124225	13.05	8.23	0.488	0.312	106.4	8.56	31.6
124230	13.05	8.23	0.487	0.312	106.3	8.55	25
124235	13.06	8.23	0.487	0.312	106.3	8.55	24.2
124240	13.06	8.23	0.488	0.312	106.4	8.55	21.8
124245	13.07	8.23	0.488	0.312	106.2	8.54	23.4
124250	13.07	8.23	0.487	0.312	106.3	8.55	20.4
124255	13.07	8.23	0.488	0.312	106.3	8.55	27.2
124300	13.07	8.23	0.488	0.312	106.2	8.54	23.1
124305	13.07	8.23	0.488	0.312	106.3	8.55	29.3
124345	13.1	8.23	0.488	0.312	106	8.52	26.8
124350	13.1	8.23	0.488	0.312	105.9	8.51	26.4
124355	13.1	8.23	0.488	0.312	105.9	8.51	20.7
124400	13.1	8.23	0.488	0.312	105.8	8.5	24.2
124405	13.1	8.24	0.488	0.312	105.7	8.49	26.6
124410	13.1	8.23	0.488	0.312	105.8	8.51	23.2
Averages	**13.07**	**8.23**	**0.488**	**0.312**	**106.23**	**8.54**	**25.01**
Lab	**n/a**	**8.4**	**0.49**	**0.304**	**n/a**	**n/a**	**16.4**
SAR=	**0.65**						

Notes:

9/23/02 Mckinney Creek (lower site) AQMAC-00, Sunny and warm,
Lab Sample @ 12:35, Air Temp= 17.0C, Wind Ave= 5.8mph, Rel Hum= 17%
Recent Precip.- 9/19, Flow less than 1/2 cfs
*** During Macros- observed very few macroinvertebrates- low biological life.

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0924 - 40282

D/T REC: 09-24-02 15:30 BY: JH

DATE COMPLETED: 10/1/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/23/02	Conductivity	.488
Time Collected	1235	Dissolved O_2	105.9%, 8.51 mg/L
Discharge	< 1/2 cfs	Turbidity	~25.0
Temperature	13.06°C	pH	8.23

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 358
Baggs, WY 82321

Sample ID: 9MckLow2M

Sampled By: LSRCD / Sheehan

Comments: Macro

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VQSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KWH 9/26	mg/L	57	Carbonate KWH 9/27	mg/L	3
Magnesium	mg/L	14	Bicarbonate	mg/L	180
Sodium	mg/L	21	Fluoride KWH 9/24/02	mg/L	0.3
Potassium	mg/L	3.2	Chloride	mg/L	4.0
TDS (ROE 180) 9/24/02	mg/L	304	Nitrate as N	mg/L	<0.1
TSS Hach 9/25/02	mg/L	12.4	Nitrite as N	mg/L	<0.1
pH KWH 9/27	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/25	umhos/cm	490	Sulfate	mg/L	93
Turbidity 9/24	NTU	16.4	Total Phosphate KWH 9/26	mg/L	0.05
			Total Alkalinity as $CaCO_3$ 9/27	mg/L	160
			Hardness as $CaCO_3$ Calc 9/27	mg/L	200

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 23-Sep-2002 | **Lab No:** 40282

CATIONS	mg/L	meq/L
Calcium	57	2.84
Magnesium	14	1.15
Sodium	21	0.91
Potassium	3.2	0.08
T. CATIONS		**4.99**
ROE 180	mg/L	304
TSS	mg/L	12.4
Turbidity	NTU	16.4

ANIONS	mg/L	meq/L
Carbonate	3	0.10
Bicarbonate	180	2.95
Chloride	4.0	0.11
Fluoride	0.3	0.02
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	93	1.94
T. ANIONS		**5.11**

Conductance, umhos/cm		490
TDS by Summation, mg/L		284
pH, Units		8.4
Total Coliform	per 100 ml	

S A R (sodium Hazard)	0.65
T Alk CaCO3, mg/L	153
Hardness as CaCO3, mg/L	200
Hardness as CaCO3, gr/gal	12

Analyte	Units	Result
Total Phosphate	mg/L	0.05
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.62
Meq Cations/Sp cond/100	1.02
Meq Anions/Sp cond/100	1.04
ROE/TDS Summation	1.07

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 1.23% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.58 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.03 (0.8 TO 1.2)

OVERALL =	0.0069	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **McKinney Creek (lower site)**

Site ID: AQMAC-00

Site Coordinates: Lat- 41° 28′ 53.42″ Long- 107° 28′ 26.53″

Date & Time: **9/24/01** 8:59

Elevation: 7140

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/17/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.34 X 25.4= 592.836

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .910 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
85810	7.72	8.27	0.428	0.274	108.5	10.07	29.4
85815	7.72	8.27	0.426	0.272	108.7	10.07	16.2
85820	7.72	8.27	0.42	0.269	108	10.02	41.2
85825	7.71	8.27	0.423	0.271	108.6	10.08	31
85830	7.72	8.27	0.429	0.274	108.1	10.03	17.9
85835	7.72	8.28	0.43	0.275	108.5	10.07	31.9
85840	7.72	8.28	0.43	0.275	108.1	10.04	18
85845	7.73	8.27	0.427	0.273	107.7	9.99	12.6
85850	7.72	8.28	0.426	0.273	108	10.03	32.2
85855	7.73	8.28	0.424	0.271	107.9	10.01	51.6
85900	7.73	8.28	0.422	0.27	107.9	10.02	29.9
85949	7.74	8.28	0.422	0.27	107.4	9.97	13.4
85950	7.74	8.28	0.429	0.275	107.5	9.98	10
Averages	**7.72**	**8.28**	**0.426**	**0.272**	**108.07**	**10.03**	**25.79**
Lab	**n/a**	**8.30**	**0.440**	**290mg/L**	**n/a**	**n/a**	**12.30**
SAR=	**0.517**						

Comment

Sunny and warm, Air Temp= 17.1; Wind Ave= .5 mph; Rel Hum= 20%;
Lab analysis attached. Warm days and cool nights.

AQMAC-00

McKinney Crk (Low Salt)

9 Meq Low / M

Na^{+} = 17/22.99 = .739

Ca^{2+} = 62/20.04 = 3.094

Mg^{2+} = 12/12.15 = .988

$$SAR = \left(.739 \Big/ \left((3.094 + .988)/2 \right) \right)^{0.5}$$

$2.041^{0.5}$ = 1.4284

1/x = .6999

x .739 =

SAR .517

Appendix 00

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0925-34139
D/T REC: 09-25-01 11:00 BY: CA
DATE COMPLETED: 10.10.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/24/01	Conductivity	.430
Time Collected	9:10	Dissolved O_2	102.78, [illegible] 10.03 mg/L
Discharge	.910 cfs	Turbidity	
Temperature	7.72°C	pH	8.28

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: McKLow-M
Sampled By: LSRCD / Sheehan
Comments: Macro Site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium LRH 10/3	mg/L	62	Carbonate LRH 9/28	mg/L	1
Magnesium	mg/L	12	Bicarbonate	mg/L	180
Sodium	mg/L	17	Fluoride LRH 9/25	mg/L	0.2
Potassium	mg/L	3.1	Chloride	mg/L	4.0
TDS (ROE 180) 9/27/01 [illegible]	mg/L	290	Nitrate as N	mg/L	<0.1
TSS 9/26/01 [illegible]	mg/L	8.00	Nitrite as N	mg/L	<0.1
pH LRH 9/28	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/25/01 [illegible]	umhos/cm	440	Sulfate	mg/L	72
Turbidity 9/25/01 [illegible]	NTU	12.3	Total Phosphate 10/9	mg/L	0.02
			Total Alkalinity as $CaCO_3$ 9/28	mg/L	150
			Hardness as $CaCO_3$	mg/L	200

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ] CA	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: McKinney Creek

Site ID: Aqmac-00

Site Coordinates: T17N, R90W, Sec. 1, NE1/4 fo NE1/4

Date & Time: 9/20/00 12:00

Elevation: 7140

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed

DO Calibration: Bar Pressure Reading 23.20 X 25.4= 598.28

Discharge Measurment: Swoffer Flow Meter model 3000 **flow .327cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
120000	11.47	8.37	0.51	0.326	103.3	8.71	37.8
120005	11.48	8.37	0.51	0.326	103.2	8.71	32.7
120010	11.48	8.37	0.51	0.326	103.2	8.71	34.2
120015	11.49	8.37	0.51	0.326	103.1	8.7	32.5
120020	11.49	8.37	0.51	0.326	103.1	8.7	33.9
120025	11.49	8.37	0.51	0.326	103.1	8.7	32
120030	11.5	8.37	0.51	0.326	103.2	8.7	31
120035	11.5	8.37	0.51	0.326	103.2	8.7	29.1
120040	11.5	8.36	0.51	0.326	103.2	8.7	34.8
120045	11.5	8.36	0.51	0.326	103.2	8.7	28.6
120050	11.51	8.36	0.51	0.326	103.2	8.7	32.3
120055	11.51	8.36	0.51	0.326	103.2	8.7	32.6
120100	11.51	8.36	0.51	0.326	103.2	8.7	33.4
120150	11.56	8.36	0.51	0.326	103.3	8.7	35.4
120155	11.56	8.36	0.51	0.326	103.4	8.7	32.9
Averages	**11.50**	**8.37**	**0.510**	**0.326**	**103.21**	**8.70**	**32.88**

Comments:

Msg. 10/4/99 Sunny and Warm, cfs 3-4 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0921- 26936

D/T REC: 09/21/00 1100 BY: LJ

DATE COMPLETED: 10-9-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/20/00	Conductivity	.510
Time Collected	12:17	Dissolved O_2	103 %, 8.2 mg/l
Discharge	≈ 1-2 cfs	Turbidity	≈ 32.0 NTU
Temperature	11.49	pH	8.37

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: AQMAC-00

Sampled By: LSRCD/Sheehan

Comments: Lower McKinney

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium LB3 9/28	mg/L	55	Carbonate LB3 9/29	mg/L	3
Magnesium 9/29	mg/L	18	Bicarbonate	mg/L	180
Sodium 10/3	mg/L	26	Fluoride LB3 9/21/00	mg/L	0.3
Potassium	mg/L	1.5	Chloride	mg/L	5.1
TDS (ROE 180) KD 9/23	mg/L	340	Nitrate as N	mg/L	<0.1
TSS KD 9/23	mg/L	26	Nitrite as N	mg/L	<0.1
pH LB3 9/29	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab KD 10/4	umhos/cm	520	Sulfate DX	mg/L	110
Turbidity LB3 9/21	NTU	35.5	Total Phosphate LB3 10/6	mg/L	0.02
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	150
			Hardness as $CaCO_3$ 10/2	mg/L	210

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: LB3 10-7-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: McKinney Creek

Site ID: Aqmac-00

Site Coordinates: T17N, R90W, Sec. 1, NE1/4 fo NE1/4

Date & Time: 10/4/99 11:30

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed 10/3/99

DO Calibration: Bar Pressure Reading 23.35 X 25.4= 593.09

Discharge Measurment:

Gage Reading:

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
112945	4.49	8.5	0.519	0.332	121.6	12.25	16.4
112950	4.49	8.5	0.528	0.338	121.7	12.26	15.6
112955	4.5	8.5	0.514	0.329	121.3	12.22	19.7
113000	4.5	8.5	0.519	0.332	121.3	12.21	14.3
113005	4.5	8.5	0.525	0.336	121.4	12.23	15.4
113010	4.51	8.51	0.525	0.336	121.2	12.2	18.8
113015	4.51	8.5	0.523	0.334	121.4	12.22	15.9
113020	4.51	8.5	0.522	0.334	121.3	12.21	16.1
113025	4.51	8.5	0.519	0.332	121.2	12.2	17.5
113030	4.51	8.5	0.523	0.334	121.2	12.2	17.2
113124	4.54	8.5	0.521	0.333	121	12.18	19
113125	4.55	8.5	0.523	0.334	121.1	12.18	16.7
113130	4.54	8.5	0.526	0.336	121.1	12.18	17.4
113135	4.54	8.5	0.521	0.333	121.2	12.19	16.6
Averages	**4.51**	**8.50**	**0.522**	**0.334**	**121.29**	**12.21**	**16.90**

Comments:

Msg. 10/4/99 Sunny and Warm, cfs 3-4 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No:	1005 - 20782
D/T REC:	10/5/99 1430 BY: RW
DATE COMPLETED:	12-7-99 - R99

Date Collected		10/4/99
Time Collected		1140
Discharge		≈ 3 cfs
Temperature	degrees C	4.5
pH	Units	8.5

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID	AAMAC-CO, McKinney #19
Sampled By	Sheehan / LSRCD
Comments:	
Invoice #	
Amount	**$45.00**

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 10-11-99	mg/L	71	Total Alkalinity as $CaCO_3$ 10/8	mg/L	160
Magnesium 10-8-99	mg/L	18	Fluoride RWH 10.5.99	mg/L	0.2
Sodium 10-13	mg/L	24	Chloride	mg/L	6.0
Potassium 10-14	mg/L	2.9	Nitrate as N	mg/L	<0.1
Hardness as $CaCO_3$ 10/13	mg/L	250	Nitrite as N	mg/L	<0.1
TDS (ROE 180) 10/11/99	mg/L	360	Ortho Phosphate	mg/L	<0.1
TSS 10/6/99 RS	mg/L	12	Total Phosphate 10/26/99	mg/L	0.05
pH 10/5/99	Units	8.4	Sulfate RWH 10.18.99	mg/L	140
Conductivity, Lab 10/12-77	umhos/cm	510	Turbidity RWH 10.5.99	NTU	8.9

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: **LSRCD01**

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

12/6/99
Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: McKinney Creek

Site ID: Aqmac-00

Site Coordinates: T17N, R90W, Sec1, NE1/4 of NE1/4

Date & Time: 10/8/98 11:47

Elevation: 7080

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: 10/7/98 Maintenace & Calibration completed

DO Calibration: Bar Pressure Reading X 25.4= 588.01

Discharge Measurment: Swoffer Flow Meter model 2100 **3.917 cfs**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
114640	8.11	8.33	0.513	0.328	128.4	11.71	62.6
114645	8.11	8.33	0.513	0.328	128.3	11.69	63.8
114650	8.11	8.33	0.513	0.328	128.5	11.71	57.1
114655	8.11	8.33	0.512	0.327	128.4	11.71	60.5
114700	8.12	8.33	0.513	0.328	128.5	11.71	53.9
114705	8.12	8.33	0.51	0.326	128	11.66	62.1
114710	8.13	8.33	0.515	0.329	127.4	11.61	62.3
114715	8.13	8.33	0.513	0.328	128.4	11.7	60
114720	8.14	8.33	0.516	0.33	128	11.66	62.5
114725	8.14	8.33	0.514	0.329	127.8	11.61	60.4
114730	8.17	8.33	0.515	0.329	126.9	11.56	63.1
114735	8.16	8.33	0.515	0.33	126.5	11.52	59.6
Averages:	**8.13**	**8.33**	**0.514**	**0.328**	**127.93**	**11.65**	**60.66**

Comments:

Msg. Sunny and warm, breeze, Numerous cattle along creek bottom, High usage in riparian area, Rain Oct. 3 &4. **Flow 3.917**

McKinney Creek at Eagle

Grab Sample Data

Stream: **Mckinney Creek at Eagle Creek** *(macro)*

Site ID: 9Eagle2M

Site Coordinates: Lat- 41° 29′ 40.25″ Long- 107° 26′ 56.74″

Date & Time: **9/17/02** @ 10:48

Elevation: 7320

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 22.86 25.4= 580.644

Discharge Measurement: Visual Flow approx. less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
104710	11.88	7.83	0.354	0.226	93.1	7.67	26.7
104715	11.88	7.85	0.354	0.226	92.8	7.64	27.6
104720	11.89	7.85	0.354	0.226	92.7	7.64	35.1
104725	11.88	7.85	0.354	0.226	92.6	7.63	18.8
104730	11.89	7.85	0.354	0.226	92.6	7.63	28
104735	11.89	7.85	0.354	0.226	92.5	7.62	31.5
104740	11.89	7.85	0.354	0.226	92.5	7.62	16.5
104745	11.88	7.85	0.354	0.226	92.4	7.61	26.3
104750	11.89	7.85	0.354	0.226	92.4	7.62	29
104755	11.89	7.85	0.354	0.226	92.4	7.61	21.8
104800	11.89	7.85	0.354	0.226	92.3	7.6	24
104805	11.89	7.85	0.354	0.226	92.3	7.6	19.6
104810	11.89	7.85	0.354	0.226	92.4	7.61	26.8
104815	11.89	7.85	0.354	0.226	92.3	7.61	28.8
104820	11.9	7.85	0.354	0.226	92.2	7.6	23.6
104825	11.9	7.85	0.354	0.226	92.2	7.6	30.2
104857	11.91	7.85	0.354	0.226	92	7.58	24.6
104900	11.9	7.85	0.354	0.226	92.2	7.59	22.8
104905	11.91	7.85	0.354	0.226	92.2	7.59	28
Averages	**11.89**	**7.85**	**0.354**	**0.226**	**92.43**	**7.61**	**25.77**
Lab	**n/a**	**8.2**	**0.36**	**0.228**	**n/a**	**n/a**	**16.1**
SAR=	**0.44**						

Notes:

9/17/02 Mckinney Creek at Eagle Creek, Partly Sunny and Breeze, Cool
Lab Sample @ 11:00, Recent Precip.- 9/10 & 9/11, Air Temp= 13.7C,
Wind Ave= 7.0 mph, Rel Hum=45%, Flow less than 1 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0918-40175
D/T REC: 09-18-02 11:00 BY: CA
DATE COMPLETED:

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/17/02	Conductivity	.354
Time Collected	11:00	Dissolved O_2	92.3%, 7.60 mg/L
Discharge	<1/2 cfs	Turbidity	~23.0
Temperature	11.89°C	pH	7.85

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 359
Baggs, WY 82321

Sample ID: 9 McKEagle 2 M
Sampled By: LSRCD/Sheehan
Comments: Macro.

