FIFTEENMILE BASIN HABITAT ENHANCEMENT PROJECT
ANNUAL REPORT FY 1988

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Abstract

The goal of the Fifteenmile Creek Habitat Enhancement Project is to improve wild winter Steelhead in the Fifteenmile Creek Basin under the Columbia River Basin Fish and Wildlife Program, Measure 704(d)(l)

The project is funded by through the Bonneville Power Administration Cooperators in the habitat enhancement project include the USDA Forest Service, Wasco County Soil and Water Conservation District and the Confederated Tribes of the Warms Springs.

Installation of instream fish habitat structures was completed on four miles of Ramsey Creek (RM l-Rm 4) and on one mile of Fifteenmile Creek (RM 40-RM 41). One hundred thirty-five structures were installed in treatment areas. Construction materials included logs and rock.

Riparian protection fencing was completed on Dry Creek and Ramsey Creek worksites. Five and one-half miles of new fence was added to existing fence on Ramsey Creek to afford riparian protection to four miles of stream. Six miles of stream on Dry Creek will be afforded riparian protection by constructing 4.5 miles of fence to complement existing fence.

Fourteen leases were procured for work to be completed during the 1989-1990 field season. Approximately 12 miles of riparian fence will be built or repaired and approximately 350 structures will be installed on Fifteenmile Creek (RM 31-RM 39) and on Eightmile Creek (RM 17-RM 20).

Irrigation withdrawal screening was investigated and found to be effective protection for downstream migrants, requiring little maintenance.

Baseline biological information on stream flows, water temperature and macro-invertebrate communities was collected*

Introduction

The Fifteenmile Creek Basin supports the eastern most stock of wild winter Steelhead in the Columbia Basin (Figure 1). The current Steelhead population is depressed below historic levels. Steelhead production within the Fifteenmile Creek Basin is limited primarily by habitat deficiencies within the Fifteenmile Creek Basin and secondarily by passage problems at Bonneville Dam on the main stem Columbia.

Fifteenmile Creek Basin was selected as a mitigation site for wild winter Steelhead enhancement under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program, Measure 703(c)(l), action item 4, 2 (amended 1987). A cooperative effort between Oregon Department of Fish and Wildlife (ODFW), U.S. Forest Service (USFS) and the Wasco County SWCD has been undertaken to enhance winter Steelhead habitat. Funding has been made available through the Bonneville Power Administration.

The Fifteenmile Creek Basin Fish Habitat Improvement Implementation Plan was generated to guide enhancement activities (Smith et al, 1987). Work completed during the Initial year (FY87-FY88) included providing improved passage at two upstream passage barriers and one downstream passage barrier.

Current enhancement strategies include providing instream structure within the basin to improve winter Steelhead rearing.

Water quality is being improved through riparian corridor fencing. Corridor Fencing will promote re-vegetation to decrease summertime high water temperatures and increase alocthonous input into the stream system. Rotary drum protection screening at unscreened or improperly screened irrigation withdrawals is being planned, to improve survival of rearing juveniles and out migrating smolts.

Description of Project Area

Project Site

Fifteenmile Creek

Habitat enhancement activities were completed on approximately one mile of Fifteenmile Creek (RM 40.5-RM 41.5)(Figure 2) located in the City of Dufur Municipal Watershed. The stream reach is riffle dominated (PR 1:9) with few quality pools existing. Rearing habitat is limited by lack of woody structure. Margins and escape cover from high water velocity is lacking during high flows. A fair population of clean water macro-invertebrates exists in this reach indicating that the system potential to raise salmonids is good.

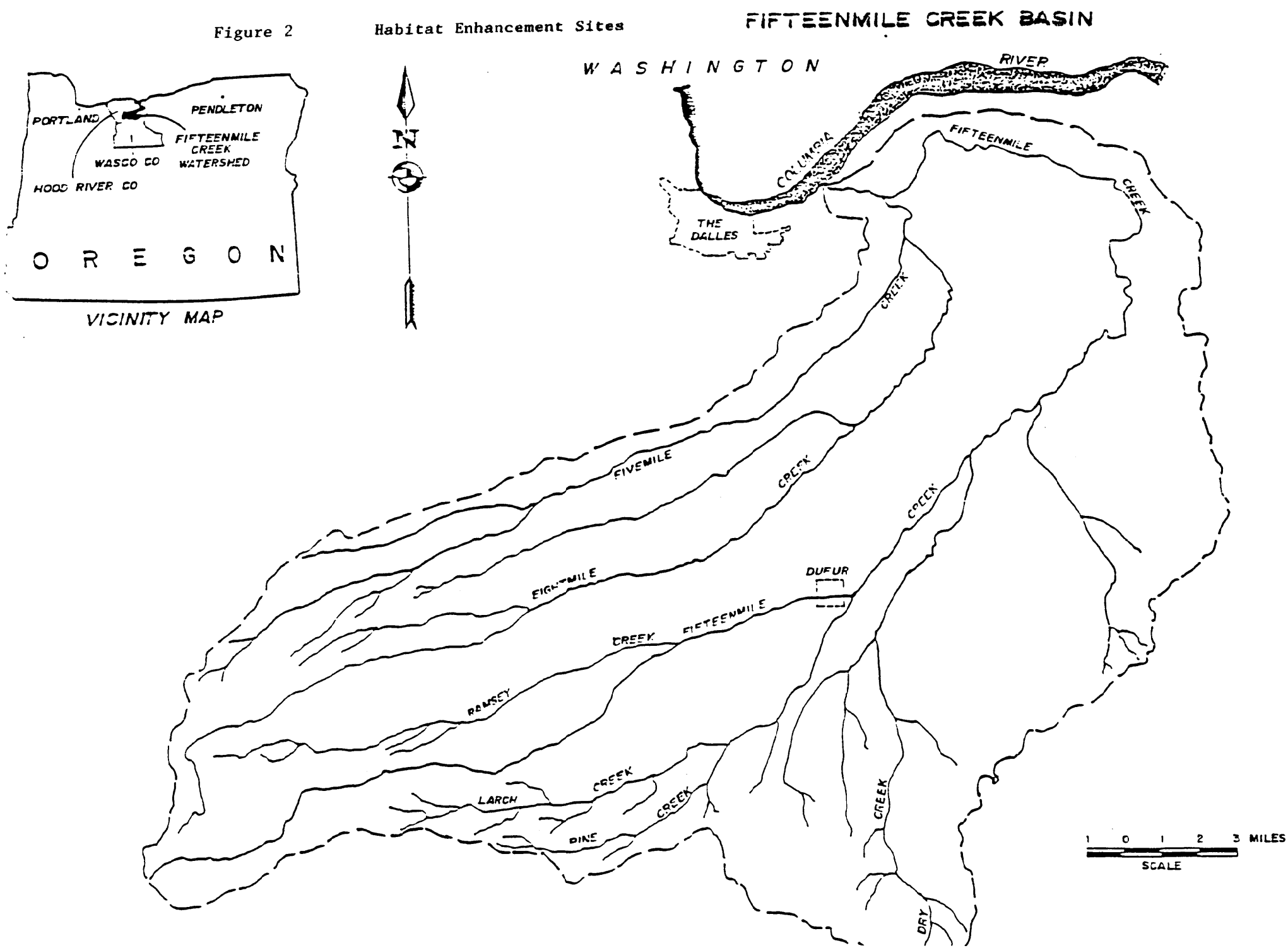
Dry Creek

Dry Creek flows into Fifteenmile Creek at river mile 24.5 (Figure 2). Dry Creek is exemplified by intensive livestock grazing on both uplands and within the stream corridor. Channelization of the stream channel was attempted after the 1974 flood. Most woody debris has been removed from the riparian area with little recruitment of woody plants back into the area. The stream currently has a poorly defined channel which has eroded down to a bedrock layer. A negative trend exists with respect to fish habitat due to organic enrichment and sedimentation (Mangum 1987). This situation is typically found when there has been severe overgrazing in an area (Mangum 1987). Macro-invertebrates are typical of a degraded, enriched stream.

Ramsey Creek

Ramsey Creek flows into Fifteenmile Creek at river mile 36 (Figure 2). Ramsey Creek is a riffle dominated creek (PR 1:9) lacking quality pools for the rearing of juvenile Steelhead. Intensive livestock usage of the stream corridor has degraded the riparian vegetation and streambanks. Soil input into the stream system is excessive with clean water species of macro-invertebrates being present, but in limited numbers (Mangum 1987).

Figure 2 Habitat Enhancement Sites



Methodsd and Materials

Instream Structures

Areas lacking in particular habitat types were identified for structural treatment under the Fifteenmile Basin Fish Habitat Improvement Implementation Plan (Smith 1986). Ramsey Creek and Fifteenmlle Creek project sites were determined to be lacking in quantity and quality of pools for rearing juvenile Steelhead in desired numbers.

Prescriptions for these project areas Include the addition of weirs, jetties and deflectors to create pools and dissipate water energy. Boulder clusters and weirs were installed to increase the diversity of habitat and to provide both escape cover as well as winter type habitat. Jetties or riprap were installed to control erosion problems.

Materials used included logs and basalt rock. Logs consisted of either cedar or Douglas fir.

Logs were purchased from a lumber company in Hood River, Oregon and transported by truck to the project site. During log installation a toe trench was excavated in the stream bed and extended into the steam bank. Approximately one-third of the log is buried into the bank. Thirty cubic feet of angular basalt rock was then placed on top of the log ends and the trench was backfilled. Planks were installed on the upstream side of the log and securely nailed in place. Half-inch spaces were left between planks for adequate water percolation for developing eggs.

Rock weirs and jetties involved filling the toe trench with 30 to 70 cubic yards of angular basalt rock then backfilling. Key ways extended into the stream bank to prevent water from rerouting outside the stream channel and to provide additional rearing margins Rock size was graduated from approximately one yard to four inch diameter.

Corridor Fencing

Corridor fencing was installed to protect instream structures and existing bank integrity. Corridor fencing protects streambanks by eliminating livestock usage around instream structure, and protects riparian plant communities. Project biologists, ODFW engineers, and private landowners set up bid specifications as well as fence locations. Private fence contractors were awarded bids with ODFW personnel acting as project inspectors Four strand barbed wire fence equipped with equipment crossings and livestock watergaps was installed on Ramsey and Dry creeks. Fence terminals consist of railroad ties, 2" full weight steel highway bracing or 4" round post rock cribs.

In-line materials included steel T133 posts or 4" round post figure 4's. Break away crossings and water gaps were constructed of 15 1/2 gage barbed wire.

Riparian Lease

Riparian leases between ODFW and Individual landowners were obtained for work to be completed in 1989-1990. Fourteen leases were obtained for Eightmile and Fifteenmile creeks habitat improvement projects.

Baseline Biological and Physical Information

Changes in physical and biological communities of the riparian project areas are being monitored by ODFW and USFS personnel.

Macro-Invertebrates

Macro-invertebrate populations are being used as biological indicators of riparian corridor health. Macro-invertebrate populations respond more quickly to changes in their physical environment (water temperature, flow, sediment loads etc.) than do fish populations. Monitoring of the macro-invertebrates will provide an indicator of the success of the fish habitat improvement project.

Macro-invertebrates are collected from eight representative sample sites located on private lands (Appendix A). Samples are collected from the spring, summer and fall periods Samples collected by ODFW and USFS are analyzed by Dr. Fred Mangum (Aquatic Ecologist, USDA Forest Service, Region 4). Results are contained in a report that will be returned to the USFS.

Photo Points

Photo points of the riparian corridor are being photographed on a seasonal basis. These photos will demonstrate riparian recovery of plant communities as well as the narrowing and deepening of the stream channel [Appendix D).

Stream Temperatures

Stream temperatures are being collected by use of Omni Data thermographs. Four sample sites consist of: Fifteenmile Creek at Dufur, Fifteenmile Creek approximately 4 miles downstream of the National Forest boundary, Eightmile Creek at Endersby and Ramsey Creek approximately 2 miles above the mouth (Appendix B).

Stream Flows

Stream flows are being recorded with a Marsh-McBirney flow meter by the direct discharge method at all macro-invertebrate sample

sites (Appendix B). An attempt is being made to document increases in summertime low flows. The improved water holding capacity of soils will enable more water to be stored to augment summertime low flows. During the summer period plant growth and water requirements are reduced.

Results

Fifteenmile Creek Project Implementation

Five log structures and 10 rock structures were installed on Fifteenmile Creek (RM 40.5-41.5). Structures included log and rock weirs, log deflectors and fish cover boulders. Prior to project implementation the stream reach contained few pools Following implementation, the pool to riffle ratio was estimated to be approximately 50:50. We anticipate the pool/riffle ratio will change due to redistribution of gravel following high water events. We expect the new ratio to be 6/4 or near optimum for rearing juvenile Steelhead in this reach.

Ramsey Creek Project Implementation

Four miles of Ramsey Creek (Rm 0-4) *were* treated with 120 rock structures. Structures included *rock* weirs, jetties deflectors, riprap and fish rocks. Riparian corridor fencing was installed to protect the stream banks and promote re-vegetation of this stream corridor. Six miles of four strand barbed wire fence were added to two miles of existing fence to exclude livestock from the instream habitat project sites as well as the stream corridor.

Dry Creek Project Implementation

Four miles of 4-strand barbed wire fence were installed on Dry Creek to exclude approximately six miles of stream corridor from livestock grazing. Dry Creek exhibits a poorly defined channel that has never re-channelized due to intensive livestock grazing since the 1974 flood. Little vegetation exists on the stream banks No instream structures were installed due to the lack of a defined stream channel. This situation will improve with time as vegetation naturally re-structures the stream channel

Irrigation Withdrawal Screening

The potential for irrigation withdrawal screening was investigated in the Fifteenmile Creek Basin. The potential use of the self-cleaning intake screen, known as the "Plum Creek" type, was investigated with respect to excluding juvenile Steelhead and for maintenance requirements. Plum Creek type screens installed in Trout Creek near Madras, Oregon were found to be very effective in excluding juvenile Steelhead from irrigation intake withdrawals, and relatively easy to maintain

This type of screen appeared to have good potential for use in Fifteenmile Creek.

Lease Procurement

Riparian lease agreements were obtained for 12 properties on Fifteenmile Creek and two properties on Eightmile Creek encompassing approximately 10 miles of stream. Additional lease agreements on Eightmile Creek will be pursued for work to be completed during the 1989-1990 field season

Macro-Invertebrate Collection

Macro-invertebrate samples were collected in the Fifteenmile Creek Basin to be used as biological indicators of the stream systems health. Insect samples were analyzed to identify species composition by Fred Mangum, Regional Aquatic Ecologist, USDA, Forest Service (Appendix E).

Samples collected at Dry Creek and Ramsey Creek exhibited Insect communities that are prevalent in stream systems that have experienced severe overgrazing (Mangum 1987). The insect community of Fifteenmile Creek included clean water species of may flies, but also species tolerant to organic enrichment and sedimentation (Mangum 1987).

Baseline Biological Information

Stream Flows

Stream flows *were* measured during the months of May and October in 1988 (Figure 3). The Fifteenmile Creek Basin experienced a regional drought during the 1988 field season. Stream flows *were* lower in 1988 than comparable periods in 1987.

Information collected will be used to document expected long-term increases in stream flows attributable to riparian restoration.

Stream Temperatures

Stream temperatures were monitored from April through October (Figures 4 8 5). Problems existed with the electronic thermographs used during this field season A possible solution to the chronic problems with the thermographs was identified and will be evaluated during the 1989-1990 field season

Figure 3

Stream Flows, Fifteenmile Creek Basin 1988

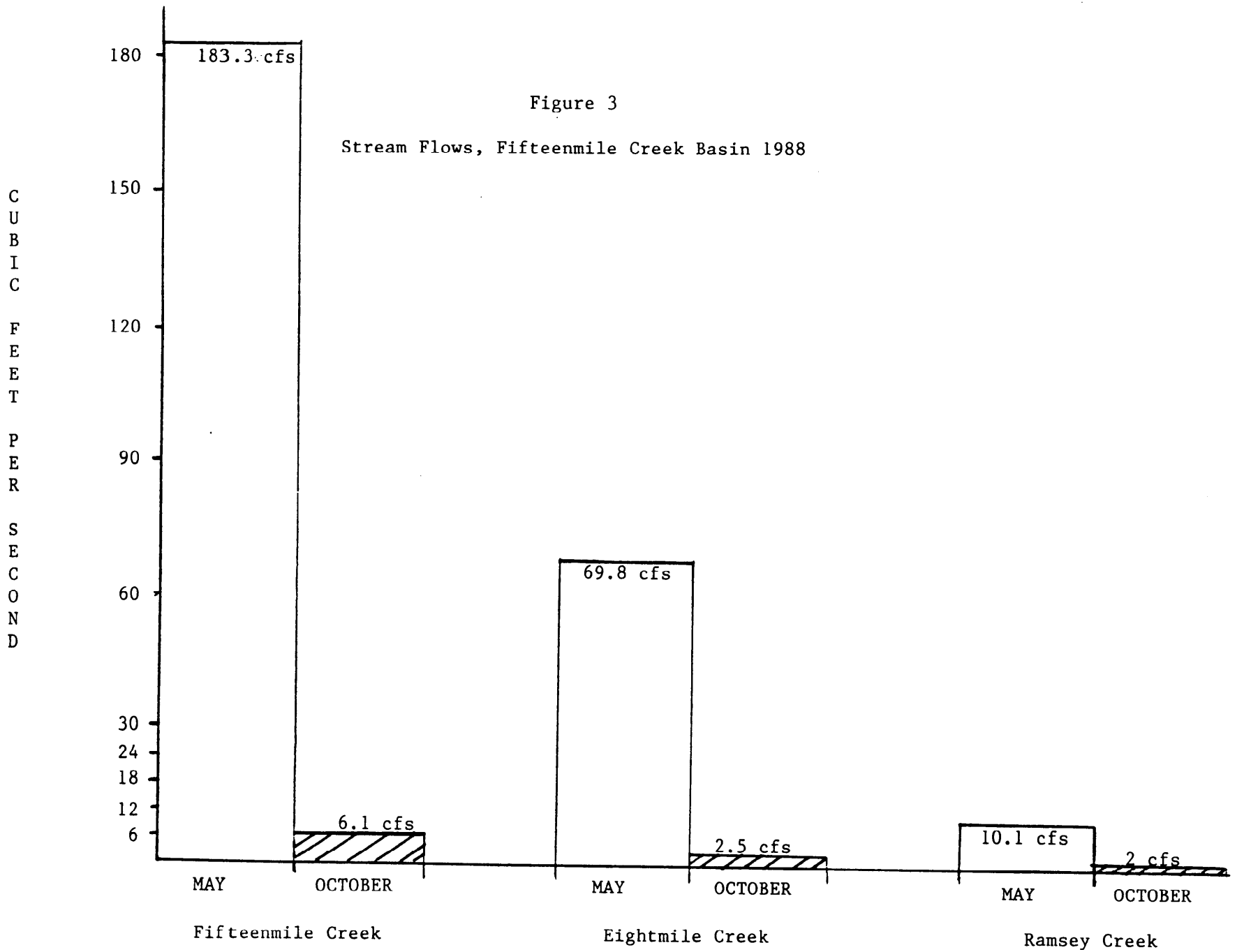
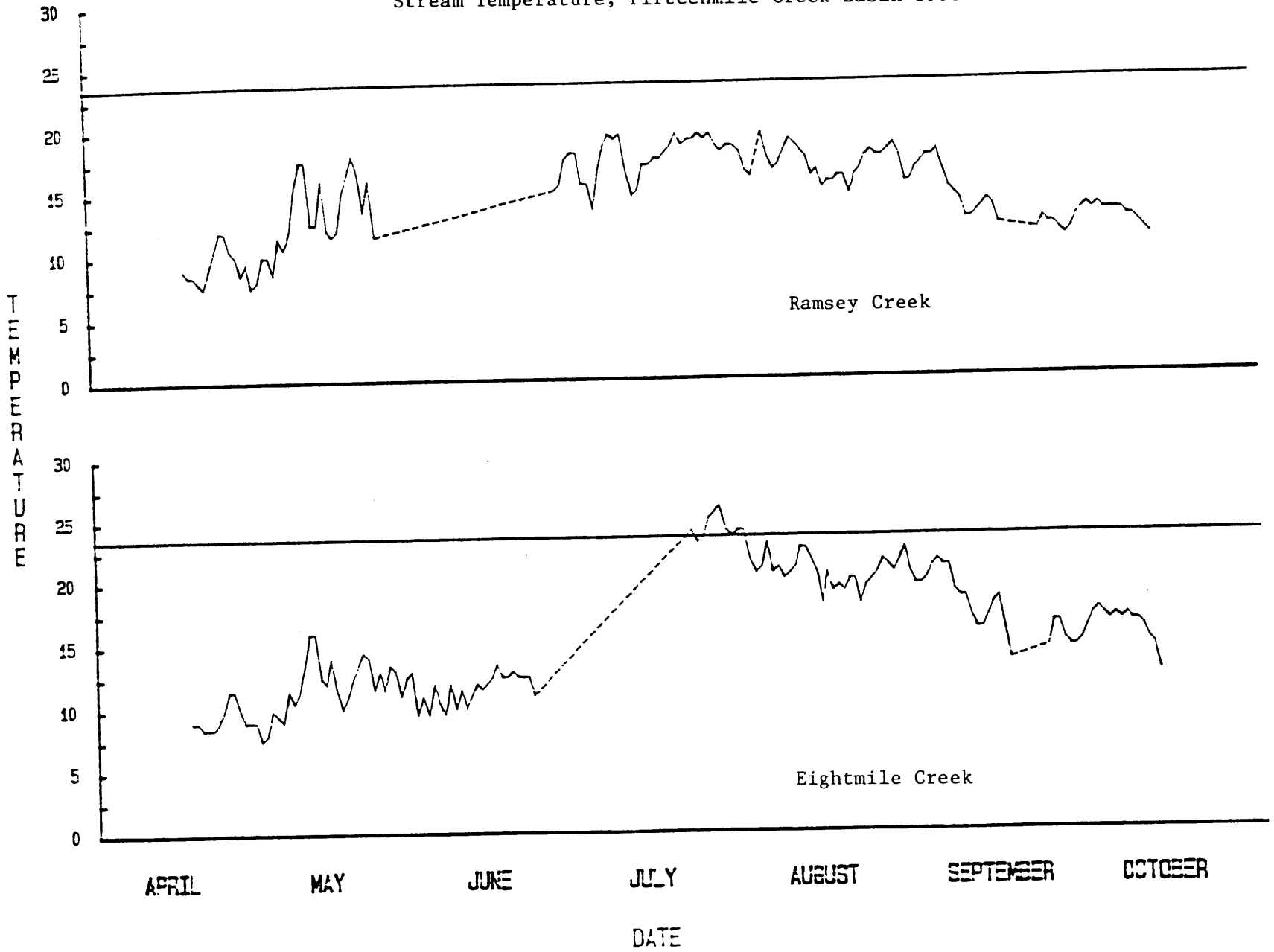
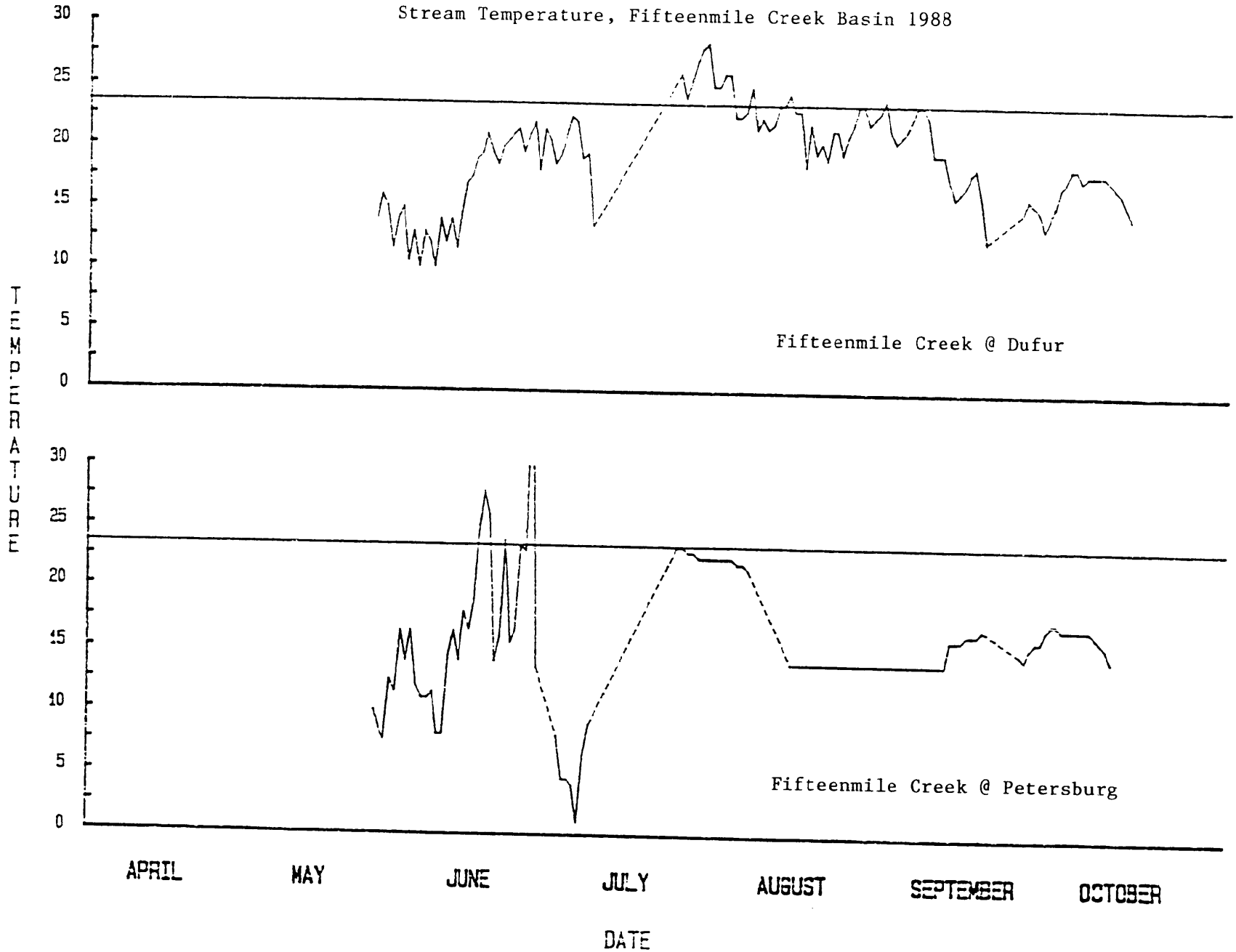


