The History and Status of Fishes in the Little Lost River Drainage, Idaho

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Salmon-Challis National Forest

Upper Snake Region
Idaho Department of Fish and Game

Idaho Falls District
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FORWARD AND ACKNOWLEDGMENTS

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ABSTRACT

Data relating to fish populations in the Little Lost River drainage were gathered between 1992 and 1999. During this time, fish population data were gathered from 171 stream sections. One-hundred-thirty-five sites were sampled by electrofishing, 27 by visual observation, 6 by a combination of electrofishing and visual observation, 2 by hook and line, and 1 by snorkeling. Four-hundred-ninety-one km of perennial stream, 40 km of perennial stream/marsh, 2,453 km of intermittent stream, 17 lakes, 1 reservoir, 3 dysfunctional reservoirs, and several private ponds were found in the drainage.

Literature reviews and field work indicate 11 species of fish and 2 hybrids have been documented in the Little Lost River drainage. These include bull trout *Salvelinus confluentus*, brook trout *Salvelinus fontinalis*, rainbow trout *Oncorhynchus mykiss*, cutthroat trout *Oncorhynchus clarki*, rainbow trout x cutthroat trout *Oncorhynchus mykiss x Oncorhynchus clarki*, brook trout x bull trout *Salvelinus fontinalis x Salvelinus confluentus*, grayling *Thymallus sp.*, shorthead sculpin *Cottus confusus*, guppy *Poecilia reticulata*, green swordtail *Xiphophorus helleri*, amelanic convict cichlid *Cichlasoma nigrofasciatum*, Mozambique tilapia *Tilapia mossambica*, and goldfish *Carassius auratus*. Mountain whitefish *Prosopium williamsoni* have not been found in fish collections completed in the drainage. However, local residents indicate whitefish were present in the Little Lost River in the early 1900's. Although brown trout *Salmo trutta* have not been documented in the basin, they have reportedly been caught by anglers in the lower end of the drainage. A single introduction of golden trout *Oncorhynchus aguabonita* did not establish a population.

Although bull trout are widely distributed in the drainage, their distribution is fragmented. Data collected during the present study indicate bull trout occupy approximately 164 km of stream and are the only salmonid present in approximately 32 km of stream. Both resident and fluvial populations are found in the drainage. Threats to bull trout populations in the drainage include high stream temperatures; hybridization, competition, and predation by exotic brook trout; disruption of migratory corridors; sediment; loss through irrigation ditches; artificial migration barriers; angler harvest; and loss of cover and habitat complexity.

Rainbow trout are the most widely distributed fish species and were found in most streams in the drainage. Although brook trout are widely distributed in the drainage, they are only abundant in a few stream reaches. Although cutthroat trout are present in mountain lakes, only 2 fish captured from streams during the study appeared to be pure cutthroat trout.

The shorthead sculpin appears to be the only sculpin species present in the drainage. It appears some factor or combination of factors (possibly high stream gradient) is limiting their distribution. With the exception of Williams Creek and Horse Creek, shorthead sculpin were absent from streams not currently connected to the drainage net.

INTRODUCTION

In the past, there has been a lack of data relating to fish populations in the Little Lost River drainage. Although some research has been conducted, it has generally focused on streams that are important recreational fisheries, and little or no data exist for most small tributary streams. Furthermore, much of the information that has been gathered is unpublished and exists only in an office file format. This makes it generally unavailable to others involved in the management of the drainage. The lack and unavailability of data has made the development of fish management plans difficult. The purpose of this document is to rectify this problem by presenting a complete description of the history and status of fish populations in the Little Lost River drainage in one publication so that information is easily accessible to resource managers.

STUDY AREA

Location and Setting

The study area includes the entire Little Lost River drainage (Figure 1). The Little Lost River is one of several isolated streams located along the northern rim of the Snake River basin in southeastern Idaho. This group of streams, which collectively includes Big Lost River, Little Lost River, Birch Creek, Medicine Lodge Creek, Beaver Creek, and Camas Creek, originates in the mountains of southeastern and south central Idaho. While these streams are located within the Snake River Basin, the immense lava formations of the upper Snake River Plain prevent them from forming an overland connection with other streams in the basin. Rather, they sink into the lava along the northern edge of the Snake River Plain. Hence, these streams have been collectively termed the Sinks Drainages or Lost Streams. Specifically, the Little Lost River originates in the Lost River and Lemhi mountain ranges, and flows in a southeasterly direction where it sinks (when undiverted) into the lava southeast of the town of Howe. The drainage covers approximately 2,520 km^2. Elevation ranges from 1,456 m at the Little Lost River Sinks to 3,718 m at the summit of Diamond Peak in the Lemhi Mountains.

During the Pleistocene, increased stream flows from the Lost Streams combined to form Lake Terreton (Pierce and Scott 1982). This would likely have been the most recent connection the Little Lost River has had with other streams. However, streams may have been transferred into the Little Lost River drainage via headwater stream capture since the existence of Lake Terreton.

Complete descriptions of the geology of the Little Lost River drainage were made by Rember and Bennett (1979a and 1979b) and Bond (1978). Mundorff et al. (1963) provided an extensive description of the hydrology of the basin.

Climate

The climate of the drainage is relatively cool and dry. Annual precipitation varies from less than 25 cm at the lower end of the valley near Howe, to over 100 cm in the headwaters of Dry Creek and Wet Creek in the Lost River Mountains. Mean annual precipitation at Howe is 23.9 cm, while mean annual temperature is 6.3 °C (Table 1). Temperatures at Howe range from -39 °C to 39 °C.

