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Draft

A Baseline Biological Study of Those Portions of Chaney and Mud Creeks Included in the Stinson Easement, Blaine County, Idaho

by

J.S. Griffith
F.L. Rose
G.W. Minshall
C.Y. Faler

Department of Biology
Idaho State University
Pocatello, Idaho 83209

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INTRODUCTION

The purpose of this report is to present the results of a monitoring program designed to collect baseline biological data to establish the current condition of portions of property owned by Ralf Stinson and Harriett Stinson, in accordance with a Conservation Easement in favor of The Nature Conservancy. The property consists of riparian zones contiguous to approximately 0.5 km (1/3 mile) of Chaney Creek and 1.1 km (2/3 mile) of Mud Creek, both tributaries of Silver Creek via Stalker Creek, Blaine County, Idaho.

Data were collected during the fall of 1981 and the spring of 1982 on:

1. sediment depth in both streams,
2. type and height of submerged aquatic vegetation,
3. turbidity and suspended sediment loads in each stream,
4. composition and abundance of aquatic macroinvertebrates,
5. species composition, abundance, size and condition of fish and use of each stream for spawning by trout, and
6. composition of riparian vegetation along each stream.

METHODS

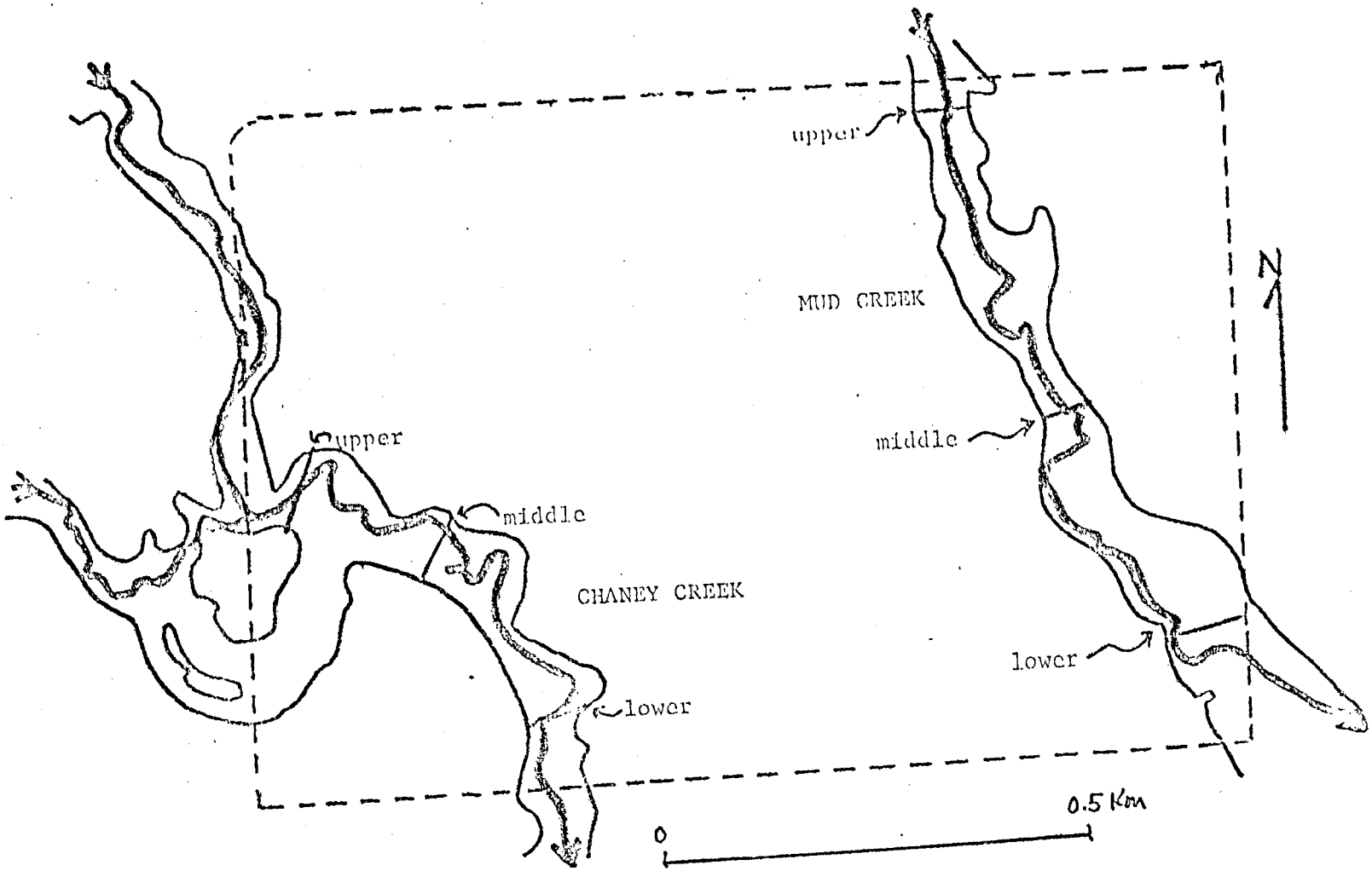
Three transects perpendicular to the stream channel were established along the portions of each of the two streams on the Stinson property. A preliminary evaluation indicated some diversity in types of aquatic habitat present along the streams, and transects were placed to sample each area. The exact placement of each transect line was done randomly. Steel stakes were placed at the ends of each transect at the outer edge of the Natural Zone.

Fall 1981 sampling dates were 12 September and 16-17 October for riparian vegetation, fish populations, and turbidity sampling and 7-8 November for sediment depth, aquatic vegetation, and aquatic invertebrates. In the spring of 1982, fish populations, sediment depth, turbidity, aquatic vegetation, and aquatic invertebrate samples were taken on 14-15 March.

Sediment Depth and Aquatic Vegetation

Two series of 10 equally-spaced measurements were made at each transect, one series on a line 1 m above the transect and the other 1 m below the transect. At each of these 20 measuring points across the stream, total depth (water surface to firm stream bottom), sediment depth, and height of submerged aquatic vegetation was recorded to the nearest centimeter using a probe. A plan view of the substrate surface was prepared to indicate the distribution of each species of aquatic vegetation across the stream at that point.

Location of upper, middle, and lower transects on Mud and Chaney Creeks in relation to the existing riparian areas.