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/19	mg/L	55	Carbonate SRH 9/20	mg/L	0
Magnesium	mg/L	7.5	Bicarbonate	mg/L	180
Sodium	mg/L	13	Fluoride	mg/L	0.3
Potassium	mg/L	2.6	Chloride	mg/L	2.7
TDS (ROE/180) 9/19/02 Hn	mg/L	228	Nitrate as N	mg/L	<0.1
TSS Hn 9/19/02	mg/L	16.0	Nitrite as N	mg/L	<0.1
pH SRH 9/20	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/20	umhos/cm	360	Sulfate	mg/L	34
Turbidity SRH 9/18	NTU	16.1	Total Phosphate SRH 9/26	mg/L	0.07
			Total Alkalinity as $CaCO_3$ 9/20	mg/L	140
			Hardness as $CaCO_3$ RWH 9/24	mg/L	170

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts: SRH 9/26

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan
Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	17-Sep-2002		Lab No:	40175	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	55	2.74	Carbonate	0	0.00
Magnesium	7.5	0.62	Bicarbonate	180	2.95
Sodium	13	0.57	Chloride	2.7	0.08
Potassium	2.6	0.07	Fluoride	0.3	0.02
T. CATIONS		**3.99**	Nitrate as N	0	0.00
ROE 180	mg/L	228	Nitrite as N	0	0.00
TSS	mg/L	16.0	Ortho phosphate	0	0.00
Turbidity	NTU	16.1	Sulfate	39	0.81
			T. ANIONS		**3.85**
Conductance, umhos/cm		360	S A R (sodium Hazard)		0.44
TDS by Summation, mg/L		209	T Alk CaCO3, mg/L		148
pH, Units		8.2	Hardness as CaCO3, mg/L		168
Total Coliform	per 100 ml		Hardness as CaCO3, gr/gal		10

Analyte	Units	Result
Total Phosphate	mg/L	0.07
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.83
Meq Cations/Sp cond/100	1.11
Meq Anions/Sp cond/100	1.07
ROE/TDS Summation	1.09

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})} = 1.78\%$$ (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.68 (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = 1.09$$ (0.8 TO 1.2)

OVERALL =	0.0094	MAX. OVERALL ALLOWED =	0.0531

RLH

Grab Sample Data

Stream: **Mckinney Creek at Eagle Creek**

Site ID: 9Eagle1M

Site Coordinates: Lat- 41° 29' 40.25" Long- 107° 26' 56.74"

Date & Time: **9/11/01** 12:30

Elevation: 7320

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/4/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.25 X 25.4= 590.55

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= .834 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
122940	11.81	8.2	0.342	0.219	101.3	8.51	3.2
122945	11.81	8.2	0.342	0.219	101.3	8.51	0
122950	11.82	8.2	0.342	0.219	101.3	8.51	0
122955	11.82	8.2	0.342	0.219	101.4	8.52	2.7
123000	11.82	8.2	0.342	0.219	101.4	8.51	0
123005	11.82	8.2	0.342	0.219	101.3	8.5	10.9
123010	11.82	8.2	0.342	0.219	101.3	8.5	2.3
123015	11.82	8.2	0.342	0.219	101.3	8.5	4.3
123103	11.85	8.21	0.342	0.219	101.4	8.51	2.5
123105	11.85	8.21	0.342	0.219	101.5	8.51	0
Averages	**11.82**	**8.20**	**0.342**	**0.219**	**101.35**	**8.51**	**2.59**
Lab	**n/a**	**8.4**	**0.360**	**230mg/l**	**n/a**	**n/a**	**3.11**
SAR=	**0.326**						

Comment

Recent precip rain/snow mix 9/8 PM. Air Temp= 23.2C; Wind Ave= 4.2 mph; Rel Hum= 13%; Lab analysis attached.

Mckinney Crk @ Eagle Crk
9 Eagle 1M

$Na^{+} = 9.5/22.99 = .413$

$Ca^{2+} = 53/20.04 = 2.648$

$Mg^{2+} = 6.9/12.15 = .568$

$SAR = \left(.413 / \left((2.648 + .568)/2 \right) \right)^{0.5} =$

$1.608 \sqrt{} = 1.268$

$1/x = .7886$

$\times .413 =$

$SAR = .326$

LSRCD Discharge Measurement Notes

Stream: McKinney Creek @ Eagle Crk.

Site ID: 9 Eagle IM

Site Coordinates: 41° 29' 40.25" 107° 26' 56.74"

Date & Time: 9/11/01 @ 11:25

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: Calibrated 9/2/01

Outside Gage Reading: N/A

Measured Discharge

.834 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	EW/LB			
1.0	.225	—		
2.0	.325	—		
3.5	.400	—		
4.5	.550	.618	.340	
5.0	.550	.253	.070	
5.5	.550	.448	.123	
6.0	.500	.514	.129	
6.5	.550	.626	.172	
7.0	.625	—		
8.0	.550	—		
9.0	EW/RB			
		Total =	.834 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0912 33864

D/T REC: 09-12-01 11:00 BY: CM

DATE COMPLETED: 10.4.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/11/01	Conductivity	.342
Time Collected	12:46	Dissolved O_2	101.3%, 8.50 mg/L
Discharge		Turbidity	
Temperature	11.82°C	pH	8.2

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Eagle - M
Sampled By: LSRCD / Sheehan
Comments: McKinney @ Eagle

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium SBH 10/3	mg/L	53	Carbonate SBH 9/14	mg/L	8
Magnesium	mg/L	6.9	Bicarbonate	mg/L	160
Sodium	mg/L	9.5	Fluoride 9/13	mg/L	0.2
Potassium	mg/L	2.4	Chloride	mg/L	3.0
TDS (ROE 180) 9/12/01 Am	mg/L	230	Nitrate as N	mg/L	<0.1
TSS 9/13/01 Am	mg/L	4.07	Nitrite as N	mg/L	<0.1
pH SBH 9/14	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/12/01 Am	umhos/cm	360	Sulfate	mg/L	34
Turbidity 9/12/01 Am	NTU	3.11	Total Phosphate SBH 9/14	mg/L	0.04
			Total Alkalinity as $CaCO_3$ 9/14	mg/L	140
			Hardness as $CaCO_3$	mg/L	160

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: SBH 10-4-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Mckinney Creek at Eagle Creek**

Site ID: 9Eagle0M

Site Coordinates: Lat- 41° 29′ 40.25″ Long- 107° 26′ 56.74″

Date & Time: **9/19/00** 12:15

Elevation: 7320

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/11/00 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 22.90 X 25.4= 581.66

Discharge Measurement: Visual- Flow approx 2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
121425	13.84	8.23	0.356	0.228	100.7	7.96	21.9
121430	13.83	8.23	0.356	0.228	100.6	7.95	25.7
121435	13.83	8.23	0.356	0.228	100.5	7.95	22.6
121440	13.83	8.23	0.356	0.228	100.6	7.95	24.1
121445	13.83	8.23	0.356	0.228	100.5	7.94	23.8
121450	13.83	8.23	0.356	0.228	100.5	7.94	23
121455	13.82	8.23	0.357	0.228	100.4	7.94	24.6
121500	13.82	8.23	0.356	0.228	100.4	7.94	25.5
121505	13.82	8.23	0.356	0.228	100.5	7.94	21.8
121510	13.81	8.23	0.357	0.228	100.4	7.94	22.8
121515	13.82	8.23	0.356	0.228	100.4	7.94	24.9
121520	13.81	8.23	0.357	0.228	100.3	7.93	22.9
121525	13.81	8.23	0.356	0.228	100.2	7.93	23.1
121530	13.81	8.23	0.356	0.228	100.2	7.93	26.9
121535	13.87	8.24	0.356	0.228	100.4	7.93	22.2
121540	13.88	8.24	0.357	0.228	100.4	7.93	25.6
Averages	**13.83**	**8.23**	**0.356**	**0.228**	**100.44**	**7.94**	**23.84**

Comments:

McKinney Creek at Eagel Creek, 9/19/00, Visually 2-3 cfs, High sediment on substrate, Breeze and warm approx. 70F, young willow growth throughout reach, Eagle Creek dry, T18N, R89W, Sec. 32, NW 1/4 of NW 1/4

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0920-20890

D/T REC: 9/20/00 1100 **BY:** KW

DATE COMPLETED: 10-9-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/19/00	Conductivity	.356
Time Collected	12:10	Dissolved O_2	100.42, 7.94
Discharge	≈2 cfs	Turbidity	23.9
Temperature	13.83	pH	8.23

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Mck @ Eagle -00

Sampled By: LSRCD/Sheehan

Comments: Mid McKinney

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KB 9/28	mg/L	49	Carbonate KB 9/29	mg/L	—
Magnesium 9/29	mg/L	8.1	Bicarbonate	mg/L	180
Sodium 10/3	mg/L	15	Fluoride KB 9-20-00	mg/L	0.3
Potassium	mg/L	<1	Chloride	mg/L	2.8
TDS (ROE 180) 9-23 KD	mg/L	220	Nitrate as N	mg/L	<0.1
TSS KD 9-23	mg/L	16	Nitrite as N	mg/L	<0.1
pH KB 9/29	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab KD 11/4	umhos/cm	360	Sulfate	mg/L	39
Turbidity KB 9/20/00	NTU	23.2	Total Phosphate KB 10/6	mg/L	0.08
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	140
			Hardness as $CaCO_3$ 10/2	mg/L	160

SAR = 1.528

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: KB 10-9-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Little Muddy Creek

Grab Sample Data

Stream: **Little Muddy Creek** *(macro)*

Site ID: 9LiMud2M

Site Coordinates: Lat- 41° 29′ 28.96″ Long- 107° 21′ 20.62″

Date & Time: **9/11/02** @ 8:41

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 8/26/02

DO Calibration: Bar Pressure Reading 22.55 25.4= 572.77

Discharge Measurement: Visual Flow approx. less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
84015	10.98	7.92	0.301	0.192	103	8.55	6.1
84020	10.98	7.92	0.301	0.193	102.9	8.55	5.8
84025	10.98	7.92	0.301	0.193	102.9	8.54	5.9
84030	10.99	7.92	0.301	0.193	102.8	8.54	6.2
84035	10.99	7.92	0.301	0.193	102.8	8.53	5.8
84040	10.98	7.92	0.301	0.193	102.8	8.53	5.8
84045	10.99	7.93	0.301	0.193	102.7	8.53	5.5
84050	10.99	7.93	0.301	0.193	102.7	8.52	6.1
84055	10.99	7.93	0.301	0.193	102.7	8.53	6.1
84100	10.99	7.93	0.301	0.193	102.6	8.52	6.2
84105	11	7.92	0.301	0.193	102.6	8.51	5.8
84110	10.99	7.93	0.301	0.193	102.6	8.51	5.8
84115	10.99	7.93	0.301	0.193	102.6	8.51	6.6
84120	10.99	7.93	0.301	0.193	102.6	8.52	6.2
84200	11	7.93	0.301	0.193	102.3	8.49	5.5
84205	11	7.93	0.301	0.193	102.4	8.49	6
Averages	**10.99**	**7.93**	**0.301**	**0.193**	**102.69**	**8.52**	**5.96**
Lab	**n/a**	**8.2**	**0.3**	**0.18**	**n/a**	**n/a**	**5.72**
SAR=	**0.28**						

Notes:

9/11/02 Little Muddy, Cloudy and cool, Recent precip 9/9/02 & 9/8/02
Lab Sample @ 8:45, Air Temp= 12.5C, Wind Ave= 1.8 mph, Rel Hum= 69%
Flow= less than 1 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
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E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0912-40094

D/T REC: 09-12-02 11:00 BY: CA

DATE COMPLETED: 9/23/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/11/02	Conductivity	.301
Time Collected	8:45	Dissolved O_2	102.6%, 8.51 mg/L
Discharge	21 cfs	Turbidity	~5.2
Temperature	10.99°C	pH	7.93

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 9 Li Mud 2M
Sampled By: LSRCD/Sheehan
Comments: Macro site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/19	mg/L	44	Carbonate ~~EBH~~ 9/13	mg/L	0
Magnesium	mg/L	6.5	Bicarbonate	mg/L	130
Sodium	mg/L	7.6	Fluoride RWH 9/12/02	mg/L	0.2
Potassium	mg/L	3.1	Chloride	mg/L	2.3
TDS (ROE 180) Am 9/12/02	mg/L	180	Nitrate as N	mg/L	<0.1
TSS Am 9/13/02	mg/L	4.80	Nitrite as N	mg/L	<0.1
pH ~~EBH~~ 9/13	Units	8.2	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab	umhos/cm	300	Sulfate	mg/L	44
Turbidity 9/12	NTU	5.72	Total Phosphate ~~EBH~~ 9/12	mg/L	0.10
			Total Alkalinity as $CaCO_3$ 9/13	mg/L	110
			Hardness as $CaCO_3$ RWH 9/23	mg/L	140

Molybdenum = 0.016 mg/L RWH 9/19
Copper = 0.001 mg/L

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: Kenneth L McMillan

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 11-Sep-2002 | **Lab No:** 40094

CATIONS	mg/L	meq/L
Calcium	44	2.20
Magnesium	6.5	0.53
Sodium	7.6	0.33
Potassium	3.1	0.08
T. CATIONS		**3.14**
ROE 180	mg/L	180
TSS	mg/L	4.8
Turbidity	NTU	5.72

ANIONS	mg/L	meq/L
Carbonate	0	0.00
Bicarbonate	130	2.13
Chloride	2.3	0.06
Fluoride	0.2	0.01
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	44	0.92
T. ANIONS		**3.12**

Conductance, umhos/cm		300
TDS by Summation, mg/L		172
pH, Units		8.2
Total Coliform	per 100 ml	

S A R (sodium Hazard)	0.28
T Alk CaCO3, mg/L	107
Hardness as CaCO3, mg/L	137
Hardness as CaCO3, gr/gal	8

Analyte	Units	Result
Total Phosphate	mg/L	0.10
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.60
Meq Cations/Sp cond/100	1.05
Meq Anions/Sp cond/100	1.04
ROE/TDS Summation	1.05

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **0.29%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.57** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.04** (0.8 TO 1.2)

OVERALL =	0.0016	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Little Muddy Creek**

Site ID: 9LiMud1M

Site Coordinates: Lat- 41° 29′ 28.96″ Long- 107° 21′ 20.62″

Date & Time: **9/10/01** 8:37

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/4/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 22.63 X 25.4= 574.802

Discharge Measurement: Visual- Flow less than 1 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
83555	6.59	8.13	0.296	0.189	91.7	8.49	0
83600	6.59	8.13	0.296	0.19	91.4	8.46	2.1
83605	6.59	8.13	0.297	0.19	91.4	8.47	5.1
83610	6.59	8.13	0.297	0.19	91.4	8.47	2.9
83615	6.59	8.13	0.297	0.19	91.4	8.47	3.8
83620	6.59	8.13	0.297	0.19	91.4	8.46	0
83625	6.59	8.13	0.297	0.19	91.3	8.45	0
83630	6.59	8.13	0.296	0.19	91.4	8.46	7.5
83635	6.59	8.13	0.297	0.19	91.3	8.46	5.2
83640	6.59	8.13	0.297	0.19	91.3	8.45	7.2
83645	6.59	8.13	0.297	0.19	91.3	8.46	8.4
83650	6.59	8.13	0.297	0.19	91.3	8.45	4.1
83655	6.6	8.13	0.296	0.19	91.2	8.45	2.5
83719	6.6	8.13	0.297	0.19	91.5	8.47	4.6
83720	6.6	8.13	0.297	0.19	91.5	8.47	4.6
Averages	**6.59**	**8.13**	**0.297**	**0.190**	**91.39**	**8.46**	**3.87**
Lab	**n/a**	**8.3**	**0.300**	**230mg/L**	**n/a**	**n/a**	**1.76**
SAR=	**0.224**						

Comment

Precip snow/rain mix on PM 9/8, Air Temp= 19.2C; Wind Ave= 12.5 mph; Rel Hum= 16%; Lab analysis attached.