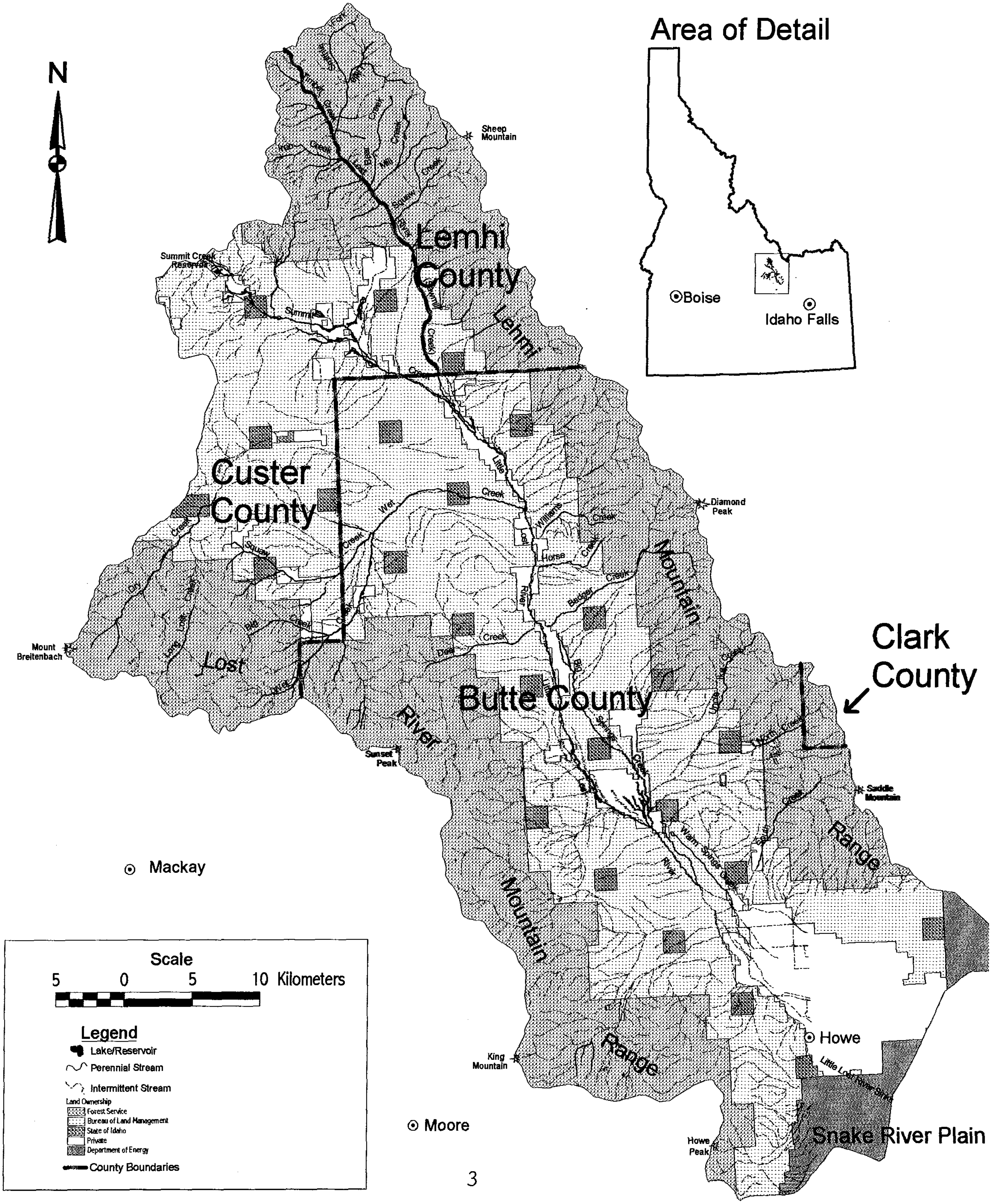

Figure 1. The Little Lost River drainage.

Table 1. Mean yearly and monthly temperature and precipitation for Howe, Idaho (1961 - 1990).

Month	Mean Temperature (°C)	Mean Precipitation (cm)
January	-8.2	1.7
February	-4.7	1.6
March	0.9	1.4
April	7.2	1.5
May	12.0	2.9
June	16.3	3.4
July	20.3	1.9
August	19.1	2.4
September	13.4	1.7
October	7.2	1.3
November	-0.6	2.0
December	-7.3	2.1
Yearly	6.3	23.9

Lands and Administration

The Little Lost River drainage is comprised of Forest Service, Bureau of Land Management (BLM), Department of Energy (Idaho National Engineering and Environmental Laboratory), State of Idaho, and private lands (Figure 1). All Forest Service lands are managed by the Lost River Ranger District of the Salmon and Challis National Forests. The Idaho Falls BLM District manages most of the BLM land in the drainage; the Salmon District manages those BLM lands in the extreme upper portion of the drainage. The extreme southern tip of the drainage is managed by the Idaho National Engineering and Environmental Laboratory. Private land in the drainage is limited and is confined primarily to agricultural land at the lower end of the valley and along the mainstem of the river. Lands belonging to the state of Idaho are scattered throughout the drainage. The entire drainage is within the jurisdiction of the Upper Snake Region of the Idaho Department of Fish and Game. The drainage includes portions of Butte, Custer, Lemhi, and Clark counties.

Methods

This report was compiled from existing data and data gathered through field work completed between 1992 and 1999. Reviews of all available office file data were made by the author at the Idaho Department of Fish and Game Upper Snake Region office in Idaho Falls, Idaho, and the U.S. Forest Service office in Mackay, Idaho. Pat Koelsch, a fisheries biologist at the BLM district office in Idaho Falls, provided pertinent data from that office. Cindy Weston, a fisheries biologist at the BLM office in Salmon, provided pertinent information from that office. Literature searches were conducted at the Eli M. Obler Library at Idaho State University; Lost Rivers Community Library in Arco, Idaho; and over the Internet. Several interviews with biologists, land managers, and local residents were also made. All of these data were reviewed and significant information included in this report. References to office file data are abbreviated as follows: Lost River Ranger District, Salmon and Challis National Forests, Mackay, Idaho: LRRD file data; Upper Snake Region, Idaho Department of Fish and Game, Idaho Falls, Idaho: USR file data; Idaho Falls District, Bureau of Land Management, Idaho Falls, Idaho: IFD file data. Fish stocking information was compiled from Idaho Department of Fish and Game stocking records. All location names were taken from the 1986 edition of the Challis National Forest map. However, Sawmill Creek was treated as part of the mainstem of the Little Lost River.

Field work to obtain current fish population data was conducted by the Lost River Ranger District of the Salmon and Challis National Forests and the Idaho Falls District of the Bureau of Land Management between 1992 and 1997. During this period the entire Little Lost River basin was inventoried.

Fish distribution was ascertained by first determining the presence or absence of a perennial stream within a subdrainage. This was done through field evaluations and/or reviews of aerial photographs. After some experimentation and field verification, it became clear that in most areas aerial photographs could be used to determine the presence and extent of perennial streams even if the stream was less than 0.5 m wide. This was due primarily to the arid nature of the drainage, which causes a sharp contrast between riparian vegetation characteristics of perennial streams and surrounding vegetation. If no perennial stream was present, the subdrainage was generally determined to be fishless and was given no further consideration.

Each perennial stream was then sampled in one or more locations to determine if fish were present. This was generally accomplished through electrofishing. A representative segment of a stream reach was selected and electrofished to determine if fish were present. When fish were not found, at least one other segment of the stream or stream reach was generally electrofished to confirm the absence of fish if it was believed the stream could support fish. The absence of fish was generally further confirmed by a visual survey. On a few extremely small streams, the absence of fish was determined by visual survey only. However, this was only done when the presence of fish was unlikely and confidence was high any fish present would be detected. If no fish were found by these methods, the stream or stream reach was considered fishless. The general location and approximate length of each sampling site in which no fish were found was recorded for future reference.

Once fish were located, or they were already known to exist in a certain reach, the population was assessed at one of two levels. Both levels involved selecting and sampling a transect representative of the stream reach. If a reach was sampled by Corsi and Elle (1989) in 1987, the same reach was generally resampled. While the exact location of some of the 1987 sites were not relocated, the sites sampled during the present study should be in the same vicinity. The first sampling level involved making a single electrofishing pass to determine species composition and length frequency. The second sampling level involved making 2 to 4 sampling passes to determine species composition, length frequency, and density. The general locations of single pass transects were recorded for future reference. The exact locations of multiple pass transects were described in detail, mapped, and/or photographed so that they could be repeated in the future. The latitude and longitude of some of these sites were also obtained with a Global Positioning System. The detailed descriptions of the transects sampled between 1992 and 1994 are on file at the Idaho Falls BLM District, 1405 Hollipark Drive, Idaho Falls, Idaho, 83401, (208) 524-7500. The detailed descriptions of the transects sampled between 1995 and 1997 are on file (file designation 2620) at the Lost River Ranger District, P.O. Box 507, Mackay, Idaho, 83251, (208) 588-2224. A general description of each transect is provided in this report.

Fish sampling involved using a backpack mounted electroshocking unit powered by a backpack mounted generator. One person carried and operated the electrofishing unit. Fish were netted by 1 to 4 personnel depending on stream size. Fish collected were held in buckets until sampling was completed. However, if extremely large numbers of fish were captured, some fish were released below the transect prior to the completion of sampling. When this occurred, it was done in a manner that prevented fish from re-entering the transect prior to the completion of sampling. Fish were anesthetized with tricaine methane-sulfonate (MS-222). Species and total length were determined and recorded. Forest Service personnel recorded the length and species for all fish captured. However, in some streams that were sampled between 1992 and 1994, the BLM only noted the presence of fish smaller than 100 mm and did not individually record their lengths. Length frequency distributions were developed using all fish captured, or in the case of some sites sampled by the BLM, all fish reported. Since the BLM did not always record the individual lengths of fish smaller than 100 mm, the presence of young-of-the-year fish is not always reflected in the length frequency distributions for sites sampled between 1992 and 1994. Snorkeling was used to assess species presence and composition in one large beaver pond. Hook and line sampling was used to assess species presence and composition in another beaver pond and one isolated stream.