Figure 4

Stream Temperature, Fifteenmile Creek Basin 1988




Stream Temperature, Fifteenmile Creek Basin 1988
30
25
20
15
10
5
0
TEMPERATURE
Fifteenmile Creek @ Dufur
30
25
20
15
10
5
0
Fifteenmile Creek @ Petersburg
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
DATE

Discussion

The acceptance of the fish habitat project by private landowners has been exceptional within the basin Approximately 95% of the stream corridor which was historically grazed in the Dufur Valley upstream from the town of Dufur will be excluded from livestock grazing through riparian fencing. Water gaps and crossings will be provided to allow livestock to utilize pastures on both sides of the creek lying outside of the leased riparian area. Instream fish habitat structures and improved bank stability will improve water quality and increase salmonid populations.

Irrigation withdrawal screening will improve the survival of juvenile Steelhead residing in the basin.

The present and future productivity of the Fifteenmile Creek basin has been greatly increased through improved rearing conditions within the basin. Erosion control will improve water quality by reducing soils input into the system. Individual landowners will learn improved riparian stewardship by observing the benefits of proper riparian management.

Summary of Expenditures

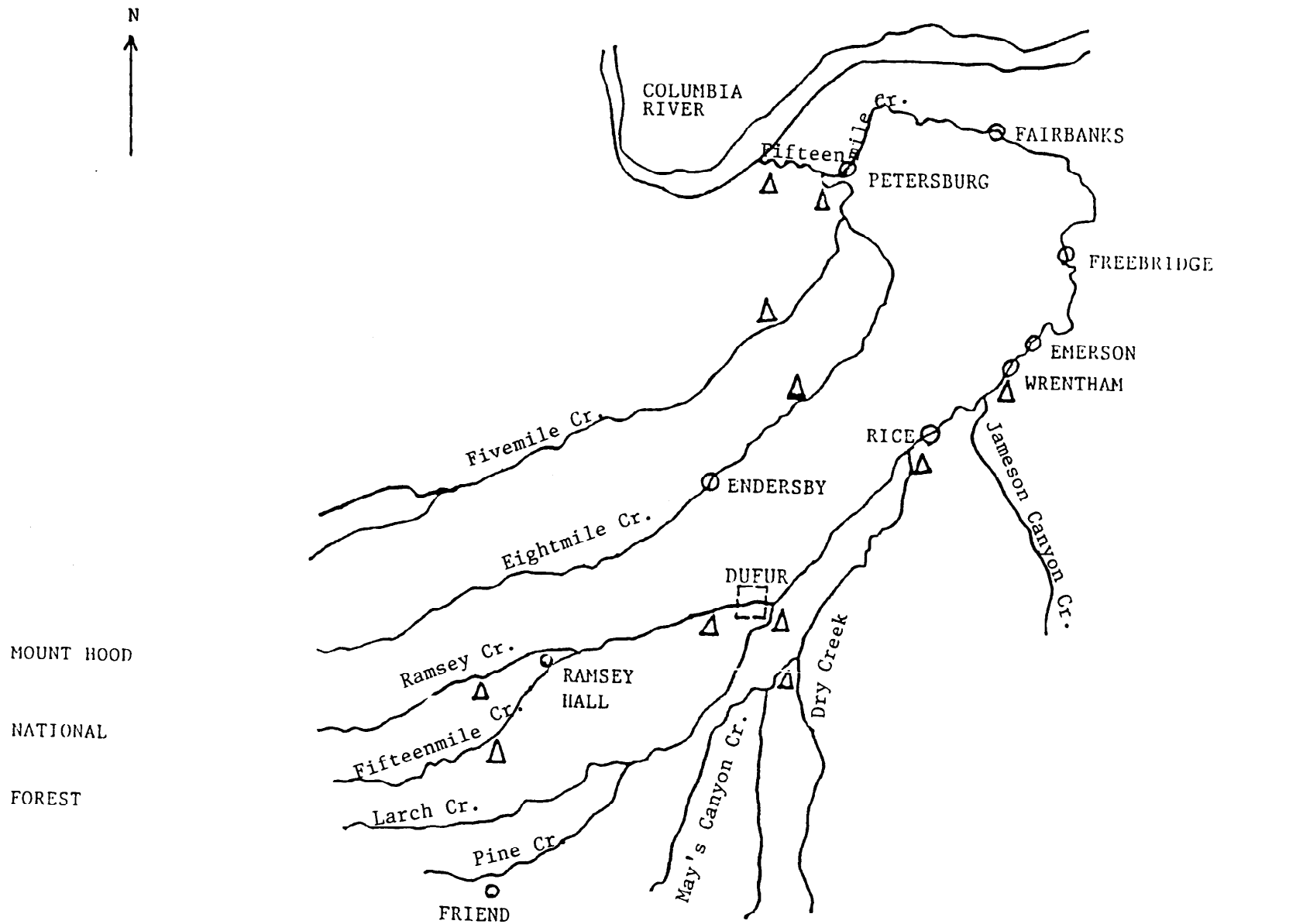
April 1,1988 through March 31,1989

1. Personnel	$84,916.39
2. Services/Supplies	$194,078.67
3. Capitol	$376.80
4.Indirect Costs (@ 26.7%)	$27,988.88
5.Total Costs	$289,311.94

Literature Cited

Mangum, Fred A. 1986. Aquatic Ecosystem Inventory, Macro-Invertebrate Analysis. In Annual Progress Report Mt. Hood National Forest, 1987. 76 pages.

Smith, R. C., D. Heller, R. Boyce, H. Forsgren, K. MacDonald, J. Newton. 1987. Fifteenmile Basin Fish Habitat Improvement Implementation Plan, September 1987. Available from: Bonneville Power Administration, Portland, Oregon. 65 pages.



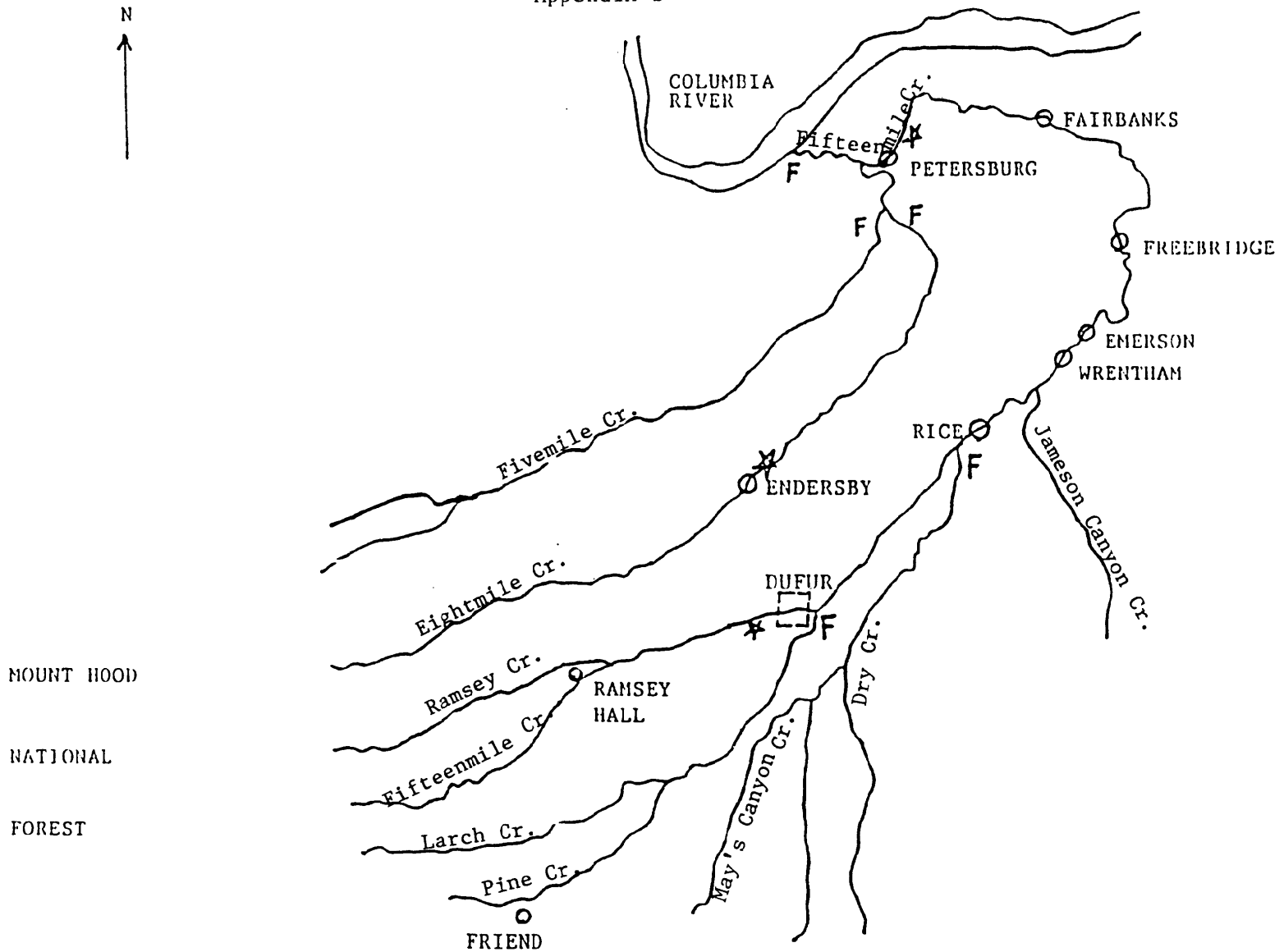
FIFTEENMILE PROJECT MACROINVERTEBRATE COLLECTION STATIONS

KEY

MACROINVERTEBRATE SAMPLE STATIONS △

MAJOR LANDMARKS ○

Appendix B



FIFTEENMILE PROJECT TEMPERATURE AND FLOW

MONITORING STATIONS

DATA POD STATIONS ☆

FLOW STATIONS F

MAJOR LANDMARKS ○

Appendix C-l

Temperature Data by Julian Day for Ramsey Creek

Julian Day	Temperature	Julian Day	Temperature
110	9.0	190	19.5
111	8.5	191	19.0
112	8.5	192	19.5
113	8.0	193	16.5
114	7.5	194	14.5
115	9.0	195	15.0
116	10.5	196	17.0
117	12.0	197	17.0
118	12.0	198	17.5
119	10.5	199	17.5
120	10.0	200	18.0
121	8.5	201	18.5
122	9.5	202	19.5
123	7.5	203	18.5
124	8.0	204	19.0
125	10.0	205	19.0
126	10.0	206	19.5
127	8.5	207	19.0
128	11.5	208	19.5
129	10.5	209	18.5
130	12.0	210	18.0
131	15.5	211	18.5
132	17.5	212	18.5
133	17.5	213	18.0
134	12.5	214	16.5
135	12.5	215	16.0
136	16.0	217	19.5
137	12.0	218	17.5
138	11.5	219	16.5
139	12.0	220	17.0
140	15.0	221	18.0
141	16.5	222	19.0
142	18.0	223	18.5
143	16.5	224	18.0
144	13.5	225	17.5
145	16.0	226	16.0
146	11.5	227	16.5
180	15.0	228	15.0
181	15.5	229	15.5
183	18.0	230	15.5
184	18.0	231	16.0
185	15.5	232	16.0
186	15.5	233	14.5
187	13.5	234	16.0
188	16.5	235	16.5
189	18.5	236	17.5

Appendix C-l cont.

Temperature Data by Jul Ian Day for Ramsey Creek

Jul ian Day	Temperature	Julian Day	Temperature
237	18.0	260	12.0
238	17.5	267	11.5
239	17.5	268	12.5
240	18.0	269	12.0
241	18.5	270	12.0
242	17.5	271	11.5
243	15.5	272	11.0
244	15.5	273	11.5
245	16.5	274	12.5
246	17.0	275	13.0
247	17.5	276	13.5
248	17.5	277	13.0
249	18.0	278	13.5
250	16.5	279	13.0
251	15.0	280	13.0
252	14.5	281	13.0
253	14.0	282	13.0
254	12.5	283	12.5
255	12.5	284	12.5
256	13.0	285	12.0
257	13.5	286	11.5
258	14.0	287	11.0

Appendix C-2

Temperature Data by Julian Day for Eightmile Creek

Julian Day	Temperature	Julian Day	Temperature
110	9.0	156	10.5
111	9.0	157	9.5
112	8.5	158	12.0
113	8.5	159	10.0
114	8.5	160	11.5
115	9.0	161	10.0
116	10.0	162	11.0
117	11.5	163	12.0
118	11.5	164	11.5
119	10.0	165	12.0
120	9.0	166	12.5
121	9.0	167	13.5
122	9.0	168	12.5
123	7.5	169	12.5
124	8.0	170	13.0
125	10.0	171	12.5
126	9.5	172	12.5
127	9.0	173	12.5
128	11.5	174	11.0
129	10.5	203	24.0
130	11.5	204	23.0
131	13.5	205	23.5
132	16.0	206	25.0
133	16.0	207	25.5
134	12.5	208	26.0
135	12.0	209	24.0
136	14.0	210	23.5
137	11.5	211	24.0
138	10.0	212	24.0
139	11.0	213	21.5
140	12.5	214	20.5
141	13.5	215	21.0
142	14.5	216	23.0
143	14.0	217	20.5
144	11.5	218	21.0
145	13.0	219	20.0
146	11.5	220	20.5
147	13.5	221	21.0
148	13.0	222	22.5
149	11.0	223	22.5
150	12.5	224	21.5
151	13.0	225	20.5
152	9.5	226	18.0
153	11.0	227	20.5
154	9.5	228	19.0

Appendix C-2 cont.

Temperature Data by Julian Day for Eightmile Creek

Julian Day	Temperature	Julian Day	Temperature
229	19.5	256	17.0
230	19.0	257	18.0
231	20.0	258	18.5
232	20.0	259	16.0
233	18.0	260	13.5
234	19.5	267	14.5
235	20.0	268	16.5
236	20.5	269	16.5
237	21.5	270	15.0
238	21.0	271	14.5
239	20.5	272	14.5
240	21.5	273	15.0
241	22.5	274	16.0
242	20.5	275	17.0
243	19.5	276	17.5
244	19.5	277	17.0
245	20.0	278	16.5
246	21.0	279	17.0
247	21.5	280	16.5
248	21.0	281	17.0
249	21.0	282	16.5
250	19.0	283	16.5
251	18.5	284	16.0
252	18.5	285	15.0
253	17.0	286	14.5
254	16.0	287	12.5
255	16.0		

Appendix C-3

Temperature Data by Julian Day for Fifteenmile Creek at Dufur

Julian Day	Temperature	Julian Day	Temperature
146	14.0	207	28.0
147	16.0	208	28.5
148	15.0	209	25.0
149	11.5	210	25.0
150	14.0	211	26.0
151	15.0	212	26.0
152	10.5	213	22.5
153	13.0	214	22.5
154	10.0	215	23.0
155	13.0	216	25.0
156	12.0	217	21.5
157	10.0	218	22.5
158	14.0	219	21.5
159	12.0	220	22.0
160	14.0	221	23.5
161	11.5	222	23.5
162	14.5	223	24.4
163	17.0	224	23.0
164	17.5	225	23.0
165	19.0	226	18.5
166	19.5	227	22.0
167	21.0	228	19.5
168	19.5	229	20.5
169	18.5	230	19.0
170	20.0	231	21.5
171	20.5	232	21.5
172	21.0	233	19.5
173	21.5	234	21.0
174	19.5	235	22.0
175	21.0	236	23.5
176	22.0	237	23.5
177	18.0	238	22.0
178	21.5	239	22.5
179	20.5	240	23.0
180	18.5	241	24.0
181	19.5	242	21.5
182	21.0	243	20.5
183	22.5	244	21.0
184	22.0	245	21.5
185	19.0	246	22.5
186	19.5	247	23.5
187	13.5	248	23.5
203	26.0	249	22.5
204	24.0	250	19.5
205	25.5	251	19.5
206	27.0	252	19.5

Appendix C-3 cont.

Temperature Data by Julian Day for Fifteenmile Creek at Dufur

Julian Day	Temperature	Julian Day	Temperature
253	17.5	274	17.0
254	16.0	275	17.5
255	16.5	276	18.5
256	17.0	277	18.5
257	18.0	278	17.5
258	18.5	279	18.0
259	16.0	280	18.0
260	12.5	281	18.0
267	15.0	282	18.0
268	16.0	283	17.5
269	15.5	284	17.0
270	15.0	285	16.5
271	13.5	286	15.5
272	14.5	287	14.5
273	15.5		

Appendix C-4

Temperature Data by Julian Day for Fifteenmile Creek at Petersburg

Julian Day	Temperature	Julian Day	Temperature
146	10.0	209	22.5
147	8.5	210	22.5
148	7.5	211	22.5
149	12.5	212	22.5
150	11.5	213	22.5
151	16.5	214	22.0
152	14.0	215	22.0
153	16.5	216	21.5
154	12.0	224	14.0
155	11.0	225	14.0
156	11.0	226	14.0
157	11.5	227	14.0
158	8.0	228	14.0
159	8.0	229	14.0
160	14.5	230	14.0
161	16.5	231	14.0
162	14.0	232	14.0
163	18.0	233	14.0
164	16.5	234	14.0
165	19.0	235	14.0
166	25.0	236	14.0
167	28.0	237	14.0
168	26.0	238	14.0
169	14.0	239	14.0
170	16.0	240	14.0
171	24.0	241	14.0
172	15.5	242	14.0
173	16.5	243	14.0
174	23.5	244	14.0
175	23.0	245	14.0
176	40.5	246	14.0
177	13.5	247	14.0
181	8.0	248	14.0
182	4.5	249	14.0
183	4.5	250	14.0
184	4.0	251	14.0
185	1.0	252	14.0
186	6.5	253	14.0
187	9.0	254	16.0
203	23.5	255	16.0
204	23.5	256	16.0
205	23.0	257	16.5
206	23.0	258	16.5
207	22.5	259	16.5
208	22.5	260	17.0
209	22.5	267	15.0

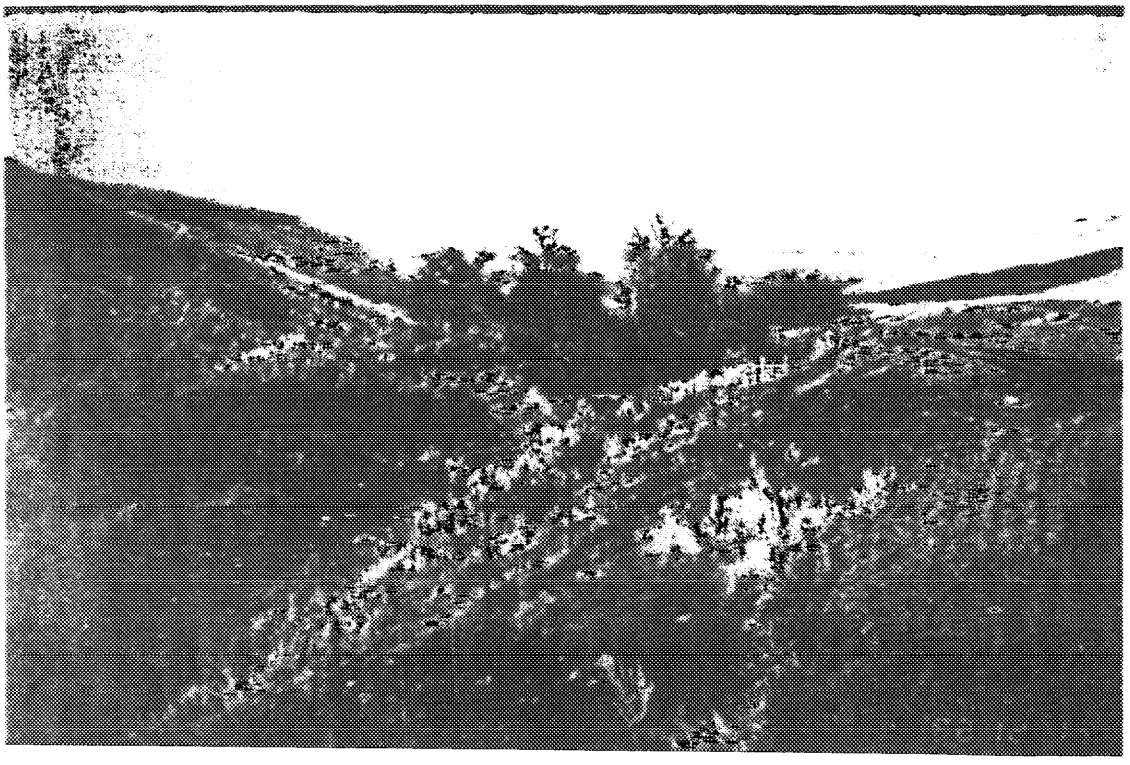
Appendix C-4 cont.