Lith Muddy

9 Limdlm

Na^{+} = $6.1/22.99$ = .265

Ca^{2+} = $4.6/20.04$ = 2.295

Mg^{2+} = $6.2/12.15$ = .510

$SAR = \left(.265 / \left((2.295 + .510)/2 \right) \right)^{0.5}$

$1.403\sqrt{} = 1.184$

$1/x = .844$

$x\ .265 =$

SAR .224

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0911-[illegible]

D/T REC: 09-11-01 10:30 BY: [illegible]

DATE COMPLETED: 10.4.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/10/01	Conductivity	.297
Time Collected	8:40 am	Dissolved O_2	91.3%; 8.46 mg/L
Discharge	.485 cfs	Turbidity	
Temperature	6.59°C	pH	8.13

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Li Mud-[illegible]
Sampled By: LSRCD/Sheehan
Comments: Mouth Site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium [illegible] 10/3	mg/L	46	Carbonate [illegible] 9/14	mg/L	<1
Magnesium	mg/L	6.2	Bicarbonate	mg/L	130
Sodium	mg/L	6.1	Fluoride KWH 9.11.01	mg/L	0.2
Potassium	mg/L	3.1	Chloride	mg/L	3.5
TDS (ROE 180) 9/12/01 [illegible]	mg/L	230	Nitrate as N	mg/L	<0.1
TSS 9/12/01 [illegible]	mg/L	<1.00	Nitrite as N	mg/L	<0.1
pH [illegible] 9/14	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 9/11/01 [illegible]	umhos/cm	300	Sulfate	mg/L	41
Turbidity 9/11/01 [illegible]	NTU	1.76	Total Phosphate [illegible] 9/14	mg/L	0.10
			Total Alkalinity as $CaCO_3$	mg/L	110
			Hardness as $CaCO_3$	mg/L	140

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: [illegible] 10-4-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Little Muddy**

Site ID: 9LiMud0

Site Coordinates: T18N, R88W, Sec. 31, SW1/4 of NW1/4

Date & Time: **9/18/00** 12:12

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 9/17/00

DO Calibration: Bar Pressure Reading 22.55 X 25.4= 572.77

Discharge Measurment: Visually approx. 1/2 cfs

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
121140	14.66	8.58	0.293	0.188	116.4	8.9	2.6
121145	14.66	8.58	0.293	0.188	116.5	8.91	0
121150	14.66	8.58	0.293	0.188	116.5	8.9	11.1
121155	14.66	8.58	0.293	0.188	116.5	8.9	8.9
121200	14.67	8.58	0.293	0.187	116.4	8.9	1
121302	14.72	8.58	0.293	0.188	116.5	8.9	1.3
121305	14.72	8.58	0.293	0.187	116.5	8.89	0
121310	14.72	8.59	0.293	0.188	116.5	8.9	6
121315	14.73	8.59	0.293	0.188	116.5	8.9	5.3
121320	14.73	8.58	0.293	0.187	116.5	8.89	0
121325	14.74	8.59	0.293	0.188	116.4	8.89	5.1
121330	14.74	8.59	0.293	0.188	116.3	8.88	6.4
121420	14.77	8.59	0.293	0.188	116.4	8.87	2.3
121425	14.77	8.59	0.293	0.188	116.3	8.87	11.5
Averages	**14.71**	**8.58**	**0.293**	**0.188**	**116.44**	**8.89**	**4.39**

Comments:

Little Muddy Site, 9/18/00 Sunny and warm, approx. 70F, No recent precip.
Visually 1/2 cfs, Breeze 10-15 mph

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0919-26868

D/T REC: 09/19/00 1030 BY: G

DATE COMPLETED: 10-9-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/18/00	Conductivity	.293
Time Collected	12:45	Dissolved O_2	116.4% 8.9
Discharge	2 1/2 cfs	Turbidity	21.2
Temperature	14.66 °C	pH	8.58

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: L.Mud-00

Sampled By: LSRCD/Sheehan

Comments: Little Muddy

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9/28	mg/L	39	Carbonate 9/29	mg/L	9
Magnesium 9/29	mg/L	6.8	Bicarbonate	mg/L	105
Sodium 10/3	mg/L	8.4	Fluoride 9/19/00	mg/L	0.2
Potassium	mg/L	1.3	Chloride	mg/L	2.6
TDS (ROE 180) 10-9-19	mg/L	180	Nitrate as N	mg/L	7.2
TSS 10 9-19	mg/L	3.8	Nitrite as N	mg/L	<0.1
pH 9/29	Units	~~8~~ 8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 10/04	umhos/cm	300	Sulfate	mg/L	45
Turbidity 9/19	NTU	4.32	Total Phosphate 10/6	mg/L	0.10
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	100
			Hardness as $CaCO_3$ 10/2	mg/L	130

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts: 10-9-00

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Upper McKinney Creek

Grab Sample Data

Stream: **Upper Mckinney Creek** *(macro)*

Site ID: 9UpMck2M

Site Coordinates: Lat- 41° 29′ 30.68″ Long- 107° 21′ 18.53″

Date & Time: **9/11/02** @ 9:02

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 8/26/02

DO Calibration: Bar Pressure Reading 22.55 25.4= 572.77

Discharge Measurement: Visual Flow approx. less than 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
90145	10.48	7.68	0.336	0.215	86.7	7.28	14.1
90150	10.48	7.68	0.336	0.215	86.6	7.27	13.4
90155	10.48	7.68	0.335	0.215	86.5	7.27	13.4
90200	10.48	7.68	0.336	0.215	86.5	7.27	11.5
90205	10.48	7.68	0.335	0.215	86.5	7.26	11.7
90210	10.48	7.68	0.336	0.215	86.5	7.26	10.8
90215	10.48	7.68	0.336	0.215	86.4	7.26	8.2
90220	10.48	7.68	0.335	0.215	86.5	7.26	11.2
90225	10.48	7.68	0.336	0.215	86.4	7.26	11.2
90230	10.49	7.68	0.335	0.214	86.4	7.25	11.6
90235	10.49	7.68	0.336	0.215	86.3	7.25	11
90240	10.49	7.68	0.336	0.215	86.3	7.24	9.8
90245	10.48	7.67	0.336	0.215	86.3	7.24	12.7
90250	10.49	7.67	0.336	0.215	86.3	7.25	9.5
90255	10.49	7.67	0.335	0.214	86.3	7.25	10
90300	10.49	7.67	0.335	0.214	86.2	7.24	10.1
90322	10.49	7.67	0.335	0.214	86.2	7.24	9.6
90325	10.5	7.67	0.335	0.214	86.2	7.24	9.3
Averages	**10.49**	**7.68**	**0.336**	**0.215**	**86.39**	**7.26**	**11.06**
Lab	**n/a**	**8.1**	**0.34**	**0.196**	**n/a**	**n/a**	**3.28**
SAR=	**0.26**						

Notes:

9/11/02 Upper Mckinney Creek, Recent Precip.- 9/8 & 9/9, Air Temp=12.7C, Wind Ave= 1.9 mph, Rel Hum= 70%, Cloudy and Cool, Lab Sample @ 9:10 Flow= less than 1/2 cfs

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 0912-40095
D/T REC: 09-12-02 11:00 BY: CA
DATE COMPLETED: 9/23/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/11/02	Conductivity	.335
Time Collected	9:10	Dissolved O_2	86.5%, 7.26 mg/L
Discharge	<1/2 cfs	Turbidity	11.2
Temperature	10.48°C	pH	7.68

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 359
Baggs, WY 82321

Sample ID: 9UpMcK2M
Sampled By: LSRCD/Sheehan
Comments: Macro Site

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 9/19	mg/L	57	Carbonate LGH 9/13	mg/L	0
Magnesium	mg/L	4.4	Bicarbonate	mg/L	170
Sodium	mg/L	7.6	Fluoride RWH 9/12	mg/L	0.3
Potassium	mg/L	4.3	Chloride	mg/L	3.3
TDS (ROE 180) JM 9/12/02	mg/L	196	Nitrate as N	mg/L	<0.1
TSS JM 9/13/02	mg/L	5.20	Nitrite as N	mg/L	<0.1
pH LGH 9/13	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab	umhos/cm	340	Sulfate	mg/L	32
Turbidity 9/12	NTU	3.28	Total Phosphate LGH 9/12	mg/L	0.08
			Total Alkalinity as $CaCO_3$ 9/13	mg/L	140
			Hardness as $CaCO_3$ RWH	mg/L	160

Molybdenum : 0.014 mg/L RWH 9/19
Copper : 0.001 mg/L

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 11-Sep-2002 | **Lab No:** 40095

CATIONS	mg/L	meq/L
Calcium	57	2.84
Magnesium	4.4	0.36
Sodium	7.6	0.33
Potassium	4.3	0.11
T. CATIONS		**3.65**
ROE 180	mg/L	196
TSS	mg/L	5.2
Turbidity	NTU	3.28

ANIONS	mg/L	meq/L
Carbonate	0	0.00
Bicarbonate	170	2.79
Chloride	3.3	0.09
Fluoride	0.3	0.02
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	32	0.67
T. ANIONS		**3.56**

Conductance, umhos/cm		340
TDS by Summation, mg/L		192
pH, Units		8.1
Total Coliform	per 100 ml	

S A R (sodium Hazard)	0.26
T Alk CaCO3, mg/L	139
Hardness as CaCO3, mg/L	160
Hardness as CaCO3, gr/gal	9

Analyte	Units	Result
Total Phosphate	mg/L	0.08
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.58
Meq Cations/Sp cond/100	1.07
Meq Anions/Sp cond/100	1.05
ROE/TDS Summation	1.02

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})} = 1.19\%$$ (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.67 (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = 1.06$$ (0.8 TO 1.2)

OVERALL =	0.0063	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Upper Mckinney Creek**

Site ID: 9UpMck1M

Site Coordinates: Lat- 41° 29′ 30.68″ Long- 107° 21′ 18.53″

Date & Time: **9/10/01** 9:00

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 9/4/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 22.63 X 25.4= 574.802

Discharge Measurement: Visual- Flow less than 1/2 cfs

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
85945	5.3	7.97	0.294	0.188	86	8.23	7
85950	5.3	7.98	0.294	0.188	86	8.23	7.4
85955	5.3	7.97	0.294	0.188	85.9	8.22	7.2
90000	5.3	7.97	0.294	0.188	85.9	8.22	8
90005	5.3	7.97	0.294	0.188	85.9	8.22	7.8
90010	5.31	7.97	0.294	0.188	85.9	8.22	7.8
90015	5.31	7.97	0.294	0.188	85.8	8.21	7.5
90020	5.31	7.98	0.294	0.188	85.8	8.21	7.7
90025	5.31	7.97	0.294	0.188	85.8	8.21	7.4
90030	5.31	7.98	0.294	0.188	85.8	8.21	8
90035	5.32	7.98	0.294	0.188	85.8	8.2	7.2
90040	5.32	7.98	0.294	0.188	85.8	8.2	7.6
90059	5.32	7.98	0.294	0.188	85.7	8.2	8.3
90100	5.32	7.98	0.294	0.188	85.7	8.2	8
Averages	**5.31**	**7.98**	**0.294**	**0.188**	**85.84**	**8.21**	**7.64**
Lab	**n/a**	**8.4**	**0.300**	**228mg/L**	**n/a**	**n/a**	**2.64**
SAR=	**0.227**						

Comment

Recent precip snow/rain mix 9/8 PM. Air Temp= 19.2C; Wind Ave= 12.4 mph; Rel Hum= 16%; Lab analysis attached.

Upper McKinney Creek

9 Upmeek / M

$Na^{+} = 6.1/22.99 = .265$

$Ca^{2+} = 49/20.04 = 2.445$

$Mg^{2+} = 3.3/12.15 = .272$

$SAR = \left(.265/(2.445 + .272)/2\right)^{0.5}$

$1.3585\sqrt{} = 1.166$

$1/x = .8579$

$\times .265 =$

$\boxed{SAR = .227}$

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES

1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 1911-33533

D/T REC: 9-11-01 10:30 BY: DA

DATE COMPLETED: 10.4.01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/10/01	Conductivity	.294
Time Collected	9:05 AM	Dissolved O_2	85.9%, 8.22 mg/L
Discharge	< ¼ cfs	Turbidity	
Temperature	5.30°C	pH	7.97

Sample ID: Up Mck-m

Sampled By: LSRCD/Sheehan

Comments:

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium KH 10/3	mg/L	49	Carbonate KH 9/14	mg/L	1
Magnesium	mg/L	3.3	Bicarbonate	mg/L	130
Sodium	mg/L	6.1	Fluoride KH 9.14.01	mg/L	0.3
Potassium	mg/L	3.1	Chloride	mg/L	3.9
TDS (ROE 180) 9/12/01 Hm	mg/L	228	Nitrate as N	mg/L	< 0.1
TSS 9/12/01 Hm	mg/L	2.50	Nitrite as N	mg/L	< 0.1
pH KH 9/14	Units	8.4	Ortho Phosphate	mg/L	< 0.1
Conductivity, Lab 9/11/01 Hm	umhos/cm	300	Sulfate	mg/L	42
Turbidity 9/11/01 Hm	NTU	2.64	Total Phosphate KH 9/14	mg/L	0.10
			Total Alkalinity as $CaCO_3$ 9/14	mg/L	110
			Hardness as $CaCO_3$	mg/L	140

S	R	Bottle
[X]	[ ]	1L Plain
[X]	[ ]	250ml Plain
[X]	[ ]	250ml HNO_3
[X]	[ ]	250ml H_2SO_4

Elect File: LSRCD01

Analysts: KH 10-4-01

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L McMillan

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: Mckinney Creek (Upper)

Site ID: UpMck

Site Coordinates: T18N, R89W, Sec. 32, NW1/4 of Nw1/4

Date & Time: 9/18/00 12:26

Elevation: 7860

Multiprobe Model & Serial #: Hydrolab H20 #30691 w/ stirrer

Calibration/ Sensors Details: Maintenance & Calibration completed on 9/17/00

DO Calibration: Bar Pressure Reading 22.55 X 25.4= 572.77

Discharge Measurment: Visual approx. 1/2 cfs

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
122540	14.16	8.11	0.319	0.204	102.3	7.9	1.9
122545	14.18	8.11	0.319	0.204	102.3	7.9	1.7
122550	14.19	8.1	0.319	0.204	102.4	7.91	1.6
122555	14.2	8.1	0.319	0.204	102.4	7.91	1.7
122600	14.2	8.1	0.319	0.204	102.5	7.91	1.7
122605	14.21	8.1	0.319	0.204	102.4	7.9	1.7
122610	14.2	8.1	0.319	0.204	102.5	7.91	1.6
122615	14.22	8.1	0.319	0.204	102.5	7.91	1.7
122620	14.22	8.1	0.319	0.204	102.6	7.92	1.6
122625	14.23	8.1	0.319	0.204	102.4	7.9	1.7
122630	14.23	8.1	0.319	0.204	102.4	7.9	1.8
122635	14.24	8.1	0.319	0.204	102.3	7.9	1.7
122640	14.25	8.1	0.319	0.204	102.3	7.89	1.8
122645	14.25	8.1	0.319	0.204	102.4	7.9	1.8
122650	14.26	8.1	0.319	0.204	102.4	7.9	1.8
122655	14.26	8.1	0.319	0.204	102.3	7.89	1.6
122700	14.25	8.1	0.32	0.204	102.4	7.9	1.7
122734	14.31	8.1	0.319	0.204	102.4	7.88	1.8
122735	14.31	8.1	0.319	0.204	102.4	7.88	1.8
Averages	**14.23**	**8.10**	**0.319**	**0.204**	**102.40**	**7.90**	**1.72**

Comments:

Msg. Sunny and warm, flow visual approx. 1/2 cfs, no recent precip.