Turbidity and Suspended Sediment

Water samples were taken throughout the water column at each transect on sampling dates in October and November 1981 and March 1982 with a depth-integrating water sampler. Samples were processed on a Hach model 2100A turbidimeter to give turbidity levels in nephelometric turbidity units (NTU). These values were then converted to suspended sediment levels by using the turbidity-suspended sediment relationship previously developed for the Silver Creek system sedimentation study in 1979.

Aquatic Invertebrates

A series of samples of 1/16 m^2 of stream substrate were taken with a Hess net (mesh size 0.39 mm) in fall and spring at each transect. Four samples per transect were taken on Chaney Creek and three per transect on Mud Creek because of its smaller size and more homogeneous habitat. The net was utilized to sample the upper 8 cm of the substrate. Samples were preserved with 10% formalin in the field. In the laboratory, they were sorted to separate invertebrates from debris, and organisms were identified to the genus level where feasible.

Fish

In fall and spring, fish were collected in 50 m stream sections with a Coffelt backpack electroshocker producing 250 volts DC that attracted the fish to the positive electrode. Each section was electroshocked three times

in succession to assess population size for trout. In all sections except lower Chaney Creek no fish were taken on the third pass and the sum of the first two passes represents a total count. In lower Chaney, a population estimate was made using the Zippin-Moran method of regressing catch per pass on accumulated catch. The length and weight of trout captured was recorded and used to calculate condition factors (weight in grams X 10^5/length^3 in millimeters) for each species in the fall. The greater the condition factor, the greater the robustness or plumpness of the fish. All length measurements were made in total length, the distance from the nose to tip of the fish's tail. All fish were released alive.

On each sampling date, each stream was walked to check for indications of trout spawning activity. If seen, the locations of redds (nests excavated by spawning female fish) were recorded.

Riparian Vegetation

At each transect in the fall of 1981 a measuring tape was stretched between the two stakes and for each 1-m interval the percent ground cover (to the nearest 5%) by genus of plants was recorded.

Table 1. Total channel depth, sediment depth, and submerged plant height in each transect in Mud and Chaney Creeks.

Transect & Date		Depth, cm total	Depth, cm sediment	Depth, cm plant (range)	Stream width, m	%gravel
			MUD CREEK			
Lower	fall 1981	93.6	40.9	0	4.6	0
	spring 1982	95.8	31.8	0	4.7	0
Middle	fall 1981	82.2	49.7	9.2(0-27)	5.2	0
	spring 1982	90.9	62.4	1.2(0-8)	5.2	0
Upper	fall 1981	47.5	13.4	10.9(0-24)	4.7	0
	spring 1982	38.8	13.3	1.3(0-7)	4.6	35
			CHANEY CREEK			
Lower	fall 1981	67.3	40.9	9.4(0-28)	17.9	0
	spring 1982	71.9	38.3	0	18.0	0
Middle	fall 1981	32.3	8.2	9.8(0-24)	10.2	30
	spring 1982	30.6	7.3	1.2(0-5)	10.1	45
Upper	fall 1981	51.5	19.6	18.7(0-30)	11.8	20
	spring 1982	41.1	17.3	1.2(0-8)	11.6	45

RESULTS

Sediment Depth and Aquatic Vegetation

Sediment depths were generally greater in Mud Creek, with sediment depth there commonly accounting for half of the total depth (Table 1, Figs. 1 and 2). Lower and middle Mud Creek held the largest amounts of sediment and were typical of the majority of the study portion of the stream. The upper Mud Creek transect was partially scoured by water dropping over the rubble placed at the fenceline. No rooted vegetation was established at the lower Mud Creek transect at either sampling date, although mats of filamentous algae covered about one-third of the substrate. There was no exposed gravel at either the lower or middle transects, although in places it could be felt with the probe at the base of the sediment layer. In the fall, Chara, the dominant vegetation in the middle and upper sites, averaged about 10 cm in height and was as much as 27 cm in places.

Spring runoff had peaked just prior to our sampling in March, although this year's runoff was more gradual than is normal despite high snowpack. Some shift in sediment distribution was noted between fall and spring in lower and middle Mud Creek and to a lesser degree in the upper section. There was an increase in sediment levels in the middle section and a decrease in the lower section, with each change in the order of 25%. The net loss from the lower transect was most likely because there was no vegetation present to anchor it.

In Chaney Creek, sediment depths were greatest in the lower section. The lower third of the study area is under the influence of the road culvert, which restricts the flow and causes suspended sediment to settle above it.

Fig.1. Schematic crossection of Chaney Creek at each transect, showing sediment depth in both fall 1981 and spring 1982 below dotted lines. Submerged plant code: green = Chara, orange = watercress, red = Potamogeton. Blue arrows indicate direction of water flow.

Aquatic Invertebrates

A total of 30 taxa were collected, 18 and 15 from Mud Creek in fall/spring, respectively, and 25 and 21 from Chaney Creek in fall and spring, respectively. There was greatest consistency between Hess samples taken at each Mud Creek transect during both fall and spring. This was also true for Lower Chaney Creek where habitat was similar to that of Mud Creek. A comparison of the average numbers of insects and non-insect invertebrates collected per net (1/16 m^2 area) as shown in Tables 3 and 4 indicates:

a. very low numbers (generally 30-50) of insects other than chironomid midges per net in all fall samples from Mud Creek and lower Chaney Creek.

b. this number dropped even lower (generally 0-22) in the spring, with the lower Mud Creek site being nearly devoid of life.

c. the bulk of non-insects in these samples were tubifex worms, one of the few species able to "mine" the soft unstable substrate.

d. for middle and upper Chaney Creek, richness (number of taxa present) was considerably increased. In these sites there were substantial differences between the Hess samples, with those taken in gravel (e.g. middle Chaney 1 & 3) holding more than those taken in vegetation

e. in the fall, the middle and upper Chaney Creek samples averaged 111-225 insects (excluding chironomid midges) and 378-476 non-insects per net, several times that found in Mud Creek. Lower Chaney Creek was low in insects and moderately high in non-insects.

Table 2. Turbidity of water in NTUs as measured at transects on Mud and Chaney Creeks during fall 1981 and spring 1982.