Temperature Data by Julian Day for Fifteenmile Creek at Petersburg

Julian Day	Temperature	Julian Day	Temperature
268	14.5	277	17.0
269	15.5	278	17.0
270	16.0	279	17.0
271	16.0	280	17.0
272	17.0	281	16.5
273	17.5	282	16.0
274	17.5	283	15.5
275	17.0	284	14.5
276	17.0		

Appendix D-1

Dry Creek



Riparian Corridor Fencing.

Four strand barbed wire fencing.

Appendix D-2

Ramsey Creek

Rock weir and rock jetty.

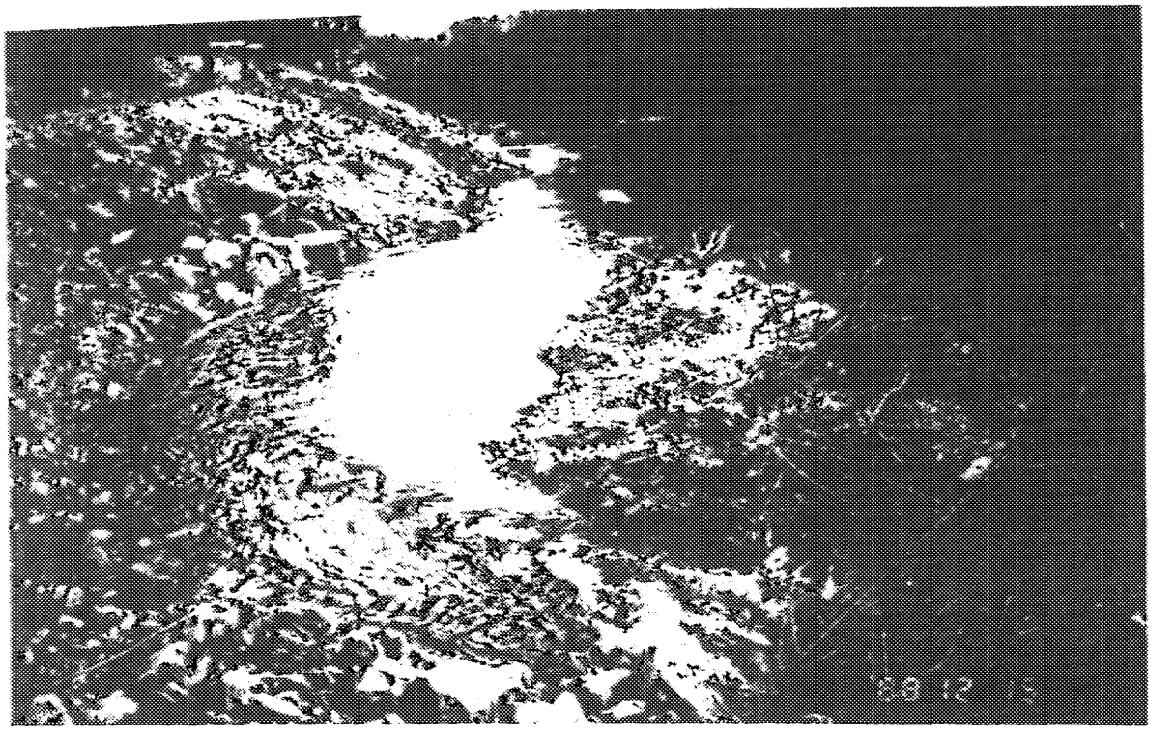
Appendix D-3

Ramsey Creek

Riparian Corridor Fencing.

Appendix D-4

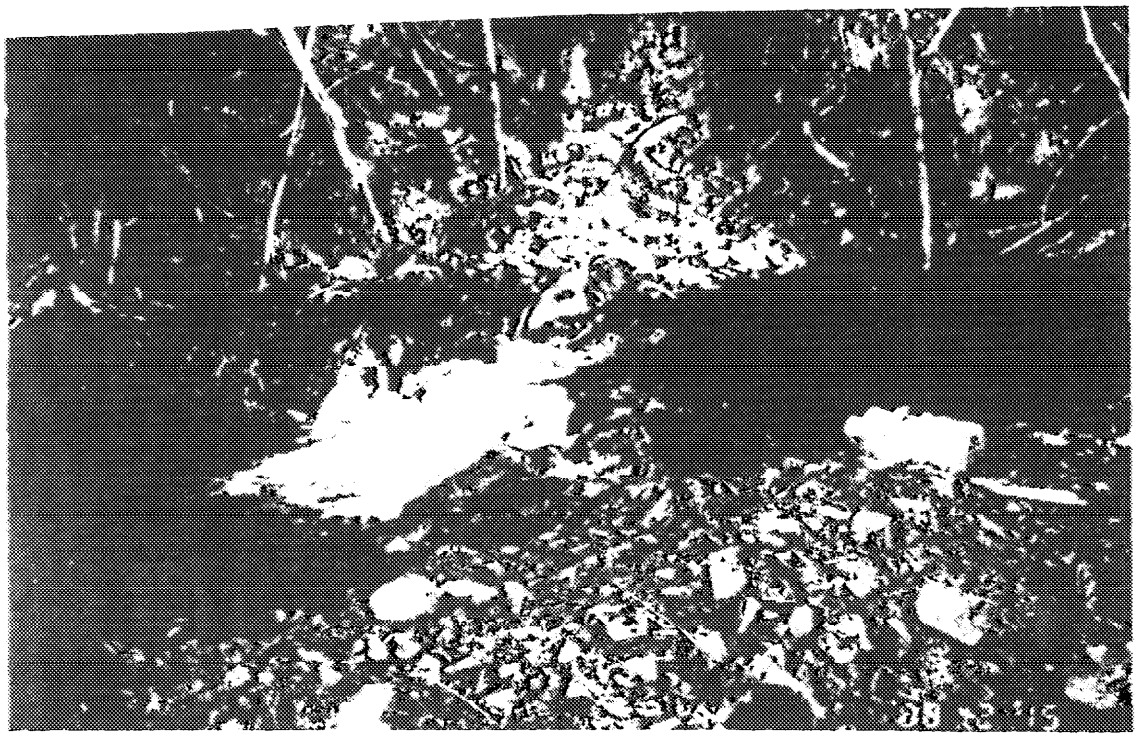
Ramsey Creek



Rock jetties designed to create pools
as well as protect stream bank.

Appendix D-5

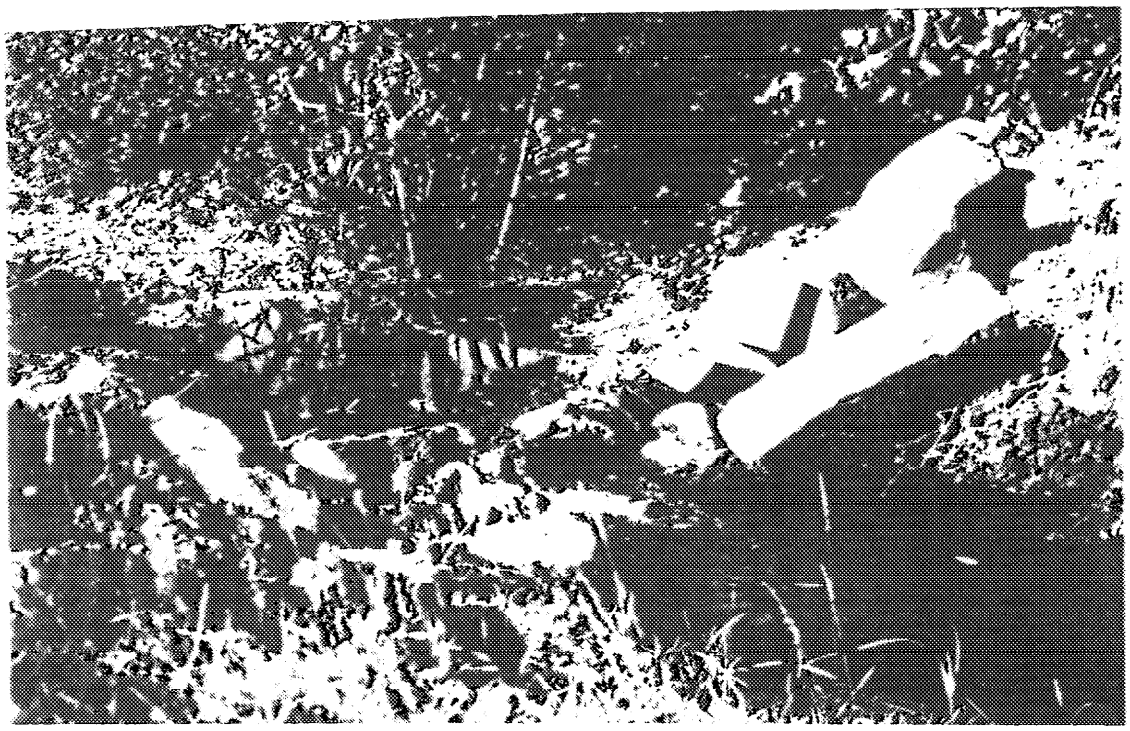
Ramsey Creek



Rock weir designed to create pool downstream
and recruit gravel on the upstream side.

Appendix D-6

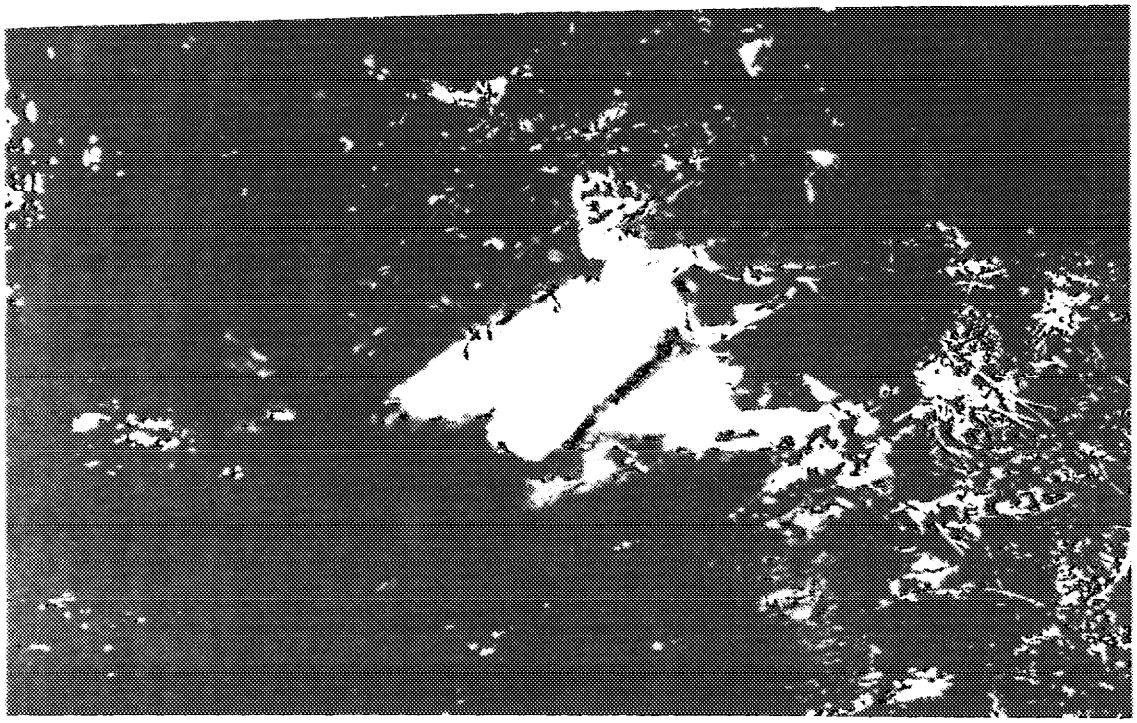
Ramsey Creek



Rock weir demonstrating the size and type of the aggregate.
Columnar basalt acquired within Oufur valley
was primary rock type.

Appendix D-7

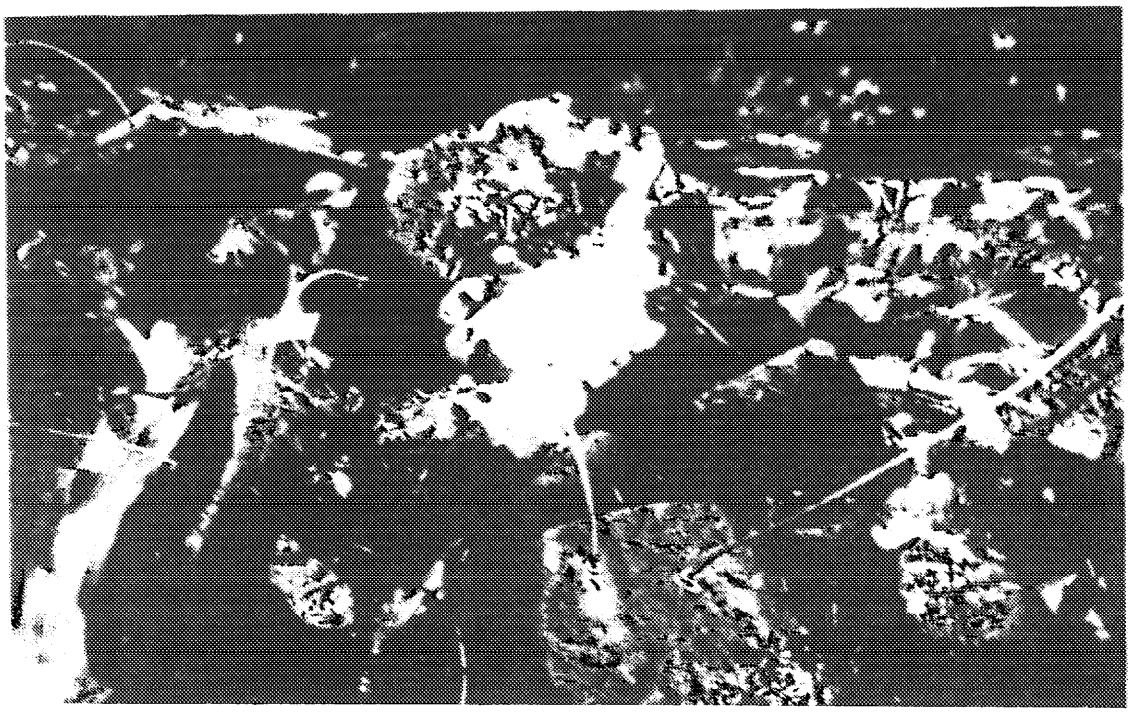
Fifteenmile Creek



Log deflector within boulder placements to provide scour pool for rearing juvenile steelhead and increased winter habitat type hiding cover.

Appendix D-8

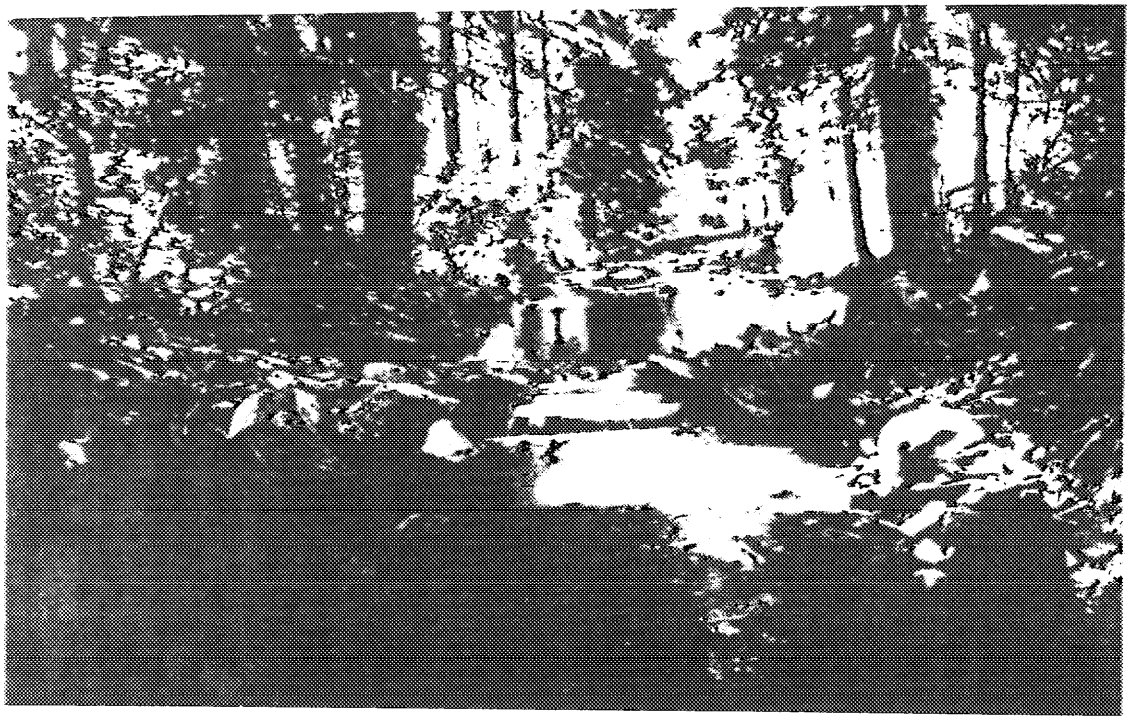
Fifteenmile Creek



Rock weir with boulders cabled together. Cables will recruit small woody debris and plant materials thereby providing diversity to the hiding cover as well as insect production in pool.

Appendix D-9

Fifteenmile Creek



Rock weir and fish rocks in foreground.
Log weir being constructed in background.

APPENDIX E

AQUATIC ECOSYSTEM INVENTORY
Macroinvertebrate Analysis

MT. HOOD NATIONAL FOREST
1987

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AQUATIC ECOSYSTEM ANALYSIS

FOR SELECTED STREAMS ON THE

MT. HOOD NATIONAL FOREST

1987

BACKGROUND AND METHODS

In recent years land managers on many of our forests and BLM districts in the west have improved the stability and reliability of land management plans and decisions by sampling aquatic organisms which act as natural monitors of management activities within the drainages on public lands.

During short-term exposure to water of poor quality or adverse changes in habitat, organisms that cannot tolerate the stress are destroyed and the aquatic macroinvertebrate community structure changes. Since aquatic organisms respond to their total environment, they can become an effective tool for detection of environmental changes.

Our analysis of aquatic ecosystems is based upon multiple factors including:

1. Various macroinvertebrate data - Community dry-weight biomass/sample expressed in gm/m2; number of individuals Per taxa (resident populations?); DAT Diversity Index, which combines a measure of dominance and number of taxa; habit, habitat and feeding preferences of individual taxa or species; specific tolerances of taxa; community composition; and BCI (Biotic Condition Index), which indicates as a percentage how close an aquatic ecosystem is to its own potential.

2. Physical parameter data and

3. Water chemistry data

Effective use of the Biotic Condition Index (BCI) depends upon the availability of data on stream gradient, natural capability of instream substrate (may not be the composition present if man-influenced sedimentation is found at the sample station), total alkalinity, and sulfate in mg/l.

Because of the way that macroinvertebrates occupy space within a stream, it generally takes at least three samples to represent the community accurately at a given station. One sample per station costs less but has little value for aquatic habitat assessment, one never knows if such single samples represent the best, the worst or an average of possible conditions at the sampling site. Also a6 a side benefit, three samples per station provides a basis for various statistical analyses, if random samples are all taken from a rubble substrate in as similar habitat as possible, taking into account mainly the velocity of flow and depth in the stream. Biologists have found that compared to other sampling devices, the Winget-modif ied surber net yields the highest coefficient of correlation (similarity of samples).

A stream's natural potential for productivity, habitat quality and water quality can be compared to the "actual" by taking quantitative samples of aquatic macroinvertebrates. Careful analysis of macroinvertebrate communities can reveal condition and trends in aquatic ecosystems. Sampling and analysis is conducted in accordance with procedures outlined in FSH R - 4 2609.23, March 1985, Fisheries Habitat Surveys Handbook.

This report is based upon 129 aquatic macroinvertebrate samles from 16 stations on 7 stream6 along with physical habitat and water chemistry data provided by your aquatic specialists. These streams were monitored as part of an action plan to improve aquatic ecosystems used as spawning and rearing areas by anadromous fisheries, particularly steelhead. Streams monitored include Dry Creek, Eight Mile Creek, Fifteen Mile Creek, Five Mile Creek, Hays Canyon Creek, Pine Creek and Ramsey Creek.

DRY CREEK

The station monitored was approximately 50 yards above its confluence with Fifteen Mile Creek. It was monitored in March and August 1987. When sampled in March the aquatic macroinvertebrate community was dominated by those taxa tolerant to sedimentation and organic enrichment. Clean water species were lacking and moderately tolerant taxa were found in less than resident population numbers, in fact were just barely hanging on.

When sampled in August the community diversity was half that found in March, just 12 taxa. The community was completely dominated by those taxa tolerant to organic enrichment and sedimentation. The observed community composition is often found where there has been severe overgrazing in an area. The organic enrichment and sediment tolerant Oligochaetes numbered almost 51,000/m*. The moderately tolerant mayfly Ameletus was found in less than resident population numbers at this station. The observed lack of shredders in the community generally indicates poor riparian habitat conditions or that instream habitat conditions are limiting to those species.

Compared to data from 1986, there appeared in 1987 to be a negative trend in this stream reach. Conditions that were bad in 1986 appeared to be even worse in 1987.