Population estimates were made using the two pass and multiple pass methods described by Platts et al. (1983). This method was utilized to provide comparability with previously collected data. Because the BLM did not always attempt to capture fish under 100 mm, population estimates for reaches sampled between 1992 and 1994 are for fish 100 mm and larger. All other population estimates are for fish 70 mm and larger. After an evaluation of the data and discussion with other biologists, it became clear that determining the length of age one fish for every site would be very subjective and prone to error due to the tremendous differences in growth between sites and species. Therefore, a standard of 70 mm was set. This standard size, which should generally reflect age one and older fish, will also allow for ease in duplicating the study. Density estimates were made by dividing the population estimate by the surface area of the transect. Surface area of the transect was calculated by multiplying the mean width by the length of the transect.

Brook trout and bull trout were identified using the criteria described by Thurow (1994). Adult and subadult brook trout and bull trout were differentiated by the presence or absence of black markings on the dorsal fin. When a fish was too small to have these markings, the presence/absence of a dark band through the nostrils and the shape of parr marks were used as the criteria. Hybrids were determined by the presence of phenotypic characteristics unique only to brook trout and only to bull trout existing on an individual fish.

Sculpin species presence was determined by sampling efforts, specimen collection, and reference to other literature. Due to the difficulty of identifying sculpin to the species level, 45 voucher specimens were collected and preserved from 8 key locations in the drainage during the present study. These fish were identified by Don Zaroban at Albertson's College of Idaho. These specimens are now in the Albertson's College of Idaho fish collection. No attempt was made to determine a population estimate for sculpin.

Sculpin distribution was determined by noting the presence or absence of sculpin at each site sampled. Since only 1 sculpin species was found at the 8 sites from which specimens were collected and this same species is the only sculpin species reported in the drainage by others (see Andrews 1972, Simpson and Wallace 1982, University of Michigan Museum of Zoology), it was assumed that this was the species observed at all sites.

The total stream lengths reported in the stream descriptions were generally obtained from topographic maps using a map wheel. Although care was taken to ensure the accuracy of this work, the scale of the maps results in an underestimate of the actual stream length. However, the Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) physically measures the entire stream reach. Therefore, R1/R4 reach lengths are actual stream lengths. For example, a topographic map indicated Big Creek was 6.6 km long while the R1/R4 fish habitat inventory indicated the reach was actually 7.9 km long. However, since R1/R4 data are not always available for a stream or stream reach, the stream lengths reported in the text are those calculated from topographic maps.

Data obtained in this study were used to revise the existing surface water map coverage on the Geographic Information System at the Lost River Ranger District. Existing arcs in the map coverage were reattributed according to the stream type (perennial or intermittent) found in this study. The coverage is now believed to be accurate to ±500 m, although streams may experience some annual variation.

The surface water map coverage was then used as a base layer for developing a map coverage depicting fish species distribution. Fish species distribution was determined by projecting the occurrence of fish species found at sampling sites up and down perennial stream reaches. Stream gradient, barriers, size of flow, and field observations were used to determine the upstream limit of fish distribution. For consistency, the distribution of one species was generally not projected through another sampling site if the species was not found at that site. However, it should be noted that species may occasionally occur in or move through these reaches although they were not found during sampling. Likewise, this layer does not project fish distribution into intermittent streams although they may occasionally occupy these reaches and use them for movement between perennial reaches.

FINDINGS AND DISCUSSION

Fish populations were assessed in a total of 171 stream sections (Figure 2). One-hundred-thirty-five sites were sampled by electrofishing, 27 by visual observation, 6 by a combination of electrofishing and visual survey, 2 by hook and line, and 1 by snorkeling. A complete summary of the field sampling effort conducted during this study is presented in Appendices A and B. For organizational purposes, the results have been divided into 4 separate sections. These are Part 1: History and Overview; Part 2: Species; Part 3: Subdrainages; and Part 4: Lakes and Reservoirs.

Part 1: History and Overview

This section presents a general overview of the water, fish, and fish management in the Little Lost River drainage.

Water

Streams

During the present study, 491 km of perennial stream, 40 km of perennial stream/marsh, and 2,453 km of intermittent stream were found in the drainage (Figure 3). Each subdrainage and/or stream is described in Part 3.

Discharge - Discharge in most streams varies drastically from month to month and year to year. Peak stream flows occur in June, while minimum flows occur in December and January (Table 2). However, streams fed primarily by large springs such as Big Springs Creek, Deer Creek, Fallert Creek, Summit Creek, and Warm Springs Creek have little variability in their discharge (personal observation).

Temperatures - Until recently, stream temperature data in the drainage were limited. The BLM collected stream temperature data in the drainage during the summer and fall of 1987, 1988, 1994, and 1995 (Appendix D). The Forest Service collected data in 1995 and 1996 (Appendix D). In 1997, an interagency effort resulted in the continuous monitoring of summer and fall water temperatures at 43 locations (Figure 4, Appendix E). This monitoring indicates maximum stream temperatures generally occur in late July and early August. The highest recorded stream temperature (with the exception of Barney Creek) was 27°C in the Little Lost River (Sawmill Creek) above Summit Creek in July 1994. Barney Creek, a stream fed by a warm springs, was 29°C at its source (Barney Hot Springs) in June 1996 and May 1997.

Lakes and Reservoirs

There are 17 lakes, 1 reservoir, 3 dysfunctional reservoirs, and several private ponds in the Little Lost River drainage (Gamett 1990b, LRRD file data, personal observation). All of the lakes in the drainage are small (less than 6 hectares) mountain lakes. The lakes and reservoirs are described in detail in Part 4.

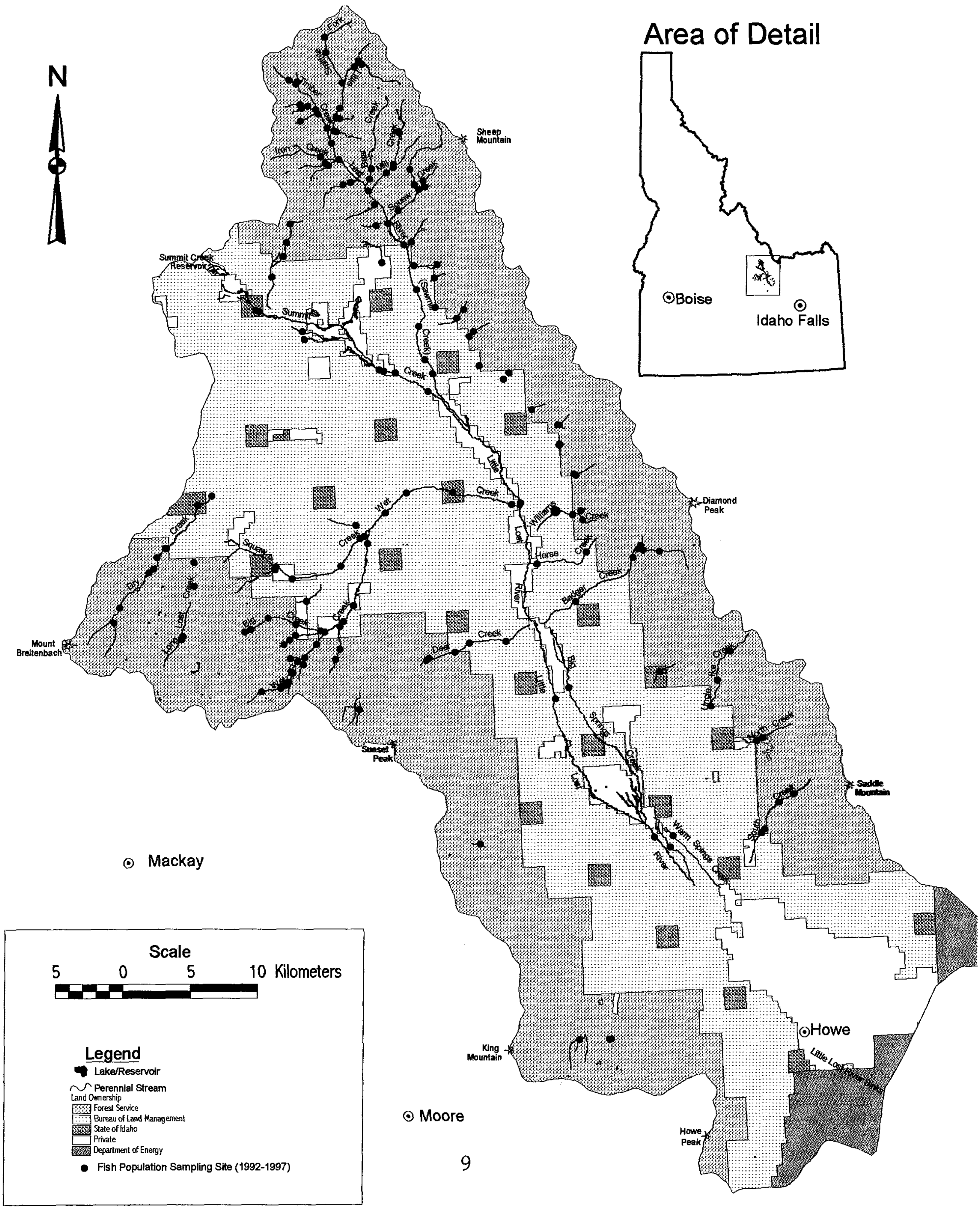

Figure 2. Sites sampled in the Little Lost River drainage during the present study to obtain fish population data.