Sampling period	Mud Creek			Chaney Creek		
	lower	middle	upper	lower	middle	upper
Oct.-Nov. 1981	0.3	0.3	0.3	1.1	1.6	1.3
March 1982	12.2	1.2	1.3	1.4	1.4	1.5

Table 3.(continued). Non-insect groups in Mud and Chaney Creeks.

Class	Order	Family	Genus	Mud fall	Mud spr	Chaney fall	Chaney spr
Crustacea	Amphipoda (shrimp)	Gammaridae	Gammarus	x	x	x	x
Arachnoidea	Hydracarina (mites)					x	
Oligochaeta	Haplotaxida	Tubificidae (worms)		x	x	x	x
Hirudinea (leeches)				x	x	x	x
Gastropoda (snails)	Basommatophora	Lymnaeidae	Lymnea	x	x		
		Physidae	Physa			x	x
		Planorbidae	Gyraulus	x	x	x	

Table 3. Aquatic macroinvertebrates present in Mud and Chaney Creeks, November 1981 and March 1982.

Order	Family	Genus	Mud Cr. fall	Mud Cr. spring	Chaney Cr. fall	Chaney Cr. spring
Ephemeroptera (mayflies)	Baetidae	Baetis	x		x	x
		Ephemerella:				
		Invaria grp.	x	x	x	x
		others	x		x	x
		Siphlonurus			x	
		Paraleptophlebia	x			
Plecoptera (stoneflies)	Perlodidae	Isogenoides			x	x
Trichoptera (caddisflies)	Hydroptilidae	Hydroptila			x	x
	Rhyacophilidae	Rhyacophila			x	x
	Hydropsychidae	Hydropsyche	x	x	x	x
	Limnephilidae	Onocosmoecus	x			x
	Leptoceridae	Oecetis			x	
		Ceraclea	x	x	x	x
	Brachycentridae	Brachycentrus				x
	Helicopsychidae	Helicopsyche		x	x	x
Odonata (damselflies, dragonflies)	Gomphidae	Ophiogomphus			x	
	Coenagrionidae	Ischnura	x	x	x	x
Coleoptera (beetles)	Elmidae	Optioservus	x	x	x	x
	Haliplidae	[illegible]	x	x	x	x
Hemiptera (true bugs)	Notonectidae	Notonecta	x		x	x
Megaloptera (dobsonflies)	Sialidae	Sialis	x		x	
Diptera (flies)	Tipulidae	Tipula		x		
	Chironomidae					
	Simuliidae	Simulium		x	x	x
	Stratiomyidae	Euparyphus	x	x	x	x

Table 4. Average numbers of insect and non-insect invertebrates taken per Hess net in Mud and Chaney Creeks. Numbers in parentheses in insect columns indicates average numbers of chironomid midges, numbers in parentheses in non-insect columns indicates average numbers of chironomid midges.

Stream & Season	lower site		middle site		upper site	
	insects	non-insects	insects	non-insects	insects	non-insects
Mud Creek						
fall	169	77	77	17	48	7
	(137)	(62)	(49)	(5)	(0)	(0)
spring	112	18	22	27	83	27
	(112)	(16)	(13)	(19)	(50)	(19)
Chaney Creek						
fall	199	204	520	378	208	476
	(160)	(102)	(295)	(244)	(97)	(356)
spring	84	341	419	93	242	124
	(41)	(347)	(137)	(47)	(46)	(78)

f. at the former transects the number of insects (other than chironomid midges) per net increased in spring samples and the numbers of non-insects dropped by two-thirds.

Numbers of organisms found in fall samples are low when compared with those of samples of equal-sized area in main Silver Creek on the TNC Preserve in November 1977 (Frannes and Bjornn TNC report). There 1032 invertebrates (91% insects) were taken in gravel and 5172 (83% insects, 52% chironomid midge larvae) in dense vegetation, mostly Chara.

In the sediment-laden portions of Mud and Chaney Creeks, the insects most valuable as trout food (especially Hydropsyche caddis, Ephemerella and Baetis mayflies) were essentially absent. Hydropsyche, for example, needs a solid substratum upon which to spin its collecting nets. If the amount of firm substrate was increased, the production of invertebrates would be expected to increase considerably.

Figure 3. Length-weight relationship of brook trout from Mud Creek, 16-17 October 1981, as represented by + symbols, and for rainbow trout as represented by o symbols.

