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**REDBAND TROUT (Oncorhynchus mykiss) POPULATION AND HABITAT
INVENTORY IN OWYHEE COUNTY, IDAHO**

BUREAU OF LAND MANAGEMENT CHALLENGE COST SHARE PROJECT

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ABSTRACT

Sixteen stream segments were sampled for redband trout (Oncorhynchus mykiss) populations in Owyhee County, Idaho in 1993. Stream segments in the Jordan Creek, Red Canyon Creek, and Deep Creek drainages were sampled. Ten of the sixteen stream segments contained redband trout in the 1993 survey with densities ranging from 0.3 to 102 redband trout/100m².

Stream riparian habitat data were collected at all survey sites. Habitat variables measured included: stream transect lengths, widths, depths, gradient, bank stability, instream fish cover, composition of greenline plant communities, and percent shading of the stream.

Several water quality variables were collected at each site. Water temperature during July through October 1993 ranged from 6.5 to 22.0^o C, dissolved oxygen ranged from 7.7 to 11.4 mg/l, and water conductivity ranged from 34.1 to >1000 uS/cm.

Ten of the stream segments sampled had been previously sampled in 1976 or 1977 or 1991. In three transects, populations had increased over previous samples, one had remained the same, and six had decreased. It is recommended that the redband trout stream and habitat surveys be continued until stream segments in all drainages are sampled.

BLM lands in the Bruneau and Owyhee Resource Areas of the Boise District. Seven stream segments were sampled in the Jordan Creek drainage; of these sites, six had been sampled in previous surveys (Figure 1). Three sample sites, two previously sampled, were on Red Canyon Creek, a tributary to the Owyhee River (Figure 2). The third grouping of nine stream segments, one previously sampled, were on Deep Creek and its tributaries (Figure 3). The Deep Creek group of stream segments were in the area of the proposed Idaho Training Range (U.S. Air Force, 1993).

METHODS

FISH POPULATIONS

On streams with previously established transects, transects were located using historic transect information (BLM data, unpublished). New transects were established with identifiable boundaries when necessary. Descriptions of all transect locations are presented in Appendix A.

Transects were greater than 61 m in length. Upper and downstream transect boundaries were located at stream constrictions to minimize fish migration during electrofishing.

A Smith-Root Model 15-B backpack electrofishing unit was utilized by two people electrofishing from the lower to the upper transect boundaries. All fish species encountered were netted and placed in buckets which were kept cool in the stream. We made three electrofishing passes, removing and segregating the

Figure 1. 1993 stream sample sites on Jordan Creek drainage in Owyhee County, Idaho.

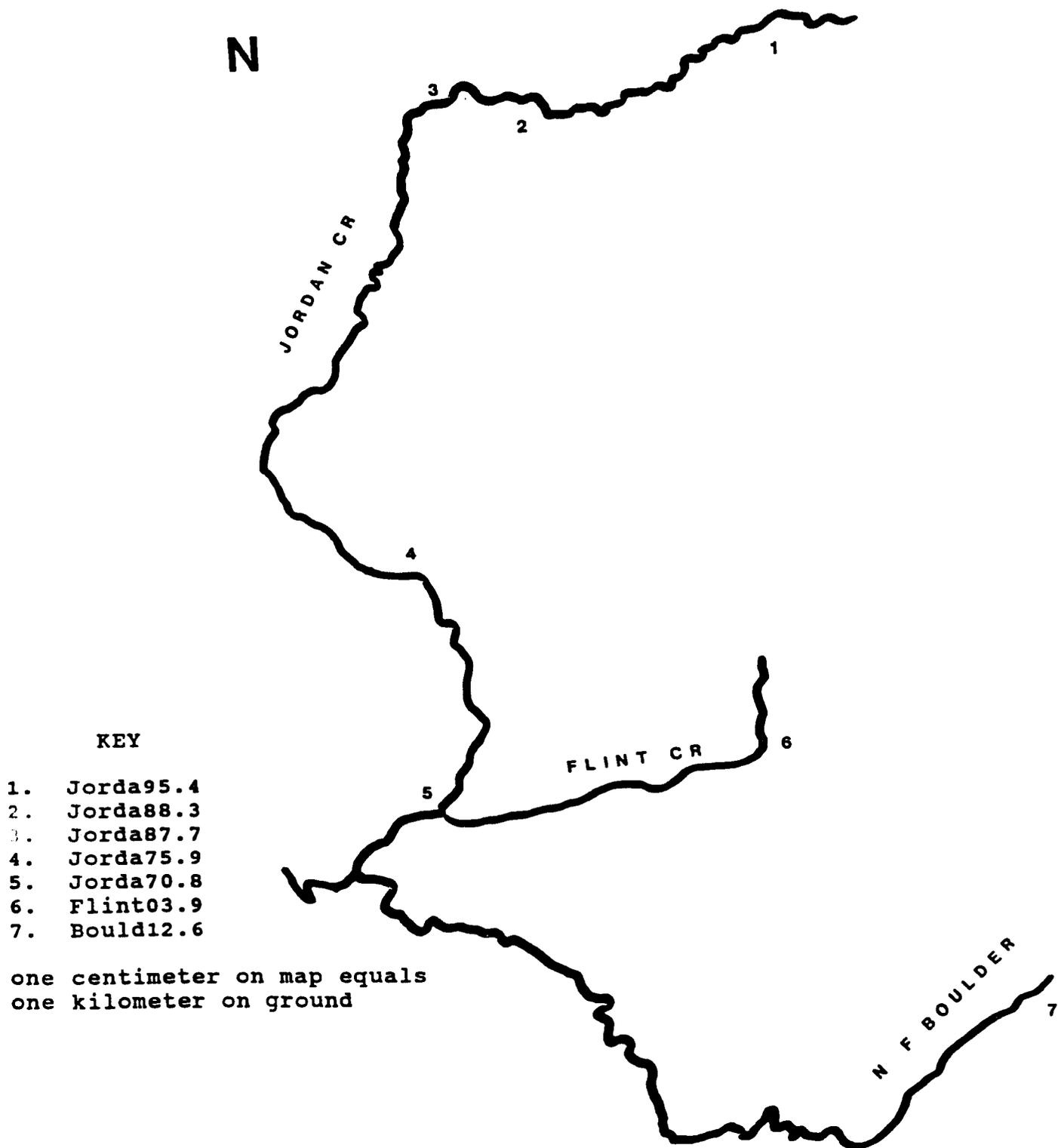


Figure 2. 1993 stream sample sites on Red Canyon Creek drainage in Owyhee County, Idaho.



Figure 3. 1993 stream sample sites on Deep Creek drainage in Owyhee County, Idaho.