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0919-26869
D/T REC: 09/19/00 – 1030 BY: EJ
DATE COMPLETED: 10-9-2000

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/18/00	Conductivity	.319
Time Collected	12:50	Dissolved O_2	102.3%, 7.91 mg/L
Discharge	est ½ cfs	Turbidity	est 4.8
Temperature	14.6°C	pH	8.10

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Up McK-00
Sampled By: LSRCD/Sheehan
Comments: Upper McKinney Creek

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium 9/28 9/28	mg/L	49	Carbonate 9/28 9/29	mg/L	0
Magnesium 9/29	mg/L	4.3	Bicarbonate	mg/L	140
Sodium 10/3	mg/L	7.3	Fluoride 9/19/00	mg/L	0.3
Potassium 10/3	mg/L	1.6	Chloride	mg/L	3.3
TDS (ROE 180) 10/19	mg/L	~~90~~ 180	Nitrate as N	mg/L	<0.1
TSS 10 9/19	mg/L	2.0	Nitrite as N	mg/L	<0.1
pH 9/28 9/29	Units	8.1	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 10 10/4	umhos/cm	320	Sulfate	mg/L	41
Turbidity 9/19	NTU	4.08	Total Phosphate 9/28 10/6	mg/L	0.10
			Total Alkalinity as $CaCO_3$ 9/29	mg/L	120
			Hardness as $CaCO_3$ 10/2	mg/L	140

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts: 9/28 10 9-10

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Doty Mountain

Grab Sample Data

Stream: **Muddy Creek (Doty Mtn Site)** (*(macro)*

Site ID: 9Doty2M

Site Coordinates: Lat- 41° 28´ 24.41´´ Long- 107° 36´ 46.81´´

Date & Time: **9/30/02** @ 10:24

Elevation: 6820

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer S/N# 30691

Calibration/ Sensors Details: Multiprobe maintained & calibrated 9/16/02

DO Calibration: Bar Pressure Reading 23.25 25.4= 590.55

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.14 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
102335	7.62	8.41	0.815	0.521	88.9	8.23	33.2
102340	7.62	8.4	0.815	0.522	88.8	8.21	22.2
102345	7.62	8.4	0.815	0.522	88.7	8.21	49.4
102350	7.62	8.4	0.815	0.522	88.7	8.2	12.5
102355	7.62	8.41	0.815	0.521	88.6	8.2	15.5
102400	7.62	8.41	0.815	0.521	88.6	8.2	10.2
102405	7.63	8.4	0.815	0.521	88.5	8.19	10.5
102410	7.63	8.41	0.815	0.521	88.5	8.19	3.6
102415	7.63	8.41	0.815	0.522	88.5	8.19	5
102420	7.63	8.41	0.815	0.521	88.5	8.18	23.3
102425	7.63	8.41	0.815	0.521	88.4	8.18	11.2
102430	7.63	8.41	0.815	0.521	88.4	8.18	6.2
102435	7.63	8.41	0.815	0.521	88.4	8.17	13.5
102501	7.63	8.41	0.815	0.522	88.4	8.18	8.2
102505	7.64	8.41	0.815	0.521	88.3	8.16	24.1
102510	7.64	8.41	0.815	0.521	88.2	8.16	27.3
Averages	**7.63**	**8.41**	**0.815**	**0.521**	**88.53**	**8.19**	**17.24**
Lab	**n/a**	**8.5**	**0.85**	**0.58**	**n/a**	**n/a**	**15.3**
SAR=	**1.41**						

Notes:

Muddy Creek (Doty Mtn) 9/30/02, light rain during sampling, light rain on 9/27, Lab Sample @ 10:05, Air Temp= 11.8C, Wind Ave= 10.4 mph, Rel Hum= 53%, Cloudy and Cool, Flow= 1.14 cfs

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Doty mtn)

Site ID: 9 Doty 2 M macro

Site Coordinates: 41° 28' 24.41", 107° 36' 46.81"

Date & Time: 9/30/02 @ 12:05

Meter Model & Serial #: Swoffer Flow Meter-model 3000

Calibration Details: 8/26/02 Calibration

Measured Discharge

1.14 cfs

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			Measured by: LSRCD/S Sheera Checked by: Dustin C. Jeringer
1.0	.475	.186	.088	
2.0	.475	.216	.103	
3.0	.500	.257	.129	
4.0	.450	.254	.114	
5.0	.425	.444	.188	
6.0	.425	.482	.205	
7.0	.375	.422	.158	
8.0	.350	.313	.110	
9.0	.400	.112	.045	
9.6	WE/LB			
		Total	1.14 cfs	

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

LAB No: 1001-40360
D/T REC: 10/1/02 11:00 BY: ~~AH~~
DATE COMPLETED: 10/21/02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	9/30/02	Conductivity	.815
Time Collected	10105	Dissolved O_2	88.4% 8.18 mg/L
Discharge	~1-2 cfs	Turbidity	~5.0
Temperature	7.63°C	pH	8.41

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 358
Baggs, WY 82321

Sample ID: 9 Doty 2 m
Sampled By: LSRCD/Sheehan
Comments: Macro #16

UPS Address: 285 N Penland.
Phone: 307-383-7660 E-mail: lsrcd@yahoo.com
FAX: 307-383-7661

Invoice #: VQSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 10/4	mg/L	66	Carbonate RWH 10/3	mg/L	10 ~~8.8~~ RWH
Magnesium	mg/L	40	Bicarbonate	mg/L	190
Sodium	mg/L	59	Fluoride RWH 10/1	mg/L	0.3
Potassium	mg/L	5.9	Chloride	mg/L	8.9
TDS (ROE 180) tbm 10/3/02	mg/L	~~284~~ 580	Nitrate as N	mg/L	<0.1
TSS tbm 10/2/02	mg/L	15.6	Nitrite as N	mg/L	<0.1
pH RWH 10/3	Units	8.5	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab tbm 10/1/02	umhos/cm	850	Sulfate	mg/L	240
Turbidity tbm 10/1/02	NTU	15.3	Total Phosphate RWH 10/31	mg/L	0.03
			Total Alkalinity as $CaCO_3$ RWH 10/3	mg/L	170
			Hardness as CaCO RWH 10/5	mg/L	330

Copper = 0.002 mg/L RWH 10/4/02
Molybdenum = 0.014 mg/L

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Select. File: LSRCD01 Analysis: RWH 10-21-02

*Laboratory facility the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 30-Sep-2002 **Lab No:** 40360

CATIONS	mg/L	meq/L
Calcium	66	3.29
Magnesium	40	3.29
Sodium	59	2.57
Potassium	5.9	0.15
T. CATIONS		**9.30**
ROE 180	mg/L	580
TSS	mg/L	15.6
Turbidity	NTU	15.3

ANIONS	mg/L	meq/L
Carbonate	10	0.33
Bicarbonate	190	3.11
Chloride	8.9	0.25
Fluoride	0.3	0.02
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	240	5.00
T. ANIONS		**8.71**

Conductance, umhos/cm		850
TDS by Summation, mg/L		524
pH, Units		8.5
Total Coliform	per 100 ml	

S A R (sodium Hazard)		1.41
T Alk CaCO3, mg/L		173
Hardness as CaCO3, mg/L		329
Hardness as CaCO3, gr/gal		19

Analyte	Units	Result
Total Phosphate	mg/L	0.03
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.68
Meq Cations/Sp cond/100	1.09
Meq Anions/Sp cond/100	1.02
ROE/TDS Summation	1.11

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 3.27% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.62 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.06 (0.8 TO 1.2)

OVERALL =	0.0190	MAX. OVERALL ALLOWED =	0.0531

RWH

Grab Sample Data

Stream: **Muddy Creek (Doty Mtn Site)**

Site ID: 10Doty1M

Site Coordinates: Lat- 41° 28´ 24.41´´ Long- 107° 36´ 46.81´´

Date & Time: **10/1/01** 12:44

Elevation: 6820

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe #30691 w/ stirrer

Calibration/ Sensors Details: 10/01/01 Multiprobe maintained and calibrated

DO Calibration: Bar Pressure Reading 23.55 X 25.4= 598.17

Discharge Measurement: Swoffer Flow Meter model 3000 **Flow= 1.423 cfs**

Field Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb-n
124400	13.86	8.46	0.71	0.454	89.4	7.25	27.3
124405	13.86	8.46	0.71	0.454	89.2	7.23	28.5
124410	13.87	8.46	0.71	0.454	89	7.22	31.7
124415	13.87	8.46	0.71	0.454	88.6	7.19	29.4
124420	13.88	8.46	0.71	0.454	87.7	7.11	28.2
124425	13.88	8.46	0.709	0.454	88.2	7.15	25.7
124430	13.89	8.46	0.71	0.454	89.4	7.25	27.9
124435	13.89	8.46	0.709	0.454	90.1	7.3	25
124440	13.89	8.46	0.71	0.454	89.8	7.28	25
124445	13.88	8.46	0.71	0.454	89.5	7.26	25
124514	13.88	8.46	0.71	0.454	90.1	7.31	29.9
124515	13.88	8.46	0.71	0.454	90.2	7.31	26.1
124520	13.89	8.46	0.71	0.454	90.3	7.32	26.7
Averages	**13.88**	**8.46**	**0.710**	**0.454**	**89.35**	**7.24**	**27.42**
Lab	**n/a**	**8.40**	**0.730**	**488mg/L**	**n/a**	**n/a**	**15.10**
SAR=	**1.002**						

Comment

Sunny and unseasonal warm, No recent precip. Air Temp= 23.8C; Wind Ave= 5.6 mph; Rel Hum= 18%; Lab analysis attached.

Muddy Creek @ Doty Mtn

10 Doty 1 M

Na^{+1} = $40/22.97$ = 1.740

Ca^{+2} = $73/20.04$ = 3.643

Mg^{+2} = $29/12.15$ = 2.387

$$SAR = \left(1.740 / \left((3.643 + 2.387)/2 \right) \right)^{0.5}$$

$3.015\sqrt{} = 1.736$

$1/x = .576$

$\times\ 1.740 =$

SAR = 1.002

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 1003-34360
D/T REC: 10-03-01 11:00 BY: CA
DATE COMPLETED: 10-23-01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	10/1/01	Conductivity	-710
Time Collected	12:55	Dissolved O_2	90.1%, 7.31 mg/L
Discharge	1,423 cfs	Turbidity	
Temperature	13.86 °C	pH	8.46

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Doty-M
Sampled By: LSRCD/Sheehan
Comments: Macro

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium LSRH 10/16	mg/L	73	Carbonate LSRH 10/5	mg/L	4
Magnesium	mg/L	29	Bicarbonate	mg/L	200
Sodium	mg/L	40	Fluoride RWH 10.8.01	mg/L	0.3
Potassium	mg/L	5.6	Chloride	mg/L	7.5
TDS (ROE 180) 10/3/01	mg/L	488	Nitrate as N*	mg/L	<0.1
TSS 10/3/01 [illegible]	mg/L	~~[illegible]~~ 16.0	Nitrite as N*	mg/L	<0.1
pH LSRH 10/5	Units	8.4	Ortho Phosphate*	mg/L	<0.1
Conductivity, Lab 10/3/01 [illegible]	umhos/cm	73.0	Sulfate [illegible]	mg/L	210
Turbidity 10/3/01 [illegible]	NTU	15.1	Total Phosphate LSRH 10/9	mg/L	<0.02
			Total Alkalinity as $CaCO_3$ 10/5	mg/L	170
			Hardness as $CaCO_3$	mg/L	300

*- analysis was not conducted within maximum holding time

S	R	Bottle
[✓]	[ ]	1L Plain
[✓]	[ ]	250ml Plain
[✓]	[ ]	250ml HNO_3
[✓]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Muddy Creek at Doty Mtn.**

Site ID: 11Doty9

Site Coordinates: T17N, R91W, Sec. 02, SW 1/4 of SE 1/4

Date & Time: **11/15/99** 14:30

Elevation: 6820

Multiprobe Model & Serial #: Hydrolab H20 Multiprobe w/ Stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated 11/14/99

DO Calibration: Bar Pressure Reading X 25.4=

Discharge Measurement: Swoffer Flow Meter- model 2100-14 **Flow= 10.653**

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
142935	6.52	8.25	0.802	0.513	103.7	9.23	38.5
142940	6.52	8.25	0.802	0.513	103.7	9.23	38.5
142945	6.52	8.25	0.802	0.513	102.8	9.19	38.7
142950	6.54	8.26	0.802	0.513	102.8	9.19	38.6
142955	6.54	8.26	0.802	0.513	103	9.2	38.6
143000	6.53	8.25	0.802	0.513	103.2	9.21	39.5
143005	6.54	8.25	0.802	0.513	103.2	9.21	42.8
143010	6.54	8.25	0.802	0.513	103.5	9.22	42.6
143015	6.53	8.25	0.802	0.513	103.7	9.23	42.6
143020	6.53	8.25	0.802	0.513	103.7	9.23	42.5
Averages	**6.531**	**8.252**	**0.802**	**0.513**	**103.33**	**9.214**	**40.29**

Comments:

Doty Mtn., 11/15/99, Dry no recent precip., Water cold. Flow= 10.653

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION &
OFFICIAL ANALYSIS REPORT

RECEIVED NOV 28 1999

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 441 Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

LAB No: 1116-21456

D/T REC: 11/16/99 1500 BY: JGH

DATE COMPLETED: RWH 12.23.99

Date Collected		11/15/99
Time Collected		1430
Discharge		
Temperature	degrees C	
pH	Units	

Sample ID: Doty mtn. #25
Sampled By: Sheehan / LSRCD
Comments: Muddy Creek (Rock Crossing)

Invoice #:
Amount: [redacted]

PARAMETER		UNITS	RESULT
Calcium RWH 11-22-99		mg/L	92
Magnesium	12-14-99	mg/L	34
Sodium	11-23	mg/L	47
Potassium	12-15-99	mg/L	3.7
Hardness as $CaCO_3$		mg/L	340
TDS (ROE 180) RWH 11/9/99		mg/L	580
TSS RS 11/16/99		mg/L	57
pH RWH 12/1/99		Units	8.1
Conductivity, Lab		umhos/cm	840

PARAMETER	UNITS	RESULT
Total Alkalinity as $CaCO_3$ 12/06	mg/L	190
Fluoride RWH 11-16-99	mg/L	0.2
Chloride	mg/L	9.2
Nitrate as N	mg/L	<0.1
Nitrite as N	mg/L	<0.1
Ortho Phosphate	mg/L	<0.1
Total Phosphate RWH 12/8/99	mg/L	0.16
Sulfate RWH 12/20/99	mg/L	240
Turbidity RWH 11.16.99	NYU	47
Carbonate 12/1/99	mg/L	0
Bicarbonate 1	mg/L	270

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶ 1

To WDA	From S Sheehan
Dept./Agency Analytical Service	Phone # 307-383-7860
Fax # 742-2154	Fax # 307-383-7861

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Sample Containers: 1 x 1L Plain, 1 x 250 ml Plain, 1 x 1 250 ml HNO_3 and 1 x 250 m, H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Red Wash

Grab Sample Data

Stream: **Red Wash**

Site ID: Red Wash below ponds

Site Coordinates: T16N, R92W, Sec. 32, SW1/4 of NW1/4

Date & Time: **4/16/01** 11:53

Elevation: 6510

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated on 4/16/01

DO Calibration: Bar Pressure Reading 23.0 X 25.4=603.25

Discharge Measurement: Visual 2-3 cfs

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115220	9.76	8.37	0.89	0.57	85.5	7.76	32.7
115225	9.78	8.38	0.89	0.57	84.9	7.7	40.3
115230	9.8	8.35	0.89	0.57	85.8	7.77	37.9
115235	9.81	8.38	0.891	0.57	87.2	7.9	36.6
115240	9.82	8.36	0.889	0.569	87.9	7.96	40.6
115245	9.83	8.38	0.89	0.569	88.3	8	36.1
115250	9.84	8.38	0.89	0.57	88.6	8.02	34.7
115255	9.87	8.36	0.887	0.567	88.7	8.03	36.7
115300	9.87	8.37	0.882	0.564	88.8	8.04	35.2
115305	9.88	8.37	0.891	0.57	88.7	8.02	45
115310	9.89	8.38	0.887	0.567	88.2	7.97	37.3
115315	9.9	8.36	0.889	0.569	88.3	7.98	39.9
115320	9.92	8.36	0.891	0.57	88.3	7.98	38.8
115325	9.93	8.36	0.891	0.57	88.3	7.98	44.5
115330	9.94	8.35	0.872	0.558	88.4	7.98	48.2
115335	9.95	8.35	0.891	0.57	88.5	7.99	41.2
115340	9.96	8.35	0.885	0.566	88.7	8.01	45.1
115405	9.97	8.34	0.891	0.57	86.4	7.79	32.4
115410	9.98	8.34	0.889	0.569	85.7	7.73	40
Averages	**9.88**	**8.36**	**0.888**	**0.568**	**87.64**	**7.93**	**39.12**
Lab	**n/a**	**7.9**	**0.91**	**0.634**	**n/a**	**n/a**	**30.2**

Comments:

4/16/01, Red Wash below ponds, Sunny and Warm, Visual 2-3 cfs

SAR= 2.742

Red Wash

¼ Below Pond 1

Na^{+} = 100/22.97 = 4.350

Ca^{2+} = 58/20.04 = 2.894

Mg^{2+} = 26/12.15 = 2.140

$SAR = \left(4.350 / \left((2.894 + 2.140)/2 \right) \right)^{0.5} =$

$2.517 \sqrt{} = 1.586$

$1/4 = .6303$

$\times\ 4.350 =$

SAR 2.742

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0417-29933

D/T REC: 04-17-01 10:30 BY: CA

DATE COMPLETED: 5-31-01

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	4/16/01	Conductivity	1982
Time Collected	1200	Dissolved O_2	8.04 mg/L
Discharge	≈ 2-3 cfs	Turbidity	≈
Temperature	9.87°C	pH	8.38

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: Red Wash

Sampled By: LSRCD/Sheehan

Comments: Below Ponds

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR

Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 4/19	mg/L	58	Carbonate RWH 4/20	mg/L	<
Magnesium	mg/L	26	Bicarbonate	mg/L	130
Sodium	mg/L	100	Fluoride RWH 4.17.01	mg/L	0.3
Potassium	mg/L	5.7	Chloride	mg/L	11
TDS (ROE 180) RWH 4.17.01	mg/L	634	Nitrate as N	mg/L	<0.1
TSS RWH 5.5.01	mg/L	30.5	Nitrite as N	mg/L	<0.1
pH RWH 4/20	Units	7.9	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 4/23	umhos/cm	910	Sulfate	mg/L	320
Turbidity RWH 4.17.01	NTU	30.2	Total Phosphate RWH 4/20	mg/L	0.07
			Total Alkalinity as $CaCO_3$ 4/20	mg/L	110
			Hardness as $CaCO_3$ 4/20	mg/L	250

S	R	Bottle
[X]	[ ]	1L Plain
[X]	[ ]	250ml Plain
[X]	[ ]	250ml HNO_3
[X]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Grab Sample Data

Stream: **Red Wash Pond #1**

Site ID: 4RdOne1

Site Coordinates: T16N, R92W, Sec. 29, S1/2 of SE1/4

Date & Time: **4/26/01** 10:50

Elevation: 6517

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated on 4/26/01

DO Calibration: Bar Pressure Reading 23.0 X 25.4=603.25

Discharge Measurement: Visual 1-2 cfs through outlet

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
104935	10.15	8.06	0.94	0.601	92.5	8.23	30.8
104940	10.15	8.06	0.941	0.602	92.5	8.22	28.4
104945	10.15	8.06	0.952	0.609	92	8.18	33.8
104950	10.15	8.06	0.947	0.606	91.7	8.15	33.8
104955	10.15	8.06	0.951	0.608	92.2	8.2	35.8
105000	10.15	8.06	0.942	0.603	92.4	8.21	25.4
105005	10.15	8.06	0.939	0.601	92.2	8.2	40.8
105010	10.16	8.06	0.946	0.605	92.3	8.21	23.8
105015	10.17	8.06	0.942	0.602	91.8	8.16	37.1
105020	10.17	8.06	0.94	0.602	91.7	8.15	36.7
105025	10.17	8.04	0.951	0.609	91.5	8.14	35.8
105030	10.17	8.06	0.952	0.609	91.2	8.1	32.3
105035	10.16	8.06	0.949	0.607	92.1	8.16	32.4
105040	10.17	8.06	0.952	0.609	91.2	8.1	27.4
105118	10.15	8.07	0.944	0.604	91.3	8.12	34.4
105120	10.16	8.07	0.951	0.608	91.5	8.13	30.5
Averages	**10.16**	**8.06**	**0.946**	**0.605**	**91.88**	**8.17**	**32.45**

Comments:

4/26/01, Red Wash Pond #1, Sunny and Warm, Approx. 70F
Pond partly full, water flowing through outlet.