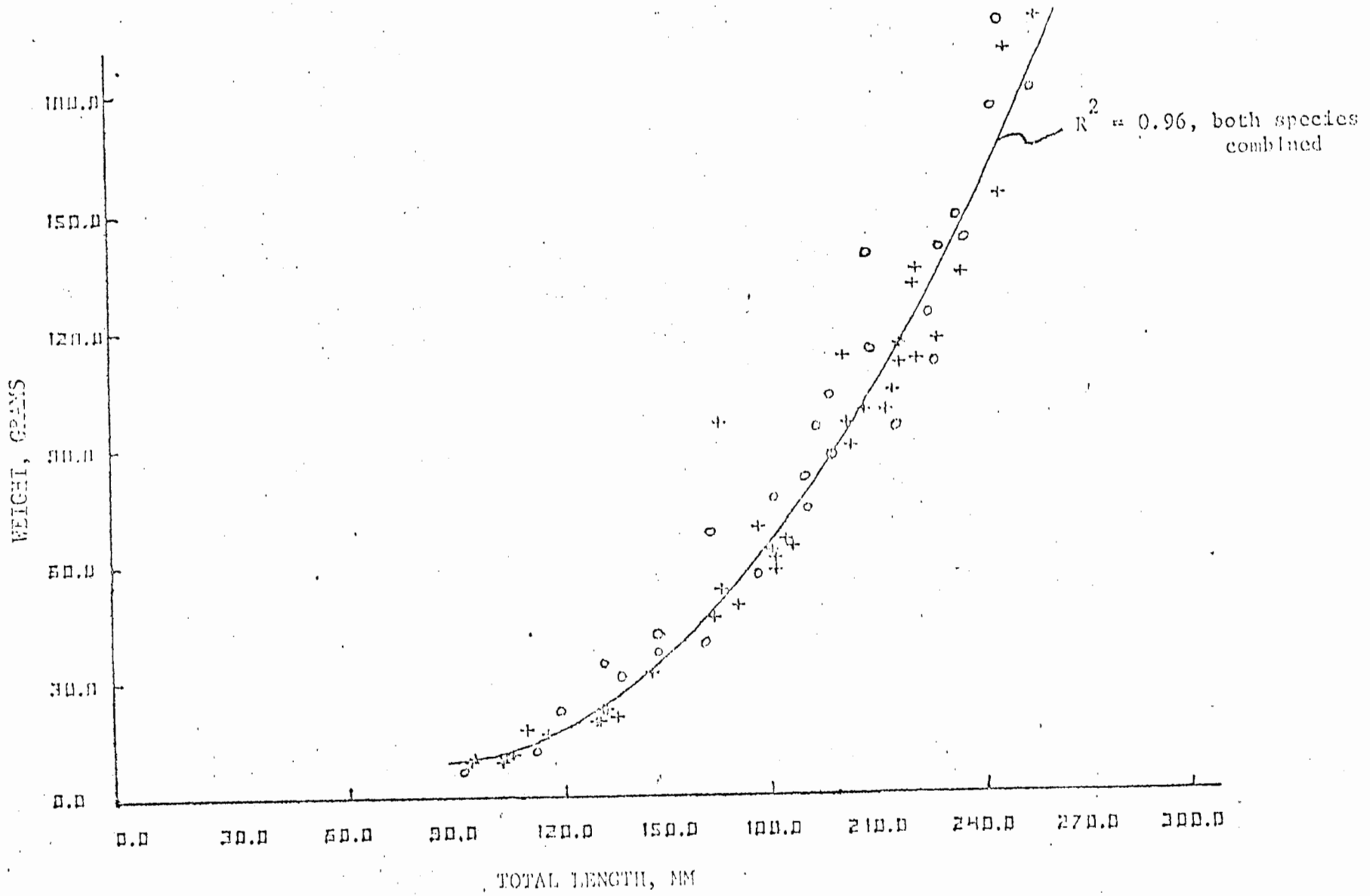


Table 6. Size composition of brook and rainbow trout collected on 16-17 October in Mud and Chaney Creeks.

	Mud Creek		Chaney Creek	
% greater than	brook	rainbow	brook	rainbow
10 cm	88	49	91	51
15	70	38	69	40
20	39	30	40	35
25	4	6	7	6
30	0	1	0	0

Fish Populations

Species composition: Seven species of fish were collected in the study areas:

	Mud		Chaney	
	fall	spring	fall	spring
1. brook trout (*Salvelinus fontinalis*)	x	x	x	x
2. rainbow trout (*Salmo gairdneri*)	x	x	x	x
3. piute sculpin (*Cottus beldingi*)		x		x
4. Wood River sculpin (*C. leiopomis*)	x		x	
5. longnose dace (*Rhinichthys cataractae*)	x		x	
6. Utah chub (*Gila atraria*)		x		
7. bridgelip sucker (*Catostomus columbianus*)	x	x	x	
8. mountain whitefish (*Prosopium williamsoni*)			x	

To our knowledge, the piute sculpin has not been previously reported from Silver Creek tributaries. The mountain whitefish is generally a larger-river species; juveniles appear to stay briefly in Chaney Creek and then probably drop down into Silver Creek.

Fish abundance: In mid-October in Mud Creek, numbers of trout in 50-m sections were relatively consistent, with 33 to 78 brook and 6 to 22 rainbow trout in each section (Table 4). This reflects the relatively homogeneous habitat of the study area of Mud Creek. Brook trout were approximately 4-5 times as numerous as rainbow trout. An average density

of 272 fish/hectare (1 hectare=2.47 acres) was present in the 1.44 ha of Mud Creek sampled in October; on a weight basis, 27 kg was the average present per hectare.

In mid-October in Chaney Creek, heterogeneity in habitat there resulted in more variation in trout numbers between sections. Some sections in the middle of the study area were too shallow to hold substantial numbers of trout. The numbers of trout averaged around 100 per section at each end of the study area, with brook trout nearly twice as abundant as rainbow trout. In the 3.49 ha of Chaney Creek sampled, a mean of 79 trout or 10 kg was present per ha. For both streams the weight of trout present per unit area is below normal for comparable streams in the region.

In March 1982, very few fish remained in the study areas (Table 5). A total of 20 brook trout and 3 rainbow trout (maximum length 13 cm) were present in two sections of Mud Creek that held 103 brook and 18 rainbow trout the previous October. The remainder of the study portion of Mud Creek was checked from the bank, and no additional fish were observed.

In the March collection in Chaney Creek, a total of 9 small brook and 9 rainbow trout were collected in the lower two sections as compared with populations of 120 brook and 74 rainbow trout found there in October. Of the rainbow captured in March, five were large fish longer than 30 cm and the largest was 46 cm (18 in) in length and weighed approximately 1.4 kg (3 lb). This fish was a ripe male, and the other four fish were females, none as yet ripe. All five fish, and two others that were not collected, were in a group holding in a small pool 1/3 of the way upstream from the lower end of the study area. From gravel that had been disturbed immediately above the pool, it appeared that the trout were preparing to spawn in that area. It is unlikely that those fish are resident to Chaney Creek, and they most likely have moved up from the lower river to spawn.

Table 5. Abundance of fish in 50-m sections of Mud and Chaney Creeks, 16-17 October 1981 and 14-15 March 1982.

Stream & Season	Section	Width, m	numbers of fish: brook trout	rainbow trout	others
Mud Creek, Fall	1	5.1	50	7	sculpin, 4 dace
	2	4.4	53	11	sculpin, 1 dace
	3	4.6	73	22	sculpin
	4	5.2	33	6	sculpin
	5	4.8	67	18	sculpin, 2 dace
	6	4.7	38	8	sculpin, 4 suckers
			319	72	
	total		319	72	
Mud Creek, Spring	1	5.1	18	3	sculpin, 2 suckers
	2	4.4	2	0	sculpin, 1 chub
			20	3	
Chaney Cr., Fall	1	12.1	43	29	scul., 6 dace, 22 suckers
	2	9.2	77	45	4 whitefish
	3	11.6	2	0	sculpin
	4	10.2	2	1	sculpin
	5	12.7	9	24	sculpin
	6	13.9	70	42	sculpin
	total		203	141	
Chaney Cr., Spring	1	12.1	2	1	none
	2	9.2	7	8	sculpin

It appears that trout move out of the study portions of Mud and Chaney Creeks during the winter. As water temperatures drop below 4 C (39 F), trout seek cover in the substrate at the bottom of deep pools or beneath undercut banks and become inactive until water warms. Neither stream area studied, especially Mud Creek, offers adequate overwintering habitat, and trout food in the form of invertebrates would also be in short supply. Water temperatures at time of fall and spring sampling were virtually identical (6.5 C or 44 F at midday).