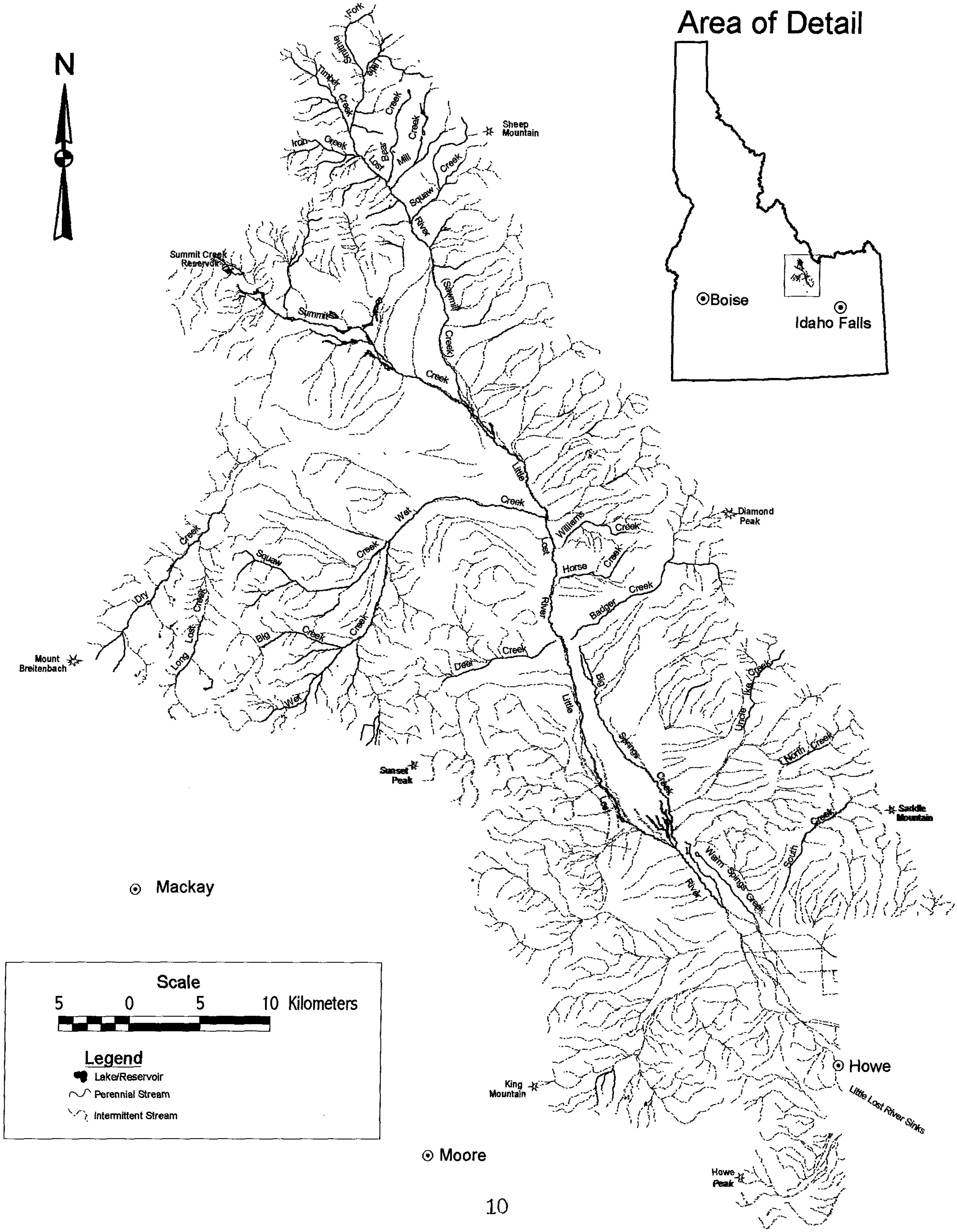

Figure 3. Perennial streams, intermittent streams, and lakes and reservoirs in the Little Lost River drainage as determined from the present study.

Table 2. Mean and annual discharges (m^3/s) for Little Lost River (adapted from Stone et al. 1993).

	Little Lost River (Sawmill Creek[a])			Main Stem below Wet Creek[b]			Main Stem near Howe[c]		
Month	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
January	0.45	0.62	0.26	0.65	1.50	0.10	0.76	1.39	0
February	0.48	0.62	0.37	0.71	1.27	0.25	1.00	2.27	0
March	0.51	0.76	0.37	1.05	1.64	0.51	1.56	3.17	.048
April	0.96	2.27	0.48	1.87	4.59	0.68	2.38	4.93	1.13
May	4.22	8.98	1.53	3.94	7.39	1.50	3.82	6.17	2.07
June	5.66	11.53	1.33	5.55	10.03	2.29	4.64	6.77	2.66
July	1.67	3.17	0.62	2.83	5.89	0.96	3.03	5.52	1.42
August	0.82	1.47	0.42	1.78	3.99	0.74	2.12	3.23	1.25
September	0.68	1.05	0.45	1.70	3.62	0.76	2.04	3.14	1.36
October	0.59	0.85	0.40	1.70	2.86	0.93	2.12	3.29	1.30
November	0.54	0.88	0.40	1.13	1.98	0.48	1.64	3.03	0.85
December	0.48	0.96	0.26	0.62	1.33	0.23	0.88	1.61	0
Annual	1.42	2.18	0.68	1.95	3.26	0.91	2.18	3.00	1.39

[a] Data from 1961-1973.
[b] Data from 1959-1990.
[c] Data from 1941-1981, 1986-1990.