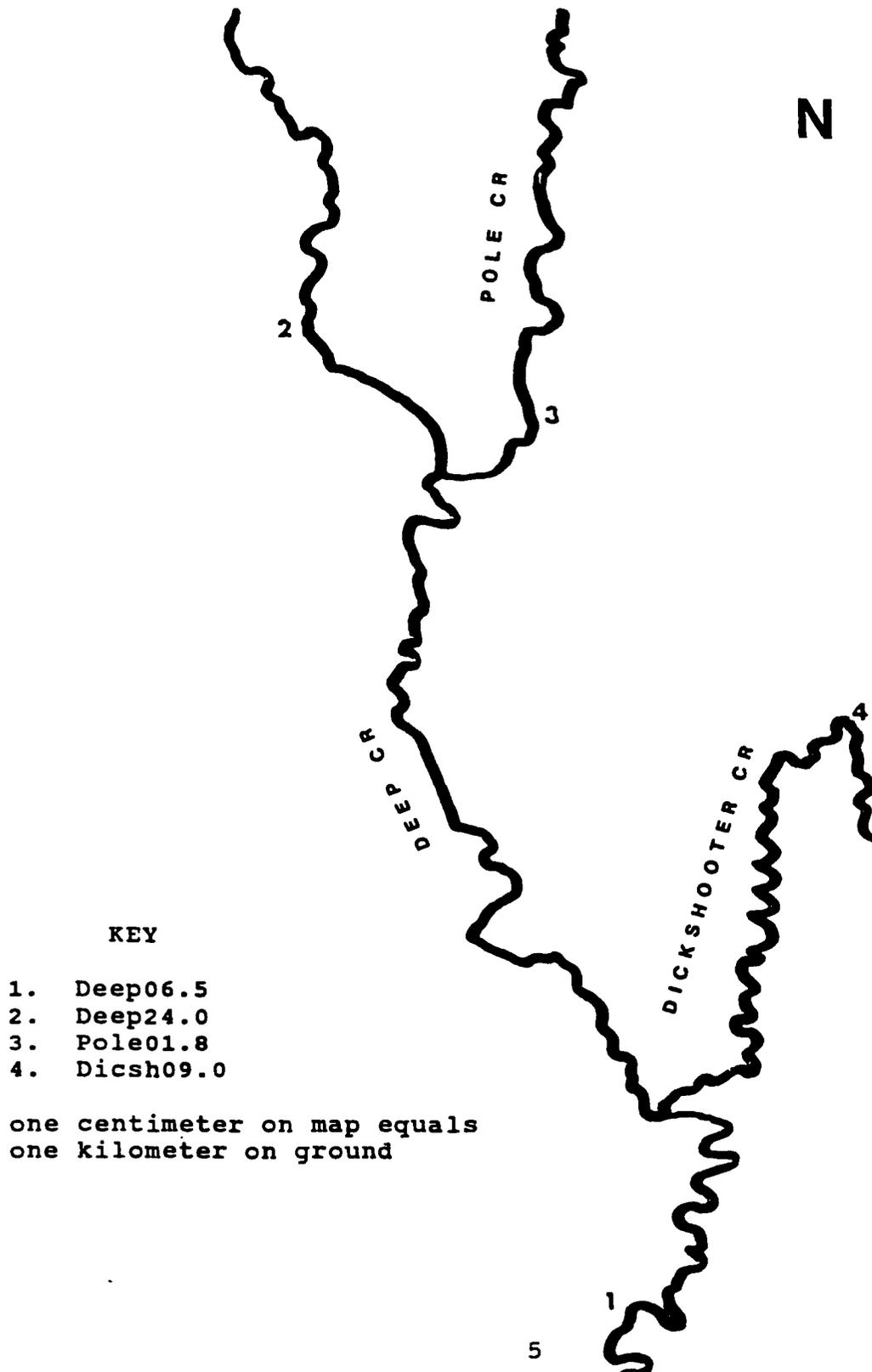
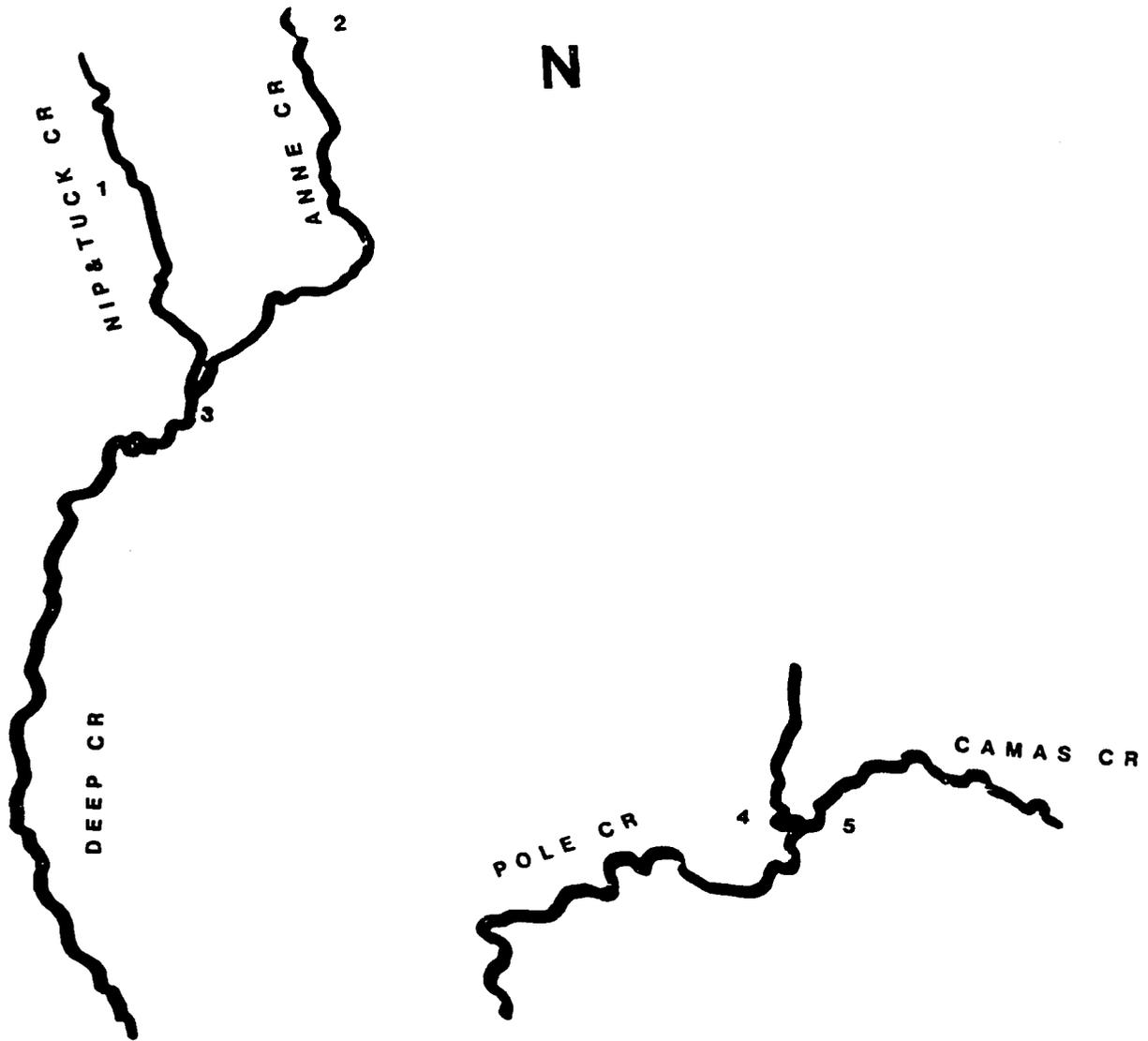


Figure 3(cont). 1993 stream sample sites on Deep Creek drainage in Owyhee County, Idaho.



KEY

- 1. Nip&Tuck03.0
- 2. Anne02.5
- 3. Deep38.0
- 4. Pole14.5
- 5. Camas0.5

one centimeter on map equals
one kilometer on ground

fish from each pass. If no redband trout were encountered on the first pass and collection conditions were considered good, no further electrofishing passes were completed. All fish collected were measured to the nearest mm; weighted to the nearest gram; and a scale sample was collected from at least five fish per centimeter group; and then released.

Collected trout scales were mounted on acetate sheets and pressed with a Carver Heat Press to create a readable impression in the acetate. The acetate impressions were then used in a microfiche reader where the focus, annuli, and margin were identified and marked on a slip of paper. The annuli marks were entered on a digitizing pad and the DisBCal 89 V1.0 Program in the Fishery Analysis Tools software of the Missouri Department of Conservation. This program produced average back-calculated lengths for each age class of trout.

Redband trout population estimates and confidence intervals were calculated by the removal method of Deventer and Platts (1987). Trout densities were calculated by dividing the population estimate by sampled area and reporting as trout/100m². All trout captured, including young of the year trout, were used in calculating densities.

STREAM HABITAT

Within each stream transect a 61.0 m habitat transect was established. Ten stream widths were measured at 6.1 m intervals beginning 6.1 m (20 feet) from the bottom of transect. At each cross section, depth measurements were taken at 1/4, 1/2, and 3/4

points across the channel. Substrate composition was determined with standard IDFG methods utilizing a view box and categorizing the substrate by size class (Petrosky and Holubetz, 1988).

Instream fish cover was a subjective visual assessment of several parameters and was recorded for each cross-section as the percentage of the stream width defined as cover. For this study cover was defined as areas where redband trout were likely to be found: (1) pools >0.45 m (>1.5 feet) in depth, (2) overhanging bank vegetation, (3) instream vegetation, (4) near large instream rocks, (5) velocity breaks ie. broken water surface (6) pocket water behind or beside large rocks, (7) near large woody debris.

Stream gradient was measured using an ocular hand level and a stadia rod. Gradient is the vertical drop between the upstream and downstream transect boundaries divided by the stream segment length and reported as a percentage.

Streambank stability measurements were a visual assessment to determine the vulnerability of the bank slopes to erosion (Platts, et. al., 1983). Four classes were used to rate the stability of the streambanks. Covered and Stable: over 50 percent of banks in healthy vegetation and/or anchoring rocks. The banks did not show signs of erosion. Covered and Unstable: more than 50 percent of streambank covered by vegetation but signs of erosion were present. Uncovered and Stable: less than 50 percent of stream bank covered by vegetation or anchoring rock. Does not show signs of erosion, ie. banks were bare but not vertical or slumped. Uncovered and Unstable: less than 50

percent covered with vegetation. Banks show some erosion, ie. slumped or vertical bare banks.

Thermal input to the stream waters was measured using a Solar Pathfinder™ following Platts, et. al. (1987). Percent stream shading was reported as the average percent of shading on the stream surface during June through September at 10 points along the transect.