The potential for use by resident or anadromous fisheries was poor, particularly on the August sampling date. The macroinvertebrate biomass of 0.3 g/m^2 in March would be limiting to a fishery, but the benthic biomass in August could have provided nutrients for a fairly good fishery. A lack of clean water species in the reach sampled indicated there would be a lack of suitable spawning substrate. The BCI value of 62 in March and 52 in August indicated there were severe stress conditions in this stream, which was indicated by all the analysis elements, particularly on the August sample date.

It appeared there would be opportunities for management to improve the instreem habitat quality, water quality and riparian habitat quality in this aquatic ecosystem.

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream DRY CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

Station	Date(s)	Diversity Index DAT (mean)	Standing Crop g/m^2 (mean)	Biotic Condition Index BCI 50	# Taxa
1	3-25-87	6.8	0.3	62	24
1	8-05-87	1.1	2.2	52	12
1	11-18-86	13.0	9.9	60	29

Scale:	DAT	Standing crop	BCI
Excellent	18 - 26	4.0 - 12.0	above 90
Good	11 - 17	1.6 - 4.0	80 - 90
Fair	6 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	below 72

TOTAL SAMPLE STATISTICS

STATION: 1 DRY CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	24	3059.	2590.	3529.	431.25	8.14	14.10	1.5681	0.6625	81.	86.

SPECIES TOLERANCE CODES

—	=	Clean water species
—⊣	=	Moderately tolerant species
▭	=	Shredders - Depend upon deciduous vegetation from riparian areas)
S	=	Sediment tolerant
O	=	Organic enrichment tolerant
Ch	=	Resistant to adverse chemistry
—⊏	=	Large stonefly species

SPECIES ANALYSES

STATION: 1 DRY CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		3.59	0.555	30.	17.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	3.59	0.555	24.	13.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		3.59	0.555	100.	60.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		35.87	1.555	24.	37.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		358.67	2.555	72.	184.	
INSECTA	PLECOPTERA				3.59	0.555	48.	27.	
INSECTA	PLECOPTERA	PERLODIDAE			3.59	0.555	48.	27.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		14.35	1.157	100.	125.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	ALISOTRICHIA		3.59	0.555	100.	60.	
INSECTA	COLEOPTERA	ELMIDAE			14.35	1.157	104.	120.	
INSECTA	COLEOPTERA	DYTISCIDAE			3.59	0.555	72.	40.	
INSECTA	DIPTERA				7.17	0.856	100.	92.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		10.76	1.032	24.	25.	
INSECTA	DIPTERA	SIMULIIDAE			71.73	1.856	100.	200.	
INSECTA	DIPTERA	CHIRONOMIDAE			2263.19	3.355	100.	362.	
INSECTA	DIPTERA	EMPIDIDAE			3.59	0.555	95.	53.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		7.17	0.856	36.	31.	
INSECTA	LEPIDOPTERA				7.17	0.856	72.	62.	
CRUSTACEA	OSTRACODA				28.69	1.458	100.	157.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		3.59	0.555	100.	60.	
OLIGOCHAETA					132.71	2.123	100.	229.	
ARACHNIDA	HYDRACARINA				10.76	1.032	98.	101.	
NEMATODA					57.39	1.759	100.	190.	
CRUSTACEA	COPEPODA				7.17	0.856	100.	92.	
				TOTALS	3059.43	3.486			0.30

TOTAL SAMPLE STATISTICS

STATION: 1 DRY CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	12	55956.	4271.	107640.	47465.51	48.97	84.83	0.5942	0.8345	102.	103.

SPECIES ANALYSES

STATION: 1 DRY CREEK, MT HOOD NATIONAL FOREST DATE: 08 05 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	COLEOPTERA	ELMIDAE			7.17	0.856	104.	89.	
INSECTA	DIPTERA	CHIRONOMIDAE			60.97	1.785	108.	193.	
CRUSTACEA	COPEPODA				401.71	2.604	108.	281.	
CRUSTACEA	OSTRACODA				3748.07	3.574	108.	386.	
GASTROPODA		LYMNAEIDAE	LYMNAEA		290.52	2.463	108.	266.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		3.59	0.555	108.	60.	
OLIGOCHAETA					50751.33	4.705	108.	508.	
NEMATODA					3.59	0.555	108.	60.	
CRUSTACEA	CLADOCERA		DAPHNIA		172.16	2.236	108.	241.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	286.93	2.458	98.	241.	
GASTROPODA		PLANORBIDAE			172.16	2.236	108.	241.	
				TOTALS	55955.59	4.748			2.20

EIGHT MILE CREEK

Three stations were sampled on this stream in March, August and October. The Lower Station (1) was near the mouth, Station 2 was above highway 197 and Station 3 near Road 4440. When sampled in March the aquatic macroinvertebrate communities at Stations 1 and 2 were dominated by taxa tolerant to sedimentation and organic enrichment. There was only one clean water species present at Station 1 and it had less than resident population numbers. There were also few moderately tolerant taxa in the community and they had less than resident population numbers. The clean water mayfly present indicated fairly good water quality at Station 1. The three clean water species found at Station 2 were extremely limited in numbers indicating they were not able to live in this stream reach. Moderately tolerant taxa were extremely limited also.

Much better conditions were indicated at Station 3 where there was fairly good diversity among clean water species. The sensitive mayflies *Epeorus* and *Rhithrogena* had fairly good resident population numbers. Clean water stonef lies present included *Zapada* and *Leuctridae*. These clean water species indicated good water quality and fairly good instream substrate in the reach sampled at Station 3. Even at this station, however, there were some indications of sedimentation and an abundance of organic nutrients. Good diversity and resident population numbers for many of the specie9 indicated there was a good stability in this reach of stream. The observed number of shredders at Station 3 is generally indicated where riparian habitat is in good condition.

When sampled in August, the macroinvertebrate communities at Stations 1 and 2 were still dominated by those taxa tolerant to sedimentation and organic enrichment, particularly at Station 2. Clean water species and moderately tolerant taxa were extremely limited in these communities. At Station 3 the clean water taxa still indicated good water quality and good instream substrate in that reach of stream. The clean water sensitive species included mayf lie9 *Epeorus*J *Rhithrogena* and *Ephemerella doddsi*, stoneflies *Cultus*, *Zapada*, *Amphinemura* and Leuctridae. There were still some indications of sedimentation and organic enrichment at Station 3 on this stream.

When sampled in October the communities at Stations 1 and 2 still had extreme dominances among the sediment and organic enrichment tolerant taxa. Clean water and moderately tolerant

taxa were still scarce in the community with the exception of some of the moderately tolerant shredders stonef lies, which indicated good riparian habitat at Stations 1 and 2. Conditions seem to have improved somewhat at Station 2 where the clean water mayf ly **Rhithrogena** had a fairly good population. Conditions seem to have improved at Station 3 where there were just moderate amounts of sediment and organic enrichment indicated. Clean water species had even better diversity which indicated good water quality and some good instream substrate in this stream reach. The sensitive species in the community included mayf lies **Epeorus, Rhithrogena** and **Ephemerella doddsi,** stoneflies **Kogotus, Cultus** and **Zapada,** and a caddisf ly **Parapsyche.**

When compared with data from 1986 it appeared conditions were similar at Stations 1 and 2 with severe impacts particularly during the summer months and some recovery in the fall. Although there appeared to be even more impacts in 1987 than there were in 1986, the productivity at each of the stations was better than that found in 1986. Compared to prior years, conditions in October appeared to have improved at Station 3. The DAT Diversity Index Value showed there was less balance in diversity in the communities at Station 1 and 2 than was found in 1986.

The potential for resident and anadromous fisheries on this stream appeared to be poor at the lower two stations but good at the Upper Station. Scarcity of clean water species at the lower two stations indicated there would be very little if any suitable spawning substrate available, but the biomass at each of the stations would have been sufficient to provide nutrients for fisheries with the exception of Station 2 in October.

The BCI values of 65, 60 and 63 at Station 1 indicated severe stress conditions in that reach of stream on each of the sampling dates. The BCI of 68, 57 and 70 at Station 2 indicated in March and October conditions were near the fair range but there were extremely severe impacts in August in this stream reach. The community composition at the lower two stations is often found where there is extreme over grazing of an area. At the upper Station (3), the BCI value of 86 in t-larch and August, indicated this reach of stream was in good condition but could be better, and a BCI of 93 in Ocotober indicated that this ecosystem was closer to its potential.

It appeared there may be opportunities for management to improve the instream habitat quality and water quality,

particularly at Stations 1 and 2 in this aquatic ecosystem.

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream EIGHT - MILE CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

Station	Date(s)	Diversity Index DAI (mean)	Standing Crop g/m² (mean)	Biotic Condition Index BCI 50	# Ta
(mouth) 1	3-26-87	10.5	1.9	65	
(abv. HW 197) 2	3-26-87	15.0	3.1	68	
(rd. 4440) 3	3-20-87	23.9	2.0	86	
1	8-06-87	8.5	1.1	60	
2	8-06-87	6.8	w/Decapo 1.3	57	
3	7-20-87	22.2	1.8	86	
1	10-20-87	11.9	w/Decapo 1.6	63	
2	10-21-87	10.9	0.4	70	
3	10-06-87	22.3	1.3	93	
1	9-24-86	14.3	0.5	66	
2	9-24-86	7.5	0.3	59	
3	9-18-86	27.4	1.2	94	
1	11-13-86	12.0	0.5	64	
2	11-13-86	15.2	0.5	74	
3	11-04-86	25.6	0.7	82	

Scale:	DAI	Standing crop	BCI
Excellent	18 - 26	4.[illegible] - 12.0	above 90
Good	11 - 17	1.[illegible] - 4.0	80 - 90
Fair	6 - 10	0.[illegible] - 1.5	72 - 79
Poor	0 - 5	0.[illegible] - 0.5	below 72

TOTAL SAMPLE STATISTICS

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	25	5219.	1070.	9367.	3809.60	42.15	73.00	2.6996	0.4200	72.	77.

SPECIES ANALYSES

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		68.15	1.833	21.	39.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		10.76	1.032	54.	56.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	43.04	1.634	18.	29.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	14.35	1.157	48.	56.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		25.11	1.400	108.	151.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		756.79	2.879	72.	207.	
INSECTA	PLECOPTERA				10.76	1.032	48.	50.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		75.32	1.877	48.	90.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA		10.76	1.032	18.	19.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		132.71	2.123	108.	229.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		545.17	2.737	108.	296.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			3.59	0.555	108.	60.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		3.59	0.555	24.	13.	
INSECTA	COLEOPTERA	ELMIDAE			586.89	2.753	104.	286.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		68.15	1.833	24.	44.	
INSECTA	DIPTERA	SIMULIIDAE			10.76	1.032	108.	111.	
INSECTA	DIPTERA	CHIRONOMIDAE			2435.35	3.387	108.	366.	
INSECTA	DIPTERA	EMPIDIDAE			14.35	1.157	95.	110.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		25.11	1.400	36.	50.	
CRUSTACEA	OSTRACODA				75.32	1.877	108.	203.	
PELECYPODA					14.35	1.157	108.	125.	
OLIGOCHAETA					161.40	2.208	108.	238.	
ARACHNIDA	HYDRACARINA				107.60	2.032	98.	199.	
NEMATODA					10.76	1.032	108.	111.	
				TOTALS	5218.80	3.718			1.90

TOTAL SAMPLE STATISTICS

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	29	4476	985.	7967.	3205.99	41 35	71.62	3 2943	0.3224	69.	74.

SPECIES ANALYSES

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		3.59	0.555	21.	12.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		28.69	1.458	30.	44.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		39.45	1.596	21.	34.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	161.40	2.208	18.	40.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	369.43	2.568	48.	123.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		125.53	2.099	108.	227.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		3.59	0.555	24.	13.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		975.57	2.989	72.	215.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		172.16	2.236	48.	107.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		3.59	0.555	12.	7.	
INSECTA	PLECOPTERA	CAPNIIDAE			3.59	0.555	32.	18.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		150.64	2.178	108.	235.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		143.47	2.157	108.	233.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			3.59	0.555	108.	60.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE	NEOTHREMMA		14.35	1.157	8.	9.	
INSECTA	COLEOPTERA	ELMIDAE			667.12	2.824	104.	294.	
INSECTA	LEPIDOPTERA				3.59	0.555	72.	40.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		17.93	1.254	24.	30.	
INSECTA	DIPTERA	SIMULIIDAE			546.17	2.737	108.	296.	
INSECTA	DIPTERA	CHIRONOMIDAE			907.43	2.958	108.	319.	
INSECTA	DIPTERA	EMPIDIDAE			25.11	1.400	95.	133.	
INSECTA	DIPTERA	CERATOPOGONIDAE			17.93	1.254	108.	135.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		3.59	0.555	36.	20.	
INSECTA	DIPTERA	TIPULIDAE	TIPULA		14.36	1.157	36.	42.	
CRUSTACEA	OSTRACODA				3.59	0.555	108.	60.	
OLIGOCHAETA					25.11	1.400	108.	151.	
ARACHNIDA	HYDRACARINA				39.45	1.596	98.	156.	
NEMATODA					3.59	0.555	108.	60.	
CRUSTACEA	COPEPODA				3.59	0.555	108.	60.	
				TOTALS	4476.16	3.651			3.10

TOTAL SAMPLE STATISTICS

STATION: 3 EIGHT MILE CREEK MT HOOD NATIONAL FOREST DATE: 03 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	40	10495.	5191	15798	4870.39	26 79	46 41	4.1130	0.2271	58.	58.

SPECIES ANALYSES

STATION: 3 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				100.43	2.002	64.	128.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		157.81	2.198	21.	46.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		430.40	2.634	30.	79.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		57.39	1.759	21.	37.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	258.24	2.412	18.	43.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	57.39	1.759	24.	42.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		229.55	2.361	24.	57.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		860.80	2.935	72.	211.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	CASCADIA	14.35	1.157	24.	28.	
INSECTA	PLECOPTERA				286.93	2.458	48.	118.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			243.89	2.387	24.	57.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		71.73	1.856	48.	89.	
INSECTA	PLECOPTERA	CAPNIIDAE			28.69	1.458	32.	47.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		215.20	2.333	16.	37.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		1470.53	3.167	24.	76.	
INSECTA	PLECOPTERA	LEUCTRIDAE			157.81	2.198	18.	40.	
INSECTA	PLECOPTERA	NEMOURIDAE			71.73	1.856	36.	67.	
INSECTA	PLECOPTERA	PERLODIDAE			71.73	1.856	48.	89.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		43.04	1.634	108.	176.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		14.35	1.157	6.	7.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		416.05	2.619	24.	63.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		358.67	2.555	18.	46.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		14.35	1.157	24.	28.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		28.69	1.458	18.	26.	
INSECTA	COLEOPTERA	ELMIDAE			229.55	2.361	104.	246.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		14.35	1.157	24.	28.	
INSECTA	DIPTERA	TIPULIDAE	HOLORUSIA		28.69	1.458	72.	105.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		57.39	1.759	36.	63.	
INSECTA	DIPTERA	SIMULIIDAE			57.39	1.759	108.	190.	
INSECTA	DIPTERA	CHIRONOMIDAE			2065.92	3.315	108.	358.	
INSECTA	DIPTERA	CERATOPOGONIDAE			129.12	2.111	108.	228.	
CRUSTACEA	COPEPODA				143.47	2.157	108.	233.	
CRUSTACEA	OSTRACODA				86.08	1.935	108.	209.	
GASTROPODA		LYMNAEIDAE	LYMNAEA		28.69	1.458	108.	157.	
PELECYPODA					43.04	1.634	108.	176.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		186.51	2.271	108.	245.	
OLIGOCHAETA					1463.36	3.165	108.	342.	
ARACHNIDA	HYDRACARINA				229.55	2.361	98.	231.	
NEMATODA					57.39	1.759	108.	190.	
				TOTALS	10494.59	4.021			2.00

TOTAL SAMPLE STATISTICS

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	24	2209.	1590.	2829.	568.99	14.87	25.75	2.4712	0.4641	78.	84.

SPECIES ANALYSES

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		139.88	2.146	54.	116.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		186.51	2.271	24.	54.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		39.46	1.596	72.	115.	
INSECTA	PLECOPTERA	CAPNIIDAE			3.59	0.555	32.	18.	
INSECTA	PLECOPTERA	NEMOURIDAE	AMPHINEMURA		3.59	0.555	6.	3.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		10.76	1.032	108.	111.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		10.76	1.032	108.	111.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		3.59	0.555	18.	10.	
INSECTA	COLEOPTERA	ELMIDAE			505.72	2.704	104.	281.	
INSECTA	ODONATA				3.59	0.555	90.	50.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		3.59	0.555	24.	13.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		7.17	0.856	36.	31.	
INSECTA	DIPTERA	CHIRONOMIDAE			1043.72	3.019	108.	326.	
INSECTA	DIPTERA	EMPIDIDAE			3.59	0.555	96.	53.	
INSECTA	DIPTERA	PSYCHODIDAE	MARUINA		3.59	0.555	36.	20.	
CRUSTACEA	COPEPODA				107.60	2.032	108.	219.	
CRUSTACEA	OSTRACODA				7.17	0.856	108.	92.	
GASTROPODA		PHYSIDAE	PHYSA		3.59	0.555	108.	60.	
PELECYPODA					39.46	1.596	108.	172.	
OLIGOCHAETA					21.52	1.333	108.	144.	
ARACHNIDA	HYDRACARINA				35.87	1.555	98.	152.	
NEMATODA					10.76	1.032	108.	111.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	3.59	0.555	98.	54.	
CRUSTACEA	DECAPODA	(Crayfish)			10.76	1.032	108.	111.	
				TOTALS	2209.39	3.344			2.20

TOTAL SAMPLE STATISTICS

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	20	2636.	-200.	5473.	2804.79	57.05	98.81	2.2916	0.4728	84.	88.

SPECIES ANALYSES

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 08 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT TQ	LOG10 X MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				3.69	0.666	84.	38.
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		7.17	0.868	64.	48.
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	21.62	1.333	2.	3.
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	200.86	2.303	108.	249.
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		39.46	1.698	24.	38.
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		17.93	1.264	72.	90.
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		3.69	0.666	108.	80.
INSECTA	COLEOPTERA	ELMIDAE			708.67	2.849	104.	298.
INSECTA	HEMIPTERA				7.17	0.868	90.	77.
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		14.36	1.167	38.	42.
INSECTA	DIPTERA	CHIRONOMIDAE			1278.86	3.108	108.	335.
INSECTA	DIPTERA	EMPIDIDAE			10.78	1.032	96.	98.
CRUSTACEA	COPEPODA				21.62	1.333	108.	144.
CRUSTACEA	OSTRACODA				88.16	1.833	108.	198.
PELECYPODA					3.69	0.666	108.	80.
OLIGOCHAETA					104.01	2.017	108.	218.
ARACHNIDA	HYDRACARINA				104.01	2.017	98.	198.
NEMATODA					14.36	1.167	108.	126.
CRUSTACEA	CLADOCERA		DAPHNIA		7.17	0.868	108.	92.
INSECTA	MEGALOPTERA	SIALIDAE	SIALIS		3.69	0.666	72.	40.
				TOTALS	2836.20	3.421		0.20

TOTAL SAMPLE STATISTICS

STATION: 3 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	41	20028	13169.	26887.	6298 76	18 16	31.45	3.9839	0.2568	58	58.

SPECIES ANALYSES

STATION: 3 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		401.71	2.604	21.	55.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		57.39	1.759	30.	53.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		143.47	2.157	54.	116.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	28.69	1.458	18.	26.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	946.88	2.976	48.	143.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	200.85	2.303	2.	5.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	229.55	2.361	24.	57.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	860.80	2.935	24.	70.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		659.95	2.820	24.	68.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1119.04	3.049	72.	220.	
INSECTA	PLECOPTERA				258.24	2.412	48.	116.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			344.32	2.537	24.	61.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		28.69	1.458	24.	35.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		200.85	2.303	12.	28.	
INSECTA	PLECOPTERA	PTERONARCYIDAE	PTERONARCYS	CALIFORNICA	28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		200.85	2.303	16.	37.	
INSECTA	PLECOPTERA	NEMOURIDAE	AMPHINEMURA		57.39	1.759	6.	11.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		2152.00	3.333	24.	80.	
INSECTA	PLECOPTERA	LEUCTRIDAE			86.08	1.935	18.	35.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		28.69	1.458	108.	157.	
INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	CHIMARRA		86.08	1.935	24.	46.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		545.17	2.737	24.	66.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		57.39	1.759	18.	32.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		28.69	1.458	18.	26.	
INSECTA	TRICHOPTERA	POLYCENTROPODIDAE			28.69	1.458	72.	105.	
INSECTA	COLEOPTERA	ELMIDAE			86.08	1.935	104.	201.	
INSECTA	DIPTERA	SIMULIIDAE			229.55	2.361	108.	255.	
INSECTA	DIPTERA	CHIRONOMIDAE			5222.19	3.718	108.	402.	
INSECTA	DIPTERA	EMPIDIDAE			28.69	1.458	96.	138.	
INSECTA	DIPTERA	CERATOPOGONIDAE			86.08	1.935	108.	209.	
INSECTA	DIPTERA	PELECORHYNCHIDAE	GLUTOPS	ROSSI	57.39	1.759	30.	53.	
CRUSTACEA	COPEPODA				459.09	2.662	108.	287.	
CRUSTACEA	OSTRACODA				2180.69	3.339	108.	361.	
PELECYPODA					28.69	1.458	108.	157.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		229.55	2.361	108.	255.	
OLIGOCHAETA					631.25	2.800	108.	302.	
ARACHNIDA	HYDRACARINA				1348.59	3.130	98.	307.	
NEMATODA					57.39	1.759	108.	190.	
CRUSTACEA	CLADOCERA		DAPHNIA		545.17	2.737	108.	296.	
GASTROPODA		PLANORBIDAE			28.69	1.458	108.	157.	
				TOTALS	20027.96	4.302			1.80

TOTAL SAMPLE STATISTICS

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	23	4028.	1561.	6495.	2265.90	32.48	56.26	2.9126	0.3578	81.	79.

SPECIES ANALYSES

STATION: 1 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		25.11	1.400	21.	29.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		25.11	1.400	54.	76.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	21.52	1.333	48.	64.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	7.17	0.856	108.	92.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		64.56	1.810	24.	43.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		75.32	1.877	72.	135.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		114.77	2.060	48.	99.	
INSECTA	PLECOPTERA	CAPNIIDAE			1560.20	3.193	32.	102.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	NIVALIS		21.52	1.333	48.	64.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		10.76	1.032	108.	111.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		157.81	2.198	108.	237.	
INSECTA	COLEOPTERA	ELMIDAE			645.60	2.810	104.	292.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		17.93	1.254	36.	45.	
INSECTA	DIPTERA	SIMULIIDAE			17.93	1.254	108.	135.	
INSECTA	DIPTERA	CHIRONOMIDAE			520.07	2.716	108.	293.	
INSECTA	DIPTERA	EMPIDIDAE			3.59	0.555	95.	53.	
CRUSTACEA	COPEPODA				3.59	0.555	108.	60.	
CRUSTACEA	OSTRACODA				46.63	1.669	108.	180.	
PELECYPODA	LIMPITS				35.87	1.555	108.	168.	
OLIGOCHAETA					251.07	2.400	108.	259.	
ARACHNIDA	HYDRACARINA				383.77	2.584	98.	253.	
NEMATODA					10.76	1.032	108.	111.	
CRUSTACEA	DECAPODA		(Crayfish)		7.17	0.856	108.	92.	
				TOTALS	4027.83	3.605			1.60

TOTAL SAMPLE STATISTICS

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 21 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	24	5735.	534.	10936.	4776.60	48.09	83.29	2.8994	0.3698	67.	71.