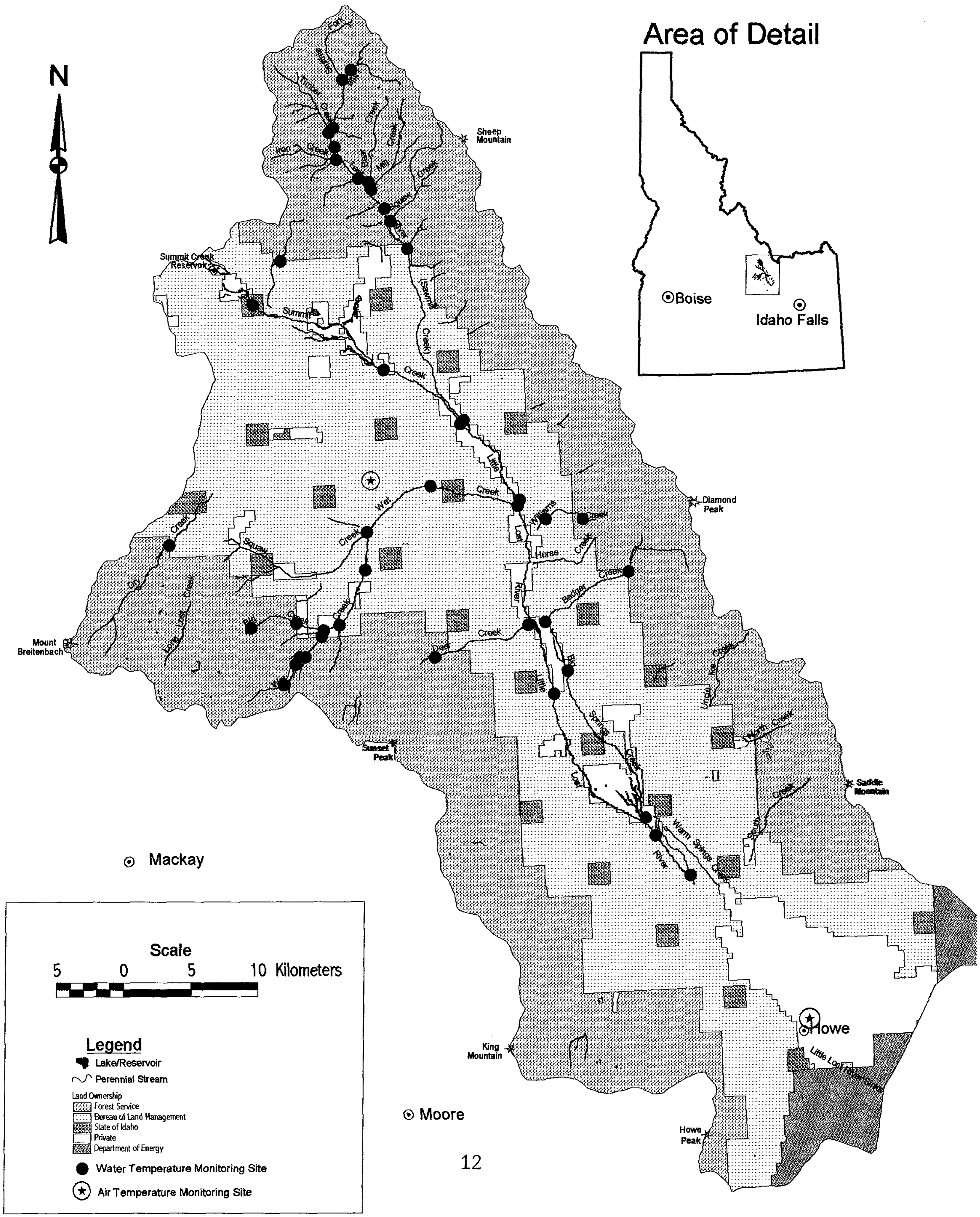

Figure 4. Temperature sites monitored in the Little Lost River drainage in 1997.

Species Present

Eleven species of fish and 2 hybrids have been documented in the Little Lost River drainage. These include bull trout *Salvelinus confluentus*, brook trout *Salvelinus fontinalis*, rainbow trout *Oncorhynchus mykiss*, cutthroat trout *Oncorhynchus clarki*, rainbow trout x cutthroat trout *Oncorhynchus mykiss x Oncorhynchus clarki*, brook trout x bull trout *Salvelinus fontinalis x Salvelinus confluentus*, grayling *Thymallus sp.*, shorthead sculpin *Cottus confusus*, guppy *Poecilia reticulata*, green swordtail *Xiphophorus helleri*, amelanic convict cichlid *Cichlasoma nigrofasciatum*, Mozambique tilapia *Tilapia mossambica*, and goldfish *Carassius auratus* (present study, Gamett 1990a, Gamett 1990b, Corsi and Elle 1989, Courtenay et al. 1987, Elle et al. 1987, Corsi et al. 1986, Corsi and Elle 1986, Ball and Jeppson 1978, Jeppson and Ball 1978, Andrews 1972, USR file data, LRRD file data, IFD file data, University of Michigan Museum of Zoology [UMMZ]). Mountain whitefish *Prosopium williamsoni* have not been found in fish collections completed in the drainage. However, local residents indicate whitefish were present in the Little Lost River in the early 1900's (James Waymire, local resident, personal communication). Although not documented, brown trout *Salmo trutta* have apparently been caught in the lower portion of the drainage in recent years (Will Marcroft, LRRD, personal communication). A single introduction of golden trout *Oncorhynchus aguabonita* did not establish a population. A drainage wide overview of each of these species is presented in Part 2.

Species Origin

It is unclear which species of fish were native to the Lost Streams including the Little Lost River. The lack of an overland stream connection between the Lost Streams and other drainages currently prevents fish from gaining access to these drainages. While it is obvious that brook trout, brown trout, guppy, green swordtail, amelanic convict cichlids, Mozambique tilapia, goldfish, and all mountain lake populations are the result of introductions, other species may have been naturally established in the Lost Streams during ancient exchanges of water with other drainages. Yet authors disagree as to which species are native and the manner in which they were established.

Hubbs and Miller (1948) described the fish of the "Mud Lake-Lost River group of streams" as follows:

In the several streams (Camas, Medicine Lodge, and Birch creeks, and Little Lost and Lost rivers) we found 3 species: an endemic species of cutthroat trout; the Dolly Varden trout (probably a Glacial relict, rather than an introduced fish); and 5 highly localized, endemic subspecies or races in the genus Cottus. None of these species are Bonneville types, despite the fact that the stream complex lies in the upper part of the Snake River systems, which in general has a Bonneville fauna... These fishes seem to be relicts of the old Snake River fauna, as it existed prior to the time of the destructive lava flows and of the Lake Bonneville discharge.

This account is based on fish collected from these streams by Carl Hubbs in 1934 (R. Miller, personal communication, UMMZ). These records indicate that 4 sites in the Little Lost River drainage were sampled on July 19 and 20. Species collected in the Little Lost River drainage were rainbow trout, shorthead sculpin, one brook trout, one bull trout, and one rainbow trout x cutthroat trout hybrid.

In his field notes (UMMZ), Carl Hubbs recorded the following for the collection site on the Little Lost River between Badger Creek and Wet Creek:

Two boys along stream who fish it say that there are only rainbow trout, bull trout and bullheads. Catch bullheads at night with light. They didn't know which of the fish were introduced.

Dr. Baker, druggist of Mackay, and a long-time resident of the region, believes that the bull trout are native of the region.

Andrews (1972) believed cutthroat trout, bull trout, shorthead sculpin, and mountain whitefish were native to the Lost Streams. He believed these fish represented species from both the Snake River and Salmon River drainages. Drawing on other literature, he described the events that he believed led to the establishment of these species in the Lost Streams. He believed that prior to the Pleistocene, the Snake River was flowing down the middle of the Snake River Plain. At that time, the present day Pahsimeroi River and Little Lost River, Big Lost River and Warm Spring Creek, and Birch Creek and Lemhi River each formed single streams that drained into the Snake River. During this time, cutthroat trout and mountain whitefish were established in the Lost Streams from the Snake River. Pleistocene volcanic activity then pushed the Snake River southward and severed its connection with the Lost Streams. Uplifting and faulting separated the streams into the present day drainage pattern with the Big Lost River, Little Lost River, and Birch Creek flowing southward and sinking into the Snake River Plain and the other streams draining northward into the Salmon River. At some time, bull trout and shorthead sculpin were established in the Lost Streams through headwater stream capture from the Salmon River drainage.

Behnke (1992) believed bull trout, cottid sculpin, and possibly cutthroat trout were native to the Lost Streams. He reported:

The question of the native trout of the Lost River streams remains open. The other fish species native to these streams - bull trout and cottid sculpins - are also found in the Salmon River drainage but not in the upper Snake River. My interpretation is that Pleistocene volcanic eruptions eliminated all fish life from these streams and buried their connections with the upper Snake River. Subsequently, headwater stream transfers from the Salmon River system established the present fauna. If this is true, westslope cutthroat trout would be the native trout of the Lost River streams unless the transfer occurred at a time when Yellowstone cutthroat trout inhabited the Salmon River drainage.