The "greenline" is the first continuous cover of perennial vegetation above the stable low water level (USDA, 1992). We determined the composition of plant communities along the greenline on both banks for each stream transect. Streambank distances were summed for each community type and the percentage of the total greenline made up by each community type was calculated for each transect.

WATER QUALITY

Several water quality parameters were measured at each stream segment. Dissolved oxygen was measured with a YSI Model 57 meter and probe. Conductivity measurements were taken with a Hanna Instruments hand held meter. Alkalinity and Hardness measurements were taken with Hach Company field titration kits. pH was measured with a pH pocket pen. Water and air temperature were recorded with a pocket thermometer at each site. Time of day was also recorded when the measurements were taken.

RESULTS AND DISCUSSION

FISH POPULATIONS

Population estimates and fish per 100m² for stream transects sampled in 1993, along with historical population estimates are presented in Table 1. Of the 10 sites resampled in 1993, six sites had reduced densities from the previous sample date, three revisited sites had increased densities, and one site had the same density.

Observations and the data support that the presence of redband trout decreases downstream in the Jordan Creek drainage. Trout densities for the upper most site (Jorda95.4) were higher than the downstream sites for both sample years (Table 1). The tributary streams Flint and Boulder also support viable populations of redbands (Table 1).

Of the three sites resampled on Red Canyon Creek one site had a higher density in 1993, one the same, and one site had a lower density than when it was previously sampled. Stream segment Redca13.5 which was inside the Trout Springs enclosure contained no trout in 1993, versus a trout density of 23/100m² measured in 1991. Because of the stream's small size at this location the drought may have affected the trout population in this stream segment.

Table 1. Population estimates and densities of redband trout (*Oncorhynchus mykiss*) in 1993 and historical sampling in selected streams in Owyhee County, Idaho.

SITE	LOCATION	DATE	POPULATION ESTIMATE	DENSITY TROUT/100m ²
JORDA95.4	T4S R3W S31	7/93	54 (4.9)	15.5
		6/77	86 (16.2)	10.2
JORDA88.3	T4S R4W S31	8/93	4 (0.6)	0.9
		8/76	29 (0.0)	13.9
JORDA87.7	T5S R4W S6	9/93	1 (0.0)	0.3
		6/77	5 (1.0)	1.2
JORDA75.9	T6S R5W S1	8/93	4 (0.0)	1.2
		8/77	6 (0.9)	3.2
JORDA70.8	T6S R4W S19	8/93	1 (0.0)	0.3
		8/76	7 (0.0)	2.2
FLINT03.9	T6S R4W S22	9/93	70 (0.9)	40.0
		7/77	62 (46.3)	11.7
BOULD14.8	T6S R3W S28	8/77	80 (594)	38.6
BOULD12.6	T7S R3W S5	9/93	19 (13.4)	7.8
REDCA13.5	T11S R5W S25	10/93	0	0
		9/91	69 (0.2)	23.0
REDCA13.4	T11S R5W S25	10/93	1 (0.0)	1.2
		9/91	1 (0.0)	1.3
REDCA02.0	T12S R4W S18	10/93	91 (7.3)	29.4
		9/91	13 (0.6)	9.0
DEEP06.5*	T13S R2W S7	10/93	0	0
DEEP24.0*	T11S R3W S22	10/93	0	0
DEEP38.0*	T10S R3W S3	10/93	0	0
		10/76	10 (0.0)	23.0
NIP&TUC3.0*	T9S R3W S27	10/93	112 (8.9)	102.0

Table 1. Population estimates and densities of redband trout (Oncorhynchus mykiss) in 1993 and from historical sampling in selected streams in Owhyee County, Idaho, (continued).

POLE1.8*	T11S R3W S24	10/93	0	0
ANNE02.5*	T9S R3W S23	10/93	DRY	DRY
POLE14.5*	T10S R2W S28	10/93	0	0
CAMAS0.50*	T10S R2W S28	10/93	0	0
DICSH9.0*	T11S R2W S9	10/93	0	DRY
* Indicates segments within or near the Idaho Training Range, (U.S. Air Force, 1993). () indicate \pm 95% confidence interval.				

Eight of the nine transects sampled in the Deep Creek drainage contained no trout; the ninth (Nip&Tuck3.0) contained the highest densities of the 16 sections sampled. Historical BLM data (1970's) document low densities at several sites on Deep Creek (BLM, unpublished data). Based on 9 sampled transects in 1993, trout populations appear to be reduced.

Several additional fish species were collected during the 1993 surveys. Species observed were: Longnose Dace, Rhinichthys cataractae; Leopard Dace, Rhinichthys falcatus; Speckled Dace, Rhinichthys osculas; Redside Shiner, Richardsoniuis balteatus; Mountain Sucker, Catostomus platyrhynchus; Chiselmouth, Acrocheilus alutaceus; Northern Squawfish, Ptychocheilus oregonensis; Smallmouth Bass, Micropterus dolomieu; Sculpin species, Cottus spp.

AGE AND GROWTH

Accurate age determination for different redband populations was difficult because of the large percentage of regenerated scales encountered per fish. Generally the different redband populations had similar growth rates. The stream section Jorda95.4 was the only population sampled that had age 4+ fish present (Figure 4). Most trout populations sampled were small and did not contain all year classes (Figures 5-9). Stream sections Jorda95.4 and Nip&Tuck03.0 (Figures 4 and 10), length frequency and age data, may be the best representations of redband populations due to the larger number of fish collected.

Ten of the sixteen stream segments sampled contained redband trout (Table 1) and of these, only two had a "healthy" population density and age structure (Figures 4 and 10). These data indicate that redband trout populations in the areas sampled were fragmented and were composed of generally a few individuals. The sampled populations had missing year classes, were highly variable in year class strength, and were generally short lived.

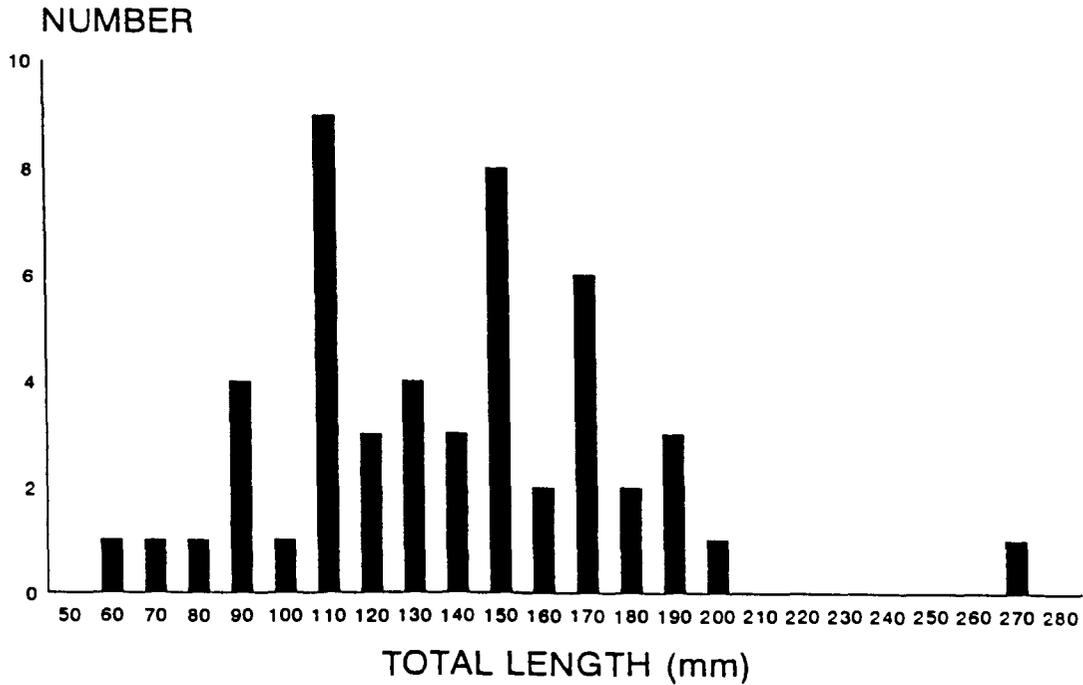
Comparisons with previous data sets for age and growth were not possible because of lack of historical data.

HABITAT

Several habitat variables were collected in 1993. Data were collected to document baseline stream riparian habitat conditions. Stream habitat variables: average width, average depth, gradient, and percent substrate composition are presented in Table 2. Percent of streambank cover and streambank stability are presented in Table 3. Percent shade quality, derived from the Solar Pathfinder™, percent instream fish cover, and percent of vegetative community types, derived from the "greenline" data collection are summarized by stream segment in Appendix A.

Figure 4. Length frequency and average back-calculated length at age class for redband trout on stream segment Jorda95.4 collected in Owyhee County, Idaho.