SPECIES ANALYSES

STATION: 2 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 21 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		7.17	0.856	30.	26.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		107.60	2.032	21.	43.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		14.35	1.157	54.	62.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	82.49	1.916	48.	92.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		46.63	1.669	24.	40.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		114.77	2.060	72.	148.	
INSECTA	PLECOPTERA				21.52	1.333	48.	64.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		7.17	0.856	12.	10.	
INSECTA	PLECOPTERA	CAPNIIDAE			749.61	2.875	32.	92.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		71.73	1.856	16.	30.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	NIVALIS		43.04	1.634	48.	78.	
INSECTA	PLECOPTERA	NEMOURIDAE	PODMOSTA		14.35	1.157	12.	14.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		53.80	1.731	108.	187.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		118.36	2.073	108.	224.	
INSECTA	COLEOPTERA	ELMIDAE			2137.65	3.330	104.	346.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	3.59	0.555	24.	13.	
INSECTA	DIPTERA	SIMULIIDAE			64.56	1.810	108.	195.	
INSECTA	DIPTERA	CHIRONOMIDAE			814.17	2.911	108.	314.	
CRUSTACEA	COPEPODA				3.59	0.555	108.	60.	
PELECYPODA	[illegible]				17.93	1.254	108.	135.	
OLIGOCHAETA					459.09	2.662	108.	287.	
ARACHNIDA	HYDRACARINA				771.13	2.887	98.	283.	
NEMATODA					7.17	0.856	108.	92.	
CRUSTACEA	CLADOCERA		DAPHNIA		3.59	0.555	108.	60.	
				TOTALS	5735.08	3.759			0.40

TOTAL SAMPLE STATISTICS

STATION: 3 EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 06 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	36	12231.	8383.	18078.	5370.27	25.35	43.91	4.1498	0.1973	54.	54

SPECIES ANALYSES

STATION: 3 . EIGHT MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 06 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		57.39	1.759	21.	37.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		982.75	2.992	30.	90.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		240.31	2.381	21.	50.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		143.47	2.157	54.	116.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	412.47	2.615	48.	126.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	355.08	2.550	2.	5.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		487.79	2.688	24.	65.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1431.08	3.156	72.	227.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	HYSTRIX	28.69	1.458	24.	35.	
INSECTA	PLECOPTERA				86.08	1.935	48.	93.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			161.40	2.208	24.	53.	
INSECTA	PLECOPTERA	PERLODIDAE	KOGOTUS		86.08	1.935	18.	35.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		39.45	1.596	12.	19.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		39.45	1.596	48.	77.	
INSECTA	PLECOPTERA	CAPNIIDAE			319.21	2.504	32.	80.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		401.71	2.604	16.	42.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		1739.53	3.240	24.	78.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		96.84	1.986	108.	214.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		17.93	1.254	108.	136.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		86.08	1.935	6.	12.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		462.68	2.665	24.	64.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		240.31	2.381	18.	43.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		10.76	1.032	24.	25.	
INSECTA	TRICHOPTERA	PHILOPOTAMIDAE			172.16	2.236	24.	54.	
INSECTA	COLEOPTERA	ELMIDAE			172.16	2.236	104.	233.	
INSECTA	DIPTERA	CHIRONOMIDAE			2055.16	3.313	108.	358.	
INSECTA	DIPTERA	EMPIDIDAE			68.15	1.833	95.	174.	
INSECTA	DIPTERA	CERATOPOGONIDAE			86.08	1.935	108.	209.	
CRUSTACEA	COPEPODA				28.69	1.458	108.	157.	
CRUSTACEA	OSTRACODA				459.09	2.662	108.	287.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		591.80	2.772	108.	299.	
OLIGOCHAETA					46.63	1.669	108.	180.	
ARACHNIDA	HYDRACARINA				527.24	2.722	98.	267.	
NEMATODA					10.76	1.032	108.	111.	
				TOTALS	12230.63	4.087			1.30

FIFTEEN MILE CREEK

Five stations were sampled on this stream, the Lower Station (1) approximately 100 yards below Seuferd Fall,-; Station 2 approximately 20 yards upstream from Wrenthum Bridge; Station 3 near Ashbrook's Pumping Station; Station 4 about 400 yards above Dufur Intake; and Station 5 just below the 4421 Bridge. When sampled in March the macroinvertebrate community at Station 1 was dominated by those taxa tolerant to sedimentation and organic enrichment. The one clean water species and three moderately tolerant taxa present in the community were present in far less than resident population numbers. The macroinvertebrate community at Station 2 had an extreme dominance among sediment and enrichment tolerant taxa. The sediment and organic enrichment tolerant Oligochaetes numbered over 10,000/m^2. There were two clean water species present and one moderately tolerant taxon which indicated water quality was a little better than found at Station 1. The community composition at each of these stations is generally found where there has been severe overgrazing in the area.

At Station 3 the clean water mayflies Ephemerella and Rhithrogena were present in good population numbers indicating there was good water quality at this station and some good instream substrate. There were still high numbers of those taxa tolerant to sedimentation and organic enrichment at this station.

At Station 4 there was even better diversity among the clean water taxa and the community even included a fair population of the most sensitive of the mayflies, Ephemerella doddsi. There were still indications, however, of sedimentation and organic enrichment even at this station where the Oligochaetes numbered over 2,000/m^2.

At Station 5 the clean water taxa indicated good water quality and good instream substrate and there was much less indication of sedimentation and organic enrichment at this station. There did not appear to be a problem in this stream reach.

When sampled in August conditions at the lowest Station (1) appeared to have improve slightly. The three clean water species present had less than resident population numbers but included a mayfly, a stonefly and a caddisfly, which indicated fairly good water quality and at least some suitable instream

substrate. The community was dominated by those taxa tolerant to sedimentation and organic enrichment, however.

The aquatic macroinvertebrate community at Station 2 showed severe *stress* conditions where the community was completely dominated by those taxa tolerant to sedimentation and organic enrichment and even they appeared to be somewhat limited on the August sampling date. Clean water and moderately tolerant taxa were spar e at this station.

Fairly good conditions seemed to persist at Station 3 where clean water species present continued to indicate good water quality and some good instream substrate. There were also indications of sedimentation and organic enrichment at this station.

At Station 4 clean water taxa were limited, in spite of better diversity among the sensitive species than found at the lower stations. There continued to be indications of sedimentation and organic enrichment at this station. However, compared to lower stations it was in fairly good condition.

Indicating this stream has an exceptionally good potential, was the community at Station 5 where there was good diversity and resident population numbers among clean water taxa, which included mayflies Ephemerella and Ephemerella doddsi, stoneflies Cultus, Zapada, Amphinemura and Leuctridae, and caddisflies Arctopsyche and Parapsyche. There were also good resident population numbers among moderately tolerant taxa with minimal amounts of organic enrichment or sedimentation indicated at this station.

In October samples at Station 1 there were two clean water and two moderately tolerant taxa which had less than resident population numbers. The community was still dominated by those taxa tolerant to sedimentation and organic enrichment. The organic enrichment and sediment tolerant Oligochaetes numbered over 5,000/m^2.

Although there was still a dominance among the sediment and organic enrichment tolerant taxa at Station 2, there was some improvement at this station compared with conditions earlier in the year. Two of the clean water mayflies Ephemerella Rhithrogena had fairly good population numbers in the community on this October sampling date.

There appeared to be fairly good conditions also at Station 3 where clean water mayflies Ephemerella Rhithrogena

had good resident population numbers indicating good water quality and some good instream substrate at that station. Also present was the clean water stonef lies Cultus with good population numbers, and Zapada which had less than resident population numbers. There were indications of sedimentation and organic enrichment at this station also.

At Station 4 there was good diversity among the clean water taxa however, they were somewhat limited and did not have good resident population numbers. Sediment and organic enrichment impacts did not appear to be severe in October.

At Station 5 the community had excellent diversity. There were warning numbers of those taxa tolerant to sedimentation but clean water species present indicated there was good water quality and some good instream substrate. Some of the species did not have resident population numbers which indicated some stress conditions at the upper Station. The observed number of shredders in the community indicated fair to good

(5).

Compared to data from 1986, almost all analysis elements indicated conditions were similar at each of the stations sampled. The high biomass readings at Station 1 of 10.9 g/m^2 in March and 13.5 g/m^2 in August were due mainly to the presence of Crayfish in the samples on those dates. In general the productivity appeared to be about the sane, if not better, at Station 1 in 1987 The lowest biomass 0.29 g/m^2 recorded at any of the stations was at Station 2 in August. Similar low values were observed at this station for each of the analysis elements in September 1986.

The potential for supporting resident or anadromous fisheries on this stream appeared to improve in an upstream direction and appeared to be better in the fall sample than on other dates sampled. The dominance among sediment tolerant taxa and scarcity among clean water species at the lower two stations indicated very little suitable spawning substrate in those lower reaches.

Clean water taxa present, particular:: at Station 3, 4 and 5 indicated there should be suitable spawning substrate available in those stream reaches. The macroinvertebrate biomass availabe at these stations would be sufficient to provide nutrients for resident and anadromous fisheries.

The BCI values of 58, 59 and 57 on the March, August and October sampling dates respectively at Station 1 indicated severe stress conditions at that station on each of the sampling dates. The BCI values at Station 2 of 58, 57 and 68 on the March, August and October sampling date9 respectively indicated severe stress conditions on the first two sampling dates, but condition9 were approaching fair by October at this station, an improvement that was not observed in 1986 in the fall samples. The BCI value9 at Station 3 of 75, 76 and 77 on the three sampling dates indicate conditions remain fairly stable or close to the same on each of the sampling dates. The BCI values at Station 4 of 83, 86 and 91 indicated relatively good conditions at this station and they improved somewhat in the fall. However, some clean water specie9 present in the fall sample did not have resident population numbers. Therefore in spite of the higher BCI value conditions were probably about the same on each of the sampling dates on this station, which indicated good conditions, but they could be better. The BCI values at Station 5 of 96, 98 and 94 for the March August and October sampling dates respectively, indicated this ecosystem was fairly close to it9 potential on the dates sampled. There appeared to be more stress conditions in the fall at this station than were observed on the other sampling dates.

It appeared there were still opportunities for management to improve instream habitat quality and water quality, particularly at the lower two stations, and possibly at Stations 3 and 4, and riparian habitat quality particularly at Stations 1, 3 and 4 in this aquatic ecosystem.

TOTAL SAMPLE STATISTICS

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

REPL	TOTAL NO. SPECIES	MEAN / S W	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. O F VARIATION	DBAR	R	CTQA	CTQD
NUMBERS DATA											
3	23	11106.	5331.	16885.	5305.63	27.58	47.76	2.7959	0.3831	81.	86.

SPECIES ANALYSES

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	7.17	0.856	48.	41.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		258.24	2.412	108.	260.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1599.65	3.204	72.	231.	
INSECTA	PLECOPTERA				14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		71.73	1.856	48.	89.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		150.64	2.178	108.	235.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		143.47	2.157	108.	233.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		43.04	1.634	24.	39.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		14.35	1.157	24.	28.	
INSECTA	COLEOPTERA	ELMIDAE			867.97	2.939	104.	306.	
INSECTA	LEPIDOPTERA	PYRALIDAE	PARAGYRACTIS		28.69	1.458	72.	105.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		43.04	1.634	24.	39.	
INSECTA	DIPTERA	SIMULIIDAE			129.12	2.111	108.	228.	
INSECTA	DIPTERA	CHIRONOMIDAE			3593.84	3.556	108.	384.	
INSECTA	DIPTERA	EMPIDIDAE			57.39	1.759	95.	167.	
INSECTA	DIPTERA	CERATOPOGONIDAE			28.69	1.458	108.	157.	
GASTROPODA		PHYSIDAE	PHYSA		28.69	1.458	108.	157.	
OLIGOCHAETA					2166.35	3.336	108.	360.	
ARACHNIDA	HYDRACARINA				57.39	1.759	98.	172.	
NEMATODA					1743.12	3.241	108.	360.	
CRUSTACEA	AMPHIPODA				28.69	1.458	98.	143.	
CRUSTACEA	DECAPODA		(crayfish)		3.59	0.556	108.	60.	
				TOTALS	11107.91	4.046			10.90

TOTAL SAMPLE STATISTICS

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	21	16875.	12606.	21145.	3920.78	13.41	23.23	2.0413	0.5361	82.	86.

SPECIES ANALYSES

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		71.73	1.856	21.	39.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		43.04	1.634	21.	34.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	315.63	2.499	48.	120.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		186.51	2.271	108.	245.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1965.49	3.293	72.	237.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		200.85	2.303	48.	111.	
INSECTA	PLECOPTERA	CAPNIIDAE			14.35	1.157	32.	37.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		86.08	1.935	108.	209.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		416.05	2.619	108.	283.	
INSECTA	COLEOPTERA	ELMIDAE			473.44	2.675	104.	278.	
INSECTA	DIPTERA	SIMULIIDAE			114.77	2.060	108.	222.	
INSECTA	DIPTERA	CHIRONOMIDAE			2481.97	3.395	108.	367.	
INSECTA	DIPTERA	EMPIDIDAE			28.69	1.458	95.	138.	
INSECTA	DIPTERA	CERATOPOGONIDAE			114.77	2.060	108.	222.	
INSECTA	DIPTERA	TIPULIDAE	TIPULA		3.59	0.555	36.	20.	
INSECTA	LEPIDOPTERA	PYRALIDAE	PARAGYRACTIS		28.69	1.458	72.	105.	
CRUSTACEA	OSTRACODA				14.35	1.157	108.	125.	
OLIGOCHAETA					10200.48	4.009	108.	433.	
ARACHNIDA	HYDRACARINA				57.39	1.759	98.	172.	
NEMATODA					28.69	1.458	108.	157.	
CRUSTACEA	AMPHIPODA				28.69	1.458	98.	143.	
				TOTALS	16875.27	4.227			1.80

TOTAL SAMPLE STATISTICS

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	32	15136	2167.	28104	11909.90	45 43	78.69	3.0110	0.3990	66.	67.

SPECIES ANALYSES

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		1154.91	3.063	21.	64.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		925.36	2.966	30.	89.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		588.21	2.770	21.	58.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	GRANDIS	57.39	1.759	24.	42.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	71.73	1.856	18.	33.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	552.35	2.742	48.	132.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES		394.53	2.596	108.	280.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		416.05	2.619	24.	63.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1240.99	3.094	72.	223.	
INSECTA	PLECOPTERA				7.17	0.856	48.	41.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			93.25	1.970	24.	47.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA		28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		86.08	1.935	48.	93.	
INSECTA	PLECOPTERA	PERLODIDAE			143.47	2.157	48.	104.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		272.59	2.436	108.	263.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		57.39	1.759	108.	190.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE	ALLOCOSMOECUS		14.35	1.157	18.	21.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		14.35	1.157	24.	28.	
INSECTA	COLEOPTERA	ELMIDAE			918.19	2.963	104.	308.	
INSECTA	LEPIDOPTERA				7.17	0.856	72.	62.	
INSECTA	LEPIDOPTERA	PYRALIDAE	PARAGYRACTIS		7.17	0.856	72.	62.	
INSECTA	DIPTERA	TIPULIDAE	HOLORUSIA		28.69	1.458	72.	105.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		50.21	1.701	36.	61.	
INSECTA	DIPTERA	SIMULIIDAE			57.39	1.759	108.	190.	
INSECTA	DIPTERA	CHIRONOMIDAE			7173.33	3.856	108.	416.	
INSECTA	DIPTERA	EMPIDIDAE			14.35	1.157	95.	110.	
INSECTA	DIPTERA	CERATOPOGONIDAE			14.35	1.157	108.	125.	
CRUSTACEA	OSTRACODA				28.69	1.458	108.	157.	
GASTROPODA		PHYSIDAE	PHYSA		28.69	1.458	108.	157.	
OLIGOCHAETA					272.59	2.436	108.	263.	
ARACHNIDA	HYDRACARINA				373.01	2.572	98.	252.	
NEMATODA					43.04	1.634	108.	176.	
				TOTALS	15135.74	4.180			8.70

TOTAL SAMPLE STATISTICS

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	38	8873.	965.	16781.	7262.56	47.25	81.85	3.2539	0.3718	56.	60.

SPECIES ANALYSES

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				28.69	1.458	84.	93.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		294.11	2.469	21.	52.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		509.31	2.707	30.	81.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		21.52	1.333	21.	28.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	GRANDIS	28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	68.15	1.833	18.	33.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	96.84	1.986	2.	4.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		7.17	0.856	24.	21.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		710.16	2.851	72.	205.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	143.47	2.157	24.	52.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	CASCADIA	28.69	1.458	24.	35.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			71.73	1.856	24.	45.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		14.35	1.157	12.	14.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		57.39	1.759	16.	28.	
INSECTA	PLECOPTERA	LEUCTRIDAE			86.08	1.935	18.	35.	
INSECTA	PLECOPTERA	NEMOURIDAE	NEMOURA		7.17	0.856	24.	21.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		114.77	2.060	108.	222.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		93.25	1.970	24.	47.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		86.08	1.935	18.	35.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		7.17	0.856	24.	21.	
INSECTA	TRICHOPTERA	LEPIDOSTOMATIDAE			14.35	1.157	18.	21.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA		157.81	2.198	108.	237.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		28.69	1.458	18.	26.	
INSECTA	COLEOPTERA	ELMIDAE			301.28	2.479	104.	258.	
INSECTA	DIPTERA				28.69	1.458	108.	157.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	35.87	1.555	24.	37.	
INSECTA	DIPTERA	SIMULIIDAE			136.29	2.134	108.	231.	
INSECTA	DIPTERA	CHIRONOMIDAE			3127.57	3.495	108.	377.	
INSECTA	DIPTERA	EMPIDIDAE			50.21	1.701	95.	162.	
INSECTA	DIPTERA	CERATOPOGONIDAE			35.87	1.555	108.	168.	
CRUSTACEA	OSTRACODA				7.17	0.856	108.	92.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		14.35	1.157	108.	125.	
OLIGOCHAETA					2065.92	3.315	108.	358.	
ARACHNIDA	HYDRACARINA				78.91	1.897	98.	186.	
NEMATODA					308.45	2.489	108.	269.	
CRUSTACEA	COPEPODA				7.17	0.856	108.	92.	
				TOTALS	8873.41	3.948			0.80

TOTAL SAMPLE STATISTICS

STATION 5 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	32	10703	5010.	16396	5228.31	28 20	48.85	3 6818	0.2641	51.	52.

SPECIES ANALYSES

STATION: 5 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		344.32	2.537	21.	53.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		473.44	2.675	30.	80.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	100.43	2.002	18.	36.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	215.20	2.333	48.	112.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	143.47	2.157	24.	52.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		760.37	2.881	24.	69.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		71.73	1.856	48.	89.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1133.39	3.054	72.	220.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	301.28	2.479	24.	59.	
INSECTA	PLECOPTERA	PERLODIDAE	KOGOTUS		14.35	1.157	18.	21.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		43.04	1.634	12.	20.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		215.20	2.333	16.	37.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		1190.77	3.076	24.	74.	
INSECTA	PLECOPTERA	LEUCTRIDAE			28.69	1.458	18.	26.	
INSECTA	TRICHOPTERA				14.35	1.157	72.	83.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		1119.04	3.049	24.	73.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		86.08	1.935	18.	35.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	LEPIDOSTOMATIDAE			14.35	1.157	18.	21.	
INSECTA	COLEOPTERA	ELMIDAE			243.89	2.387	104.	248.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		28.69	1.458	24.	35.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		28.69	1.458	36.	52.	
INSECTA	DIPTERA	SIMULIIDAE			143.47	2.157	108.	233.	
INSECTA	DIPTERA	CHIRONOMIDAE			3012.80	3.479	108.	376.	
INSECTA	DIPTERA	EMPIDIDAE			14.35	1.157	95.	110.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		143.47	2.157	36.	78.	
CRUSTACEA	COPEPODA				57.39	1.759	108.	190.	
CRUSTACEA	OSTRACODA				14.35	1.157	108.	125.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		71.73	1.856	108.	200.	
OLIGOCHAETA					258.24	2.412	108.	260.	
ARACHNIDA	HYDRACARINA				373.01	2.572	98.	252.	
				TOTALS	10702.62	4.029			1.80

TOTAL SAMPLE STATISTICS

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	25	12274	8775.	15772.	3212.64	15.11	26.18	3.3585	0.2781	81.	85.

SPECIES ANALYSES

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		401.71	2.604	54.	141.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	57.39	1.759	108.	190.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		272.59	2.436	24.	58.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		272.59	2.436	72.	175.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	THRAULODES	BICORNUTA	28.69	1.458	36.	52.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		28.69	1.458	18.	23.	
INSECTA	TRICHOPTERA				846.45	2.928	72.	211.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		760.37	2.881	108.	311.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		459.09	2.662	108.	287.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		129.12	2.111	18.	38.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		14.35	1.157	24.	28.	
INSECTA	COLEOPTERA	ELMIDAE			2682.83	3.429	104.	357.	
INSECTA	DIPTERA	SIMULIIDAE			43.04	1.634	108.	176.	
INSECTA	DIPTERA	CHIRONOMIDAE			2496.32	3.397	108.	367.	
CRUSTACEA	COPEPODA				1549.44	3.190	108.	345.	
CRUSTACEA	OSTRACODA				14.35	1.157	108.	125.	
GASTROPODA					86.08	1.935	96.	186.	
PELECYPODA					71.73	1.856	108.	200.	
OLIGOCHAETA					1535.09	3.186	108.	344.	
ARACHNIDA	HYDRACARINA				43.04	1.634	98.	160.	
NEMATODA					14.35	1.157	108.	125.	
CRUSTACEA	CLADOCERA		DAPHNIA		329.97	2.518	108.	272.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	43.04	1.634	98.	160.	
CRUSTACEA	DECAPODA		(crayfish)		64.56	1.810	108.	196.	
				TOTALS	12273.58	4.089			13.50

TOTAL SAMPLE STATISTICS

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 05 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	15	4153.	2404.	5902.	1606.23	22.33	38.67	2.6105	0.3334	82.	88.