Grab Sample Data

Stream: **Red Wash Pond #2**

Site ID: 4RdTwo1

Site Coordinates: T16N, R92W, Sec. 29, S1/2 of SE1/4

Date & Time: **4/26/01** 11:45

Elevation: 6517

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated on 4/26/01

DO Calibration: Bar Pressure Reading 23.0 X 25.4=603.25

Discharge Measurement: Visual 1-2 cfs through outlet

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
114415	12.93	8.5	1.12	0.717	123.3	10.28	11.8
114420	12.95	8.5	1.122	0.718	123.1	10.26	12.2
114425	12.95	8.5	1.116	0.714	122.7	10.22	12.9
114430	12.95	8.51	1.118	0.715	123.2	10.27	11.5
114435	12.94	8.5	1.119	0.716	123.4	10.28	12.9
114440	12.95	8.5	1.123	0.719	123.7	10.31	10.6
114445	12.95	8.5	1.121	0.717	123.6	10.3	12.7
114450	12.95	8.51	1.116	0.714	123.5	10.29	10.6
114455	12.96	8.5	1.118	0.715	123.2	10.27	11.1
114500	12.96	8.5	1.12	0.717	122.7	10.22	12.3
114505	12.96	8.5	1.116	0.714	122.8	10.23	10.3
114510	12.96	8.5	1.116	0.714	123.1	10.25	12
114515	12.96	8.51	1.114	0.713	123	10.24	12.2
114520	12.96	8.51	1.113	0.712	123.3	10.27	11.6
114525	12.97	8.51	1.115	0.713	123.1	10.25	11.5
114548	12.97	8.51	1.115	0.713	122.6	10.21	10.3
114550	12.98	8.5	1.113	0.712	122.6	10.21	12.6
Averages	**12.96**	**8.50**	**1.117**	**0.715**	**123.11**	**10.26**	**11.71**

Comments:

4/26/01, Red Wash Pond #2, water at HWL, visual flow 1-2 cfs through outlet

Grab Sample Data

Stream: **Red Wash Pond #3**

Site ID: 4RdThr1

Site Coordinates: T16N, R92W, Sec. 32, SW1/4 of NW1/4

Date & Time: **4/26/01** 11:59

Elevation: 6517

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated on 4/26/01

DO Calibration: Bar Pressure Reading 23.0 X 25.4=603.25

Discharge Measurement: Visual 1-2 cfs through outlet

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
115855	13.91	8.48	1.14	0.73	119.1	9.71	16.1
115900	13.91	8.48	1.147	0.734	119	9.71	16
115905	13.91	8.48	1.142	0.73	119	9.7	16.7
115910	13.91	8.48	1.147	0.734	118.9	9.7	16.4
115915	13.91	8.48	1.146	0.734	118.7	9.68	17.1
115920	13.91	8.48	1.142	0.731	118.8	9.69	16.6
115925	13.91	8.48	1.138	0.728	118.8	9.69	16.1
115930	13.91	8.48	1.146	0.733	118.7	9.68	16.3
115935	13.91	8.48	1.139	0.729	118.5	9.66	16.8
115940	13.91	8.48	1.149	0.735	118.8	9.69	16.9
115945	13.91	8.48	1.14	0.729	118.8	9.69	17
115950	13.91	8.49	1.147	0.734	118.7	9.68	15.8
115955	13.91	8.48	1.142	0.731	119.1	9.71	16.5
120018	13.91	8.49	1.139	0.729	119.1	9.71	16.4
120020	13.91	8.49	1.137	0.728	119	9.71	15.4
Averages	**13.91**	**8.48**	**1.143**	**0.731**	**118.87**	**9.69**	**16.41**

Comments:

4/26/01, Red Wash Pond #3, Pond full water at HWL, water flowing through outlet.

Grab Sample Data

Stream: **Red Wash Pond #4**

Site ID: 4RdFour1

Site Coordinates: T16N, R92W, Sec. 30, SE1/4 of SE1/4

Date & Time: **4/26/01** 11:20

Elevation: 6517

Multiprobe Model & Serial #: Hydrolab Multiprobe H20 w/ stirrer #30691

Calibration/ Sensors Details: Maintained and Calibrated on 4/26/01

DO Calibration: Bar Pressure Reading 23.0 X 25.4=603.25

Discharge Measurement: Visual 1-2 cfs through outlet

Gage Reading: n/a

Creek Sample:

Time	Temp (C)	pH	EC	TDS	DO %sat	DO mg/l	Trb
111950	12.67	8.65	1.168	0.747	105.6	8.85	15.1
111955	12.68	8.65	1.162	0.744	105.8	8.87	12.5
112000	12.68	8.65	1.163	0.744	105.9	8.87	10
112005	12.69	8.65	1.169	0.748	105.7	8.86	9.9
112010	12.68	8.65	1.168	0.747	105.6	8.85	9.6
112015	12.69	8.65	1.17	0.748	105.5	8.84	11.3
112020	12.69	8.65	1.168	0.747	105.4	8.84	12
112025	12.68	8.65	1.169	0.748	105.5	8.84	9.8
112030	12.69	8.65	1.168	0.747	105.3	8.83	11.9
112035	12.69	8.65	1.166	0.746	105.3	8.82	10.2
112040	12.7	8.65	1.162	0.744	105.3	8.83	10.8
112045	12.7	8.65	1.169	0.748	105.3	8.83	8.6
112050	12.7	8.65	1.167	0.747	105.1	8.81	11.2
112055	12.71	8.65	1.163	0.744	105.2	8.81	9.4
112100	12.7	8.65	1.161	0.743	105	8.8	10.3
112121	12.71	8.66	1.166	0.746	105	8.79	10.5
112125	12.72	8.66	1.165	0.745	105.1	8.8	23.3
Averages	**12.69**	**8.65**	**1.166**	**0.746**	**105.39**	**8.83**	**11.55**

Comments:

4/26/01, Red Wash Pond **#4**, pond full and water flowing through outlet, sampled in front of outlet structure.

Art Samples

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0724-39113

D/T REC: 8-24-02 11:00 BY: CA

DATE COMPLETED: 8.11.02

COLLECTION DATA & FIELD MEASUREMENTS			
Date Collected	7/23/02	Conductivity	
Time Collected	1315	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 7 Duck Flow 2
Sampled By: LSRCD/Stratton
Comments: T16N R91W, Sec 22
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 8/9/02	mg/L	4.0	Carbonate SZH 7/26	mg/L	34
Magnesium	mg/L	2.0	Bicarbonate	mg/L	1100
Sodium	mg/L	510	Fluoride 7/24	mg/L	~~2.8~~ 2.8
Potassium	mg/L	3.9	Chloride	mg/L	56
TDS (ROE 180) 7/25/02	mg/L	1230 RWH	Nitrate as N	mg/L	<0.1
TSS Hm 7/25/02	mg/L	6160	Nitrite as N	mg/L	<0.1
pH SZH 7/26	Units	8.6	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 7/24	umhos/cm	1900	Sulfate	mg/L	62
Turbidity 7/24	NTU	61.5	Total Phosphate SZH 7/31	mg/L	0.18
			Total Alkalinity as $CaCO_3$ 7/26	mg/L	920
			Hardness as $CaCO_3$ RWH 8/11	mg/L	18

Boron = 1.1 mg/L RWH 8/9/02

S	R	Bottle
[ ]	[ ] CA	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Supervisor

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	23-Jul-2002		Lab No:	39113	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	4.0	0.20	Carbonate	34	1.13
Magnesium	2.0	0.16	Bicarbonate	1100	18.03
Sodium	510	22.18	Chloride	56	1.58
Potassium	3.9	0.10	Fluoride	2.8	0.15
T. CATIONS		**22.64**	Nitrate as N	0	0.00
ROE 180	mg/L	1230	Nitrite as N	0	0.00
TSS	mg/L	66.0	Ortho phosphate	0	0.00
Turbidity	NTU	61.5	Sulfate	62	1.29
			T. ANIONS		**22.18**

Conductance, umhos/cm	1900	S A R (sodium Hazard)	51.99
TDS by Summation, mg/L	1216	T Alk CaCO3, mg/L	959
pH, Units	8.6	Hardness as CaCO3, mg/L	18
Total Coliform per 100 ml		Hardness as CaCO3, gr/gal	1

Analyte	Units	Result
Total Phosphate	mg/L	0.18
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.65
Meq Cations/Sp cond/100	1.19
Meq Anions/Sp cond/100	1.17
ROE/TDS Summation	1.01

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = **1.04%** (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = **0.64** (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = **1.18** (0.8 TO 1.2)

OVERALL =	0.0056	MAX. OVERALL ALLOWED =	0.0531

RWH

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0724-39114
D/T REC: 07-24-02 11:00 BY: CA
DATE COMPLETED: 8.11.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	7/23/02	Conductivity	
Time Collected	1300	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: > Bit Dp Crk 2
Sampled By: LSRCD/Sheehan
Comments: T7CN R91W, Sec. 28

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWT 8/9/02	mg/L	7.6	Carbonate SAH 7/26	mg/L	25
Magnesium	mg/L	3.0	Bicarbonate ↓	mg/L	1500
Sodium	mg/L	690	Fluoride 7/24	mg/L	5.9
Potassium	mg/L	6.1	Chloride 2X 7/25	mg/L	150
TDS (ROE 180) 7/25/02	mg/L	1620 RWT	Nitrate as N 7/24	mg/L	<0.1
TSS Tm 7/25/02	mg/L	2.13	Nitrite as N	mg/L	<0.1
pH SAH 7/26	Units	8.4	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 7/24	umhos/cm	2600	Sulfate ↓ ↓	mg/L	0.5
Turbidity ↓ 7/24	NTU	1.04	Total Phosphate SAH 7/31	mg/L	0.05
			Total Alkalinity as $CaCO_3$ 7/26	mg/L	1200
			Hardness as $CaCO_3$ RWT 8/11	mg/L	31

Boron = 1.4 mg/L RWT 8/9/02

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 23-Jul-2002 **Lab No:** 39114

CATIONS	mg/L	meq/L
Calcium	7.6	0.38
Magnesium	3.0	0.25
Sodium	690	30.01
Potassium	6.1	0.16
T. CATIONS		**30.79**
ROE 180	mg/L	1620
TSS	mg/L	2.13
Turbidity	NTU	1.04

ANIONS	mg/L	meq/L
Carbonate	25	0.83
Bicarbonate	1500	24.58
Chloride	150	4.23
Fluoride	5.9	0.31
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	0.5	0.01
T. ANIONS		**29.97**

Conductance, umhos/cm		2600
TDS by Summation, mg/L		1626
pH, Units		8.4
Total Coliform	per 100 ml	

S A R (sodium Hazard)	53.64
T Alk CaCO3, mg/L	1272
Hardness as CaCO3, mg/L	31
Hardness as CaCO3, gr/gal	2

Analyte	Units	Result
Total Phosphate	mg/L	0.05
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.62
Meq Cations/Sp cond/100	1.18
Meq Anions/Sp cond/100	1.15
ROE/TDS Summation	1.00

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})} = 1.36\%$$ (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.63 (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = 1.17$$ (0.8 TO 1.2)

OVERALL =	0.0073	MAX. OVERALL ALLOWED =	0.0531

Kent

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0725-39160

D/T REC: 07-25-02 15:45 BY: CA

DATE COMPLETED: 8.12.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	7/24/02	Conductivity	
Time Collected	10:20	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Sample ID: 2 Art Coll N
Sampled By: LSRCD/Sheehan
Comments: North Art
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 8.10.02	mg/L	26	Carbonate KH 7/26	mg/L	8
Magnesium	mg/L	8.7	Bicarbonate	mg/L	430
Sodium	mg/L	160	Fluoride 7/25	mg/L	1.0
Potassium	mg/L	4.1	Chloride	mg/L	4.8
TDS (RoE 180) KH 7/26/02	mg/L	496	Nitrate as N	mg/L	<0.1
TSS KH 7/26/02	mg/L	<1.00	Nitrite as N	mg/L	<0.1
pH KH 7/26	Units	8.3	Ortho Phosphate	mg/L	<0.1
Conductivity, Lab 7/30	umhos/cm	810	Sulfate	mg/L	67
Turbidity 7/25	NTU	0.102	Total Phosphate KH 7/30	mg/L	0.08
			Total Alkalinity as $CaCO_3$ 7/26	mg/L	370
			Hardness as $CaCO_3$ 8/12	mg/L	100

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

CA

Elect. File: LSRCD01

Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 24-Jul-2002 **Lab No:** 39160

CATIONS	mg/L	meq/L
Calcium	26	1.30
Magnesium	8.7	0.72
Sodium	160	6.96
Potassium	4.1	0.10
T. CATIONS		**9.08**
ROE 180	mg/L	496
TSS	mg/L	<1.00
Turbidity	NTU	0.102

ANIONS	mg/L	meq/L
Carbonate	8	0.27
Bicarbonate	430	7.05
Chloride	4.8	0.14
Fluoride	1.0	0.05
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0	0.00
Sulfate	67	1.39
T. ANIONS		**8.90**

Conductance, umhos/cm		810
TDS by Summation, mg/L		491
pH, Units		8.3
Total Coliform	per 100 ml	

S A R (sodium Hazard)	6.94
T Alk CaCO3, mg/L	366
Hardness as CaCO3, mg/L	101
Hardness as CaCO3, gr/gal	6

Analyte	Units	Result
Total Phosphate	mg/L	0.08
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.61
Meq Cations/Sp cond/100	1.12
Meq Anions/Sp cond/100	1.10
ROE/TDS Summation	1.01

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})| * 100}{(\text{meq/L cations} + \text{meq/L anions})} = 1.00\%$$ (<5%)

$$\text{TDS/COND} = \frac{(\text{TDS SUM mg/L})}{(\text{Specific Conductance})} = 0.61$$ (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = 1.11$$ (0.8 TO 1.2)

OVERALL =	0.0055	MAX. OVERALL ALLOWED =	0.0531

RWH

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: D725 - 9902
D/T REC: D7-25-02 1545 BY: CF
DATE COMPLETED: 8-12-02

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	7/24/02	Conductivity	
Time Collected	10:05	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Sample ID: 7 Cat Art 2 S
Sampled By: 2 SRCD/Sheehan
Comments: South Art.
Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT
Calcium EWH 8/12/02	mg/L	1.9
Magnesium	mg/L	0.6
Sodium	mg/L	280
Potassium	mg/L	4.2
TDS (ROE 180) 7/26/02	mg/L	596
TSS HM 7/26/02	mg/L	<1.00
pH SBH 7/21	Units	8.6
Conductivity, Lab 7/30	umhos/cm	1000
Turbidity 7/25	NTU	0.501

PARAMETER		UNITS	RESULT
Carbonate SBH	7/26	mg/L	21
Bicarbonate	L	mg/L	630
Fluoride	7/25	mg/L	6.8
Chloride		mg/L	3.3
Nitrate as N		mg/L	<0.1
Nitrite as N		mg/L	<0.1
Ortho Phosphate		mg/L	<0.1
Sulfate		mg/L	0.5
Total Phosphate SBH	7/31	mg/L	0.06
Total Alkalinity as $CaCO_3$	7/26	mg/L	550
Hardness as $CaCO_3$	8/12	mg/L	7.2

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ]	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01

I hereby certify the above was analyzed by myself or my assistant.