REDBAND TROUT LENGTH FREQUENCY



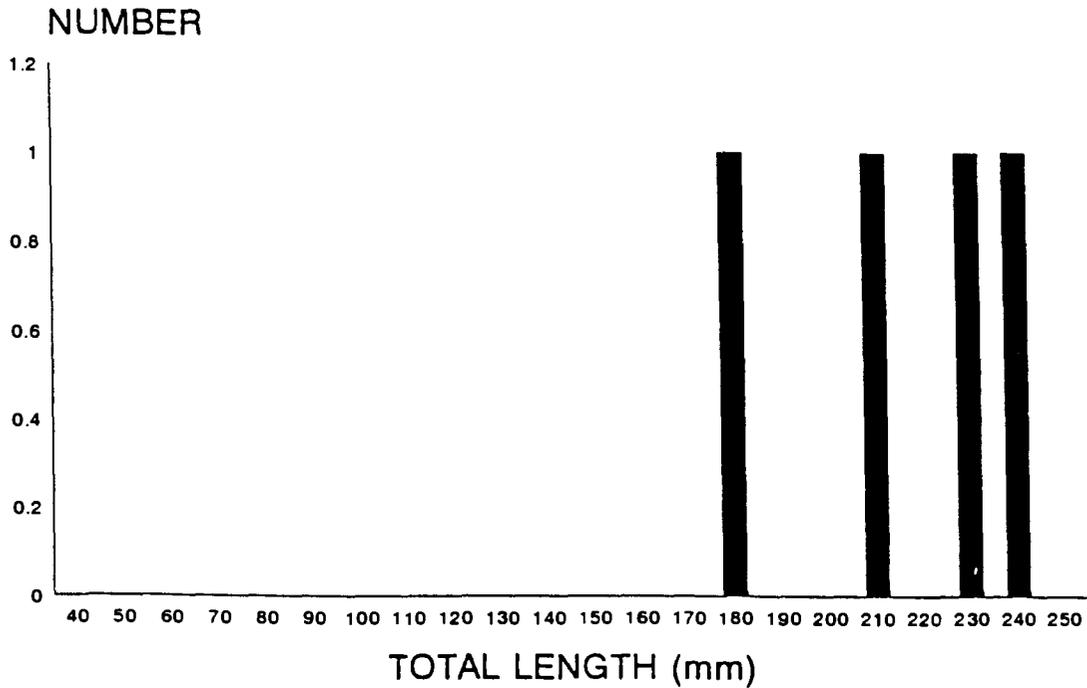
JORDAN 95.4 7/28/93

AVERAGE BACK-CALCULATED LENGTHS (mm) FOR EACH AGE CLASS Back-calculation Age

<u>Year Class</u>	<u>Age</u>	<u>N</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1992	1	20	78.20			
1991	2	17	91.60	133.03		
1990	3	9	78.99	118.50	150.13	
1989	4	3	85.70	121.00	152.15	180.54
ALL CLASSES			83.45	127.28	150.63	180.54
	N	50	49	29	12	3

Figure 5. Length frequency and average back-calculated length at age class for redband trout on stream segment Jorda88.3 collected in Owyhee County, Idaho.

REDBAND TROUT LENGTH FREQUENCY



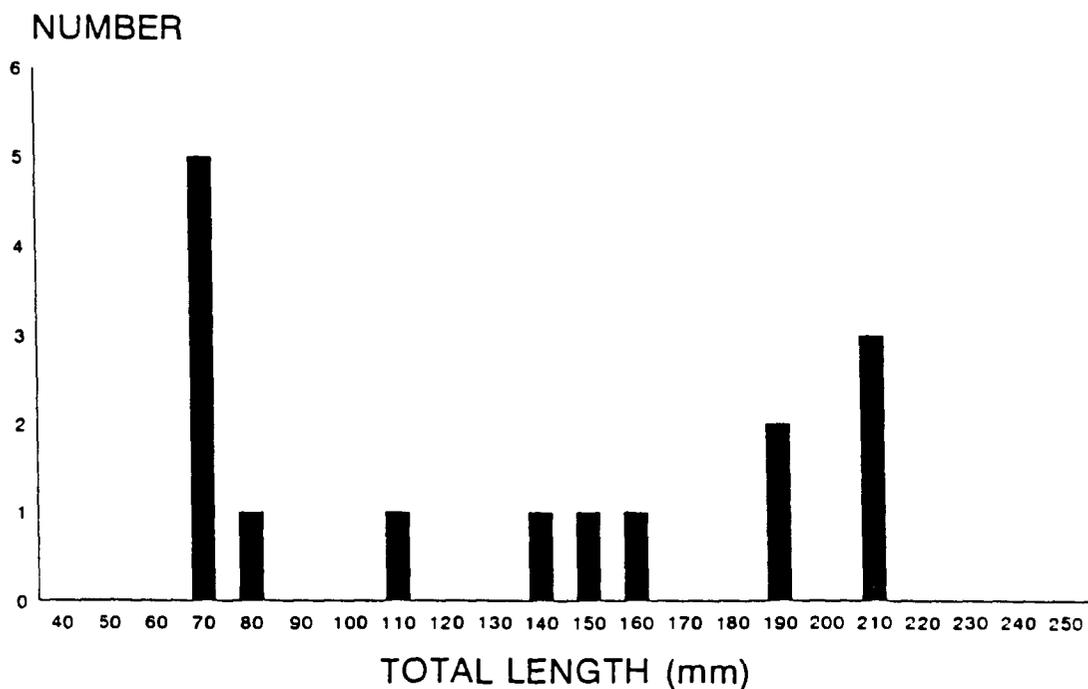
JORDA 88.3 8/3/93

AVERAGE BACK-CALCULATED LENGTHS (mm) FOR EACH AGE CLASS Back-calculation Age

<u>Year Class</u>	<u>Age</u>	<u>N</u>	<u>1</u>	<u>2</u>	<u>3</u>
1992	1	0	0.00		
1991	2	0	0.00	0.00	
1990	3	4	91.84	137.78	197.00
ALL CLASSES			91.84	137.78	197.00
	N	4	4	4	4

Figure 7. Length frequency and average back-calculated length at age class for redband trout on stream segment Bould12.6 collected in Owyhee County, Idaho.

REDBAND TROUT LENGTH FREQUENCY



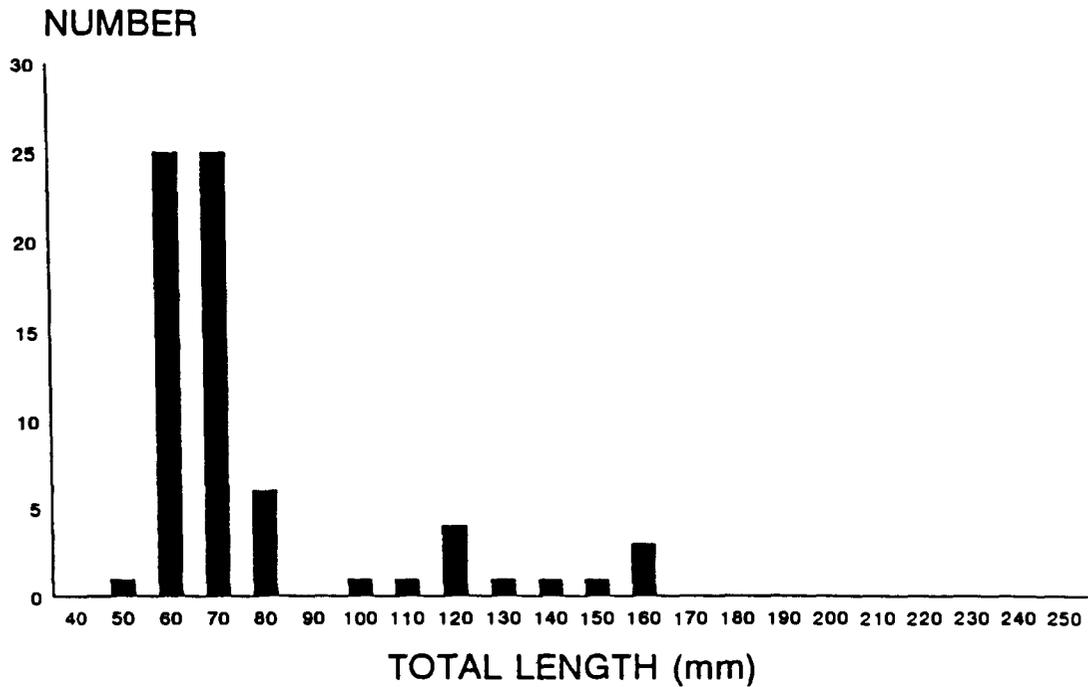
BOULD12.6 9/22/93

AVERAGE BACK-CALCULATED LENGTHS (mm) FOR EACH AGE CLASS Back-calculation Age

<u>Year Class</u>	<u>Age</u>	<u>N</u>	<u>1</u>	<u>2</u>	<u>3</u>
1992	1	2	80.61		
1991	2	3	90.15	134.12	
1990	3	4	84.29	142.63	186.38
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All Classes			85.43	138.99	186.38
N		15	9	7	4

Figure 8. Length frequency and average back-calculated length at age class for redband trout on stream segment Flint03.9 collected in Owyhee County, Idaho.