Size and condition of trout: The maximum size of brook and rainbow trout in October was 26 and 31 cm, respectively, in Mud Creek and 28 and 29 cm, respectively, in Chaney Creek. Size composition was similar for each species between streams, but more small (< 10 cm) rainbow were present than brook trout (Table 6). Young-of-the-year brook trout reached an average length of 10.3 cm in mid-October, which is good but not exceptional growth.

Length-weight relationships for both species were similar (Fig.3). Condition factors calculated for trout collected in the fall of 1981 were 1.29 for brook trout, typical of fish approaching spawning readiness, and 1.21 for rainbow trout, also average.

Trout reproduction: Brook trout were approaching spawning condition in November, with most males ripe but females still "green". In Chaney Creek, 21 redds had been excavated from 30 m below the middle transect to 40 m above the duck blinds on the east bank above the lower transect. Except for that gravel moved by the large fish mentioned above, no redds were seen in Chaney Creek in March.

In Mud Creek, three probable redds were noted near the north fenceline

Table 7. Dimensions of riparian vegetation transects in Mud and Chaney Creeks, fall 1981.

	Mud Creek			Chaney Creek		
Width, m	lower	middle	upper	lower	middle	upper
total riparian zone	46	100	52	73	68	50
portion upwind of stream	12	21	28	42	31	28
portion with willow or birch	3	4	8	0	2	11

above our upstream transect and at the bend above our middle transect in November. It was thought these had been made by brook trout and no ripe rainbow trout were collected in November, but some fall spawning of rainbow must have occurred since 22-24 cm-long fry were present along the stream margins at the middle transect in March. The fry are rainbow trout, and eggs of this species hatch 10% faster than brook trout at 4 C and 40% faster at 8 C.

Riparian Vegetation

The vegetation transects proved to be typical of the study areas. A total of 30 species was recorded in transects on Chaney Creek and the total for Mud Creek was 25 species (data sheets appended). Seven genera were present in all transects on both creeks, and these prioritized in order of decreasing overall abundance are:

Poa, bluegrass

Juncus, rush

Rosa, wildrose

Potentilla, cinquefoil

Agropyron, wheatgrass

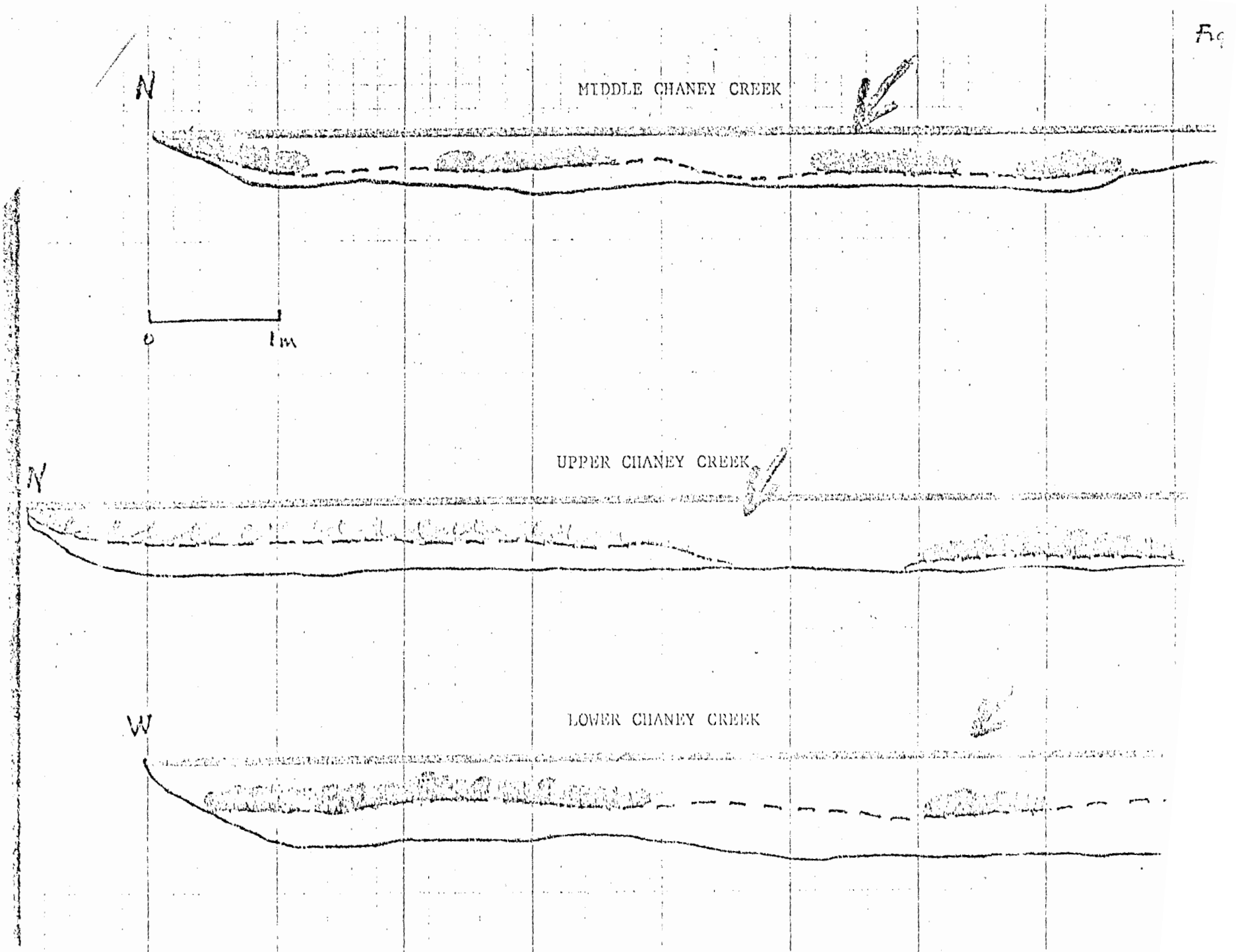
Equisetum, horsetail

Cirsium, thistle

Other abundant species were Carex, sedge, in lower and upper Mud Creek and clover in lower Chaney Creek.