SPECIES ANALYSES

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 05 87

CLASS	ORDER	FAMILY	GENUS	SPECIES		MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		S,I	28.69	1.458	30.	44.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	S,I	509.31	2.707	108.	292.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		S,I	35.87	1.555	24.	37.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		S,O	193.68	2.287	72.	165.	
INSECTA	PLECOPTERA	CAPNIIDAE			S,I	7.17	0.856	32.	27.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		S,I	35.87	1.555	18.	28.	
INSECTA	COLEOPTERA	ELMIDAE			S	756.79	2.879	104.	299.	
INSECTA	ODONATA	COENAGRIONIDAE			S,I	7.17	0.856	108.	92.	
INSECTA	DIPTERA	CHIRONOMIDAE			S,O	954.05	2.980	108.	322.	
CRUSTACEA	COPEPODA				S	172.16	2.236	108.	241.	
CRUSTACEA	OSTRACODA				S	57.39	1.759	108.	190.	
OLIGOCHAETA					O,S,I	1345.00	3.129	108.	338.	
ARACHNIDA	HYDRACARINA				S	21.52	1.333	98.	131.	
NEMATODA					S	14.35	1.157	108.	126.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	O	14.35	1.157	98.	113.	
				TOTALS		4153.36	3.618			0.20

TOTAL SAMPLE STATISTICS

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	26	24770.	20466.	29073.	3952.48	9.21	15.96	2.8901	0.3853	61.	66.

SPECIES ANALYSES

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 05 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		516.48	2.713	21.	57.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		2611.09	3.417	54.	185.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	1291.20	3.111	48.	149.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	28.69	1.458	2.	3.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	659.95	2.820	108.	305.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		731.68	2.864	24.	69.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		2238.08	3.350	72.	241.	
INSECTA	PLECOPTERA				28.69	1.458	48.	70.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			114.77	2.060	24.	49.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA	PARALLELA	57.39	1.759	18.	32.	
INSECTA	PLECOPTERA	CAPNIIDAE			28.69	1.458	32.	47.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		28.69	1.458	16.	23.	
INSECTA	PLECOPTERA	PERLODIDAE	PERLINODES		315.63	2.499	48.	120.	
INSECTA	TRICHOPTERA				229.55	2.361	72.	170.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		459.09	2.662	108.	287.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		86.08	1.935	108.	209.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	AGAPETUS		28.69	1.458	32.	47.	
INSECTA	TRICHOPTERA	POLYCENTROPODIDAE			28.69	1.458	72.	105.	
INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	CHIMARRA		28.69	1.458	24.	35.	
INSECTA	COLEOPTERA	ELMIDAE			10781.52	4.033	104.	419.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		143.47	2.157	24.	52.	
INSECTA	DIPTERA	CHIRONOMIDAE			3184.98	3.503	108.	378.	
CRUSTACEA	OSTRACODA				57.39	1.759	108.	190.	
PELECYPODA					28.69	1.458	108.	157.	
OLIGOCHAETA					114.77	2.060	108.	222.	
ARACHNIDA	HYDRACARINA				946.88	2.976	98.	292.	
				TOTALS	24769.53	4.394			2.00

TOTAL SAMPLE STATISTICS

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 03 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	39	18672.	-2610.	39954.	19544.76	60.43	104.67	2.8233	0.4666	54.	58.

SPECIES ANALYSES

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 03 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		28.69	1.458	30.	44.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		190.09	2.279	54.	123.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	28.69	1.458	18.	26.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	190.09	2.279	48.	109.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	25.11	1.400	2.	3.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	39.45	1.596	24.	38.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	43.04	1.634	24.	39.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		269.00	2.430	24.	58.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		132.71	2.123	72.	153.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	HECUBA	39.45	1.596	48.	77.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	373.01	2.572	24.	62.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			96.84	1.986	24.	48.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA	PARALLELA	182.92	2.262	18.	41.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		7.17	0.856	24.	21.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		17.93	1.254	12.	15.	
INSECTA	PLECOPTERA	PTERONARCYIDAE	PTERONARCYS	CALIFORNICA	10.76	1.032	18.	19.	
INSECTA	PLECOPTERA	CAPNIIDAE			28.69	1.458	32.	47.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		258.24	2.412	16.	39.	
INSECTA	PLECOPTERA	NEMOURIDAE	AMPHINEMURA		28.69	1.458	6.	9.	
INSECTA	PLECOPTERA	PERLODIDAE	PERLINODES		86.08	1.935	48.	93.	
INSECTA	TRICHOPTERA				172.16	2.236	72.	161.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		39.45	1.596	108.	172.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		17.93	1.254	18.	23.	
INSECTA	COLEOPTERA	ELMIDAE			807.00	2.907	104.	302.	
INSECTA	COLEOPTERA	DYTISCIDAE			193.88	2.287	72.	165.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	484.20	2.685	24.	64.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		7.17	0.856	36.	31.	
INSECTA	DIPTERA	SIMULIIDAE			17.93	1.254	108.	135.	
INSECTA	DIPTERA	CHIRONOMIDAE			10089.29	4.004	108.	432.	
INSECTA	DIPTERA	EMPIDIDAE			211.61	2.326	95.	221.	
INSECTA	DIPTERA	CERATOPOGONIDAE			60.97	1.785	108.	193.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		1682.15	3.226	36.	116.	
CRUSTACEA	COPEPODA				28.69	1.458	108.	157.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		10.76	1.032	108.	111.	
OLIGOCHAETA					344.32	2.537	108.	274.	
ARACHNIDA	HYDRACARINA				1405.97	3.148	98.	309.	
NEMATODA					936.12	2.971	108.	321.	
INSECTA	MEGALOPTERA	SIALIDAE	SIAL?		28.69	1.458	72.	105.	
				TOTALS	18672.19	4.271			1.80

OTAL SAMPLE STATISTICS

STATION: 5 FIFTEEN MILE CREEK MT HOOD NATIONAL FOREST DATE: 07 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	40	30024	15578.	44470.	13266.72	25.51	44.19	3 8163	0.2834	50.	51

SPECIES ANALYSES

STATION: 5 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		315.83	2.499	21.	52.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		975.57	2.989	30.	90.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		28.69	1.458	54.	79.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	344.32	2.537	48.	122.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	344.32	2.537	2.	5.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	602.56	2.780	24.	67.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	57.39	1.759	24.	42.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		1434.87	3.157	24.	78.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		6628.16	3.821	72.	275.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	602.56	2.780	24.	67.	
INSECTA	PLECOPTERA				509.31	2.707	48.	130.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			143.47	2.157	24.	52.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		28.69	1.458	12.	17.	
INSECTA	PLECOPTERA	CAPNIIDAE			86.08	1.935	32.	62.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		4705.71	3.673	16.	59.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA	PACIFICA	57.39	1.759	18.	32.	
INSECTA	PLECOPTERA	NEMOURIDAE	AMPHINEMURA		114.77	2.060	6.	12.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		258.24	2.412	24.	58.	
INSECTA	PLECOPTERA	LEUCTRIDAE			32.28	1.509	18.	27.	
INSECTA	TRICHOPTERA				200.85	2.303	72.	166.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		545.17	2.737	18.	49.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		114.77	2.060	6.	12.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		401.71	2.604	24.	62.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		401.71	2.604	18.	47.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		373.01	2.572	24.	62.	
INSECTA	TRICHOPTERA	POLYCENTROPODIDAE			143.47	2.157	72.	155.	
INSECTA	COLEOPTERA	ELMIDAE			1004.27	3.002	104.	312.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	258.24	2.412	24.	58.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		57.39	1.759	36.	63.	
INSECTA	DIPTERA	SIMULIIDAE			258.24	2.412	108.	260.	
INSECTA	DIPTERA	CHIRONOMIDAE			6082.99	3.784	108.	409.	
INSECTA	DIPTERA	EMPIDIDAE			143.47	2.157	96.	205.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		530.83	2.725	36.	98.	
INSECTA	DIPTERA	DIXIDAE			86.08	1.935	108.	209.	
CRUSTACEA	COPEPODA				200.85	2.303	108.	249.	
CRUSTACEA	OSTRACODA				57.39	1.759	108.	190.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		57.39	1.759	108.	190.	
OLIGOCHAETA					602.56	2.780	108.	300.	
ARACHNIDA	HYDRACARINA				1205.12	3.081	98.	302.	
NEMATODA					28.69	1.458	108.	157.	
				TOTALS	30023.99	4.477			1.50

TOTAL SAMPLE STATISTICS

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 19 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	22	13217.	10368.	16066.	2616.17	11.43	19.79	2.7099	0.3928	85.	87.

SPECIES ANALYSES

STATION: 1 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 19 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		157.81	2.198	54.	119.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	86.08	1.935	108.	209.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		57.39	1.759	24.	42.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		71.73	1.856	72.	134.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		86.08	1.935	48.	93.	
INSECTA	PLECOPTERA	CAPNIIDAE			186.51	2.271	32.	73.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		71.73	1.856	16.	30.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		401.71	2.604	108.	281.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA		14.35	1.157	108.	125.	
INSECTA	COLEOPTERA	ELMIDAE			2625.44	3.419	104.	356.	
INSECTA	DIPTERA	CHIRONOMIDAE			1606.83	3.206	108.	346.	
INSECTA	DIPTERA	CERATOPOGONIDAE			28.69	1.458	108.	157.	
CRUSTACEA	COPEPODA				1348.59	3.130	108.	338.	
CRUSTACEA	OSTRACODA				631.25	2.800	108.	302.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		28.69	1.458	108.	157.	
OLIGOCHAETA					5336.96	3.727	108.	403.	
NEMATODA					14.35	1.157	108.	125.	
CRUSTACEA	CLADOCERA		DAPHNIA		114.77	2.060	108.	222.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	301.28	2.479	98.	243.	
PELECYPODA					14.35	1.157	108.	125.	
CRUSTACEA	DECAPODA		(crayfish)		3.59	0.555	108.	60.	
				TOTALS	13216.87	4.121			3.60

TOTAL SAMPLE STATISTICS

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 21 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	25	26368.	19002.	33729.	6762.68	14.81	25.85	2.7658	0.4050	69.	73.

SPECIES ANALYSES

STATION: 2 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 21 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		258.24	2.412	21.	51.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		28.69	1.458	30.	44.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		688.64	2.838	21.	60.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		28.69	1.458	54.	79.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	2754.56	3.440	108.	372.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		401.71	2.604	72.	187.	
INSECTA	PLECOPTERA				946.88	2.976	48.	143.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		545.17	2.737	48.	131.	
INSECTA	PLECOPTERA	CAPNIIDAE			581.04	2.764	32.	88.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	NIVALIS		28.69	1.458	48.	70.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		200.85	2.303	108.	249.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		946.88	2.976	108.	321.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		57.39	1.759	18.	32.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	OLIGOPLECTRUM		28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	HELICOPSYCHIDAE			57.39	1.759	18.	32.	
INSECTA	COLEOPTERA	ELMIDAE			6369.92	3.804	104.	396.	
INSECTA	ODONATA	COENAGRIONIDAE	ARGIA		28.69	1.458	108.	157.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	28.69	1.458	24.	35.	
INSECTA	DIPTERA	SIMULIIDAE			172.16	2.236	108.	241.	
INSECTA	DIPTERA	CHIRONOMIDAE			10530.45	4.022	108.	434.	
INSECTA	DIPTERA	CERATOPOGONIDAE			28.69	1.458	108.	157.	
OLIGOCHAETA					1276.85	3.106	108.	336.	
ARACHNIDA	HYDRACARINA				315.63	2.499	98.	245.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	28.69	1.458	98.	143.	
CRUSTACEA	DECAPODA		(crayfish)		32.28	1.509	108.	163.	
				TOTALS	28365.59	4.421			5.30

SPECIES ANALYSES

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 19 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		588.21	2.770	21.	58.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		760.37	2.881	21.	61.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		28.69	1.458	54.	79.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	1951.15	3.290	48.	158.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	57.39	1.759	108.	190.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		2008.53	3.303	24.	79.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		2654.13	3.424	72.	247.	
INSECTA	PLECOPTERA				28.69	1.458	48.	70.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			129.12	2.111	24.	51.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		172.16	2.236	48.	107.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		200.85	2.303	12.	28.	
INSECTA	PLECOPTERA	CAPNIIDAE			129.12	2.111	32.	68.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		14.35	1.157	16.	19.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		1327.07	3.123	108.	337.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		875.15	2.942	108.	318.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		57.39	1.759	24.	42.	
INSECTA	TRICHOPTERA	HELICOPSYCHIDAE			143.47	2.157	18.	39.	
INSECTA	COLEOPTERA	ELMIDAE			5093.07	3.707	104.	386.	
INSECTA	ODONATA				14.35	1.157	90.	104.	
INSECTA	DIPTERA				28.69	1.458	108.	157.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	114.77	2.060	24.	49.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		14.35	1.157	36.	42.	
INSECTA	DIPTERA	SIMULIIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	CHIRONOMIDAE			502.13	2.701	108.	292.	
CRUSTACEA	OSTRACODA				43.04	1.634	108.	176.	
OLIGOCHAETA					444.75	2.648	108.	286.	
ARACHNIDA	HYDRACARINA				802.56	2.780	98.	272.	
NEMATODA					57.39	1.759	108.	190.	
				TOTALS	18069.63	4.257			2.10

TOTAL SAMPLE STATISTICS

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	34	4985.	1733.	8238.	2986.89	34.59	59.91	3.4519	0.3243	52.	55.

TOTAL SAMPLE STATISTICS

STATION: 3 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 19 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	28	18070.	8665.	27475.	8637.28	27.60	47.80	3.4238	0.2878	64	65.

SPECIES ANALYSES

STATION: 4 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				10.78	1.032	64.	66.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		132.71	2.123	21.	45.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		380.19	2.580	30.	77.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		17.93	1.254	21.	26.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	GRANDIS	14.35	1.157	24.	28.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	168.57	2.227	48.	107.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	7.17	0.856	2.	2.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	14.35	1.157	24.	28.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		96.84	1.986	24.	48.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		7.17	0.856	48.	41.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		243.89	2.387	72.	172.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	68.15	1.833	24.	44.	
INSECTA	PLECOPTERA				32.28	1.509	48.	72.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			14.35	1.157	24.	28.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		132.71	2.123	12.	25.	
INSECTA	PLECOPTERA	CAPNIIDAE			139.88	2.146	32.	69.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		32.28	1.509	16.	24.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA	PACIFICA	14.35	1.157	18.	21.	
INSECTA	PLECOPTERA	LEUCTRIDAE			14.35	1.157	18.	21.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		118.36	2.073	108.	224.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		50.21	1.701	18.	31.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA		78.91	1.897	108.	205.	
INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	NICTIOPHYLAX		7.17	0.856	72.	62.	
INSECTA	COLEOPTERA	ELMIDAE			168.57	2.227	104.	232.	
INSECTA	DIPTERA				3.59	0.555	108.	60.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	279.78	2.447	24.	59.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		7.17	0.856	24.	21.	
INSECTA	DIPTERA	SIMULIIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	CHIRONOMIDAE			2044.40	3.311	108.	358.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		139.88	2.146	36.	77.	
CRUSTACEA	OSTRACODA				14.35	1.157	108.	125.	
OLIGOCHAETA					387.36	2.588	108.	280.	
ARACHNIDA	HYDRACARINA				107.60	2.032	98.	199.	
INSECTA	LEPIDOPTERA	PYRALIDAE	ACENTRIA		7.17	0.856	72.	62.	
				TOTALS	4985.47	3.698			0.50

TOTAL SAMPLE STATISTICS

STATION: 5 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 18 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	42	17022	13121.	20924.	3583.00	12.15	21.05	3.7774	0.3005	51.	53.

SPECIES ANALYSES

STATION: 5 FIFTEEN MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 18 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		71.73	1.856	21.	39.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		875.15	2.942	30.	88.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	975.57	2.989	48.	143.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	28.69	1.458	2.	3.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		1190.77	3.076	24.	74.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		588.21	2.770	72.	199.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	HYSTRIX	28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	961.23	2.983	24.	72.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			243.89	2.387	24.	57.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA	PARALLELA	28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		28.69	1.458	48.	70.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		86.08	1.935	12.	23.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		229.55	2.361	48.	113.	
INSECTA	PLECOPTERA	CAPNIIDAE			93.25	1.970	32.	63.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		43.04	1.634	16.	26.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		918.19	2.963	36.	107.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		1276.85	3.106	24.	75.	
INSECTA	PLECOPTERA	LEUCTRIDAE			43.04	1.634	18.	29.	
INSECTA	PLECOPTERA	PERLIDAE			28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		157.81	2.198	108.	237.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		43.04	1.634	18.	29.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		43.04	1.634	24.	39.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		200.85	2.303	18.	41.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		129.12	2.111	24.	51.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	PALAEAGAPETUS		14.35	1.157	108.	125.	
INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	POLYCENTROPUS		143.47	2.157	72.	155.	
INSECTA	COLEOPTERA	ELMIDAE			616.91	2.790	104.	290.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	43.04	1.634	24.	39.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		28.69	1.458	24.	35.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		14.35	1.157	36.	42.	
INSECTA	DIPTERA	SIMULIIDAE			114.77	2.060	108.	222.	
INSECTA	DIPTERA	CHIRONOMIDAE			5796.05	3.763	108.	406.	
INSECTA	DIPTERA	EMPIDIDAE			86.08	1.935	95.	184.	
INSECTA	DIPTERA	CERATOPOGONIDAE			86.08	1.935	108.	209.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		358.67	2.555	36.	92.	
CRUSTACEA	COPEPODA				100.43	2.002	108.	216.	
CRUSTACEA	OSTRACODA				28.69	1.458	108.	157.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		14.35	1.157	108.	125.	
OLIGOCHAETA					731.68	2.864	108.	309.	
ARACHNIDA	HYDRACARINA				444.75	2.648	98.	260.	
				TOTALS	17022.32	4.231			0.70

Two stations were sampled on this stream in March, August and October. When sampled in March, the aquatic macroinvertebrate community at Station 1 was dominated by those taxa tolerant to sedimentation and organic enrichment. Clean water and moderately tolerant taxa were sparse in this community . At Station 2 just moderate amounts of sediment and organic nutrient9 were indicated. The clean water species present indicated good water quality and good instream substrate at this station. The diversity in the community was much better than observed at Station 1.

When sampled in August there was an extreme contrast in conditions at Stations 1 and 2. At Station 1 there was a dominance among those taxa tolerant to sedimentation and organic enrichment. Clean water species were lacking and two moderately tolerant taxa present had far less than resident population numbers. Almost all species in the community were limited whether tolerant or not.

At the Upper Station (2) there was good diversity among clean water species which included the mayfly Ephemerella doddsi, stonef lies Kogotus, Cultus, Zapada, Calineuria, Amphinemura and Leuctridae; and caddisflies Arctopsyche and Parapsyche. There was also good diversity among the moderately tolerant taxa in the community. There were indications of moderate amounts of sediment and organic enrichment. The high biomass at this station was due partly to the presence of Crayfish in the sample.

When sampled in October the macroinvertebrate community at Station 1 had improved considerably over that found in August. A clean water mayfly was present in less than resident population numbers but indicated at least fairly good water quality at this station. The community was still dominated by those taxa tolerant to sedimentation and organic enrichment. The observed number of shredders in the community is generally found where riparian habitat, in spite of the impacts, is in good condition.

In October samples at Station 2 clean water species indicated good water quality and good instream substrate. The clean water mayf ly Epeorus had a good resident population as did the stoneflies Cultus and Zapada. Other clean water species present included stonef lies Calineuria and Leuctridae, and a caddisfly Parapsyche. There were also indications of at least moderate amounts of sediment and organic enrichment in this ecosystem.

The potential for resident and anadromous fisheries on this stream appeared to be fair to good. It appeared to be fair

at Station 1 where the benthic biomass of 0.2 g/m^2 would be limiting to a fishery and at Station 2, particularly in the fall, the 0.5 g/m^2 biomass would be somewhat limiting to the fishery. Dominance of sediment tolerant taxa at Station 1 on the dates sampled and scarcity of clean water species indicated there would be a limited amount of suitable spawning substrate, if any, at this lower station, whereas clean water species present at the upper Station indicated there would be suitable spawning substrate for a fishery in that stream reach.

A comparison of data at these stations with that observed in 1986 indicates conditions were similar. Almost all analysis elements, with small variations, indicate the same stress or good conditions observed at Stations 1 and 2 that where found in 1986.

The BCI values at Station 1 of 63, 54 and 66 on the March, August and October sampling dates respectively, indicate severe stress conditions in that reach of stream. These conditions became even more limiting to the aquatic community in August and appeared to improve somewhat by the October sampling date.

BCI values at Station 2 of 85, 96 and 89 on the March, August and October sampling dates indicate this ecosystem was in good condition but could be better and showed the constrast in the habitat quality found at the lower and upper Stations which indicated significantly detrimental effects from management activities between Stations 1 and 2. It appeared there would be opportunities for management to improve instream habitat quality and water quality in this aquatic ecosystem.

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream FIVE - MILE CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

Station	Date(s)	Diversity Index DAI (mean)	Standing Crop g/m^2 (mean)	Biotic Condition Index BCI 50	# Taxa
. HW 197) 1	3-26-87	10.3	1.6	63	24
) 4431) 2	3-23-87	19.6	0.5	85	37
1	8-06-87	5.0	0.2	54	17
2	7-20-87	25.3	5.8	96	48
1	10-20-87	12.5	1.5	66	27
2	10-06-87	21.4	1.6	89	39
1	9-24-86	7.6	0.5	57	23
2	9-18-86	26.2	0.3	92	42
1	11-13-86	11.9	8.7	62	25
2	11-13-86	21.8	6.9	88	36

Scale:	DAT	Standing crop	BCI
Excellent	18 - 26	4.0 - 12.0	above 90
Good	11 - 17	1.6 - 4.0	80 - 90
Fair	6 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	below 72

TOTAL SAMPLE STATISTICS

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	24	5154.	841	9467.	3960.95	44 37	76.85	2 7326	0.4053	75.	79.