REDBAND TROUT LENGTH FREQUENCY



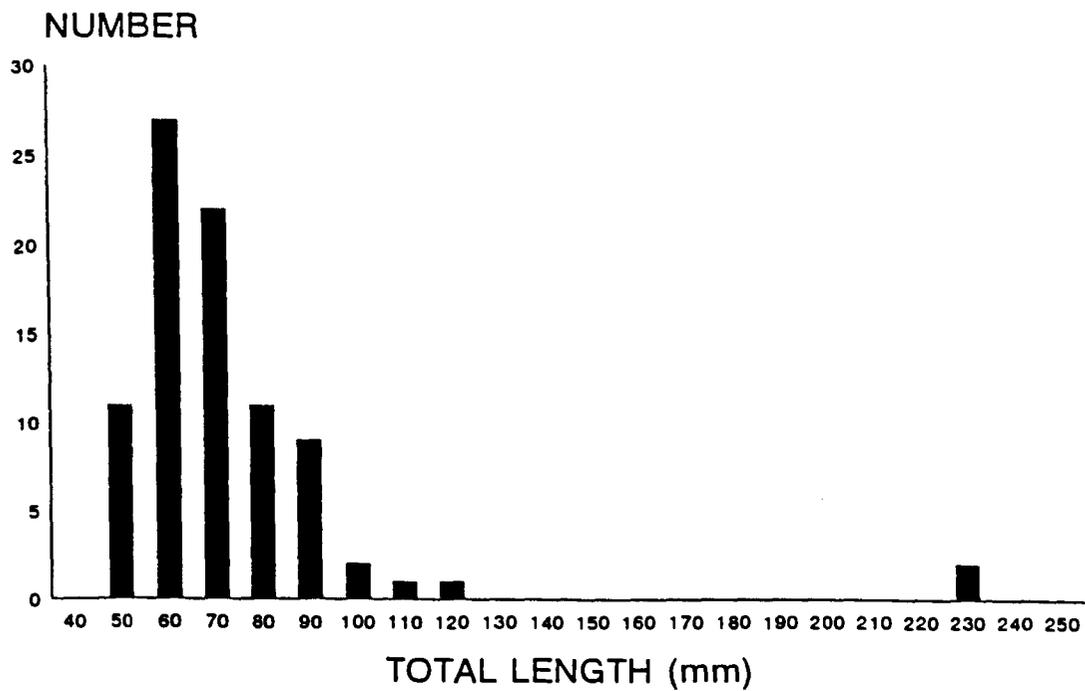
FLINT 3.9 9/23/93

AVERAGE BACK-CALCULATED LENGTHS (mm) FOR EACH AGE CLASS Back-calculation Age

<u>Year Class</u>	<u>Age</u>	<u>N</u>	<u>1</u>	<u>2</u>	<u>3</u>
1992	1	5	79.67		
1991	2	6	83.30	116.17	
1990	3	1	63.90	92.04	109.53
ALL CLASSES			80.17	112.72	109.53
	N	24	12	7	1

Figure 9. Length frequency for redband trout on stream segment Redca02.0 collected in Owyhee County, Idaho.

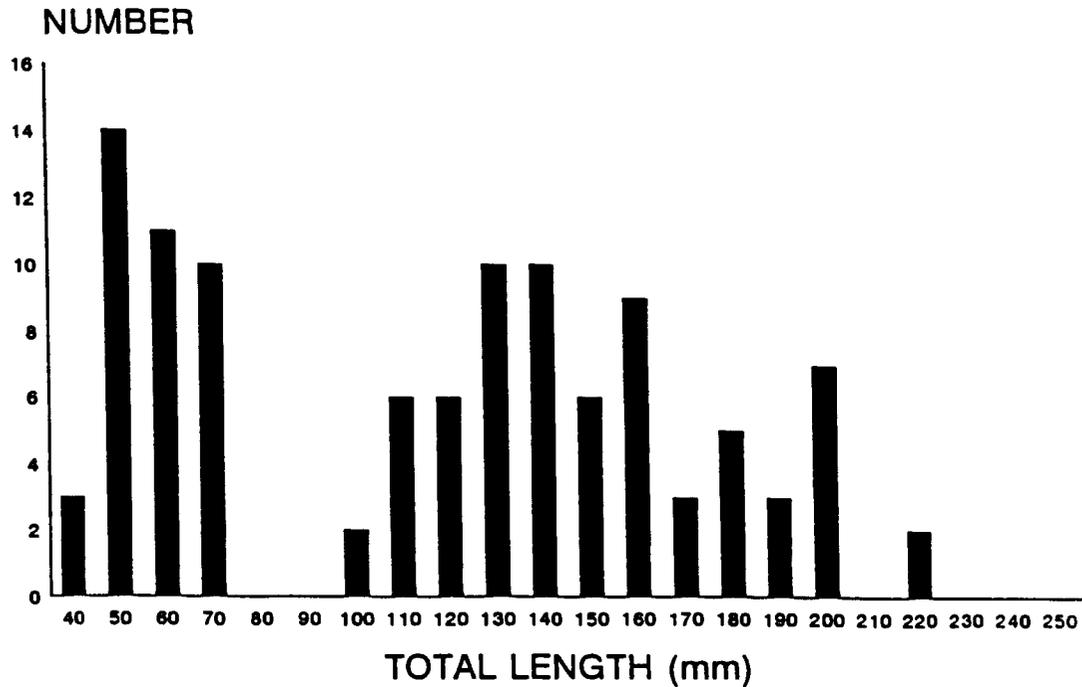
REDBAND TROUT LENGTH FREQUENCY



REDCA 02.0 10/5/93

Figure 10. Length frequency and average back-calculated length at age class for redband trout on stream segment Nip&Tuck03.0 collected in Owyhee County, Idaho.

REDBAND TROUT LENGTH FREQUENCY



NIP&TUCK CR 3.0 10/93

AVERAGE BACK-CALCULATED LENGTHS (mm) FOR EACH AGE CLASS
Back-calculated Age

<u>Year Class</u>	<u>Age</u>	<u>N</u>	<u>1</u>	<u>2</u>	<u>3</u>
1992	1	22	81.78		
1991	2	16	89.11	129.12	
1990	3	8	87.01	137.89	179.28
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ALL CLASSES			85.24	132.04	179.28
N		54	46	24	8

WATER QUALITY

Measurements of sampled water quality parameters are provided in Table 4. Water quality conditions observed in all sampled transects were adequate for trout survival. Water temperatures may be elevated to lethal levels for trout during some years in some of these streams. We did not observe this condition in 1993, however, the summer was the coolest on record for southwestern Idaho.

CONCLUSION

The surveys completed in 1993 documented fragmented populations of redband trout in central Owyhee County. These redband populations usually consist of small numbers of individuals with probable missing year classes. Overall the numbers of redband trout seem to have declined from previously documented trout densities from the 1970's. Unfortunately, no undisturbed watershed and associated stream and riparian areas remain to provide a baseline of what characterizes a "healthy" redband trout habitat. In our opinion, large fenced exclosures must be constructed to allow reestablishment of natural watersheds with excellent stream and riparian conditions, and these exclosures should be monitored to document the habitat and population parameters of a "typical" redband trout population.

Table 2. Habitat variables of stream lengths, average width, gradient, and percent composition of substrate collected during July through October, 1993 on selected stream sections in Owyhee County, Idaho. (* indicates in or near the Idaho Training Range, U.S. Air Force, 1993).