Transect lengths ranged from 46 to 100 m (Table 7). The width of the riparian zone upwind from the streams (west bank) ranged from 12 to 42 m.

Some of the most abundant species such as Poa, Juncus, and Carex are, because of their diffuse nature or lack of height, of little value in retarding either surface or airborne introduction of soil particles into the streams. Shrubs such as Potentilla and Rosa reach waist height and do trap some airborne sediment, but taller species such as Salix (willow) and Betula (riverbirch) are more effective. The latter two species are very limited in both riparian zones (Table 7), especially on the upwind side of the stream channels. Chaney Creek is more satisfactorily buffered from airborne sediment inputs; in Mud Creek, the buffer zone is generally restricted to the flood plain several feet below the level of adjacent fields, and more vegetation is needed at the field level itself. Species such as Lombardy poplar or additional willows might be established there along with hedgerows of species like siberian pea and/or floribunda rose that would also provide habitat for upland game species.


N
MIDDLE CHANEY CREEK
0
1m
N
UPPER CHANEY CREEK
W
LOWER CHANEY CREEK

E

S

Date 12 September 1981

Transect length 73m, west → east

SPECIES — % COVER BY 1 m. INTERVAL

Scientific name - common name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Agropyron - wheatgrass								25				30	40		10			30	100	110	20	40	60	60	40
Cirsium - thistle																									10
Equisetum - horsetail			5																						
Juncus - rush																									
Poa - bluegrass																									
Potentilla - cinquefoil																									
Rosa - wild rose																									
Trifolium - clover	40	90	10		25	25	10	30	45	70					10										
Chenopodium - pigweed	10				25					30	30														
Hordeum - barley		10	20								30			30										
Avena - oats			25				10		10																
Sisymbrium - tumbleweed				80	50	25																			
Carex - sedge																									
Solidago - goldenrod																									
Distichlis - saltgrass																									
Sitanion - squirreltail																									
Panicum - witchgrass																									
Stubble																									
water (Prothole)																									
Bare ground or straw-covered	50		40	20		50	30	45	15		40	70	60	70	80	100	100	70			80	60	40	40	50

Stream Chaney Cr.
Date

RIPARIAN VEGETATION

Transect low c.c
Transect length

SPECIES

% COVER BY 1 m. INTERVALS

Scientific name - common name	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Agropyron - wheatgrass	40	100	100	80	100	30	20	10		20					20					20	40		25	
Cirsium - thistle						30	20		10	20												50	10	
Equisetum - horsetail																	5							
Juncus - rush																								
Poa - bluegrass												10					15	15		15			15	
Potentilla - cinquefoil																								
Rosa - wild rose	20																							
clover							10	20	40	40	60		20	15	15	25	65	50	100			15		
rig																								
lxr									20			20									20			
oats						10	10				25		40			10				15	20	10		
SIS																								
CAREX																								
Solid																								
distich	40			10																				
sit								10																
Panicum									10															
Aster																					20			
															65	65								
						30	40	60	20	20	15	70	40	85			15	35		50		25	50	

Stream Chaney Cr.
Date

RIPARIAN VEGETATION

Transect lower
Transect length

% COVER BY 1 m. INTERVAL

SPECIES Scientific name – common name	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Agropyron – wheatgrass	20			15								20								20		10		
Cirsium – thistle	20	20	15	15					5									5			5	5		
Equisetum – horsetail				5									10	10		10					5			
Juncus – rush																								15
Poa – bluegrass			15	80	20	50	75	50	95	70	100		60	25	40			20			80	45	40	
Potentilla – cinquefoil					70	50	10	50		30		70	30	65	20	90	40	25	90				15	
Rosa – wild rose	20	50	70		10		15					10			20		10	20	10	60			5	85
C															20		20	30				40		

Chaney Creek Flow

30

20 10 10

40 30

Stream Chaney Cr.
Date

RIPARIAN VEGETATION

Transect middle
Transect length

SPECIES
Scientific name -
common name

% COVER BY 1 m. INTERVAL

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Agropyron - wheatgrass																								
Cirsium - thistle									10															
Equisetum - horsetail										5	5	5			5									
Juncus - rush	10		10			10	50	25	35	50	50	50	40	30					20	20		30		
Poa - bluegrass	30	20	10				50	25	40	45	45	45	45	30	40	25			40		10	30	10	40
Potentilla - cinquefoil	60	30	40	100	40	50												80	30	15	35		50	
Rosa - wild rose																							10	20
carex					10											45	100	20						40
senecio		20	30	-	40	40		50	15															
Salix													15	15										
Distichlis														25										
eleocharis															45	30								
strawberry																			10		5			
		20	10		10															35	50	40		

Chaney Creek Flow

Stream Chaney Creek
Date 12 September 1988

RIPARIAN VEGETATION

Transect middle
Transect length 68 m.
South → no.

SPECIES

% COVER BY 1 m. INTERVAL

Scientific name - common name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Agropyron - wheatgrass	90	80																							
Cirsium - thistle	10	10																		25		20			
Equisetum - horsetail																									
Juncus - rush				20	20	20	20	10	20					15	20	20	20	30	40	15				20	10
Poa - bluegrass				20		30	20	10	10						20	20	30	30	10	10	30				50
Potentilla - cinquefoil			30	50	80	50	30	80	60	40		90			20	10	30		40	50	50	30	40		
Rosa - wild rose		10	70	10			30						40	75	70	10		30			20				
Carex - sedge									10	60	100	10	60	10	20	10									
Senecio - ragwort																						30	20	40	
Salix - willow																									
Distichlis - saltgrass																									
Eleocharis - spike rush																									
Fragaria - strawberry																									
																30	20	10	10			20	40	40	40