SPECIES ANALYSES

STATION: 2 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 23 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		46.63	1.669	21.	35.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		86.08	1.935	30.	58.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	43.04	1.634	18.	29.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	17.93	1.254	48.	60.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	39.45	1.596	24.	38.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		136.29	2.134	24.	51.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		32.28	1.509	48.	72.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		258.24	2.412	72.	174.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	28.69	1.458	24.	35.	
INSECTA	PLECOPTERA				21.52	1.333	48.	64.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			25.11	1.400	24.	34.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		60.97	1.785	48.	86.	
INSECTA	PLECOPTERA	CAPNIIDAE			7.17	0.856	32.	27.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		136.29	2.134	16.	34.	
INSECTA	PLECOPTERA	LEUCTRIDAE			3.59	0.555	18.	10.	
INSECTA	PLECOPTERA	PERLODIDAE			25.11	1.400	48.	67.	
INSECTA	PLECOPTERA	NEMOURIDAE	NEMOURA		7.17	0.856	24.	21.	
INSECTA	TRICHOPTERA				7.17	0.856	72.	62.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		21.52	1.333	108.	144.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			14.35	1.157	108.	125.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		17.93	1.254	24.	30.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		14.35	1.157	18.	21.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		17.93	1.254	24.	30.	
INSECTA	COLEOPTERA	ELMIDAE			3.59	0.555	104.	58.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		7.17	0.856	24.	21.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		7.17	0.856	36.	31.	
INSECTA	DIPTERA	SIMULIIDAE			53.80	1.731	108.	187.	
INSECTA	DIPTERA	CHIRONOMIDAE			731.68	2.864	108.	309.	
INSECTA	DIPTERA	CERATOPOGONIDAE			7.17	0.856	108.	92.	
INSECTA	DIPTERA	PSYCHODIDAE			21.52	1.333	36.	48.	
INSECTA	COLLEMBOLA				28.69	1.458	0.	0.	
CRUSTACEA	OSTRACODA				57.39	1.759	108.	190.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		10.76	1.032	108.	111.	
OLIGOCHAETA					222.37	2.347	108.	253.	
ARACHNIDA	HYDRACARINA				35.87	1.555	98.	152.	
NEMATODA					3.59	0.555	108.	60.	
CRUSTACEA	COPEPODA				35.87	1.555	108.	168.	
				TOTALS	2295.47	3.361			0.50

TOTAL SAMPLE STATISTICS

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	17	2238.	173.	4303.	1896.60	48.93	84.74	1.9770	0.5212	83.	92.

SPECIES ANALYSES

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 26 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				14.35	1.157	64.	74.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		14.35	1.157	21.	24.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	86.08	1.935	18.	35.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	78.91	1.897	48.	91.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1072.41	3.030	72.	218.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		17.93	1.254	48.	60.	
INSECTA	PLECOPTERA	CAPNIIDAE			7.17	0.856	32.	27.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		39.45	1.598	108.	172.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE		14.35	1.157	108.	125.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			3.59	0.555	108.	60.	
INSECTA	COLEOPTERA	ELMIDAE			229.55	2.361	104.	246.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	21.52	1.333	24.	32.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		21.52	1.333	24.	32.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		21.52	1.333	36.	48.	
INSECTA	DIPTERA	SIMULIIDAE			860.80	2.935	108.	317.	
INSECTA	DIPTERA	CHIRONOMIDAE			1922.45	3.284	108.	355.	
INSECTA	DIPTERA	EMPIDIDAE			14.35	1.157	95.	110.	
INSECTA	DIPTERA	CERATOPOGONIDAE			7.17	0.856	108.	92.	
INSECTA	DIPTERA	TIPULIDAE	TIPULA		14.35	1.157	36.	42.	
CRUSTACEA	COPEPODA				7.17	0.856	108.	92.	
OLIGOCHAETA					473.44	2.675	108.	289.	
ARACHNIDA	HYDRACARINA				64.56	1.810	98.	177.	
NEMATODA					118.36	2.073	108.	224.	
CRUSTACEA	AMPHIPODA				28.69	1.458	98.	143.	
				TOTALS	5154.04	3.712			1.60

TOTAL SAMPLE STATISTICS

STATION: 2 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 03 23 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	37	2295.	665.	3926.	1497.32	37.66	65.23	3.8452	0.2625	58.	59.

SPECIES ANALYSES

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 08 06 87

CLASS	ORDER	FAMILY	GENUS	SPECIES		MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA			17.93	1.254	24.	30.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS			7.17	0.856	72.	62.	
INSECTA	PLECOPTERA					3.59	0.555	48.	27.	
INSECTA	PLECOPTERA	CAPNIIDAE				3.59	0.555	32.	18.	
INSECTA	TRICHOPTERA					3.59	0.555	72.	40.	
INSECTA	COLEOPTERA	ELMIDAE				17.93	1.254	104.	130.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA			7.17	0.856	36.	31.	
INSECTA	DIPTERA	CHIRONOMIDAE				577.45	2.762	108.	298.	
CRUSTACEA	COPEPODA					362.25	2.559	108.	276.	
CRUSTACEA	OSTRACODA					14.35	1.157	108.	125.	
PELECYPODA						10.76	1.032	108.	111.	
OLIGOCHAETA						1111.87	3.046	108.	329.	
ARACHNIDA	HYDRACARINA					78.91	1.897	98.	186.	
CRUSTACEA	CLADOCERA		DAPHNIA			7.17	0.856	108.	92.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA		7.17	0.856	98.	84.	
INSECTA	MEGALOPTERA	SIALIDAE	SIALIS			3.59	0.555	72.	40.	
CRUSTACEA	DECAPODA			(crayfish)		3.59	0.555	108.	60.	
					TOTALS	2238.08	3.350			0.20

TOTAL SAMPLE STATISTICS

STATION: 2 FIVE MILE CREEK MT HOOD NATIONAL FOREST DATE: 07 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	48	10595.	4521	16669	5578 48	30.40	52 65	4.2967	0.2308	52.	52.

SPECIES ANALYSES

STATION: 2 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				28.69	1.458	64.	93.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		803.41	2.905	30.	87.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	28.69	1.458	18.	26.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	28.69	1.458	2.	3.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	35.87	1.555	24.	37.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		279.76	2.447	24.	59.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		459.09	2.662	48.	128.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		50.21	1.701	72.	122.	
INSECTA	PLECOPTERA				1477.71	3.170	48.	152.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			35.87	1.555	24.	37.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		7.17	0.856	24.	21.	
INSECTA	PLECOPTERA	PERLODIDAE	KOGOTUS		7.17	0.856	18.	15.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		43.04	1.634	12.	20.	
INSECTA	PLECOPTERA	CAPNIIDAE			114.77	2.060	32.	66.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		860.80	2.935	16.	47.	
INSECTA	PLECOPTERA	PERLIDAE	CALINEURIA		7.17	0.856	24.	21.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA	PACIFICA	28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		459.09	2.662	36.	98.	
INSECTA	PLECOPTERA	NEMOURIDAE	AMPHINEMURA		7.17	0.856	6.	5.	
INSECTA	PLECOPTERA	LEUCTRIDAE			35.87	1.555	18.	28.	
INSECTA	TRICHOPTERA				129.12	2.111	72.	152.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		566.89	2.753	18.	50.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		114.77	2.060	6.	12.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE	NEOPHYLAX		28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE	OLIGOPHLEBODES		28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		193.68	2.287	24.	55.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		57.39	1.759	18.	32.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		566.69	2.753	24.	66.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		28.69	1.458	18.	26.	
INSECTA	COLEOPTERA	ELMIDAE			301.28	2.479	104.	258.	
INSECTA	DIPTERA				7.17	0.856	108.	92.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		43.04	1.634	36.	59.	
INSECTA	DIPTERA	CHIRONOMIDAE			1434.67	3.157	108.	341.	
INSECTA	DIPTERA	EMPIDIDAE			57.39	1.759	96.	167.	
INSECTA	DIPTERA	CERATOPOGONIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		878.73	2.944	36.	106.	
INSECTA	DIPTERA	DIXIDAE			14.35	1.157	108.	125.	
INSECTA	DIPTERA	PELECORHYNCHIDAE	GLUTOPS	ROSSI	14.35	1.157	30.	35.	
CRUSTACEA	COPEPODA				365.84	2.563	108.	277.	
CRUSTACEA	OSTRACODA				86.08	1.935	108.	209.	
GASTROPODA		LYMNAEIDAE	LYMNAEA		21.52	1.333	108.	144.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		7.17	0.856	108.	92.	
OLIGOCHAETA					365.84	2.563	108.	277.	
ARACHNIDA	HYDRACARINA				315.63	2.499	98.	245.	
NEMATODA					43.04	1.634	108.	176.	
INSECTA	COLLEMBOLA	ENTOMOBRYIDAE			78.91	1.897	0.	0.	
CRUSTACEA	DECAPODA				3.59	0.555	108.	60.	
				TOTALS	10595.01	4.025			5.80

TOTAL SAMPLE STATISTICS

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	27	5918.	5692.	6144.	207.53	2.02	3.51	2.8915	0.3936	75.	76.

SPECIES ANALYSES

STATION: 1 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		21.52	1.333	21.	28.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	68.15	1.833	48.	88.	
INSECTA	EPHEMEROPTERA	TRICORYTHIDAE	TRICORYTHODES	MINUTUS	17.93	1.254	108.	135.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		57.39	1.759	24.	42.	
INSECTA	PLECOPTERA				10.76	1.032	48.	50.	
INSECTA	PLECOPTERA	CAPNIIDAE			645.60	2.810	32.	90.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	NIVALIS		760.37	2.881	48.	138.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		10.76	1.032	108.	111.	
INSECTA	COLEOPTERA	ELMIDAE			2388.72	3.378	104.	351.	
INSECTA	ODONATA				10.76	1.032	90.	93.	
INSECTA	ODONATA	COENAGRIONIDAE	ARGIA		50.21	1.701	108.	184.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	32.28	1.509	24.	36.	
INSECTA	DIPTERA	TIPULIDAE	HOLORUSIA		17.93	1.254	72.	90.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		10.76	1.032	36.	37.	
INSECTA	DIPTERA	SIMULIIDAE			394.53	2.596	108.	280.	
INSECTA	DIPTERA	CHIRONOMIDAE			767.55	2.885	108.	312.	
INSECTA	DIPTERA	EMPIDIDAE			28.69	1.458	96.	138.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		10.76	1.032	36.	37.	
INSECTA	DIPTERA	PSYCHODIDAE	MARUINA		84.58	1.810	36.	65.	
INSECTA	DIPTERA	TIPULIDAE	TIPULA		17.93	1.254	36.	45.	
INSECTA	DIPTERA	STRATIOMYIDAE			17.93	1.254	108.	135.	
CRUSTACEA	COPEPODA				21.52	1.333	108.	144.	
OLIGOCHAETA					68.15	1.833	108.	198.	
ARACHNIDA	HYDRACARINA				365.84	2.563	98.	251.	
NEMATODA					17.93	1.254	108.	135.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	10.76	1.032	98.	101.	
PELECYPODA	LIMPITS				28.69	1.458	108.	157.	
				TOTALS	5918.00	3.772			1.50

TOTAL SAMPLE STATISTICS

STATION: 2 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 06 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	39	16538	441.	32636.	14783.56	51.61	89.39	3.8643	0.2690	55.	56.

SPECIES ANALYSES

STATION: 2 FIVE MILE CREEK, MT HOOD NATIONAL FOREST DATE: 10 06 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X MEAN WT TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		466.27	2.669	21.	56.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		946.88	2.976	30.	89.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	93.25	1.970	48.	95.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	64.56	1.810	24.	43.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		645.60	2.810	24.	67.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		774.72	2.889	72.	208.	
INSECTA	PLECOPTERA				365.84	2.563	48.	123.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		28.69	1.458	48.	70.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		265.41	2.424	12.	29.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		717.33	2.856	48.	137.	
INSECTA	PLECOPTERA	CAPNIIDAE			954.05	2.980	32.	96.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		186.51	2.271	16.	36.	
INSECTA	PLECOPTERA	PERLIDAE	CALINEURIA		10.76	1.032	24.	25.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		401.71	2.604	36.	94.	
INSECTA	PLECOPTERA	LEUCTRIDAE			57.39	1.769	18.	32.	
INSECTA	PLECOPTERA	PERLIDAE			57.39	1.759	24.	42.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	NIVALIS		43.04	1.634	48.	78.	
INSECTA	TRICHOPTERA				86.08	1.935	72.	139.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		530.83	2.725	108.	294.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		28.69	1.460	6.	9.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		222.37	2.347	24.	56.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		523.65	2.719	18.	49.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		408.88	2.612	24.	63.	
INSECTA	TRICHOPTERA	LEPIDOSTOMATIDAE			57.39	1.759	18.	32.	
INSECTA	COLEOPTERA	ELMIDAE			401.71	2.604	104.	271.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	71.73	1.856	24.	46.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		7.17	0.856	24.	21.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		57.39	1.759	36.	63.	
INSECTA	DIPTERA	SIMULIIDAE			7.17	0.866	108.	92.	
INSECTA	DIPTERA	CHIRONOMIDAE			5996.91	3.778	108.	408.	
INSECTA	DIPTERA	CERATOPOGONIDAE			64.56	1.810	108.	196.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		394.53	2.596	36.	93.	
INSECTA	DIPTERA	DIXIDAE			7.17	0.856	108.	92.	
INSECTA	DIPTERA	TABANIDAE			57.39	1.759	108.	190.	
CRUSTACEA	COPEPODA				523.65	2.719	108.	294.	
CRUSTACEA	OSTRACODA				200.85	2.303	108.	249.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		143.47	2.167	108.	233.	
OLIGOCHAETA					351.49	2.646	108.	275.	
ARACHNIDA	HYDRACARINA				315.63	2.499	98.	246.	
				TOTALS	16538.12	4.218			1.60

MAYS CANYON CREEK

This stream was sampled in March and October 1987. On each of the sampling dates the community was completely dominated by those taxa tolerant to sedimentation and organic enrichment. Clean water taxa were lacking and moderately tolerant taxa were severely limited in this community. The observed lack of shredders in the community is generally found where riparian habitat is in poor condition.

When compared with data from 1986 it appears conditions have not improved on this stream. All analysis elements indicate conditions were about the same if not worse. Productivity in the fall was considerably less than found in 1986.

It did not appear there was a good potential for resident or anadromous fisheries on this stream. A lack of clean water species and dominance of sediment tolerant taxa indicated there would be very little if any suitable spawning substrate in the reach sampled and the macroinvertebrate biomass in March could have supported a good fishery but the 0.3 g/m* biomass found in October would be limiting to the number and size of fish that could be supported in a community.

The BCI values of 62 and 57 for March and October respectively indicated severe stress conditions in this stream reach. It appeared there would be opportunities for management to improve the instream habitat quality, riparian habitat quality and water quality in this aquatic ecosystem.

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream MAYS CANYON CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

Station	Date(s)	Diversity Index DAI (mean)	Standing Crop g/m^2 (mean)	Biotic Condition Index BCI 50	# Taxa
1	3-25-87	7.6	1.3	62	23
1	10-21-87	9.9	0.3	57	25
	11-18-86	7.7	1.7	60	21

Scale:	DAI	Standing crop	BCI
Excellent	18 - 26	4.0 - 12.0	above 90
Good	11 - 17	1.6 - 4.0	80 - 90
Fair	6 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	below 72

TOTAL SAMPLE STATISTICS

STATION: 1 MAYS CANYON, MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	23	4591.	2751.	6431.	1690.05	21.25	36.81	2.1838	0.5202	80.	85.

SPECIES ANALYSES

STATION: 1 MAYS CANYON, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		14.35	1.157	30.	35.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		68.15	1.833	24.	44.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		502.13	2.701	72.	194.	
INSECTA	PLECOPTERA				3.59	0.555	48.	27.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		7.17	0.856	48.	41.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		3.59	0.555	108.	60.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE	HESPEROPHYLAX		21.52	1.333	108.	144.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		3.59	0.555	24.	13.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	ALISOTRICHIA		10.76	1.032	108.	111.	
INSECTA	COLEOPTERA	ELMIDAE			32.28	1.509	104.	157.	
INSECTA	COLEOPTERA	DYTISCIDAE			10.76	1.032	72.	74.	
INSECTA	DIPTERA				3.59	0.555	108.	60.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	50.21	1.701	24.	41.	
INSECTA	DIPTERA	SIMULIIDAE			383.77	2.584	108.	279.	
INSECTA	DIPTERA	CHIRONOMIDAE			2750.97	3.439	108.	371.	
INSECTA	DIPTERA	EMPIDIDAE			3.59	0.555	95.	53.	
INSECTA	DIPTERA	CERATOPOGONIDAE			64.56	1.810	108.	195.	
INSECTA	DIPTERA	STRATIOMYIDAE			3.59	0.555	108.	60.	
INSECTA	DIPTERA	BLEPHARICERIDAE			7.17	0.856	2.	2.	
CRUSTACEA	OSTRACODA				96.84	1.986	108.	214.	
OLIGOCHAETA					279.76	2.447	108.	264.	
NEMATODA					261.83	2.418	108.	261.	
CRUSTACEA	COPEPODA				7.17	0.856	108.	92.	
				TOTALS	4590.93	3.662			1.30

TOTAL SAMPLE STATISTICS

STATION: 1 MAY'S CANYON, MT HOOD NATIONAL FOREST DATE: 10 21 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	25	9264.	-704.	19233.	9154.98	57.05	98.82	2.0716	0.5556	89.	93.

SPECIES ANALYSES

STATION: 1 MAY'S CANYON, MT HOOD NATIONAL FOREST DATE: 10 21 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				3.59	0.555	64.	36.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		75.32	1.877	72.	135.	
INSECTA	PLECOPTERA	CAPNIIDAE			3.59	0.555	32.	18.	
INSECTA	PLECOPTERA	PERLODIDAE			7.17	0.856	48.	41.	
INSECTA	TRICHOPTERA				35.87	1.555	72.	112.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA		64.56	1.810	108.	195.	
INSECTA	COLEOPTERA	HYDROPHILIDAE			3.59	0.555	72.	40.	
INSECTA	COLEOPTERA	ELMIDAE			82.49	1.916	104.	199.	
INSECTA	COLEOPTERA	DYTISCIDAE			93.25	1.970	72.	142.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	ALISOTRICHIA		333.56	2.523	108.	273.	
INSECTA	HEMIPTERA	CORIXIDAE			7.17	0.856	108.	92.	
INSECTA	ODONATA	COENAGRIONIDAE			3.59	0.555	108.	60.	
INSECTA	ODONATA	COENAGRIONIDAE	AMPHIAGRION		86.08	1.935	72.	139.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	39.45	1.596	24.	38.	
INSECTA	DIPTERA	SIMULIIDAE			107.60	2.032	108.	219.	
INSECTA	DIPTERA	CHIRONOMIDAE			5595.20	3.748	108.	405.	
INSECTA	DIPTERA	EMPIDIDAE			21.52	1.333	95.	127.	
INSECTA	DIPTERA	CERATOPOGONIDAE			3.59	0.555	108.	60.	
INSECTA	DIPTERA	DIXIDAE			7.17	0.856	108.	92.	
CRUSTACEA	COPEPODA				204.44	2.311	108.	250.	
CRUSTACEA	OSTRACODA				1517.16	3.181	108.	344.	
OLIGOCHAETA					860.80	2.935	108.	317.	
ARACHNIDA	HYDRACARINA				14.35	1.157	98.	113.	
NEMATODA					64.56	1.810	108.	195.	
CRUSTACEA	AMPHIPODA	TALITRIDAE	HYALELLA	AZTECA	28.69	1.458	98.	143.	
				TOTALS	9264.36	3.967			0.30

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream PINE CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

Station	Date(s)	Diversity Index DAI (mean)	Standing Crop g/m^2 (mean)	Biotic Condition Index BCI 53
1	3-25-87	5.3	0.8	70

Scale:	DAI	Standing crop	BCI
Excellent	18 - 26	4.0 - 12.0	above 90
Good	11 - 17	1.6 - 4.0	80 - 90
Fair	6 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	below 72

TOTAL SAMPLE STATISTICS

STATION: 1 PINE CREEK MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	23	3841.	324	8006.	3825.01	57.49	99.58	1.9013	0.5821	73.	76.

SPECIES ANALYSES

STATION: 1 PINE CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				14.35	1.157	64.	74.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		10.76	1.032	21.	22.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		272.59	2.436	24.	58.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		96.84	1.986	72.	143.	
INSECTA	PLECOPTERA	CAPNIIDAE			10.76	1.032	32.	33.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		3.59	0.555	16.	9.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		10.76	1.032	108.	111.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		3.59	0.555	6.	3.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		17.93	1.254	18.	23.	
INSECTA	COLEOPTERA	ELMIDAE			21.52	1.333	104.	139.	
INSECTA	LEPIDOPTERA				7.17	0.856	72.	62.	
INSECTA	COLEOPTERA	PSEPHENIDAE			3.59	0.555	72.	40.	
INSECTA	DIPTERA				3.59	0.555	108.	60.	
INSECTA	DIPTERA	SIMULIIDAE			14.35	1.157	108.	125.	
INSECTA	DIPTERA	CHIRONOMIDAE			1474.12	3.169	108.	342.	
INSECTA	DIPTERA	EMPIDIDAE			3.59	0.555	95.	53.	
INSECTA	DIPTERA	CERATOPOGONIDAE			14.35	1.157	108.	125.	
CRUSTACEA	OSTRACODA				7.17	0.856	108.	92.	
OLIGOCHAETA					1782.57	3.251	108.	351.	
ARACHNIDA	HYDRACARINA				3.59	0.555	98.	54.	
NEMATODA					28.69	1.458	108.	157.	
CRUSTACEA	COPEPODA				7.17	0.856	108.	92.	
				TOTALS	3841.32	3.584			0.80

TOTAL SAMPLE STATISTICS

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	30	7528.	4908.	10149.	2406.26	18.45	31.96	3.0029	0.3899	51.	57.

This stream was sampled in March, August and October 1987. The lower Station is located at Emsley Roger's Place, Station 2 was above the log jam, and Station 3 just above the culvert. When sampled in March there was a good resident population of the clean water mayfly Ephemerella and a fairly good population of Rhithrogena. Other clean water species were present in limited numbers and there were indications of some sedimentation and organic enrichment. At Station 2 there was excellent diversity. Clean water taxa had good diversity and indicated good water quality and some good instream substrate at this station. Sediment and organic enrichment did not appear to be a problem at this station.

At Station 3 there was also good diversity. The community had clean water and moderately tolerant taxa which indicated good water quality and good instream substrate. There was however, indications of some sedimentation and organic enrichment at this station although it did not appear to be severe.

When sampled in August there were clean water species at Station 1 but most were not present in resident population numbers. There were some indications of sedimentation and organic enrichment. At Station 2 there was good diversity among clean water and moderately tolerant taxa with an indication of only moderate amounts of sediment and organic nutrients. At Station 3 in July, clean water species indicated good water quality and some good instream substrate, however most were not present in resident population numbers. Moderately tolerant taxa were doing well in this community. There were indications of sediment and organic enrichment.

When sampled in October at Station 1 clean water mayflies Ephemerella and Rhithrogena had fairly good resident population numbers and the stonefly Cultus was also present in the community. There were indications of at least moderate amounts of sedimentation and organic enrichment. The observed number of shredders in the community is generally found where riparian habitat is in fairly good condition.

At Station 2 the clean water mayfly Ephemerella had a good resident population. Also present where clean water stoneflies Zapada, Calineuria and Leuctridae. Most of the moderately tolerant taxa had good resident population numbers. The observed number of shredders in the community at Station 2 is generally found where riparian habitat is in excellent condition.

At Station 3 there was a good resident population of the clean water mayfly Ephemerella and Ephemerella doddsi was present

in less than resident population numbers. Other clean water specie8 present included a stonefly Zapada and Leuctridae The presence of these species indicated fairly good water quality and some good instream substrate in the reach sampled. The observed number of shredder8 at Station 3 is generally found where riparian habitat is in excellent condition. There were indication8 of sedimentation and organic enrichment.