SITE	LOCATION	LEN (m)	AVE WIDTH (m)	MEAN DEPTH (m)	% GRAD- IENT	% SAND	% GRAV- EL	% RUBBLE	% BOUL- DER	% BED- ROCK
JORD95.4	T4SR3WS31	81.0	4.3	0.16	N/A	30.8	22.8	35.3	7.7	3.3
JORD88.3	T4SR4WS31	77.3	5.6	0.23	1.4	22.7	25.6	45.9	5.6	0.0
JORD87.7	T5SR4WS6	85.0	4.3	0.12	0.35	9.0	13.5	57.2	20.3	0.0
JORD75.9	T6SR5WS1	71.3	4.6	0.18	0.79	28.0	34.8	24.2	13.0	0.0
JORD70.8	T6SR4WS19	70.1	4.7	0.36	0.71	25.0	30.5	41.0	3.5	0.0
FLINT3.9	T6SR4WS22	64.9	2.7	0.07	0.69	11.7	15.0	73.3	0.0	0.0
BOUD12.6	T7SR3WS5	80.8	3.0	0.13	N/A	19.5	26.2	51.3	3.0	0.0
RDCA13.5	T11SR5WS25	61.0	0.8	0.07	N/A	4.3	17.7	62.0	16.0	0.0
RDCA13.4	T11SR5WS25	61.0	1.4	0.05	3.45	21.3	24.2	42.5	12.0	0.0
RDCA02.0	T12SR4WS18	64.6	4.8	0.2	0.85	31.3	28.0	39.0	1.7	0.0
DEP06.5*	T13SR2WS7	61.0	6.7	0.19	0.74	12.0	3.3	76.3	8.4	0.0
DEP24.0*	T11SR3WS22	61.0	4.7	0.16	1.8	37.5	14.2	37.3	7.7	3.3
DEP38.0*	T10SR3WS3	61.0	3.8	0.16	0.66	84.8	14.5	0.0	0.7	0.0
NP&T3.0*	T9SR3WS27	61.0	1.8	0.14	1.72	14.5	6.5	15.3	3.0	60.7
POLE1.8*	T11SR3WS24	61.0	3.4	0.2	1.5	19.0	6.0	41.2	24.2	9.6
POL14.5*	T10SR2WS28	61.0	4.8	0.47	0.25	55.8	13.3	4.5	6.3	20.0
CAM0.50*	T10SR2WS28	61.0	4.5	0.44	0.9	13.0	24.8	55.0	0.8	6.3

Table 3. Percent of streambank cover and streambank stability of selected stream transects in Owyhee County, Idaho. (* indicates within or near the proposed Idaho Training Range, U.S. Air Force, 1993).

SITE	LOCATION	PERCENT COVERED /STABLE	PERCENT COVERED/ UNSTABLE	PERCENT UNCOVERD /STABLE	PERCENT UNCOVERD/ UNSTABLE
JORD95.4	T4SR3WS31	53.25	11.5	30.25	5.0
JORD88.3	T4SR4WS31	20.5	6.5	64.5	8.5
JORD87.7	T5SR4WS6	67.75	9.0	10.0	13.25
JORD75.9	T6SR5WS1	30.75	3.0	44.25	22.0
JORD70.8	T6SR4WS19	43.5	0	6.5	50.0
FLINT3.9	T6SR4WS22	52.5	1.0	34.25	12.25
BOULD12.6	T7SR3WS5	72.5	11.75	0	15.75
REDCA13.5	T11SR5WS25	88.25	6.25	5.5	0
REDCA13.4	T11SR5WS25	40.75	35.25	6.0	18.0
REDCA02.0	T12SR4WS18	88.25	0.75	1.0	10.0
DEEP06.5*	T13SR2WS7	100.0	0	0	0
DEEP24.0*	T11SR3WS22	97.0	0	3.0	0
DEEP38.0*	T10SR3WS3	45.75	33.0	0	21.25
NIP&T3.0*	T9SR3WS27	19.5	6.25	64.5	9.75
POLE1.8*	T11SR3WS24	49.5	0	50.5	0
POLE14.5*	T10SR2WS28	47.75	3.0	49.25	0
CAMAS0.5*	T10SR2WS28	57.0	22.5	20.5	0

Table 4. Water quality measurements collected on selected streams in Owyhee County, Idaho, July through October, 1993. (* indicates in or near proposed Idaho Training Range, U.S. Air Force, 1993).

SITE	LOCATION	DATE	WATER TEMP. C.	AIR TEMP. C.	DIS. OX. mg/l	pH	CONDUCTIVITY Us/cm	HARDNESS mg/l	ALKALINITY mg/l
JORD95.4	T4SR3WS31	7/28/93	17.0	n/a	7.7	7.3	n/a	20	90
JORD88.3	T4SR4WS31	8/3/93	20.0	n/a	n/a	7.3	n/a	60	30
JORD87.7	T5SR4WS6	9/24/93	7.7	11.0	10.7	7.8	56.2	80	25
JORD75.9	T6SR5WS1	8/3/93	22.0	30.0	n/a	7.5	n/a	40	60
JORD70.8	T6SR4WS19	8/4/93	17.2	32.2	n/a	7.0	n/a	20	45
FLINT3.9	T6SR4WS22	9/23/93	14.0	19.0	8.6	7.8	52.9	60	80
BOULD12.6	T7SR3WS5	9/22/93	11.5	12.0	8.8	8.0	34.5	20	25
REDCA13.5	T11SR5WS25	10/4/93	17.5	22.0	7.7	7.5	34.1	20	40
REDCA13.4	T11SR5WS25	10/4/93	18.0	24.0	7.6	7.0	40.4	20	40
REDCA02.0	T12SR4WS18	10/5/93	18.0	n/a	10.4	8.5	116.0	20	60
DEEP06.5*	T13SR2WS7	10/6/93	11.0	8.0	8.2	7.7	130.0	60	80
DEEP24.0*	T11SR3WS22	10/6/93	17.6	18.0	11.4	8.9	100.6	20	45
DEEP38.0*	T10SR3WS3	10/7/93	12.0	11.0	9.0	8.3	52.2	20	40
NIP&T3.0*	T9SR3WS27	10/18/93	10.6	11.0	7.8	7.8	>1000	20	60
POLE1.8*	T11SR3WS24	10/19/93	6.5	7.0	8.8	8.0	n/a	40	80
POLE14.5*	T10SR2WS28	10/8/93	8.5	7.5	9.8	7.2	99.1	60	100
CAMAS0.5*	T10SR2WS28	10/8/93	11.0	9.0	9.2	7.2	124.1	60	120

RECOMMENDATIONS

1. Complete survey of major Owyhee County stream drainages. Increase intensity of sampling to positively identify the presence/absence of redband trout populations on a drainage basis county wide.
2. Reduce the number of stream cross-section measurements at each sample segment to five.
3. Monitor forage utilization in riparian areas.
4. Collect and analyze trout tissue samples to determine the genetic purity of Owyhee County redband trout populations.
5. Monitor seasonal stream temperatures with recording thermograph placed into stream segments to be sampled.
6. Establish several large watershed stream and riparian exclosures and monitor the changes to the riparian area, stream channel, and fish populations over time.

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Appendix A. Percent stream shading, percent instream fish cover, and percent composition of greenline plant communities for stream segments sampled in 1993 in Owyhee County, Idaho.

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Jorda 95.4 DATE 07/28/93 TIME 1335 hrs.

STREAM Jordan Creek GENERAL LOCATION 1 1/2 below Silver City above bridge crossing
 WATER SAMPLES: Y (N)
 INVERT SAMPLES: Y (N)
 FISH SAMPLES: (Y) N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	WAT TEMP C INSTANT	00010	17.0
BAROMETRIC PRESSURE (in Hg)	00025	WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127	pH - METER	00401	7.3
WET BULB DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	140
HUMIDITY %	00052	DISSOLVED OXYGEN - PROBE	00299	7.7
STREAMFLOW - CFS	00061	DO meter calibration factor:		
STREAMFLOW - GPM	00059	TDS - METER (umhos/cm)	70304	
STREAMFLOW ESTIMATE	74069	ICE COVER %	01355	
WATER CLARITY:		CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921	% POOLS	99901
% 1 WOODY STEM	99922	% RIFFLES	99902
% 2-10 WOODY STEMS	99923	STREAM CANOPY COVER, EST	83515
% >10, 1/2 ALIVE	99924	MEAN DEPTH, Q TRANSECT	00064
% >10, 1/2 DEAD	99925	MEAN POOL DEPTH	83507
% ALL DEAD WOODY VEG	99926	MEAN RIFFLE DEPTH	83508
% VEGED STABLE	99927	INSTREAM COVER %	99920 42.5
% VEGED UNSTABLE	99928	MEAN STREAM WIDTH	83509
% UNVEGED STABLE	99929	SEGMENT LENGTH	85055
% UNVEGED UNSTABLE	99930	% SOIL MOISTURE	99932
% TOTAL SHADE JULY	99933		
% UNDERCUT BANK	99931		
SHADE QUALITY %	99933	40.6	SUBSTRATE COMPOSITION %
			<0.1 sand 99934
			0.1-0.6 gravel 99935
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel 99936
Barren	16.0		1.3-2.5 very coarse gravel 99937
Mesic grass	15.25		2.5-5.0 small cobbles 99938
Salix spp	45.75		5-10 large cobbles 99939
Conif	2.75		10-20 small boulders 99940
Alder	7.75		20-40 medium boulders 99941
Salix spp/mesic grass	10.0		40-60 large boulders 99942
Sage	2.5		>80 very large boulders 99943
			BEDROCK 99944
			COLIFORM - FECAL 31623

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Jorda 88.3

DATE 08/03/93

TIME 1300 hrs.