Stream Chaney Creek
Date 12 September 1981

RIPARIAN VEGETATION

Transect upper
Transect length 50 m.
North → South

% COVER BY 1 m. INTERVAL

SPECIES scientific name - common name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
agropyron - wheatgrass	70	15																									
Carsium - thistle					15		10		35	20	40	20		30	60					20		15		15	20	30	20
equisetum - horsetail																											
juncus - rush										10	25	15		10	20	30	20	40	40	20	80	20	5	5	5	5	
poa - bluegrass	5	80	75	85	55	70	15	15	30	35		15									20	40	50	50	20	30	50
potentilla - cinquefoil							35	85	10		10		30														
rosa - wild rose	25	5	25	15	10	25			25	35	25	50	70	60	20	40	40	50	50	60			40	30	40	20	
Betula - riverbirch																											
Scirpus - bulrush																30											
Senecio - ragwort					20																					15	10
Smilacena - Solomons seal																						25	5		15		
Achillea - yarrow																											
Aster - aster																											
Solidago - goldenrod																	40	10	10								
Salix - willow																											
Rorippa - watercress																											
Typha - cattail																											
Carex - sedge																											
Cicuta - water hemlock																											
Distichlis - saltgrass																											
Eleocharis - spikerush																											
Fragaria - strawberry																											
Eriogonum - buckwheat																											
bare ground						5	40																				

Stream Chaney Cr.
Date

RIPARIAN VEGETATION

Transect middle
Transect length

SPECIES
Scientific name -
common name

% COVER BY 1 m. INTERVALS

common name	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Agropyron - wheatgrass																		10					
Cirsium - thistle									15				10			10	10	10					
Equisetum - horsetail									5														
Juncus - rush																							
Poa - bluegrass	90	90	90	80	65	65	65	60	60	100	100	100	90	100	100	50	60						
Potentilla - cinquefoil																40	10	40					
Rosa - wild rose																	30	40					
carex																							
Senecio																							
salix																							
Distich																							
elea																							
straw																							
orchard				20	35	35	35	40	20														
	10	10	10																				

Stream Mud Creek

Date 16 October 1981

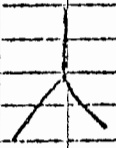
RIPARIAN VEGETATION

Transect length 46 m.

west → east

% COVER BY 1 m. INTERVAL

SPECIES Scientific name - common name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Agropyron - wheatgrass	100	60					20																		
Cirsium - thistle																								20	20
Equisetum - horsetail			10	5																					
Juncus - rush		40	70	80	20	20	40	20							50	50	55	50	20	25	10	10			
Poa - bluegrass			20	15	30	30	20	20													20	20	10	30	
Potentilla - cinquefoil					50	10															15	40	50		
Rosa - wild rose																					5				20
Carex - sedge						30	40	50	50	40	70	100	100	90	50	50	45	50	20						
Solidago - goldenrod								10	20	10										15	10	30			
Salix - willow									30	50	30								60	60	40				
Typha - cattail														10											
Fragaria - strawberry																							20		
-yarrow																								10	20
Aster - aster																									
Bare ground						10																	10	40	40



Mud Creek flow

ect upper Chaney

ect length 50 m. North → South orientation

RIPARIAN VEGETATION

Transect

Transect length

% COVER BY 1 m. INTERVAL

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
	20		15		15	20	30	20																		10				
10	20	80	20	5	5	5	5			80	20	10	10	20	20	10	60	85	55								10	30	40	15
		20	40	50	50	20	30	50																	90					50
50	60			40	30	40	20		30																					
												80	70	70																
							15	10	20																					
			25	5		15																								
									30																					
										20	10	10	20	10	30	10	15	15	15											
10											70				60	80	35		30	30	30	30								
																				15	15	15								
																				15	15	15								
																				30	30	30	100	100						
																				10	10	10								
																										30				
																										30				
																										30	60	20		
																												10	25	15

Chaney Creek Flow

																									10		30	40	30	20

Stream Pilot Cr.

Date

RIPARIAN VEGETATION

Transect mid

Transect length

% COVER BY 1 m. INTERVALS

SPECIES Scientific name - common name	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	
Agropyron - wheatgrass																									
Cirsium - thistle	10			10	20										20	10		10							
Equisetum - horsetail																	10								
Juncus - rush																10			10	10	30	50	55	50	45
Poa - bluegrass	10	10	100	90	30		20	60	30	60	40	70	60	50	20	10	40								
Potentilla - cinquefoil	40	50				50	40	10	30	20	30	10	10			30	20	10							
Rosa - wild rose	40	30			50	50	40	30	30	20	20	20	20	20	50	20	20	20							
oats																									
bar																									
solid											10							10	10	10	10				
carex																	10		30	30	40	50	45	50	55
snow																									
yarrow													10	20	10										
fescue																									
plantago									10																
straw																20									
birch																		30	50	50	30				
		10												10				30							

Date 16 October 1981

Transect length 52 m
-east → west

SPECIES
Scientific name -
common name

% COVER BY 1 m. INTERVAL

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Agropyron - wheatgrass	50																								
Cirsium - thistle	30	40	30	80	20	15	20	20																	
Equisetum - horsetail																				10					
Juncus - rush											10	10	10						20	20	50	50	65	50	45
Poa - bluegrass		40	40		10	15	10	10	30	50	20	40	50	20	60	70		30	60						
Potentilla - cinquefoil											20			20	20	10	90	40		20					
Rosa - wild rose	20	20	30	20	20	20	25	30	10		10		40												
Geranium - geranium												10													
Elymus - wheatgrass												30													
Solidago - goldenrod															10	10	10	10	10	10					
Carex - sedge															10	10		10							
Symphoricarpos - snowbush																		10	10	10					
Eleocharis - spikerush																				30	50	50	45	50	55
Salix - willow					50	50	45	30	60	50	40														
mosses																									
Aster - aster																									
mixed seeded grasses																									
Trifolium - clover																									
Polygonum - smartweed																									

Stream Mud Cr.
Date

RIPARIAN VEGETATION

Transect middle
Transect length

SPECIES
Scientific name –
Common name

% COVER BY 1 m. INTERVAL

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Agropyron – wheatgrass																									
Cirsium – thistle												10					10		20	20	10	20	30	20	40
Equisetum – horsetail																									
Juncus – rush					20						20						10								
Poa – bluegrass			20	10					20	20	30	60				10		20	20			10	10	10	10
Potentilla – cinquefoil	70	40	70	70	80	100	100	40	40	80	30	20	100	80	50	20	70	30		50	50	70	60	50	30
Rosa – wild rose	30	30										10		10				50	30	20	30			20	20
weeds																									
barley																									
Salix																	10				10				
carex		30						30	40										10	10					
straw															50	70									
straw																			20						
			10	20				30			20			10											