Analysts:

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
E-mail: aslab@missc.state.wy.us
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected:	24-Jul-2002		Lab No:	39162	
CATIONS	**mg/L**	**meq/L**	**ANIONS**	**mg/L**	**meq/L**
Calcium	1.9	0.09	Carbonate	21	0.70
Magnesium	0.6	0.05	Bicarbonate	630	10.32
Sodium	280	12.18	Chloride	3.8	0.11
Potassium	4.2	0.11	Fluoride	6.8	0.36
T. CATIONS		**12.43**	Nitrate as N	0	0.00
ROE 180	mg/L	596	Nitrite as N	0	0.00
TSS	mg/L	<1.00	Ortho phosphate	0	0.00
Turbidity	NTU	0.501	Sulfate	0.5	0.01
			T. ANIONS		**11.50**
Conductance, umhos/cm		1000	S A R (sodium Hazard)		45.36
TDS by Summation, mg/L		629	T Alk CaCO3, mg/L		552
pH, Units		8.6	Hardness as CaCO3, mg/L		7
Total Coliform	per 100 ml		Hardness as CaCO3, gr/gal		0

Analyte	Units	Result
Total Phosphate	mg/L	0.06
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.60
Meq Cations/Sp cond/100	1.24
Meq Anions/Sp cond/100	1.15
ROE/TDS Summation	0.95

% ERROR = $\frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})}$ = 3.88% (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.63 (0.65 TO 0.85)

IONIC = $\frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100}$ = 1.20 (0.8 TO 1.2)

OVERALL =	0.0204	MAX. OVERALL ALLOWED =	0.0531

RWH

WYOMING DEPARTMENT OF AGRICULTURE
ANALYTICAL SERVICES
1174 Snowy Range Road
Telephone: (307)-742-2984 Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm

SURFACE WATER COLLECTION & OFFICIAL ANALYSIS REPORT

LAB No: 0724-39115
D/T REC: 07-24-02 11:00 BY: CA
DATE COMPLETED: 8.11.02

COLLECTION DATA & FIELD MEASUREMENTS

Date Collected	7/23/02	Conductivity	
Time Collected	1345	Dissolved O_2	
Discharge		Turbidity	
Temperature		pH	

Little Snake River Conservation District
c/o J. Sheehan
P. O. Box 355
Baggs, WY 82321

Sample ID: 7 Gas Flow 2
Sampled By: LSRCD/Sheehan
Comments: Gas Reservoir RW

UPS Address: 285 N Penland
Phone: 307-383-7860 E-mail: lsrcd@yahoo.com
FAX: 307-383-7861

Invoice #: VOSR
Amount: $45.00

PARAMETER	UNITS	RESULT	PARAMETER	UNITS	RESULT
Calcium RWH 8/9/02	mg/L	84	Carbonate 7/26	mg/L	21
Magnesium	mg/L	29	Bicarbonate	mg/L	1700
Sodium	mg/L	780	Fluoride 7/24	mg/L	4.5
Potassium	mg/L	11	Chloride 2x 7/25	mg/L	150
TDS (ROE 180) 7/25/02	mg/L	1850	Nitrate as N 7/24	mg/L	<0.1
TSS 7/25/02	mg/L	18.9	Nitrite as N	mg/L	<0.1
pH 7/26	Units	8.4	Ortho Phosphate	mg/L	0.1
Conductivity, Lab 7/24	umhos/cm	2900	Sulfate	mg/L	0.8
Turbidity 7/24	NTU	40.2	Total Phosphate 7/31	mg/L	0.26
			Total Alkalinity as $CaCO_3$ 7/26	mg/L	1400
			Hardness as $CaCO_3$ 8/11	mg/L	33

Boron = 1.6 mg/L RWH 8/9/02

S	R	Bottle
[ ]	[ ]	1L Plain
[ ]	[ ] CA	250ml Plain
[ ]	[ ]	250ml HNO_3
[ ]	[ ]	250ml H_2SO_4

Elect. File: LSRCD01
Analysts:

I hereby certify the above was analyzed by myself or my assistant.

Kenneth L. McMillan

Section Supervisor

Kenneth L. McMillan, Laboratory Manager

Wyoming Department of Agriculture
Analytical Services
1174 Snowy Range Road
Laramie, WY 82070
E-mail: aslab@missc.state.wy.us
Internet: http://wyagric.state.wy.us/aslab/aslab.htm
Phone: (307)-742-2984

WATER QA BALANCE CHECK

Date Collected: 23-Jul-2002 | **Lab No:** 39115

CATIONS	mg/L	meq/L
Calcium	8.4	0.42
Magnesium	2.9	0.24
Sodium	780	33.92
Potassium	11	0.28
T. CATIONS		**34.86**
ROE 180	mg/L	1850
TSS	mg/L	18.9
Turbidity	NTU	40.2

ANIONS	mg/L	meq/L
Carbonate	21	0.70
Bicarbonate	1700	27.86
Chloride	150	4.23
Fluoride	4.5	0.24
Nitrate as N	0	0.00
Nitrite as N	0	0.00
Ortho phosphate	0.1	0.00
Sulfate	0.8	0.02
T. ANIONS		**33.05**

Conductance, umhos/cm		2900
TDS by Summation, mg/L		1814
pH, Units		8.4
Total Coliform	per 100 ml	

S A R (sodium Hazard)	59.16
T Alk CaCO3, mg/L	1429
Hardness as CaCO3, mg/L	33
Hardness as CaCO3, gr/gal	2

Analyte	Units	Result
Total Phosphate	mg/L	0.26
Selenium	mg/L	
TOC	mg/L	
COD	mg/L	
NH_3 as N	mg/L	
Fecal Coliform	cnt/100 ml	

QA ERROR CHECKS

(ROE mg/L)/Sp. Cond.	0.64
Meq Cations/Sp cond/100	1.20
Meq Anions/Sp cond/100	1.14
ROE/TDS Summation	1.02

$$\%\ \text{ERROR} = \frac{|(\text{meq/L cations} - \text{meq/L anions})|*100}{(\text{meq/L cations} + \text{meq/L anions})} = 2.67\%$$ (<5%)

TDS/COND = (TDS SUM mg/L)/(Specific Conductance) = 0.63 (0.65 TO 0.85)

$$\text{IONIC} = \frac{(\text{meq/L cations} + \text{meq/L anions})/2}{(\text{Sp. Conductance})/100} = 1.17$$ (0.8 TO 1.2)

OVERALL =	0.0143	MAX. OVERALL ALLOWED =	0.0531

Rwt

Discharge

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (CDad Sta)

Site ID: 5 Dad 2

Site Coordinates: T16N, R92W, Sec. 29, NE 1/4 of SE 1/4

Date & Time: May 9/02 @ 13:45

Meter Model & Serial #: Swoffer Flow Meter - model 3000

Calibration Details: 3/28/02 Cal, Ck on 5/9

Measured Discharge

21.605 cfs

@ 1.11

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			Outside Staff Readings = 1.11
1.0	1.010	.257	.765	Flow Measured by: LSRCD/Steele
2.0	1.550	.908	1.407	
3.0	1.750	1.598	2.797	
4.0	1.650	2.038	3.363	
5.0	1.675	2.099	3.516	
6.0	1.675	1.856	3.109	
7.0	1.710	1.819	3.110	
8.0	1.900	1.648	3.131	
9.0	1.710	.238	.407	
10.0	WE/LB			
		Total		
			21.605 cfs	

Checked by: Mark Tolle

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Sta)

Site ID: 5Dad2

Site Coordinates: T16N, R92W, Sec. 29, NE 1/4 of SE 1/4

Date & Time: May 1/02 @ 11:30

Meter Model & Serial #: Swoffer Flow Mtr-model 3000

Calibration Details: 3/28/02 Calibrated / ck 5/1/02

Measured Discharge

25.648 cfs

@ 1.22 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			
1.0	1.150	.663	.762	
2.0	1.725	1.051	1.813	
3.0	1.975	1.603	3.166	
4.0	1.975	2.032	4.013	
5.0	2.075	1.985	4.119	
6.0	2.025	1.900	3.848	
7.0	2.050	1.728	3.542	
8.0	2.225	1.494	3.324	
9.0	1.810	.459	.831	
10.0	1.300	.177	.230	
10.5	WE/LB			
		Total		
			25.648 cfs	

Outside Stage Reading = 1.22

Flow Measured by: LSRCD / S Sheldon

Checked By Traci Hollie

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Site)

Site ID: 4 Dad 2

Site Coordinates: T16N, R92W, Sec. 29, NE¼ of SE¼

Date & Time: April 30/02 @ 12:00

Meter Model & Serial #: Swoffer Flow Meter model 3000

Calibration Details: 3/28/02 calibrated, ck on Apr 30/02 @ 1.41 stage

Measured Discharge

28.564 CFS

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			
1.0	1.425	.258	.368	
2.0	1.950	.425	.829	
3.0	2.310	1.467	3.389	
4.0	2.200	1.789	3.936	
5.0	2.175	1.928	4.193	
6.0	2.210	2.039	4.506	
7.0	2.150	2.156	4.635	
8.0	2.125	1.640	3.485	
9.0	1.925	1.035	1.992	
10.0	1.325	.929	1.231	
11.0	WE/RB			
		Total		
			28.564 CFS	

Outside Stage Reading = 1.41
Flow Measured by: LSRCD / Swoffer
Checked By Mark Hollis

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Sta)

Site ID: 4Dad2

Site Coordinates: T16N, R92W, Sec. 29, NE 1/4 of SE 1/4

Date & Time: April 26/02 @ 1410

Meter Model & Serial #: Swoffer Flow Meter - model 3000

Calibration Details: 3/28/02 calibrated
ck on 4/26/02

Measured Discharge

20.756 cfs

@ 1.11 staff

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WS/LB			Outside Staff Reading = 1.11 Flow Measurement by: LSRCD / S Shelton
1.0	1.60	.427	.683	
2.0	1.675	1.892	3.169	
3.0	1.610	1.764	2.840	
4.0	1.600	2.032	3.251	
5.0	1.600	2.086	3.338	
6.0	1.600	2.014	3.222	
7.0	1.575	1.534	2.416	
8.0	1.375	.849	1.167	
9.0	.850	.788	.670	
10.0	WS/RB			
		Tot		
			20.756 cfs	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Sta)

Site ID: 4 Dad 2

Site Coordinates: T16N, R92W, Sec. 29, NE 1/4 of SE 1/4

Date & Time: April 12/02

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/28/02 calibrated ck. 4/12/02

Measured Discharge

24.644 cfs

@ 1.29 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			Outside Stage Reading = 1.29
1.0	.875	.688	.602	Flow Measured by: LSRCD/S Sheehan
2.0	.950	.973	.924	
3.0	1.950	1.003	1.956	
4.0	1.975	2.042	4.033	
5.0	2.000	2.099	4.198	
6.0	1.925	1.989	3.829	
7.0	1.875	1.733	3.249	
8.0	1.950	1.595	3.110	
9.0	2.050	1.048	2.148	
10.0	1.625	.366	.595	
11.0	.400	—		
11.4	WE/LB			
		Total		
			24.644 cfs	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Sta)

Site ID: 4 Dad 2

Site Coordinates: T16N, R92W, Sec 29, NE¼ of SE¼

Date & Time: April 4/02 @ 14:40

Meter Model & Serial #: Swoffer Flow Meter-Model 3000

Calibration Details: 3/28/02 calibrated, ck. 4/4/02

Measured Discharge

12.666 cfs

@ .65 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			
1.0	.475	.114	.054	
2.0	1.150	.566	.651	
3.0	1.300	1.418	1.843	
4.0	1.275	1.776	2.264	
5.0	1.210	1.749	2.116	
6.0	1.225	1.653	2.025	
7.0	1.300	1.474	1.916	
8.0	1.450	1.097	1.591	
9.0	1.100	.187	.206	
10.0	WE/LB			
		Total		
			12.666 cfs	

Outside Staff Reading = .65

Flow Measured by: LSRCD / S Shrader

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Sta.)

Site ID: 4 Dad 2

Site Coordinates: T16N, R92W, Sec. 29, NE¼ of SE¼

Date & Time: April 1, 02 @ 13:00

Meter Model & Serial #: Swoffer Flow Meter-Model 3000

Calibration Details: 3/26/02 calibrated, ck on 4/1/02

Measured Discharge

21.474 cfs @ 1.21 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
.5	WE/RB			Outside Staff Gage Reading = 1.21
1.5	.850	.698	.593	
2.5	1.400	.781	1.093	
3.5	1.650	1.797	2.965	
4.5	1.550	2.046	3.171	
5.5	1.500	2.083	3.125	
6.5	1.500	1.932	2.898	
7.5	1.550	1.917	2.971	
8.5	1.675	1.852	3.102	
9.5	1.550	1.004	1.556	
10.5	LE/LB			
		Total		
			21.474 cfs	

Flow Measured by: LSRCD/S Shrader

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (Dad Stn)

Site ID: 3Dad2

Site Coordinates: T16N, R92W, Sec. 29, NE¼ of SE¼

Date & Time: March 26/02 @ 12:15

Meter Model & Serial #: Swoffer Flow Meter Model 3000

Calibration Details: 3/26/02 calibrated, ck. on 3/26/02

Measured Discharge

7.632 cfs

@ 1.05 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/RB			
1.0	.675	.186	.126	
2.0	1.150	.414	.476	
3.0	1.375	1.039	1.429	
4.0	1.150	1.667	1.917	
5.0	1.050	1.568	1.646	
6.0	.910	1.057	.962	
7.0	.890	.646	.575	
8.0	.750	.503	.377	
9.0	.510	.244	.124	
10.0	WE/LB			
		Total		
			7.632 cfs	

- Outside Staff Readings = 1.05
- Anchor Ice Present
- Flow Measured by: LSRCD/TS Sheridan

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3)

Site ID: 6 RC-3

Site Coordinates: _____

Date & Time: June 17/02 @ 14:00

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 5/25/01 calibrated, ck. on 6/17/02

Measured Discharge

2.618 cfs

@ .19 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Outside Staff Reading = .19
1.0	.280	.735	.206	Flow Measured by: LSRCD / S Shuster
2.0	.325	.441	.143	
3.0	.425	.481	.204	
4.0	.475	.669	.318	
5.0	.500	.643	.322	
6.0	.550	.705	.388	
7.0	.600	.956	.574	
8.0	.600	.459	.275	
9.0	.500	.376	.188	
10.0	WE/RB			
		Total		
			2.618 cfs	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (CRC-3 Sta.)

Site ID: 6 RC-3

Site Coordinates: _____

Date & Time: June 3/02 @ 10:30

Meter Model & Serial #: Swoffer Flow Meter-Model

Calibration Details: 5/25/02 calibrated, ck on 6/3

Measured Discharge

8.616 cfs

@ .60 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			
1.0	.625	.291	.182	
2.0	.700	.995	.697	
3.0	.800	1.126	.901	
4.0	.810	1.127	.913	
5.0	.825	1.244	1.089	
6.0	1.000	1.389	1.389	
7.0	.975	1.137	1.109	
8.0	.925	.954	.930	
9.0	.910	1.059	.964	
10.0	.850	.520	.442	
11.0	WE/RB			
		Total		
			8.616	
			cfs	

Outside Stage Reading = .60
Flow Measured by: LSRCD
S Shelton

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3 Sta.)

Site ID: 5 RC-3

Site Coordinates: _____

Date & Time: May 28, 02 @ 10:20

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 5/25/02 calibrated, ck on 5/28

Measured Discharge

12.657 CFS

@ .76 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Outside Stage = .76 Flow Measured by: LSRCD/S Sheldon
1.0	.275	.290	.225	
2.0	.850	.985	.837	
3.0	.910	1.386	1.261	
4.0	1.000	1.415	1.415	
5.0	1.100	1.687	1.856	
6.0	1.125	1.794	2.018	
7.0	1.125	1.439	1.619	
8.0	1.110	1.215	1.349	
9.0	1.110	1.402	1.556	
10.0	1.000	.521	.521	
11.2	WE/RB			
		Total		
			12.657	
			CFS	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3 Sta.)

Site ID: 5 RC-3

Site Coordinates: _____

Date & Time: May 4, 02 @ 10:15

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/28/02 Cal, Ck. on 5/1

Measured Discharge

41.761 CFS

@ 1.73 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Outside Stage = 1.73 Flow Measured by: LSRCD / S Skeldon
1.0	1.525	.632	.964	
2.0	1.810	1.709	3.093	
3.0	1.800	2.205	3.969	
4.0	1.850	2.567	4.749	
5.0	2.050	2.808	5.756	
6.0	2.100	2.870	6.027	
7.0	2.125	2.755	5.854	
8.0	2.150	2.057	4.423	
9.0	2.025	1.974	3.997	
10.0	1.950	1.120	2.184	
11.0	1.375	.542	.745	
12.0	WE/RB			
		Total		
			41.761 CFS	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3 Sta)

Site ID: 4 RC-3

Site Coordinates:

Date & Time: April 30/02 @ 10:00

Meter Model & Serial #: Swoffer Flow Meter - Model 3000

Calibration Details: 3/28/02 Cal, Ck on 4/30

Measured Discharge

34.844 CFS

@ 1.47 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Outside Stage = 1.47 Flow Measured by: LSRCD/5 Station
.5	1.410	.640	.902	
1.5	1.600	1.827	2.923	
2.5	1.600	1.958	3.133	
3.5	1.600	2.359	3.774	
4.5	1.750	2.500	4.375	
5.5	1.810	2.936	5.314	
6.5	1.850	2.457	4.545	
7.5	1.850	2.124	3.929	
8.5	1.725	2.022	3.488	
9.5	1.700	1.091	1.855	
10.5	1.110	.546	.606	
11.3	WE/RB			
		Total		
			34.844 CFS	

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3 sta.)