STREAM Jordan Creek GENERAL LOCATION Below Delamor townsite - upper end
 WATER SAMPLES: Y N of station ends at Sage Hen Cr.
 INVERT SAMPLES: Y N
 FISH SAMPLES: Y N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	WAT TEMP C INSTANT	00010	20.0
BAROMETRIC PRESSURE (in Hg)	00025	WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127	pH - METER	00401	7.3
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094
HUMIDITY %	00052	DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061	DO meter calibration factor:		
STREAMFLOW - GPM	00059	TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069	ICE COVER %	01355	
WATER CLARITY:		CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921	% POOLS	99901	
% 1 WOODY STEM	99922	% RIFFLES	99902	
% 2-10 WOODY STEMS	99923	STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924	MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925	MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926	MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927	INSTREAM COVER %	99920	33.0
% VEGED UNSTABLE	99928	MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929	SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930	% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933			
% UNDERCUT BANK	99931			
SHADE QUALITY %	99933	10.4	SUBSTRATE COMPOSITION %	
			<0.1 sand	99934
			0.1-0.6 gravel	99935
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936
Salix spp/Equis	12.75		1.3-2.5 very coarse gravel	99937
Meso Forb/Equis	12.0		2.5-5.0 small cobbles	99938
Mesic grass	3.25		5-10 large cobbles	99939
Salix spp	53.75		10-20 small boulders	99940
Rowo	4.0		20-40 medium boulders	99941
Poison oak	3.0		40-60 large boulders	99942
Alder	2.5		>60 very large boulders	99943
Prvi	4.5		BEDROCK	99944
Barren	2.0			
			COLIFORM - FECAL	31623

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Jorda 87.7 DATE 09/24/93 TIME 1200 hrs.

STREAM Jordan Cr. GENERAL LOCATION Below Delamar Mine road just below private fence across stream
 WATER SAMPLES: Y (N)
 INVERT SAMPLES: Y (N)
 FISH SAMPLES: (Y) N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	11.0	WAT TEMP C INSTANT	00010	7.7
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.8
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	56.2
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	10.7
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	40.0
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	33.2	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	36.25		1.3-2.5 very coarse gravel	99937	
Equis	52.0		2.5-5.0 small cobbles	99938	
Mesic grass	2.25		5-10 large cobbles	99939	
Barren	8.75		10-20 small boulders	99940	
Prvi	0.25		20-40 medium boulders	99941	
Cose	0.5		40-60 large boulders	99942	
			>60 very large boulders	99943	
			BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Jorda 75.9 DATE 08/03/93 TIME 1700

STREAM Jordan Creek GENERAL LOCATION Where road hits Jordan Creek above Louse Creek
 WATER SAMPLES: Y (N)
 INVERT SAMPLES: Y (N)
 FISH SAMPLES: (Y) N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020		WAT TEMP C INSTANT	00010	22.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.5
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	19.4
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	39.8	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	18.5		1.3-2.5 very coarse gravel	99937	
Barren	26.5		2.5-5.0 small cobbles	99938	
Salix/hydric graminoid	17.0		5-10 large cobbles	99939	
Prvi	8.25		10-20 small boulders	99940	
Acrr spp	1.75		20-40 medium boulders	99941	
Alder	1.0		40-60 large boulders	99942	
Alder/hydric gram	1.75		>60 very large boulders	99943	
Hydric gram	10.75		BEDROCK	99944	
Prvi/hydric gram	1.5				
Mesic grass	3.75		COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Jorda 70.8 DATE 08/04/93 TIME 1100

STREAM Jordan Creek GENERAL LOCATION Triangle road crossing of Jordan Creek - start at bridge upstream
 WATER SAMPLES: Y (N)
 INVERT SAMPLES: Y (N)
 FISH SAMPLES: (Y) N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	32.0	WAT TEMP C INSTANT	00010	17.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.0
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	57.2
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	22.8	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Barren	41.0		1.3-2.5 very coarse gravel	99937	
Rock	1.0		2.5-5.0 small cobbles	99938	
Salix spp	27.0		5-10 large cobbles	99939	
hydric gram	11.75		10-20 small boulders	99940	
Rowo/hydric gram	4.0		20-40 medium boulders	99941	
Salix/hydric gram	2.25		40-60 large boulders	99942	
Salix/mesic gr	11.5		>60 very large boulders	99943	
Hydric gram/mesic gr	1.5		BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Bould 12.6

DATE 09/22/93

TIME 1200

STREAM N.F. Boulder GENERAL LOCATION Below bridge on Triangle Road crossin

WATER SAMPLES: Y N

INVERT SAMPLES: Y N

FISH SAMPLES: Y N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	12.0	WAT TEMP C INSTANT	00010	11.5
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	8.0
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	34.5
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	53.0
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	21.9	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix/mesic gr	41.0		1.3-2.5 very coarse gravel	99937	
Barren	25.25		2.5-5.0 small cobbles	99938	
Mesic gr	3.5		5-10 large cobbles	99939	
Equis	3.0		10-20 small boulders	99940	
Sabo	4.5		20-40 medium boulders	99941	
Sala	6.75		40-60 large boulders	99942	
Salix/equis	6.25		>60 very large boulders	99943	
Salu	2.5		BEDROCK	99944	
Salix/hvdric gram	7.25				
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Flint 3.9 DATE 09/23/93 TIME 1500

STREAM Flint Creek GENERAL LOCATION Upstream of Triangle Road bridge crossing of Flint Creek
 WATER SAMPLES: Y N
 INVERT SAMPLES: Y N
 FISH SAMPLES: Y N SAMPLE COLLECTED BY _____

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	19.0	WAT TEMP C INSTANT	00010	14.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.8
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	52.9
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	22.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	12.2	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Barren	6.5		1.3-2.5 very coarse gravel	99937	
Salix spp	10.0		2.5-5.0 small cobbles	99938	
Mesic grass	78.5		5-10 large cobbles	99939	
Hydric gram	5.0		10-20 small boulders	99940	
			20-40 medium boulders	99941	
			40-60 large boulders	99942	
			>60 very large boulders	99943	
			BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Redca 13.5 DATE 10/04/93 TIME 1630

STREAM Red Canyon Creek GENERAL LOCATION Inside Trout Springs Enclosure in Aspen Grove
 WATER SAMPLES: Y N
 INVERT SAMPLES: Y N
 FISH SAMPLES: Y N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	22.0	WAT TEMP C INSTANT	00010	17.5
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.5
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	34.1
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	7.7
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	N/A
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	37.2	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
POTR/mesic gr	32.25		1.3-2.5 very coarse gravel	99937	
Mesic gram	18.0		2.5-5.0 small cobbles	99938	
Hydric gram	34.25		5-10 large cobbles	99939	
Rock	2.75		10-20 small boulders	99940	
Mesic forb	3.0		20-40 medium boulders	99941	
Salix spp	2.5		40-60 large boulders	99942	
Barren	2.5		>60 very large boulders	99943	
Hydric forb	1.0		BEDROCK	99944	
ARTRVA	3.0				
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Red Ca 13.4

DATE 10/04/93

TIME 1430

STREAM Red Canyon Creek GENERAL LOCATION Directly below Trout Springs Exclu:

WATER SAMPLES: Y N

INVERT SAMPLES: Y N

FISH SAMPLES: Y N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	24.0	WAT TEMP C INSTANT	00010	18.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	40.4
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	7.6
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	0.0
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	15.4	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Mesic gr	55.0		1.3-2.5 very coarse gravel	99937	
Barren	9.0		2.5-5.0 small cobbles	99938	
Rock	7.0		5-10 large cobbles	99939	
Salix/mesic gr	6.75		10-20 small boulders	99940	
Bryophyte	1.25		20-40 medium boulders	99941	
Hydric gram	7.0		40-60 large boulders	99942	
Mesic gram	7.25		>60 very large boulders	99943	
ARTRVA	1.5		BEDROCK	99944	
Jun.occ/mesic gr	4.75				
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Red Ca 02.0

DATE 10/05/93

TIME 1100

STREAM Red Canyon Creek

GENERAL LOCATION The garden area below road end

WATER SAMPLES: Y N

INVERT SAMPLES: Y N

FISH SAMPLES: Y N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020		WAT TEMP C INSTANT	00010	18.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	8.5
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	116.
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	37.0
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	30.5	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix/hydric gram	18.25		1.3-2.5 very coarse gravel	99937	
Hydric gram	30.25		2.5-5.0 small cobbles	99938	
Saex/hydric gram	5.0		5-10 large cobbles	99939	
Saex	2.75		10-20 small boulders	99940	
Mesic forb	31.5		20-40 medium boulders	99941	
Saex/mesic forb	1.0		40-60 large boulders	99942	
Rowo/mesic forb	2.25		>60 very large boulders	99943	
Rock	0.5		BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Deep 38.0