When compared with prior year8 data it appeared there had been a Blight improvement at Station 1. Data for the other Station8 appeared to be similar to that found in 1986, except in October analysis element8 at Station 2 were lower than those found at Station 2 in November 1986, with the exception of the biomass which was higher in 1987.

The potential for resident and anadromous fisheries on this stream appeared to be good. Clean water specie8 on each of the sampling date8 indicated there should be at least Borne suitable spawning substrate at each of the stations sampled. The macroinvertebrate biomass would be sufficient to provide nutrients for the fisheries.

The BCI value8 for Station 1 were 88, 81 and 82 and indicate condition8 were good but could be better. The BCI values for Station 2 of 94, 100, and 88 indicate this station even closer to it8 potential, however most species were not present in resident population number8 so this reach stream appeared to be in good condition but could be better. At Station 3 the BCI values of 88 in March and July and 91 in October indicated this ecosystem was in good condition but could be better.

It appeared there may be management opportunities to improve the instream habitat quality and water quality at each of the stations, and riparian habitat quality at Station 1 in this aquatic ecosystem.

USFS - INTERMOUNTAIN REGION - ANNUAL PROGRESS REPORT

MACROINVERTEBRATE ANALYSIS

Aquatic Ecosystem Analysis Laboratory
105 Page School
Brigham Young University
Provo, Utah 84602

A. Investigator Cory Hutchinson

Forest/District Mt. Hood National Forest

Stream RAMSEY CREEK

State/County Oregon, Wasco County

Forest Service Cat. No.

B.

	Station	Date(s)	Diversity Index DAI (mean)	Standing Crop g/m^2 (mean)	Biotic Condition Index BCI 50
Ems. Pl.)	1	3-25-87	15.2	0.7	
abv. jam)	2	3-23-87	21.3	2.0	94
abv. culv.)	3	3-23-87	17.6	2.1	88
	1	8-04-87	12.2	0.6	81
	2	7-20-87	22.9	1.1	100
	3	7-20-87	18.2	1.6	88
	1	10-20-87	16.8	1.1	82
	2	10-07-87	16.2	1.7	88
	3	10-07-87	19.4	1.0	91
	1	9-22-86	9.7	1.1	77
	2	9-10-86	19.7	0.7	94
	3	9-10-86	23.4	1.0	86
	1	11-12-86	10.7	0.9	79
	2	11-04-86	24.3	0.7	96
	3	11-04-86	23.7	2.2	96

Scale:	DAI	Standing crop	BCI
Excellent	18 - 26	4.0 - 12.0	above 90
Good	11 - 17	1.6 - 4.0	80 - 90
Fair	6 - 10	0.6 - 1.5	72 - 79
Poor	0 - 5	0.0 - 0.5	below 72

SPECIES ANALYSES

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 03 25 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		304.87	2.484	21.	52.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		265.41	2.424	30.	73.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		125.53	2.099	21.	44.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	21.52	1.333	18.	24.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	71.73	1.856	48.	89.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	10.76	1.032	24.	25.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		21.52	1.333	24.	32.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		10.76	1.032	48.	50.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		692.23	2.840	72.	204.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	125.53	2.099	24.	50.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			28.69	1.458	24.	35.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA		17.93	1.254	18.	23.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		78.91	1.897	12.	23.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		17.93	1.254	16.	20.	
INSECTA	PLECOPTERA	LEUCTRIDAE			32.28	1.509	18.	27.	
INSECTA	PLECOPTERA	NEMOURIDAE	NEMOURA		35.87	1.555	24.	37.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		39.45	1.596	108.	172.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		53.80	1.731	18.	31.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		14.35	1.157	18.	21.	
INSECTA	COLEOPTERA	ELMIDAE			441.18	2.645	104.	275.	
INSECTA	DIPTERA				43.04	1.634	108.	176.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		39.45	1.596	24.	38.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		10.76	1.032	24.	25.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		86.08	1.935	36.	70.	
INSECTA	DIPTERA	SIMULIIDAE			75.32	1.877	108.	203.	
INSECTA	DIPTERA	CHIRONOMIDAE			3378.64	3.529	108.	381.	
INSECTA	DIPTERA	CERATOPOGONIDAE			21.52	1.333	108.	144.	
OLIGOCHAETA					1086.76	3.036	108.	328.	
ARACHNIDA	HYDRACARINA				304.87	2.484	98.	243.	
NEMATODA					71.73	1.856	108.	200.	
				TOTALS	7528.42	3.877			0.70

TOTAL SAMPLE STATISTICS

STATION: 2 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 03 23 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
* NUMBERS DATA											
3	41	5201.	1980	8421	2957.66	32.83	56.87	3.1672	0 4115	49.	53.

SPECIES ANALYSES

STATION: 2 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 03 23 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		168.57	2.227	21.	47.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		258.24	2.412	30.	72.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		39.45	1.596	21.	34.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	132.71	2.123	18.	38.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	32.28	1.509	48.	72.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	75.32	1.877	24.	45.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	46.63	1.669	24.	40.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		17.93	1.254	24.	30.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		294.11	2.469	72.	178.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	161.40	2.208	24.	53.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	HYSTRIX	7.17	0.856	24.	21.	
INSECTA	PLECOPTERA				57.39	1.759	48.	84.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			25.11	1.400	24.	34.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		21.52	1.333	24.	32.	
INSECTA	PLECOPTERA	PERLODIDAE	KOGOTUS		3.59	0.555	18.	10.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		10.76	1.032	48.	50.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		46.63	1.669	16.	27.	
INSECTA	PLECOPTERA	PERLIDAE	CALINEURIA		10.76	1.032	24.	25.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA		28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		21.52	1.333	24.	32.	
INSECTA	PLECOPTERA	LEUCTRIDAE			7.17	0.856	18.	15.	
INSECTA	PLECOPTERA	PERLIDAE	CLAASSENIA		10.76	1.032	6.	6.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		10.76	1.032	108.	111.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		10.76	1.032	18.	19.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		17.93	1.254	8.	8.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		64.56	1.810	24.	43.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		78.91	1.897	18.	34.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		21.52	1.333	24.	32.	
INSECTA	COLEOPTERA	ELMIDAE			96.84	1.986	104.	207.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		93.25	1.970	24.	47.	
INSECTA	DIPTERA	SIMULIIDAE			7.17	0.856	108.	92.	
INSECTA	DIPTERA	CHIRONOMIDAE			2758.15	3.441	108.	372.	
INSECTA	DIPTERA	EMPIDIDAE			78.91	1.897	95.	180.	
INSECTA	DIPTERA	CERATOPOGONIDAE			25.11	1.400	108.	151.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		14.35	1.157	36.	42.	
CRUSTACEA	OSTRACODA				43.04	1.634	108.	176.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		147.05	2.167	108.	234.	
OLIGOCHAETA					139.88	2.146	108.	232.	
ARACHNIDA	HYDRACARINA				68.15	1.833	98.	180.	
NEMATODA					25.11	1.400	108.	151.	
CRUSTACEA	COPEPODA				21.52	1.333	108.	144.	
				TOTALS	5200.67	3.716			2.00

TOTAL SAMPLE STATISTICS

STATION 3 RAMSEY CREEK MT HOOD NATIONAL FOREST DATE: 03 23 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	38	6578	4935.	8221	1508.91	13.24	22.94	3.5298	0.3285	52.	57.

SPECIES ANALYSES

STATION: 3 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 03 23 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				25.11	1.400	64.	90.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		186.51	2.271	21.	48.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		96.84	1.986	30.	60.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	60.97	1.785	18.	32.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	14.35	1.157	2.	2.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	114.77	2.060	24.	49.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	17.93	1.254	24.	30.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		53.80	1.731	24.	42.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		656.36	2.817	72.	203.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	53.80	1.731	24.	42.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	CASCADIA	35.87	1.555	24.	37.	
INSECTA	PLECOPTERA				25.11	1.400	48.	67.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			28.69	1.458	24.	35.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		17.93	1.254	24.	30.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		7.17	0.856	48.	41.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		93.25	1.970	16.	32.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA		43.04	1.634	18.	29.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		28.69	1.458	24.	35.	
INSECTA	PLECOPTERA	LEUCTRIDAE			14.35	1.157	18.	21.	
INSECTA	PLECOPTERA	PERLODIDAE			14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		43.04	1.634	108.	176.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		39.45	1.596	6.	10.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			43.04	1.634	108.	176.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		419.64	2.623	24.	63.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		111.19	2.046	18.	37.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		21.52	1.333	24.	32.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		17.93	1.254	18.	23.	
INSECTA	COLEOPTERA	ELMIDAE			150.84	2.178	104.	227.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA		57.39	1.759	24.	42.	
INSECTA	DIPTERA	SIMULIIDAE			93.25	1.970	108.	213.	
INSECTA	DIPTERA	CHIRONOMIDAE			2625.44	3.419	108.	369.	
INSECTA	DIPTERA	EMPIDIDAE			53.80	1.731	95.	164.	
INSECTA	DIPTERA	CERATOPOGONIDAE			25.11	1.400	108.	151.	
CRUSTACEA	OSTRACODA				147.05	2.167	108.	234.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		269.00	2.430	108.	262.	
OLIGOCHAETA					656.36	2.817	108.	304.	
ARACHNIDA	HYDRACARINA				143.47	2.157	98.	211.	
NEMATODA					71.73	1.856	108.	200.	
				TOTALS	6577.95	3.818			2.00

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TOTAL SAMPLE STATISTICS

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 08 04 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	28	14088.	10686.	17490.	3124.28	12.80	22.18	2.6564	0.4483	58.	62.

SPECIES ANALYSES

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 08 04 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA				28.69	1.458	64.	93.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		71.73	1.856	21.	39.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		143.47	2.157	21.	45.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		71.73	1.856	54.	100.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	14.35	1.157	2.	2.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		659.95	2.820	24.	68.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		14.35	1.157	48.	56.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		301.28	2.479	72.	178.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	301.28	2.479	24.	59.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	THRAULODES	BICORNUTA	172.16	2.236	36.	80.	
INSECTA	PLECOPTERA				28.69	1.458	48.	70.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			143.47	2.157	24.	52.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		387.36	2.588	16.	41.	
INSECTA	PLECOPTERA	PERLODIDAE	ARCYNOPTERYX		14.35	1.157	24.	28.	
INSECTA	PLECOPTERA	PERLODIDAE	PERLINODES		14.35	1.157	48.	56.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		28.69	1.458	108.	157.	
INSECTA	COLEOPTERA	ELMIDAE			2395.89	3.379	104.	351.	
INSECTA	COLEOPTERA	DYTISCIDAE			57.39	1.759	72.	127.	
INSECTA	DIPTERA				129.12	2.111	108.	228.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	28.69	1.458	24.	35.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		100.43	2.002	24.	48.	
INSECTA	DIPTERA	CHIRONOMIDAE			6513.39	3.814	108.	412.	
INSECTA	DIPTERA	EMPIDIDAE			28.69	1.458	95.	138.	
INSECTA	DIPTERA	CERATOPOGONIDAE			114.77	2.060	108.	222.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		14.35	1.157	36.	42.	
OLIGOCHAETA					43.04	1.634	108.	176.	
ARACHNIDA	HYDRACARINA				2180.69	3.339	98.	327.	
NEMATODA					86.08	1.935	108.	209.	
				TOTALS	14088.43	4.149			0.60

O'AL SAMPLE STATISTICS

STATION 2 RAMSEY CREEK MT HOOD NATIONAL FOREST DATE: 07 20 87

REPL	TOTAL NO SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	44	16104.	4911	27297	10279.27	36.85	63.83	3 9509	0.2763	45	47.

SPECIES ANALYSES

STATION: 2 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		57.39	1.759	21.	37.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		939.71	2.973	30.	89.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		28.69	1.458	21.	31.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		86.08	1.935	54.	104.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	93.25	1.970	18.	35.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	164.99	2.217	48.	106.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DODDSI	28.69	1.458	2.	3.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	243.89	2.387	24.	57.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	136.29	2.134	24.	51.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		394.53	2.596	24.	62.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1147.73	3.060	72.	220.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	ATTENELLA	86.08	1.935	24.	46.	
INSECTA	PLECOPTERA				1226.64	3.089	48.	148.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			7.17	0.856	24.	21.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA	PARALLELA	86.08	1.935	18.	35.	
INSECTA	PLECOPTERA	PERLODIDAE	MEGARCYS		35.87	1.555	24.	37.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		100.43	2.002	12.	24.	
INSECTA	PLECOPTERA	CAPNIIDAE			236.72	2.374	32.	76.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		2352.85	3.372	16.	54.	
INSECTA	PLECOPTERA	PERLIDAE	DORONURIA		86.08	1.935	18.	35.	
INSECTA	PLECOPTERA	PERLIDAE	HESPEROPERLA	PACIFICA	28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		301.28	2.479	36.	89.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		114.77	2.060	24.	49.	
INSECTA	PLECOPTERA	LEUCTRIDAE			7.17	0.856	18.	15.	
INSECTA	TRICHOPTERA				1721.60	3.236	72.	233.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	PARAPSYCHE		107.60	2.032	6.	12.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		57.39	1.759	24.	42.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		186.51	2.271	18.	41.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		236.72	2.374	24.	57.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	HIMALOPSYCHE		35.87	1.555	18.	28.	
INSECTA	COLEOPTERA	ELMIDAE			444.75	2.648	104.	275.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	57.39	1.759	24.	42.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		86.08	1.935	24.	46.	
INSECTA	DIPTERA	CHIRONOMIDAE			3952.51	3.597	108.	388.	
INSECTA	DIPTERA	EMPIDIDAE			35.87	1.555	95.	148.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		251.07	2.400	36.	86.	
INSECTA	DIPTERA	DIXIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	PSYCHODIDAE	MARUINA		57.39	1.759	36.	63.	
CRUSTACEA	COPEPODA				57.39	1.759	108.	190.	
CRUSTACEA	OSTRACODA				35.87	1.555	108.	168.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		286.93	2.458	108.	265.	
OLIGOCHAETA					28.69	1.458	108.	157.	
ARACHNIDA	HYDRACARINA				401.71	2.604	98.	255.	
NEMATODA					43.04	1.634	108.	176.	
				TOTALS	16104.13	4.207			1.10

TOTAL SAMPLE STATISTICS

STATION: 3 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	34	24016.	10619.	37414.	12304.03	29.58	51.23	3.6419	0.2842	58.	57.

SPECIES ANALYSES

STATION: 3 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 07 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		459.09	2.662	30.	80.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		57.39	1.759	54.	95.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	COLORADENSIS	28.69	1.458	18.	26.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	1262.51	3.101	48.	149.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	TIBIALIS	401.71	2.604	24.	62.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	SPINIFERA	631.25	2.800	24.	67.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		573.87	2.759	24.	66.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		6800.32	3.833	72.	276.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	28.69	1.458	24.	35.	
INSECTA	PLECOPTERA				114.77	2.060	48.	99.	
INSECTA	PLECOPTERA	PERLODIDAE	SKWALA	PARALLELA	114.77	2.060	18.	37.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		28.69	1.458	12.	17.	
INSECTA	PLECOPTERA	CAPNIIDAE			746.03	2.873	32.	92.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		2381.55	3.377	16.	54.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		57.39	1.759	24.	42.	
INSECTA	PLECOPTERA	LEUCTRIDAE			143.47	2.157	18.	39.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		28.69	1.458	108.	157.	
INSECTA	TRICHOPTERA				286.93	2.458	72.	177.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	ARCTOPSYCHE		28.69	1.458	18.	26.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		1377.28	3.139	24.	75.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		114.77	2.060	18.	37.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		315.63	2.499	24.	60.	
INSECTA	COLEOPTERA	ELMIDAE			545.17	2.737	104.	285.	
INSECTA	DIPTERA	SIMULIIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	CHIRONOMIDAE			4619.63	3.665	108.	396.	
INSECTA	DIPTERA	EMPIDIDAE			229.55	2.361	95.	224.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		401.71	2.604	36.	94.	
CRUSTACEA	COPEPODA				57.39	1.759	108.	190.	
CRUSTACEA	OSTRACODA				344.32	2.537	108.	274.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		659.95	2.820	108.	305.	
OLIGOCHAETA					344.32	2.537	108.	274.	
ARACHNIDA	HYDRACARINA				602.56	2.780	98.	272.	
NEMATODA					143.47	2.157	108.	233.	
				TOTALS	24016.32	4.381			1.60

TOTAL SAMPLE STATISTICS

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	31	13192.	10371.	16013.	2590.55	11.34	19.64	3.6685	0.2602	59.	61.

SPECIES ANALYSES

STATION: 1 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 10 20 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		243.89	2.387	21.	50.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		28.69	1.458	30.	44.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	RHITHROGENA		286.93	2.458	21.	52.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	HEPTAGENIA		200.85	2.303	54.	124.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	GRANDIS	28.69	1.458	24.	35.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	1606.83	3.206	48.	154.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		688.64	2.838	24.	68.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		1276.85	3.106	72.	224.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	43.04	1.634	24.	39.	
INSECTA	PLECOPTERA	CHLOROPERLIDAE			114.77	2.060	24.	49.	
INSECTA	PLECOPTERA	PERLODIDAE	ISOPERLA		186.51	2.271	48.	109.	
INSECTA	PLECOPTERA	PERLODIDAE	CULTUS		157.81	2.198	12.	26.	
INSECTA	PLECOPTERA	CAPNIIDAE			172.16	2.236	32.	72.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		14.35	1.157	36.	42.	
INSECTA	PLECOPTERA	PERLODIDAE	PERLINODES		28.69	1.458	48.	70.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		157.81	2.198	108.	237.	
INSECTA	TRICHOPTERA	LIMNEPHILIDAE			150.64	2.178	108.	235.	
INSECTA	TRICHOPTERA	HYDROPTILIDAE	HYDROPTILA		14.35	1.157	108.	125.	
INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	DOLIPHILODES		28.69	1.458	24.	35.	
INSECTA	COLEOPTERA	ELMIDAE			2811.95	3.449	104.	359.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	373.01	2.572	24.	62.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		14.35	1.157	24.	28.	
INSECTA	DIPTERA	TIPULIDAE	HEXATOMA		186.51	2.271	36.	82.	
INSECTA	DIPTERA	SIMULIIDAE			71.73	1.856	108.	200.	
INSECTA	DIPTERA	CHIRONOMIDAE			2424.59	3.385	108.	366.	
INSECTA	DIPTERA	EMPIDIDAE			14.35	1.157	95.	110.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		172.16	2.236	36.	80.	
CRUSTACEA	COPEPODA				43.04	1.634	108.	176.	
OLIGOCHAETA					401.71	2.604	108.	281.	
ARACHNIDA	HYDRACARINA				1104.69	3.043	98.	298.	
NEMATODA					143.47	2.157	108.	233.	
				TOTALS	13191.76	4.120			1.10

TOTAL SAMPLE STATISTICS

STATION: 2 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 10 07 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	36	12381.	6009.	18753.	5851.91	27.29	47.26	3.2871	0.3654	58.	57.

SPECIES ANALYSES

STATION: 2 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 10 07 87

CLASS	ORDER	FAMILY	GENUS	SPECIES	MEAN NO/SQM	LOG10 NO/SQM	TOLERANCE QUOTIENT	LOG10 X TQ	MEAN WT GM/SQM
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	EPEORUS		387.36	2.588	21.	54.	
INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	CINYGMULA		731.68	2.864	30.	86.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	INERMIS	373.01	2.572	48.	123.	
INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	PARALEPTOPHLEBIA		157.81	2.198	24.	53.	
INSECTA	EPHEMEROPTERA	SIPHLONURIDAE	AMELETUS		57.39	1.759	48.	84.	
INSECTA	EPHEMEROPTERA	BAETIDAE	BAETIS		258.24	2.412	72.	174.	
INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	MARGARITA	28.69	1.458	24.	35.	
INSECTA	PLECOPTERA				14.35	1.157	48.	56.	
INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	TAENIONEMA		731.68	2.864	48.	137.	
INSECTA	PLECOPTERA	CAPNIIDAE			1133.39	3.054	32.	98.	
INSECTA	PLECOPTERA	NEMOURIDAE	ZAPADA		28.69	1.458	18.	23.	
INSECTA	PLECOPTERA	PERLIDAE	CALINEURIA		57.39	1.759	24.	42.	
INSECTA	PLECOPTERA	NEMOURIDAE	MALENKA		602.56	2.780	36.	100.	
INSECTA	PLECOPTERA	PELTOPERLIDAE	YORAPERLA		14.35	1.157	24.	28.	
INSECTA	PLECOPTERA	LEUCTRIDAE			28.69	1.458	18.	26.	
INSECTA	PLECOPTERA	NEMOURIDAE	VISOKA		28.69	1.458	108.	157.	
INSECTA	PLECOPTERA	PERLIDAE			28.69	1.458	24.	35.	
INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE		200.85	2.303	108.	249.	
INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	MICRASEMA		602.56	2.780	24.	67.	
INSECTA	TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA		28.69	1.458	18.	26.	
INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	GLOSSOSOMA		215.20	2.333	24.	56.	
INSECTA	TRICHOPTERA	LEPIDOSTOMATIDAE			57.39	1.759	18.	32.	
INSECTA	COLEOPTERA	ELMIDAE			143.47	2.157	104.	224.	
INSECTA	DIPTERA	TIPULIDAE	ANTOCHA	MONTICOLA	57.39	1.759	24.	42.	
INSECTA	DIPTERA	TIPULIDAE	DICRANOTA		14.35	1.157	24.	28.	
INSECTA	DIPTERA	SIMULIIDAE			28.69	1.458	108.	157.	
INSECTA	DIPTERA	CHIRONOMIDAE			5480.43	3.739	108.	404.	
INSECTA	DIPTERA	EMPIDIDAE			28.69	1.458	95.	138.	
INSECTA	DIPTERA	PSYCHODIDAE	PERICOMA		229.55	2.361	36.	86.	
INSECTA	DIPTERA	DIXIDAE			14.35	1.157	108.	125.	
CRUSTACEA	COPEPODA				28.69	1.458	108.	157.	
CRUSTACEA	OSTRACODA				344.32	2.537	108.	274.	
TURBELLARIA	TRICLADIDA	PLANARIIDAE	PLANARIA		100.43	2.002	108.	216.	
OLIGOCHAETA					14.35	1.157	108.	125.	
ARACHNIDA	HYDRACARINA				100.43	2.002	98.	196.	
NEMATODA					28.69	1.458	108.	157.	
				TOTALS	12381.17	4.093			1.70

TOTAL SAMPLE STATISTICS

STATION: 3 RAMSEY CREEK, MT HOOD NATIONAL FOREST DATE: 10 07 87

REPL	TOTAL NO. SPECIES	MEAN /SQM	CONFIDENCE LIMITS (80 PERCENT) LL	UL	STANDARD DEVIATION	PERCENT SE OF MEAN	COEFF. OF VARIATION	DBAR	R	CTQA	CTQD
• NUMBERS DATA											
3	36	15415.	8241.	22590.	6589.14	24.88	42.74	3.8973	0.2488	54.	55.