However, Van Eimeren (1996) and Rieman and Apperson (1989) both concluded that westslope cutthroat trout *O. c. lewisi*, the cutthroat trout subspecies present in the Salmon River drainage, were not native to the Lost Streams. Similarly, May (1996) concluded Yellowstone cutthroat trout *O. c. bouvieri*, the cutthroat trout subspecies present in the upper Snake River drainage, were not native to the Lost Streams. Although Thurow et al. (1988) indicated Yellowstone cutthroat trout were present in the Lost Streams, they did not know if these fish were native.

Simpson and Wallace (1982) depicted the rainbow trout of the Lost Streams as introduced. However, Corsi and Elle (1989) reasoned that headwater stream capture may have established this species in the Lost Streams from the Salmon River drainage.

Thurow et al. (1997) and Lee et al. (1997) concluded that rainbow trout, Yellowstone cutthroat trout, and westslope cutthroat trout were likely not native to the Little Lost River drainage. However, Rieman et al. (1997) and Lee et al. (1997) concluded that bull trout were likely present in the drainage prior to European settlement.

It is also possible that trout were not native to the Little Lost River drainage. Early historical accounts indicate that trout were not present in the Big Lost River or Birch Creek drainages prior to their introduction in the late 1800's (Locke 1929, Sonnenkalb 1925, Oberg 1970). If trout were not present in the Little Lost River drainage, early European settlers, who first arrived in 1879 (Anna Sermon, valley historian, personal communication), may have introduced them from the Pahsimeroi River drainage. It is also possible that bull trout moved into the Little Lost River through a small canal from the Pahsimeroi River drainage. This canal, which was probably built in the late 1800's by the Swauger family (Robert R. Mays, local resident, personal communication), delivers water from Big Gulch Creek in the Pahsimeroi River drainage to the upper portion of the Little Lost River drainage. Bull trout are present in Big Gulch Creek and can move into the upper portion of the Little Lost River drainage through this canal (personal observation).

Although these theories give much insight as to the possible native fish of the Little Lost River and their origins, they differ greatly from each other. Only with additional research will the correct native species and means of origin be established.

Previous Work

Historical data (before 1950) relating to fish in the Little Lost River drainage is scarce. The earliest reference to fish in the Little Lost River drainage that could be located is provided by Williams et al. (1973). This unpublished family history gives an account of the Williams family settling in the Little Lost River valley in the 1880's. The account indicates that the "...streams were full of fish." It also mentions the "enormous" fishing catches on the Little Lost River between Warm Creek and Squaw Creek. An additional early reference is provided by Anna Sermon, a local resident and valley historian (personal communication). Her great-grandparents, who were settlers to the valley, indicated that in the 1880's there were lots of fish in the river. She also indicated that fish were an important food source for early residents of the valley. For example, her family would eat about 500 fish per year. Another reference to fish in the Little Lost River is provided by Mullen (1970). This account details the author spending the summer of 1904 mining in the Little Lost River valley. He indicates that the stream near the mine was "teaming" with trout. Based on his description and direction and length of travel, it appears he was in the headwaters of Sawmill Canyon. The next reference to fish in the Little Lost River is found in the University of Michigan's ichthyological collection. These records indicate that Carl Hubbs collected fish from 4 locations in the drainage in July 1934. This work was later referenced by Hubbs and Miller (1948) (R.R. Miller, University of Michigan, personal communication). FWPWPA (1937) indicates rainbow trout were "especially common" in the Little Lost River. Andrews (1972) sampled five sections of the mainstem in 1970. Ball and Jeppson (1978), Jeppson and Ball (1978), and USR file data provide creel census data collected between 1967 and 1979. Keller and Burnham (1982) and Keller et al. (1979) describe a grazing exclosure project on Summit Creek and the response of the fish population and habitat. Corsi et al. (1986), Corsi and Elle (1986), and Elle et al. (1987) describe sampling efforts completed by the Idaho Department of Fish and Game in the early and mid 1980's. Corsi and Elle (1989) conducted an intensive study of fish populations in the drainage in 1987. Bruhn (1990) describes a BLM grazing exclosure project on Wet Creek and the response of the fish population and habitat. Gamett (1990a, 1990b) and LRRD file data describe mountain lake fish populations.

Fishery Management History

The Little Lost River drainage has an extensive history of fish introductions (Table 3). Species introduced have included rainbow trout, cutthroat trout, brook trout, mountain whitefish, golden trout, and grayling. Although not introduced by the Department of Fish and Game, brown trout have apparently been introduced into the lower portion of the drainage. The presence of guppy, green swordtail, amelanic convict cichlids, Mozambique tilapia (Courtenay et al. 1987) and goldfish (USR file data) in Barney Hot Springs indicate these species have also been introduced. Idaho Department of Fish and Game records indicate fish had been introduced into the Little Lost River drainage by at least 1915. At that time, 10,000 rainbow trout and 15,000 brook trout were stocked. Likewise, cutthroat trout may have been introduced into Dry Creek in 1915 (see Part 2: Species, Cutthroat Trout). Since that time, fish have been stocked into the mainstem (including Sawmill Creek) and every major tributary including Badger Creek, Big Creek, Big Springs Creek, Deer Creek, Dry Creek, Mill Creek, Summit Creek, Uncle Ike Creek, Wet Creek, and possibly Squaw Creek. Fish have also been introduced into Big Creek Lake #2, Copper Lake, Mill Creek Lake, Nolan Lake, Shadow Lake #1, Shadow Lake #2, Swauger Lake #1, Swauger Lake #2, and Dry Creek Reservoir. Undoubtedly, unrecorded fish introductions have also taken place throughout the drainage.

With the exception of Big Springs Creek and mountain lakes, the Little Lost River drainage has been managed for wild trout production since 1985. Hatchery introductions into most streams began to be phased out in the 1970's and early 1980's. With the exception of Big Springs Creek and mountain lakes, hatchery introductions were completely discontinued in the drainage after 1984. Currently, Big Springs Creek is stocked with catchable rainbow trout (Bruce Rich, IDFG, personal communication). Swauger Lake #1, Swauger Lake #2, Mill Creek Lake, and Upper Big Creek Lake are stocked every 3 years with cutthroat trout fry.

In 1994, wild trout regulations were implemented in the majority of the drainage. Prior to that time, the Little Lost River drainage was managed under a general trout regulation. The wild trout regulation allows for the harvest of 2 trout per day in the river and tributaries above Big Springs Creek. The drainage below Big Springs Creek, Big Springs Creek, and high mountain lakes remain under the statewide general trout regulation, which allows 6 trout to be harvested. However, only 2 cutthroat trout or cutthroat trout hybrids may be harvested from any drainage stream. The statewide regulation allowing an additional 10 brook trout remains in effect throughout the drainage. As with most of the state, bull trout harvest was closed in 1994.

Creel census data were periodically gathered from drainage streams between 1967 and 1987 (see Ball and Jeppson 1978; Jeppson and Ball 1979; Corsi and Elle 1989; USR file data) and from mountain lakes in 1990 and 1994 (see Gamett 1990a and LRRD file data) (see Table 4 for drainage summaries; Appendix C for complete results). Catch rates for salmonids in drainage streams averaged 1.4, 1.3, and 1.6 fish/hour in 1977, 1978, and 1987, respectively (Ball and Jeppson 1978; Jeppson and Ball 1979; Corsi and Elle 1989).

Catch rates for rainbow trout in drainage streams remained relatively unchanged following the cessation of hatchery introductions. In 1978, catch rates for all rainbow trout (both wild and hatchery) from drainage streams was 1.1 fish/hour (review of Jeppson and Ball 1979). In 1987, after stocking had been discontinued in all but Big Springs Creek, catch rates for rainbow trout were 1.2 fish/hour (review of Corsi and Elle 1989).

Table 3. Summary of waters and species stocked in the Little Lost River drainage (adapted from Idaho Department of Fish and Game stocking records).