Site ID: 4RC-3

Site Coordinates: _____

Date & Time: April 19/02 @ 15:00

Meter Model & Serial #: Swoffer Flow Meter - Model 8000

Calibration Details: 3/28/02 Cal, ck on 4/19

Measured Discharge

32.48 cfs @ 1.38 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			
1.0	1.490	.859	1.280	
2.0	1.525	1.936	2.952	
3.0	1.500	2.417	3.626	
4.0	1.625	2.290	3.721	
5.0	1.750	2.628	4.599	
6.0	1.775	2.686	4.768	
7.0	1.800	2.396	4.313	
8.0	1.775	1.951	3.463	
9.0	1.725	1.518	2.619	
10.0	1.425	.799	1.139	
11.0	WE/RB			
		Total		
			32.48 cfs	

Outside Stage = 1.38

Flow Measured by: LSRCD / S Sheridan

LSRCD Discharge Measurement Notes

Stream: Muddy Creek (RC-3 Sta)

Site ID: 4 RC-3

Site Coordinates:

Date & Time: April 7/02 @ 16:30

Meter Model & Serial #: Swoffer Flow Meter-Model 3000

Calibration Details: 3/28/02 Cal, ck on 4/7

Measured Discharge

45.024 cfs

@ 2.57 stage

Distance (ft)	Depth (ft)	Velocity (fps)	Discharge (cfs)	Comments
0.0	WE/LB			Outside Stage = 2.57
1.0	.050	.186	.009	Flow Measured by: LSRCD/TS Sheehan
2.0	1.00	1.110	1.110	
3.0	3.00	1.608	4.824	
4.0	3.050	1.876	5.722	
5.0	2.975	2.229	6.631	
6.0	2.925	2.463	7.204	
7.0	2.90	2.394	6.943	
8.0	2.975	1.428	4.248	
9.0	2.90	1.439	4.173	
10.0	1.475	1.521	2.243	
11.0	.950	1.903	1.808	
12.0	.625	.175	.109	
12.7	WE/RB			
		Total		
			45.024 cfs	

DRAFT

UPPER MUDDY CREEK WATERSHED PROJECT

Project Number: ON005

Project Sponsor
Little Snake River Conservation District
P.O. Box 355 Baggs, WY 82321
307-383-7860

3-25-05

Water quality related aspects of the Upper Muddy Creek Watershed Project were a cooperative effort between the Little Snake River Conservation District, Wyoming Department of Environmental Quality, and United States Environmental Protection Agency, Region 8.

Grant No. C9008630-00

EXECUTIVE SUMMARY

The Upper Muddy Creek Watershed Project was initiated to address not only water quality concerns but a whole range of natural resource related issues and concerns outline by the Muddy Creek CRM. Because of the size of the watershed (over 500,000 acres) and scope of the project this project was viewed and subsequently set up as a long term watershed management project.

Pertinent to water quality related concerns in the Muddy Creek Watershed the LSRCD entered into its first of six contracts with the DEQ on September 13, 1993. This report covers the fifth of six contracts from the period 2000-2003. The contract for this period covered by this report was signed on October 10, 2000. However, given this time frame it is imperative that the reader understand that contracts over lapped. Subsequently implementation of project tasks over lap to some degree on both ends of the time frame covered by this report. Currently the last of the six contracts with DEQ to address water quality concerns in the Muddy Creek Watershed expires in December of 2005.

Project Start Date: October 10, 2000 Completion Date: June, 2004

Funding:		
Total EPA Grant	Total Budget	$296,667
Total Match Funding		$178,000
		$118,667

Total Actual Expenditures	Total Actual Spent	$325,171.64
Total EPA Spent		$177,997.38
Total Non-Federal Cash Match		$131,159.86
Total Non-Federal In-kind Match		$16,014.14

Numerous and diverse funding sources were used for project related activities during this reporting period. Sources of matching non-federal funds included contribution from land owners, LSRCD, Wyoming Water Development Commission, Ducks Unlimited, Rocky Mountain Elk Foundation and others. Accounting and reporting of federal expenditures for this report include only 319 funds. Other federal funds expended on project related activities by the BLM, and NRCS were not track or accounted for. Also funds and in-kind services provided by the WGFD towards watershed related activities were not tracked or accounted for. Only funds that were directly under the over site and control of the LSRCD are reported and accounted for associated with this project.

Accomplishments during the time frame covered by this report include the de-listing of three water bodies that appeared on the 1998 303(d) list of impaired streams.

Name	HUC	Class	Status
Upper Muddy Creek	14050004-062-1	2	segment de-listed
Littlefield Creek	14050004-067-1	2	de-listed
McKinney Creek	14050004-022-2	2	segment de-listed

De-listing resulted from the collection of scientifically "credible data" that include physical, chemical, and biological data since 1994 that demonstrated that the streams were meeting their beneficial uses. Monitoring indicated that stream segments on McKinney and Littlefield Creeks were incorrectly listed initially. In the case of Upper Muddy Creek and lower Littlefield Creek achieving all their beneficial uses was the

result of implementation of BMP's associated with this watershed project. Colorado River Cutthroat Trout (CRCT) were re-introduced into Littlefield Creek and the population has demonstrated reproductive activities since their original re-introduction. CRCT are an indicator of improved water quality. In the last three grants for the Muddy Creek Watershed Project 11 task were identified, however, activities for each task were not scheduled or funded in all three grants. Four tasks were funded under this contract including administration (T-1), upland water development (T-2), fencing (T-3), and channel and flood plain maintenance (T-9). Project activities associated with each of the four funded task occurred in addition to some of the non-funded task (monitoring T-11) during this time frame.

INTRODUCTION

In the 1980's and early 1990's the BLM and landowner/permittees had been working towards improving individual allotments in the watershed. To enhance these efforts the Little Snake River Conservation District initiated the Coordinated Resource Management (CRM) process in 1992 to address resource concerns on a watershed basis including livestock grazing, recreation, wildlife, range, riparian, and water quality in the Muddy Creek Watershed. The emphasis of the project is to improve the overall function of the watershed as a whole. With the local conservation district taking the lead, a team was established to address these issues. The team was comprised of numerous interests including private, government, conservation and recreational interest. When it was initiated the Upper Muddy Creek CRM Project was the largest watershed improvement project in the state of Wyoming. Because of the success of the project in the headwaters of Muddy Creek (280,000 aces), the project area was expanded in 1998 to additional first order headwater streams accounting for a total area of approximately 540,000 acres. The Muddy Creek Watershed Project is an on going funded Clean Water Act section 319 project. Project funds ($178,000) covered by this grant are for project activities and task previously approved in the 1999 PIP and SAP (see appendix A). Additional funds were for the augmentation of the existing budget for the tasks outlined in the 1999 PIP and SAP. Tasks funded by this grant were project administration (task 1), upland water development (task 2), fencing (task 3), and wetland protection/development (task 9).

The Muddy Creek Watershed encompasses approximately 1,000 square miles and is a major tributary to the Little Snake River, Yampa, and Green Rivers in the Upper Colorado River Basin. Elevation in the watershed range from 8,400 feet on the continental divide to 6,000 feet on the west side of the watershed in the Red Desert. Precipitation varies with elevations from 16 to 7 inches. Within the Muddy Creek watershed the project area encompasses approximately 540,000 acres primarily the eastern most portion of the watershed including all perennial, intermittent, and ephemeral creeks and channels arising east of State Highway 789. Estimated average annual water yield from the Muddy Creek Watershed is 13,772 acre feet (Green River Basin Water Planning Process Final Report). While the Little Snake contributes 20% of the total flow of the Yampa River at the Maybell, CO gauge it supplies approximately 60% of the total sediment load (USGS bull. 78-105). Within the Little Snake the majority of the sediment yield occurs below the Dixon WY gauge. Muddy Creek is the first major tributary to the

Little Snake below the Dixon, WY gauge. Within the LSR Basin sediment yield estimates of 100-500 tons/square/miles/year occur (USGS bull. 78-105). Higher rates are associated with lower precipitation zones especially those of 12 inches and below. Average annual precipitation in the Muddy Creek watershed ranges from 7-9 to 14-16 inches. The majority of the basin in the project area receives approximately 12 inches of annual precipitation.

Sediment is the non-point source pollutant targeted for remediation. Primary source of sediment in order of contribution are: destabilized stream banks, accelerated upland erosion, roads, well pads, and ancillary infrastructure associated with natural gas development and production. The primary focus of this project was livestock grazing practices to address bank stability problems primarily associated with riparian grazing and accelerated upland erosion associated with season long grazing practices...

Water Resource Description:
Water bodies on the 1998 303(d) list of impaired streams.

Name	HUC	Class
Upper Muddy Creek	14050004-062-1	2
Littlefield Creek	14050004-067-1	2
McKinney Creek	14050004-022-2	2
Lower Muddy Creek	14050004-007-3	3

Other Water bodies in the project area include the following:

Cow Creek	14050004-020-2	4
Dry Cow Creek	14050004	4
Wild Cow Creek	14050004	3
Deep Gulch	14050004	3
Cherokee Creek	14050004	3
Deep Creek	14050004	3

Project Results from 1993-1999 can be found in the Upper Muddy Creek Watershed Project Completion Report submitted to WY_DEQ in 1999.

Project Product Outcomes, Targets, and Task Activity

Product Outcome: The primary focus and out come for this grant was to continue the existing work related activities (task) focused at remediating the impacts of livestock grazing thereby reducing grazing related contribution of sediment in the Muddy Creek Watershed. Four task received continuation funding during this grant period three of which where focused at on-the-ground implementation of BMP's and associated activities to reduce or trap sediment in the Muddy Creek Watershed. The other task was to continue administration and coordination activities among the numerous entities involved.

Task 1. Project administration, coordination, and implementation.

Product: Quarterly reports, final monitoring report, financial accounting, annual audits and project coordination with other local, state, and federal agencies.

Thirty-four local, state, and federal agencies, private landowners, conservation and industry organization are involved in the Muddy Creek Watershed Project.

Goal 1. Improve water quality by improving livestock management practices.

Objective 1. Modify season and duration of use by livestock in riparian and upland areas to improve plant species diversity, vigor and residual plant cover in the watershed.

Task 2. Upland water developments: To reduce or change the season and duration of grazing use on perennial and intermittent streams, alternative watering sites must be developed for livestock. Number and size of water developments is dependant upon the existing water development in a pasture and the class and number of livestock expected to be using each facility. For example, allotments having yearling cattle will require greater amounts and more watering surface area (in ponds and troughs) than cow/calf allotments due to the greater number of animals and the fact that they travel in much larger groups within a pasture. Also water developments will take into consideration the enhancement and/or development of other natural resources such as wetlands and wildlife habitat. All water developments will be planned in cooperation with the appropriate land management entity, on private, BLM, and state lands.

Highest priority for construction will be water developments that can service a large number of animals, have a long life expectancy (25 year minimum), and require the least amount of annual operation and maintenance.

Task 3. Livestock fencing to improve flexibility in pasture management to reduce duration of use, facilitate changes in season of use, and protect sensitive areas. Both traditional barbed and solar electric fencing will be utilized. Fences will either be used to subdivide pastures and as livestock exclosure fences around critical areas, such as spring sources, and dams. Barbed fence will consist of 3 and/or 4 wire fences with smooth bottom wires. High-tensile electric will be used in areas with large concentrations of big game animals and/or migration corridors. Electric fences will consist of 3 wire, top and bottom hot. All fences will comply with NRCS and/or BLM specifications. The appropriate landowner and land management personnel will agree upon location of fences. Allotments/pastures with perennial streams will have the highest priority followed by allotments or pastures, which have the greatest potential for improvement in range condition.

Objective 2. Increase herbaceous and woody cover on stream banks and wetland areas to reduce stream sedimentation.

Goal 3. Improve water quality by protection, enhancement, and development of wetlands.

Objective1. Improve the biological function and increase the acres of wetlands to serve as sediment and nutrient sinks.

Task 9. Channel and flood plain maintenance and grade control to reduce active channel erosion and down cutting that is/or has the potential to lower water tables and drain wetland areas, develop additional wetlands to serve as sediment traps and nutrient sinks.

Wetland enhancement consist of instillation of water control structures and water delivery systems to existing wetlands to facilitate improved hydrological regimes to maintain and increase both the diversity and habitat values of wetland types: palustrine meadow, emergent, and aquatic bed wetlands, and open aquatic habitat). Approximately 50 acres of wetlands will be served by these activities.

Wetland development will consist of diverting and spreading water within upland areas in the geologic flood plain of Muddy Creek by use of low dikes and ditches. Also dikes will be used to capture irrigation water return flows creating additional acres of wetland habitat. Approximately 75 acres of additional wetlands will be developed by these activities.

Wetland protection will consist of two components, minor maintenance to existing structures and livestock fencing. Fencing will be used to change the livestock grazing use from growing season to winter use and/or to exclude livestock from newly constructed wetland areas.

Work will be conducted on BLM, state, and private lands in the Muddy Creek wetland area near Dad, WY. BLM will provide all NEPA documentation, cultural resources, biological assessment and consultation with the USFWS. The NRCS will assist with surveying and permitting; in addition, the NRCS will do all wetland delineation and engineering

Product: 125, acres of wetlands protected, developed, and enhanced.

Goal 6. Implement a monitoring program that accurately reflects changes in water quality as a result of changes in land management practice associated with this project.

Task 11. Implement a monitoring program that both quantitatively and qualitatively measures improvements in physical, chemical, and biological water quality and also stream channel morphology and fisheries habitat. (See attached Sampling and Analysis Plan (SAP).
Product: Data collection and monitoring report:

Planned and Actual Milestones and Completion Dates.

Table 1. Planned and actual milestones and completion dates.

Task	Planned Products	Actual products	Planned Comp.	Actual Comp.
Task 1. Project Admin.	Reports 1 final and monitoring Coord. Meetings	4 reports 1 numerous	12-02	4-05
Task 2 Upland Water Development	ponds	4	12-01	10-03
Task 3 Fencing	fencing	8 miles, 3 allotments	10-01	7-02
Task 9 Channel & flood Plain maintenance	wetland development & protection	approx 68 acres wetland development 1 new structure & ditch 56 acres fenced from livestock	6-01	7-02

Evaluation of Product Outcome Achievement and Relationship to State NPS Management Plan.

While monitoring was not a grant funded task under this grant the LSRCD in conjuncture with the BLM did continue to monitor water chemistry, physical properties, biotic indices and channel morphology during this time frame. There are some time periods in which monitoring data was not collected, primarily water column information. This was the result of changes in BLM personnel and their associated responsibility.

Implementation of BMP's and task associated with this project exceed the originally projected time frame. Consequently, billings, reporting and the final report also exceed the projected time frame for these activities to be completed. Final billing for task 2-9 was submitted to DEQ in June of 2004. The last billing for the project was submitted in January of 2005 for task 1. Payment by DEQ on this last billing is being with held until completion and submittal of this report.

The project met high priority goals of the Wyoming Nonpoint Source Management Plan through the implementation of BMP's and the collection of "Credible Data on listed streams that allowed for evaluation of streams by reach and to continue to document water quality improvement towards meeting their potential beneficial uses.

Monitoring Result: to be submitted as a separate document.

Implementation of Water Quality Improvement Practices

Practices for this grant were two fold with the primary objective of implementing grazing BMP's to reduce grazing related NPS pollution (sediment) and to trap transported sediment in wetlands. Grazing BMP's where aimed at reducing duration of use and in some cases changing the season of use by livestock on riparian areas through the implementation of upland water development that then facilitated additional fencing of livestock into small pastures resulting in the implementation of rotational grazing systems. These grazing systems also would serve to increase herbaceous cover on uplands allowing for more residual vegetation being left after the grazing season thereby providing for increase plant vigor, soil cover, increased water infiltration, and nutrient cycling. A secondary feature of these result would be the reduction of transported soil

particles from uplands into water ways. While we did not monitor uplands, general knowledge and scientific literature supports these assumptions. However, it should be stated that the influence of the prolonged drought conditions that existed during this time frame may have masked or temporarily negated these assumed benefits.

The second aspect of water quality improvement practice implemented under this grant incorporated the use of wetlands to serve as a filter (sink) to trap transported sediment already in the water column in Muddy Creek. Additional wetland acres were developed through the diversion of water and the capturing of irrigation return flows into large shallow ponds. Fencing was also used to control livestock access to wetland areas.

Water Quality Improvement through Measured or Estimated Load Reduction

Sediment was the identified nonpoint source pollutant target for reduction in the Muddy Creek Watershed. Because of the remote location, holding times, and expense associated with actually measuring and monitoring suspended sediment in the water column we used numerous surrogate methods to document sediment load reductions. The use of surrogate methods subsequently makes it impossible to do actual numeric calculations on the sediment load reduced. However, surrogate methods can and do supply sufficient information to document an improving trend in the reduction of sediment in the water column. Methods used included turbidity in the water column, benthic macroinvertabrates, fish, channel geomorphology, and photopoints. Please see discussion in the monitoring report retaining to improved water quality.

Public Involvement and Coordination

The BLM and landowner/permittees had been working towards improving individual allotments in the watershed for several years. To enhance these efforts the Little Snake River Conservation District initiated the Coordinated Resource Management (CRM) process in 1992 to address resource concerns and opportunities on a watershed basis. The emphasis of the project is to improve the overall function of watershed as a whole.