DATE 10/07/93

TIME 1300

STREAM Deep Creek

GENERAL LOCATION Below fence just below Mud Flat

WATER SAMPLES: Y (N)

road crossing

INVERT SAMPLES: Y (N)

FISH SAMPLES: (Y) N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	11.0	WAT TEMP C INSTANT	00010	12.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	8.3
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	52.2
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	9.0
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	9.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	15.0	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	0.25		1.3-2.5 very coarse gravel	99937	
Hydric gram/mesic forb	68.0		2.5-5.0 small cobbles	99938	
Hydric gram	10.0		5-10 large cobbles	99939	
Salix/hydric gram	16.75		10-20 small boulders	99940	
Salix/weedy annual	0.5		20-40 medium boulders	99941	
Weedy annual	4.5		40-60 large boulders	99942	
			>60 very large boulders	99943	
			BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Deep 24.0

DATE 10/06/93

TIME 1630

STREAM Deep Creek

GENERAL LOCATION Above Nickel Creek mouth

WATER SAMPLES: Y (N)

INVERT SAMPLES: Y (N)

FISH SAMPLES: (Y) N

SAMPLE COLLECTED BY D. Allen IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	18.0	WAT TEMP C INSTANT	00010	17.6
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	8.9
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	100.6
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	11.4
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	29.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	30.2	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	41.0		1.3-2.5 very coarse gravel	99937	
Salix/hydric gram	43.25		2.5-5.0 small cobbles	99938	
Hydric gram	11.75		5-10 large cobbles	99939	
Salix/mesic forb	1.25		10-20 small boulders	99940	
Salix/clematis	0.5		20-40 medium boulders	99941	
Red os dogwood/clematis	0.75		40-60 large boulders	99942	
Mesic forb	0.75		>60 very large boulders	99943	
			BEDROCK	99944	
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Deep 06.5

DATE 10/06/93

TIME 0900

STREAM Deep Creek

GENERAL LOCATION At mouth of Antelope Springs Drainage

WATER SAMPLES: Y (N)

INVERT SAMPLES: Y (N)

FISH SAMPLES: (Y) N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	8.0	WAT TEMP C INSTANT	00010	11.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.7
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	13.0
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	8.2
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	14.0
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	16.0	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	27.5		1.3-2.5 very coarse gravel	99937	
Saex	13.75		2.5-5.0 small cobbles	99938	
Saex/hydric gram	1.5		5-10 large cobbles	99939	
Hydric gram	26.25		10-20 small boulders	99940	
Salix/hydric gram	24.25		20-40 medium boulders	99941	
Saex/Equis	1.0		40-60 large boulders	99942	
Equis	2.25		>60 very large boulders	99943	
Salix/Equis	3.25		BEDROCK	99944	
Equis/hydric gram	0.75				
			COLIFORM - FECAL	31623	

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Nip & T 3.0 DATE 10/18/93 TIME 1500

STREAM Nip & Tuck Creek GENERAL LOCATION 300 yards above road crossing on BLM ground above private ground
 WATER SAMPLES: Y (N)
 INVERT SAMPLES: Y (N)
 FISH SAMPLES: (Y) N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	11.0	WAT TEMP C INSTANT	00010	10.6
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.8
WET BULB DRY BULB		DEW PT.	CONDUCTIVITY - FIELD	00094	>1,000
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	7.8
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	14.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	41.7	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix spp	22.5		1.3-2.5 very coarse gravel	99937	
Salix/ribes/mesic forb	14.25		2.5-5.0 small cobbles	99938	
Salix/bryophyte	5.25		5-10 large cobbles	99939	
Hydric gram	3.75		10-20 small boulders	99940	
Ribes/mesic gr./mesic forb	8.5		20-40 medium boulders	99941	
Ribes/mesic gr	4.5		40-60 large boulders	99942	
Rock/mesic forb	9.0		>60 very large boulders	99943	
Salix/redos dogwood	2.25		BEDROCK	99944	
Rock	9.0				
Saex	6.25		COLIFORM - FECAL	31623	
Salix/saex	1.0				
Rock/upland grass	14.0				

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Camas 0.50

DATE 10/08/93

TIME 1300

STREAM Camas Creek GENERAL LOCATION 1/4 mile above Camas Creek mouth with Pole Creek
 WATER SAMPLES: Y N
 INVERT SAMPLES: Y N
 FISH SAMPLES: Y N SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	9.0	WAT TEMP C INSTANT	00010	11.0
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.2
WET BULB DRY BULB	DEW PT.		CONDUCTIVITY - FIELD	00094	124.1
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	9.2
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	46.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	33.6	SUBSTRATE COMPOSITION %		
Mesic gram/mesic gr/mesic forb/			<0.1 sand	99934	
red os dogwood	6.25		0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Salix/hydric gram	1.75		1.3-2.5 very coarse gravel	99937	
Salix spp	10.75		2.5-5.0 small cobbles	99938	
Salix/mesic forb	6.5		5-10 large cobbles	99939	
Hydric gram/mesic gr/mesic frb	25.5		10-20 small boulders	99940	
Saex	2.5		20-40 medium boulders	99941	
Salix/hydric gram/mesic gr/forb	4.5		40-60 large boulders	99942	
Saex/mesic forb/mesic gr	7.0		>60 very large boulders	99943	
Red os dogwood	14.5		BEDROCK	99944	
Rock	7.0				
Hydric gram/mesic forb	2.0		COLIFORM - FECAL	31623	
Mesic forb/mesic gr/saex/red os dogwood	4.0				

STREAM/RIPARIAN/WATER QUALITY MONITORING RESULTS

SITE ID Pole 14.5

DATE 10/08/93

TIME 1030

STREAM Pole Creek

GENERAL LOCATION Below Henley Basin above mouth of Camas Creek

WATER SAMPLES: Y (N)

INVERT SAMPLES: Y (N)

FISH SAMPLES: (Y) N

SAMPLE COLLECTED BY D. Allen, IDFG

WATER QUALITY/WEATHER MEASUREMENTS

AIR TEMP C INSTANT	00020	7.5	WAT TEMP C INSTANT	00010	8.5
BAROMETRIC PRESSURE (in Hg)	00025		WAT TEMP C - MAX T	85558	
WIND SPEED (mph)	82127		pH - METER	00401	7.2
WET BULB	DRY BULB	DEW PT.	CONDUCTIVITY - FIELD	00094	99.1
HUMIDITY %	00052		DISSOLVED OXYGEN - PROBE	00299	9.8
STREAMFLOW - CFS	00061		DO meter calibration factor:		
STREAMFLOW - GPM	00059		TDS - METER (umhos/cm)	70304	
STREAMFLOW, ESTIMATE	74069		ICE COVER %	01355	
WATER CLARITY:			CLOUD COVER:		

RIPARIAN GREENLINE MEASUREMENTS

% FINE SEDIMENT	99921		% POOLS	99901	
% 1 WOODY STEM	99922		% RIFFLES	99902	
% 2-10 WOODY STEMS	99923		STREAM CANOPY COVER, EST	83515	
% >10, 1/2 ALIVE	99924		MEAN DEPTH, Q TRANSECT	00064	
% >10, 1/2 DEAD	99925		MEAN POOL DEPTH	83507	
% ALL DEAD WOODY VEG	99926		MEAN RIFFLE DEPTH	83508	
% VEGED STABLE	99927		INSTREAM COVER %	99920	42.5
% VEGED UNSTABLE	99928		MEAN STREAM WIDTH	83509	
% UNVEGED STABLE	99929		SEGMENT LENGTH	85055	
% UNVEGED UNSTABLE	99930		% SOIL MOISTURE	99932	
% TOTAL SHADE JULY	99933				
% UNDERCUT BANK	99931				
SHADE QUALITY %	99933	33.4	SUBSTRATE COMPOSITION %		
			<0.1 sand	99934	
			0.1-0.6 gravel	99935	
VEG COMMUNITY TYPES %			0.6-1.3 coarse gravel	99936	
Rock	17.5		1.3-2.5 very coarse gravel	99937	
hydric gram/mesic gr/ forb	28.25		2.5-5.0 small cobbles	99938	
hydric gram	15.75		5-10 large cobbles	99939	
Ribes/mesic forb/mesic gram	0.75		10-20 small boulders	99940	
Salix/hydric gram	0.5		20-40 medium boulders	99941	
Red os dogwood	28.0		40-60 large boulders	99942	
Red os dogwood/mesic forb	5.0		>60 very large boulders	99943	
Mesic forb/mesic gr	2.0		BEDROCK	99944	
Salix/mesic gr/mesic forb	2.25				
			COLIFORM - FECAL	31623	