Water	Species Planted
Badger Creek	rainbow trout, brook trout
Big Creek	rainbow trout, cutthroat trout, brook trout
Big Creek Lake #2	rainbow trout, cutthroat trout
Big Springs Creek	rainbow trout
Copper Lake	cutthroat trout
Deer Creek	rainbow trout
Dry Creek	rainbow trout, cutthroat trout
Dry Creek Reservoir	rainbow trout
Little Lost River (including Sawmill Creek)	rainbow trout, brook trout, cutthroat trout, mountain whitefish[a]
Mill Creek	rainbow trout, brook trout[b], cutthroat trout[b]
Mill Creek Lake	rainbow trout, cutthroat trout, grayling
Nolan Lake	golden trout
Shadow Lake #1 (lower)	cutthroat trout
Shadow Lake #2 (upper)	rainbow trout, cutthroat trout
Squaw Creek	brook trout[b], cutthroat trout[b]
Summit Creek	rainbow trout
Swauger Lake #1 (lower)	rainbow trout, cutthroat trout
Swauger Lake #2 (upper)	cutthroat trout
Uncle Ike Creek	brook trout
Wet Creek	rainbow trout, cutthroat trout

[a] These fish are recorded as "whitefish" from "MACKAY SALVAGE". Likely these were mountain whitefish *Prosopium williamsoni* salvaged from the Big Lost River drainage.

[b] The stocking records indicate that these fish were stocked into Mill Creek and Squaw Creek in Custer county. However, it is not clear if these particular species were stocked into these streams in the Little Lost River or another stream in Custer county with the same name.

Table 4. Mean angler catch rates and species composition for the Little Lost River drainage.

Year	# Anglers Interviewed	Hours Fished	Fish/ Hour	Species Composition Wrb	Hrb	Bk	Bl	Ct	Source
1987	47	73.5	1.6	78		6	16		Corsi and Elle 1989
1978	157	309	1.3	61	21	16	2		Jeppson and Ball 1979
1977	350	691	1.4	35	46	14	4	1[a]	Jeppson and Ball 1978

[a] USR file data indicates all of these cutthroat trout were caught in Dry Creek.

Habitat Management History

Several fisheries habitat improvement/restoration projects have been implemented in the Little Lost River drainage. Each of these projects is summarized under the tributary in which it took place.

Between 1994 and 1997, fish habitat data were gathered from drainage streams using the Forest Service R1/R4 (Northern/Intermountain Regions) Fish and Fish Habitat Inventory Procedures described by Overton et al. 1997 (Appendix F). By the end of 1997, the survey had been completed on all fish bearing streams on National Forest lands in the drainage. In addition, habitat data have been collected by the Idaho Falls and Salmon BLM districts.

Part 2: Species

Introduction

Bull trout, brook trout, rainbow trout, cutthroat trout, rainbow trout x cutthroat trout hybrids, brook trout x bull trout hybrids, grayling, shorthead sculpin, guppy, green swordtail, amelanic convict cichlids, Mozambique tilapia, and goldfish have been documented in the Little Lost River drainage (present study, Gamett 1990a, Gamett 1990b, Corsi and Elle 1989, Courtenay et al. 1987, Elle et al. 1987, Corsi et al. 1986, Corsi and Elle 1986, Ball and Jeppson 1978, Jeppson and Ball 1978, Andrews 1972, USR file data, UMMZ). During the current study, salmonids were found to occupy most streams in the basin (Figure 5). Mountain whitefish have not been found in fish collections completed in the drainage. However, local residents indicate whitefish were present in the Little Lost River in the early 1900's (James Waymire, local resident, personal communication). Although not documented, brown trout have apparently been caught in the lower portion of the drainage in recent years (Will Marcroft, LRRD, personal communication). A single introduction of golden trout did not establish a population. A drainage wide overview of each of the species is presented below.

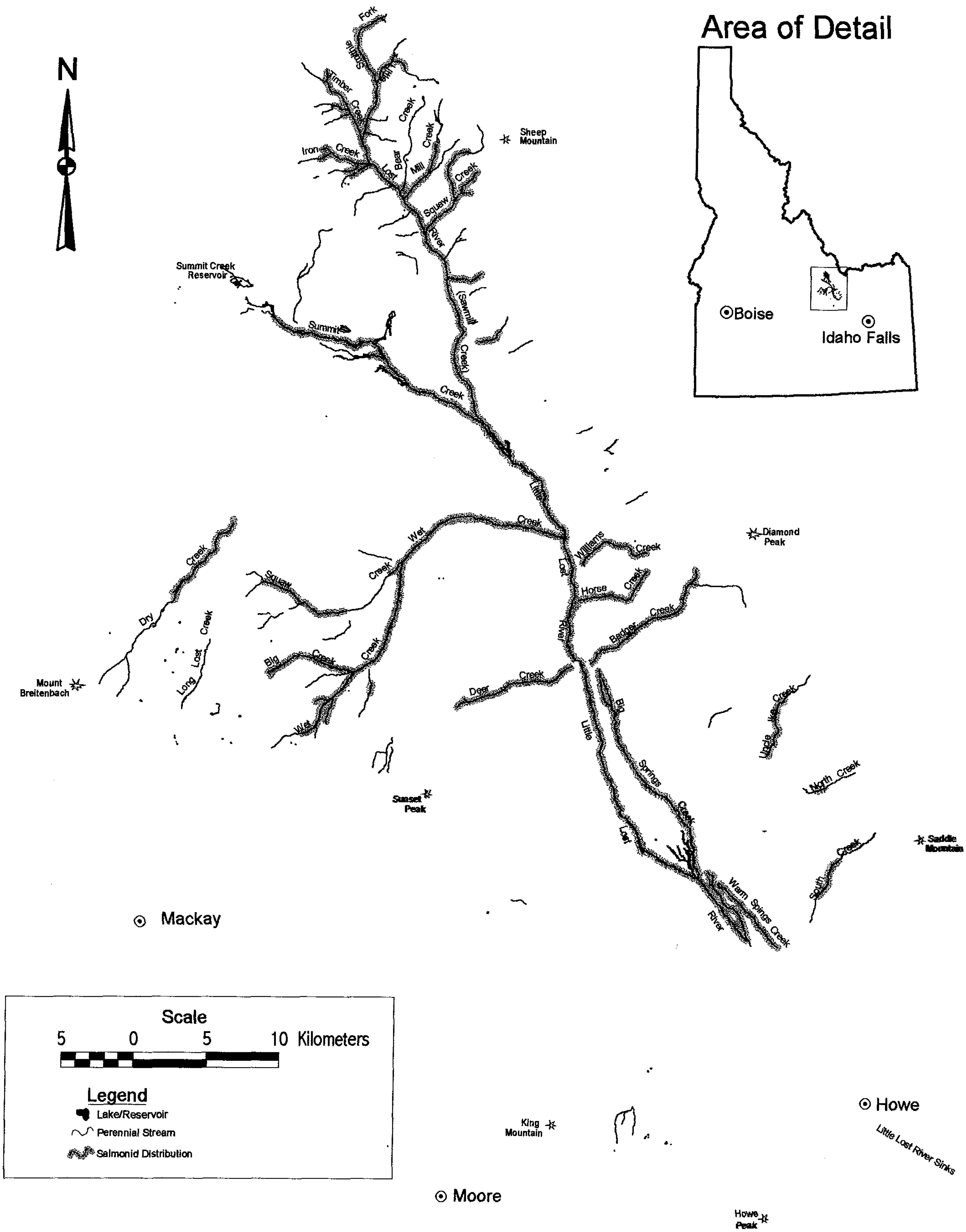

Figure 5. Current distribution of all salmonids in the Little Lost River drainage (present study).