In 1993 the Little Snake River Conservation, Private Landowners, Wyoming Department of Agriculture, Wyoming Game and Fish Department, and the Bureau of Land Management-Great Divide Resource Area received recognition for the Muddy Creek CRM Project as a "SEEKING COMMON GROUND: Wildlife and Livestock on Western Rangelands national demonstration project. Goals established by the team for the Upper Muddy Creek CRM project include:

* Increased cooperation, coordination, and trust among landowners, permittee's, agencies and special interest groups.
*Improve critical ranges for antelope, elk, and deer.
*Demonstrate that properly managed livestock grazing can be compatible with wildlife and their habitat.
*Restore and enhance riparian and wetland habitats to their desired future condition.
*Re-establish the candidate Threatened and Endangered Species "Colorado River Cutthroat Trout" to the headwaters of Muddy Creek and its tributaries.
*Manage upland habitats to improve their biodiversity and productivity for wildlife and livestock.

To date over 34 different entities have participated on the Muddy Creek CRM representing broad and diverse backgrounds and interest.

Education and Information

Numerous tours with diverse groups have occurred during this reporting period. Two videos about the project where done prior to this reporting period but are still being utilized throughout the western U.S. In 2002 a presentation was done to the Wildlife and Land Management Professionals works shop in Albuquerque, NM at the annual Rocky Mountain Elk Foundation Convention.

Other Sources of Funding

CWA section 319 funds represent accounted for approximately 55% of the total project funding. Other funding sources during this time period included grants from Ducks Unlimited, Wyoming Water Development Commission, and Wyoming Game and Fish Department. Private funds and/or in-kind contribution came from 5 landowners in the watershed with the balance of the remaining fund coming from the LSRCD.

Future Activity

As previously stated this is still an on going project with an existing open contract with DEQ for the Muddy Creek Watershed Project.

Literature Citation

1. "Transport of Sediment by Stream in the Sierra Madre, Southern Wyoming". USGS Water Resources Investigations Report 94-4091, 1992.
2. "Present and Potential Sediment Yields in the Yampa River Basin, Colorado and Wyoming", USGS Water-Resources Investigations 78-105, 1978.

Appendix

A. 1999 Project Implementation Plan and Sampling and analysis Plan.

PROJECT ACTIVITIES

Task 1. Project administration, coordination, and implementation.

Product: Quarterly reports, final monitoring report, financial accounting, annual audits and project coordination with other local, state, and federal agencies.

Cost : $19,400

Goal 1. Improve water quality by improving livestock management practices.

Objective 1. Modify season and duration of use by livestock in riparian and upland areas to improve plant species diversity, vigor and residual plant cover in the watershed.

Task 2. Upland water developments.

Product: spring developments, ponds, pits, wells, water pipeline, tanks, troughs, and bentonite sealing of existing ponds.

Cost: $125,500

Task 3. Livestock fencing to improve flexibility in pasture management to reduce duration of use, facilitate changes in season of use, and protect sensitive area's.

Product: 7 miles of fence.
Cost: $33,000

Task 4. Irrigation maintenance, enhancement, and repair will provide alternative area's for livestock grazing to allowing for deferment and seasonal nonuse in sensitive pastures. Also improvements will increase irrigation efficiency thereby reducing the quantity of water diverted and reduce the amount of sediment laden irrigation water return flows.

Product: Two functional water regulation diversion structures, water division boxes, gated pipe.
Cost: $6,500

Task 5. Vegetation management through mechanical, chemical, and prescribed burning will increase herbaceous vegetation in uplands resulting in less time spent by wildlife and livestock in riparian area's. Increased herbaceous production will also reduce upland soil erosion and subsequent stream sedimentation. Treatments will also provide movement corridors for livestock out of riparian zones.

Product: 4,000 acres treated in upper watershed.
Cost: $11,850

Task 6. Livestock creek crossings to reduce stream bank trailing and trampling. Crossing will consist of narrow bridges that will allow livestock but not motorized vehicular crossing.

Product: Four creek crossings on upper Muddy Creek and Littlefield Creek.
Cost: $6,250

Objective 2. Increase herbaceous and woody cover on stream banks and wetland areas to reduce stream sedimentation.

Task 7. In-stream habitat improvement structures to elevate stream bank water tables providing for enhancement and expansion of riparian areas. In addition small stream structures will be used to stop active channel erosion and down cutting and also provide pool habitat for trout.

Product: One fish barrier/ drop structure, spawning cribs, log K dams, and other habitat structures.
Cost: $5,250

Task 8. Vegetative and Physical Bank and Shoreline Protection: to protect and stabilize stream channels, dams, dikes shorelines, wetland areas and flood plains.

Product: 15 stream miles planted with woody and herbaceous riparian species, 10,000 feet of embankments vegetated (seeded and transplanted plant materials). Critical embankments in wetland areas protected with erosion cloth.
Cost: $7,500

Goal 3. Improve water quality by protection, enhancement, and development of wetlands.
Objective1. Improve the biological function and acres of wetlands to serve as sediment and nutrient sinks.

Task 9. Channel and flood plain maintenance and grade control to reduce active channel erosion and down cutting that is/or has the potential to lower water tables and drain wetland areas, develop additional wetlands to serve as sediment traps and nutrient sinks.

Product: One-drop structure, 2,600 feet of spreader dike, and 75 acres of additional wetlands.
Cost: $16,500

Goal 5. Improve water quality by increasing both public and resource user awareness about the causes of nonpoint source pollution and best management practices to remediate these causes.

Task 10. Implement an Information and Education (I&E) program using all forms of written, verbal, and electronic media. (i.e. tours, video, television, slide and poster presentations, newsletters, publication in scientific, technical, and popular publications). Also implement a resource user education program.

Product: One video on best management practice that worked for improving water quality in the Muddy Creek Watershed. One project tour. Slide/poster presentations to watershed groups, producer organizations, interested publics, and professional symposiums. Publications in district newsletters, scientific, technical, and popular print. Resource user education on nonpoint source pollution, natural resources, and management tools to implement BMP's.
Cost: $4,500.

Goal 6. Implement a monitoring program that accurately reflects changes in water quality as a result of changes in land management practice associated with this project.

Task 11. Implement a monitoring program that both quantitatively and qualitatively measures improvements in physical, chemical, and biological water quality and also stream channel morphology and fisheries habitat. (See attached Sampling and Analysis Plan (SAP).
Product: Data collection and monitoring report:
Cost: $12,40

EXHIBIT B

Muddy Creek Watershed Project
Monitoring Sample and Analysis Plan (SAP)

Project Organization and Responsibility

Project Manager:	Chris Abernathy, WDEQ
Field Operations Manager:	Larry Hicks, LSRCD
Field Technician:	J Sheehan, LSRCD
Quality Assurance:	WDEQ/LSRCD
BLM representatives:	
Water quality/hydrology	Ken Peacock, Hydrologist
Photopoints and X-sections	Andy Warren and Cheryl Hicks: Range
Conservationist	
WY Game and Fish Dept:	Kevin Spence, Habitat biologist
NRCS Technical assistance:	Norman Vigil, District Conservationist
	Jack Waltz, Engineer

Data Quality Objectives (DQO's) for Monitoring Data

1. Monitor stream physical and chemical water quality, and aquatic biological community changes.

2. Monitor stream channel morphology and cold-water fisheries habitat.

3. Evaluate effectiveness of BMP implementation.

Water Column Physical and Chemical Parameters:

Turbidity: will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards.

Total Dissolved Solids (TDS): will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards. The relationship as used in the HYDROLAB reporter is, TDS = C (0.640), absent specific knowledge of the sampled water. This algorithm is used in data collection.

Electrical Conductivity (EC): will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards. The H20 multiprobe will be calibrated monthly against known standards. Specific Conductance (EC) is waters ability to conduct electricity, and is related to the ionic activity of the water sample. The parameter is temperature normalized to 25 degrees centigrade to remove the temperature variability in the recorded data.

Dissolved Oxygen (DO): will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards. Dissolved Oxygen (DO): is the amount of free oxygen that the water column will maintain in a dissolved state. DO is affected by water temperature, atmospheric pressure and salinity. The inverse relationship of DO to water temperature indicates that DO should be greatest when temperature is least. In the field, the HYDROLAB reporter collects 'raw' data (related to the sensed partial pressure) at the DO cell, then corrects this value for each of the confounding factors above.

pH: will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards. pH is the log of the inverse hydrogen ion concentration. It is the most commonly used determinant of the relative acidity or alkalinity of a water sample, determined by measuring the hydrogen ion concentration. pH is temperature sensitive. Neutral pH is 7 at 25 degrees centigrade and 7.53 at 0 degrees centigrade.

Temperature: will be measured with a Hydrolab H20 multiprobe and where continuos monitoring occurs a Handar 555 data logger will be coupled with the probe. The H20 multiprobe will be calibrated monthly against known standards.

Flow/Discharge: A fluid pressure transducer will be used at the continuos recording stations. It is used to determine the pressure exerted by the water column. This data is converted to feet of water over the datum using the relationship: Water Depth = 2.31 Water Pressure (psi). Periodic flow sampling of a rated cross-section at the site using the equal increment method generates a flow vs. stage rating curve. This allows the data collected by continuous recorders to be proofed and measurement error minimized. An accurate hydrograph can be presented at each monitoring location.

At locations where only grab samples are collected a flow measurement will be done using a Swaffor flow meter and the equal increment method.

Biological Water Quality:

Fish: can be an indirect measure of a streams water quality. Class II streams is required to have the potential to support cold water fisheries as part of a streams designated beneficial uses. Where the Colorado River Cutthroat Trout (CRCT) species requirements are more stringent than the individual State Water Quality Standards for Class II streams, they become the target water quality standard for these streams in the reintroduction area's of Upper Muddy and Littlefield Creeks. Table 3 contains applicable standards for CRCT trout for each parameter monitored. Electrofishing will be conducted by the WGFD on Littlefield, Upper Muddy, and McKinney Creeks as part of the monitoring program. Estimates on size (age class), numbers of trout per miles, and pounds of trout per mile are calculated and will be used as a long term monitoring trend and indicator of water quality and watershed health.

Benthic Macroinvertabrates: important elements of water quality evaluations because they (1) live in, on, or near streambed sediments; (2) have relatively long life cycles; and (3) are relatively sessile compared with large organisms, such as fish. This combination of characteristics ensures that benthic invertebrates (1) respond to natural and anthropogenic environmental conditions that physically or chemically alter streambed sediments; (2) integrate effects over a year; and (3) spatial patterns of water quality at multiple sites, and for integrating effects up to a year after a pollution disturbance event. Macroinvertabrate sampling will be done annually at nine stations in the watershed on perennial tributaries.

Table 1: Water Quality Standards for three life stages of Colorado River Cutthroat Trout for each of the parameters monitored. ND indicates no data. AADF is the Average Annual Daily Flow. ? Indicates that upper limit is unknown.

Parameter	CRCT Standard Range		
	Incubation	Juvenile	Adult
Temperature Degree C	10	0-22	0-22
pH Standard Units	ND	6.5-8.0	6.5-8.0
Dissolved Oxygen (mg/l)	6-10	6-?	6-?
Low-Flow Regime	ND	>=50% AADF	>=50% AADF
TDS/Specific Conductance/Salinity (mg/l)	ND	40-500	40-500

Stream Assessment:

Habitat Quality Index: The Wyoming Game and Fish Department (WGFD) has developed the Habitat Quality Index (HQI) as a means of assessing a streams fluvial trout habitat. The HQI procedure was initially developed as a habitat evaluation tool. The HQI has also been used to predict trout standing crop and to assess the effects of habitat alterations. The HQI is a relatively simple tool that can be used to assess fluvial trout habitat. Whereas trout and trout habitat can be an indicator of the health of a fluvial stream system. The HQI can then serve as and indirect qualitative evaluation of water quality or at least provide indication of a stream system that may be degrading or improving with regards to trout habitat. Three locations in the Upper watershed: on Muddy, Little Muddy, and Littlefield Creeks currently have established HQI stations. These stations will be monitored biannually.

WDEQ Stream Bioassessment: The Wyoming Department of Environmental Quality (WDEQ) has developed a bioassessment method for assessing the biological condition of stream health. Bioassessments will be conducted biannually at nine locations on perennial tributaries in the watershed.

Bioassessment parameters assessed provide direct and indirect evidence of water column quality and/or types of pollutants that may be present, primarily nutrients and sediments may be detected. The WDEQ Bioassessment consists of two components that include both water quality and stream habitat parameters. Whereas water quality parameters are quantitatively measured the person conducting the assessment primarily qualitatively estimates the habitat parameters. Water quality is evaluated based on chemical, physical, and biological sampled parameters. Habitat assessment is composed of evaluating the presence of aquatic biota and 13 physical habitat parameters. The relative abundance of aquatic biota (filamentous algae, periphytin, floating algae, slimes, rooted macrophytes, and fish) are rated on a scale of 0 - 4 as part of the bioassessment where 0 = not observed/present, 1 = rare, 2 = common, and 4 = dominant in system. Some aquatic biota can be used as an indicator of water and habitat quality and may also serve as indicators to some types of water quality impairments. The thirteen habitat parameters evaluate include both in-stream and riparian habitat condition. Condition scores are ranked as optimal, sub-optimal, marginal and poor.

Because of the subjective nature of the habitat evaluation portion of the assessment it should not be used as a stand-alone method for evaluating water quality. In conjunction with additional quantitative sampling of the water column it can provide useful information that correlates with other quantitative parameters. Whereas water column (physical and chemical) and macroinvertabrate sampling may indicate impairment, they provide little information as to the source or activity related to the impairment. This is where the qualitative portion of the bioassessment has the greatest application. The bioassessment may actually provide indicators of the source and/or activity that are resulting in impairment to the water quality in any given water-body.

Stream Channel Morphology:

Channel Cross Section: provide an indicator of the alluvial geomophology of a stream system and its ability to transport sediment and bed load materials. Repeatable channel cross section can demonstrate if a system is agrading or degrading based on its channel shape. Water quality characteristics inferred from cross sections is the trend in the amount of sediment load being transported and deposited during high flow events. Channel shape will indicate if agradation or degradation is occurring in a stream segment. In areas of channel agradation the location of deposition (in the channel or on banks) may provide indicators of a streams health. The same is true for stream channel degradation, from where the material is being removed (banks or stream bottom). Channel shape is also a key component in fisheries habitat and also directly effects physical water quality (temperature). Some 20 repeatable channel cross section will be used on Muddy Creek and its tributaries. Cross sections will be read every 3 years.

Permanent Photopoints:

Photopoints: provide a visual record of the condition of the landscape. They especially important in determining trend, weather a stream segment is improving and declining in condition. Channel shape, bank cover, eroding banks, bare ground/cover and herbaceous and woody communities can all be evaluated with photopoints to determine trend. Even though the photographs are not quantitative they often provide the most striking evidence for demonstrating that upland, riparian, and fluvial habitats are improving. It can be inferred then that if these areas are song a positive trend then water quality is improving especially in systems were silt and sediment are the nonpoint source pollutant. Over 40 permanent photopoints currently exist in the watershed and will be retaken biannually.

Monitoring Quality Assurance Quality Control (QA/QC)

Where applicable water column monitoring will adhere to WDEQ "Surface Water Quality and Nonpoint Source Program Quality Assurance Project Plans". Hydrolab multiprobes will be calibrated against known standards biweekly during high flows and monthly during low flow periods at continuous monitoring stations. Multiprobes will be calibrated against known standards prior to grab sampling. In addition grab samples will be taken at each site annually and sent to the Wyoming State Water Quality lab for comparison against the Hydrolabs.

Macroinvertabrates samples will be sent to the USDI- National Aquatic Monitoring Center. A minimum a 500 organism will be identified. Sample collection will follow WDEQ protocols. The WDEQ bioassessment will be conducted by district personnel trained by WDEQ staff. Biannually district personnel conducting the bioassessments will work with WDEQ personnel to stay current with bioassessment protocols.

Table 2. Monitoring sites, parameters and frequency for the Muddy Creek Watershed Project.

Stream Segment	Physical/Chemical	Discharge
Muddy @ headwaters	Annually	Annually
Muddy @ Grizzly/Sulphur Springs	Annually	Annually
Upper Muddy above Littlefield	Continuous* - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Littlefield Creek	Continuous* - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Little Muddy Creek	Grab - Hydrolab H2O monthly **	Flow Meter - Monthly
Upper McKinney Creek	Grab - Hydrolab H2O monthly **	Flow Meter - Monthly
Middle McKinney Creek	Grab - Hydrolab H2O monthly **	Flow Meter - Monthly
Lower McKinney Creek	Continuous - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Muddy @ Bridger Pass	Continuous - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Muddy @ Doty Mountain	Annually	Annually
Muddy @ Reach 3	Continuous* - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Muddy @ Dad	Continuous* - Hydrolab H2O hourly	Continuous - Pressure Transducer, hourly
Dry Cow	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly
Cow Creek	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly
Deep Gulch	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly
Wild Cow	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly

Cherokee	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly
Deep Creek	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly
Muddy @ Baggs	Grab - Hydrolab H2O Quarterly	Flow Meter - Monthly

* During Ice Free Periods
** When Site is Accessible