Stream Mud Cr.
Date

RIPARIAN VEGETATION

Transect middle
Transect length

% COVER BY 1 m. INTERVALS

SPECIES Scientific name - Common name	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73		
Agropyron - wheatgrass																									
Cirsium - thistle				20											10		50		10		10	30	50		
Equisetum - horsetail																									
Juncus - rush																									
Poa - bluegrass		20	40	40	80	70	70	10	10	70		40		20	60		20	90	50	90	40	20		10	10
Potentilla - cinquefoil	40	30	10		10		10	30			80	10	60	10		80			40				20	70	
Rosa - wild rose	50	40	40	40	10	30	20	60	80	30	20	40	40	70	30	20					40	50	30	20	40
oats																									
bear																									
Solid																									
Carex																									
Snow																									
-yarrow												10													
Fogwort									10																
plantago																									
straw																									
birch																									
	10	10	10															10		10	10				30

Stream Mud Cr.
Date

RIPARIAN VEGETATION

Transect lower
Transect length

SPECIES — % COVER BY 1 m. INTERVAL

Scientific name – common name	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Agropyron – wheatgrass																								
Cirsium – thistle				10			20																	
Equisetum – horsetail												30	20											
Juncus – rush	5																							
Poa – bluegrass	20	20	70	50	30	10		80	80	70	30	20	40	20	30	30	35	60	80	80	80			
Potentilla – cinquefoil						60																		
Rosa – wild rose	20	20							20						10	20	20							
carex																								
Solidago														20	20	20	20							
salix																								
typha																								
shrub.																								
yarrow																								
aster																								
	55	60	30	40	70	30	80	20		50	70	50	60	60	40	30	25	40	20	20	20			

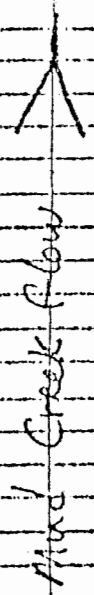
Stream Mud Creek
Date 16 october 1981

RIPARIAN VEGETATION

Transect middle
Transect length 100 m.
West → east

% COVER BY 1 m. INTERVAL

SPECIES Scientific name - Common name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Agropyron - wheatgrass							20	10																	
Cirsium - thistle																									
Equisetum - horsetail																					10				
Juncus - rush																	20	10	10	20	20				
Poa - bluegrass															60	80	40	70	40	60	50	50	30	40	20
Potentilla - cinquefoil														40	40		10			20		20	40	40	80
Rosa - wild rose																						30	30	20	
Avena - oats	70	20	40		20		40			80	20	70							40						
Hordeum - barley									30																
Solidago - goldenrod																10	30	20	10						
Carex - sedge																10					20				
Symphoricarpos - snowbush																									
- yarrow																									
Scrophularia - figwort																									
Plantago - mullein																									
Fragaria - strawberry																									
Betula - riverbirch																									
Bare ground	30	80	60	100	80	100	40	90	70	20	80	30	100	60											



Stream Mud Cr.

Date

RIPARIAN VEGETATION

Transect Upper

Transect length

SPECIES

% COVER BY 1 m. INTERVALS

Scientific name - common name	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Agropyron - wheatgrass																									
Cirsium - thistle																									
Equisetum - horsetail																									
Juncus - rush																									
Poa - bluegrass																									
Potentilla - cinquefoil																									
Rosa - wild rose																									
agran																									
Panicum																									
Solidago																									
carex																									
snow																									
cleach																									
willow																									
moss																									
aster																									
mixed seeded grasses	40	40																							
clover																									
polygonum	40	30																							
	20	30																							

Stream Mud Cr.

Date

RIPARIAN VEGETATION

Transect upper

Transect length

SPECIES

Scientific name -

common name

% COVER BY 1 m. INTERVAL

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Agropyron - wheatgrass																		50	100	60					30
Cirsium - thistle																									
Equisetum - horsetail													10	5			5								
Juncus - rush	50	25	15								20														
Poa - bluegrass										10	30	25	50	15		20	25								
Potentilla - cinquefoil										40	20		10	10	30	30	35								
Rosa - wild rose															50	50		50							
geran																	10								
panicum																									
Solidago										20		25	20												
carex				100	100	100	100	100	100	30	40	25	10	20	20	20	25								
Sagebrush																									
alder	50	25	15																						
willow														50											
moss		50	70																						
aster												25													
mixed sedge/grasses																					60	90	50	60	
clover																								10	
polygonum																									15
																				40	40	10	20	30	2

Mud Creek Flow

Idaho State University
FISH AGE-LENGTH DATA SHEET

LOCATION ____________ DATE ________ SPECIES ____________

Margin

SAMPLE #	TOTAL LENGTH, mm.	WEIGHT, gm.	SEX	scale length (S) / fish length (F)	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10	+
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				F																				
				S																				
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Idaho State University
FISH AGE-LENGTH DATA SHEET

LOCATION ______________ DATE ______________ SPECIES ______________

SAMPLE #	TOTAL LENGTH, mm.	WEIGHT, gm.	SEX	scale length (S) fish length (F)	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10	Margin
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				F																				
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LOCATION ______________

Idaho State University
FISH AGE-LENGTH DATA SHEET

DATE ______________ SPECIES ______________

SAMPLE #	TOTAL LENGTH, mm.	WEIGHT, gm.	SEX	scale length (S) fish length (F)	SCALE MEASUREMENT TO ANNULUS 1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10	+
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Margin

Idaho State University
FISH AGE-LENGTH DATA SHEET

LOCATION ______________ DATE ______________ SPECIES ______________

Hargi

SAMPLE #	TOTAL LENGTH, mm.	WEIGHT, gm.	SEX	scale length (S) fish length (F)	SCALE MEASUREMENT TO ANNULUS 1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10
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				F																			
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Idaho State University
FISH AGE-LENGTH DATA SHEET

LOCATION ______ DATE ______ SPECIES ______

Margin

SAMPLE #	TOTAL LENGTH, mm.	WEIGHT, gm.	SEX	scale length (S) fish length (F)	1	+	2	+	3	+	4	+	5	+	6	+	7	+	8	+	9	+	10	+
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