Bull Trout

Distribution

Although bull trout are widely distributed in the drainage, their distribution is fragmented. Data collected during the present study indicate bull trout occupy approximately 164 km of stream (Figure 6). Bull trout are the only salmonid present in approximately 32 km of stream. During the present study, bull trout were found in the upper reach of Badger Creek, the upper reach of Big Creek, the lower reach of Bunting Canyon Creek, the lower reach of Camp Creek, Firebox Creek, Hawley Creek, Iron Creek, Jackson Creek, the mid and upper reaches of the mainstem (including Sawmill Creek), Mill Creek, Quigley Creek, Redrock Creek, Smithie Fork, an unnamed tributary to Smithie Fork, Summit Creek, Timber Creek, Squaw Creek (Sawmill Canyon), North Fork Squaw Creek, the lower reach of Slide Creek, the upper reach of Warm Creek, Wet Creek (except the mid section), and Williams Creek. Bull trout comprised 25% or more of the salmonids captured in the lower reach of Bunting Canyon Creek, the lower reach of Camp Creek, Firebox Creek, Hawley Creek, Iron Creek, Jackson Creek, the mainstem (including Sawmill Creek) above Iron Creek Road, Mill Creek, Quigley Creek, Redrock Creek, the lower reach of Slide Creek, Smithie Fork, an unnamed tributary to Smithie Fork, upper Squaw Creek (Sawmill Canyon), North Fork Squaw Creek, Timber Creek, the upper reach of Warm Creek, the lower and upper reach of Wet Creek, and Williams Creek.

Some bull trout populations were highly localized. For example, in Wet Creek 2 sampling sites located 6 km apart suggested bull trout were not present in the upper portion of the stream. However, at the request of the BLM, an additional site was sampled midway between these 2 sections and bull trout were found. Additional sampling indicated a relatively large, undocumented bull trout population occupied the section of stream between the 2 initial sampling sites. Similar localization was found in Warm Creek. Only rainbow trout were found in Warm Creek 400 m above the Little Lost River in June 1995. However, only bull trout were collected at a site approximately 3 km above the Little Lost River the same day. This degree of localization can make the detection of bull trout extremely difficult even with intensive sampling efforts and could result in bull trout going undetected in a stream or watershed.

Historic Distribution

It is difficult to determine the precise distribution of bull trout in the Little Lost River drainage prior to the arrival of European man. Likely, bull trout were historically present in all streams in which they are currently found. The presence of bull trout in the mainstem near Howe in 1983 (Corsi et al. 1986) prior to the annual dewatering of this section of stream indicates that bull trout occupied the entire mainstem from the headwaters to the sinks. Although not found in the present study or in 1987 (Corsi and Elle 1989), creel census data indicate bull trout were present in Big Springs Creek as recent as 1977 (Appendix C). Similarly, bull trout were found in lower Squaw Creek in the Wet Creek drainage in 1987 (Corsi and Elle 1989). However, bull trout were not collected from Squaw Creek during the present study. Apparently, bull trout were also historically present in Dry Creek. Jesse Strope, who moved to the Little Lost River valley in 1910, indicated that in the 1920's he caught only "dolly varden" in Dry Creek Reservoir and Dry Creek above the reservoir (personal communication). Rob Stauffer, an area resident, indicated that in the early 1960's "dolly varden" comprised about 10% of the fish he caught in Dry Creek (personal communication).

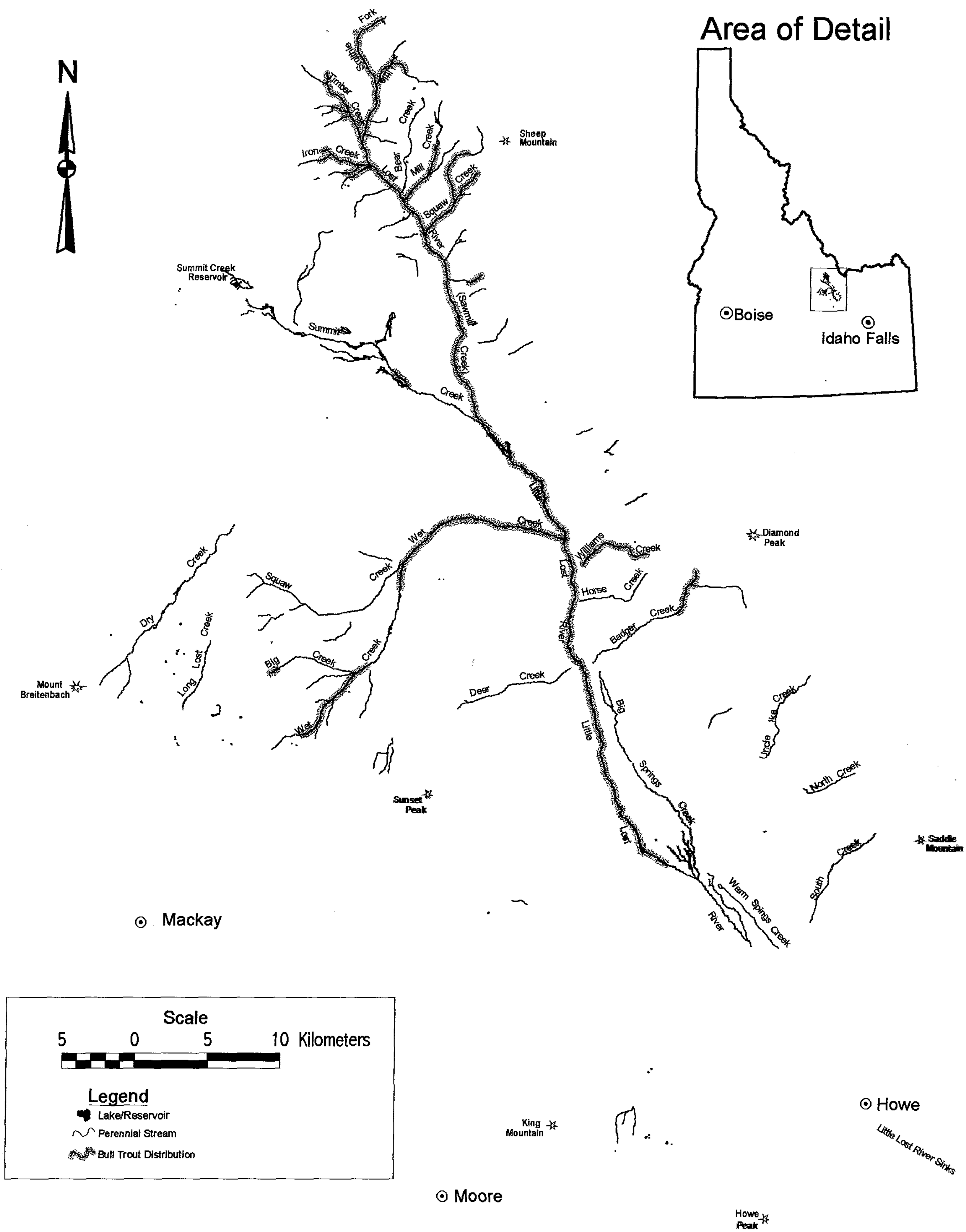

Figure 6. Current distribution of bull trout in the Little Lost River drainage (present study).

An early record of bull trout in Wet Creek was made by Carl Hubbs while collecting fish in the area during the summer of 1934 (UMMZ). Although he did not collect any bull trout from Wet Creek (see Wet Creek in Part 3), he recorded the following in his field notes:

> *Dr. Baker, druggist of Mackay and a long-time resident of the region, says that there are several "bottomless holes" in the course of Wet Creek, which until they were dynamited a few months ago were "full" of bull trout (Dolly Vardens).*

Although bull trout were present in the mainstem below Summit Creek in the early part of this century, two accounts suggest they were not abundant in this reach. Wilma Mays has been a resident of the Little Lost River valley since she was born there in 1919 (personal communication). She first fished the stream with a safety pin, piece of white twine from the grocery store, and a green willow. She indicated that in the 1920's, most of the fish she caught in the mainstem near Williams Creek were rainbow trout. "Dolly varden" were not very abundant. In the mainstem below Summit Creek in the 1930's and 1940's, only about 1 in 25 or 30 fish were bull trout and the remainder were rainbow trout. The bull trout caught were approximately 150 to 175 mm in length. She does not remember any brook trout at that time. Similarly, in 1934, Carl Hubbs collected fish from the Little Lost River between Badger Creek and Wet Creek with a seine (UMMZ). He collected 2 rainbow trout (136 mm and 56 mm), one bull trout (136 mm), and shorthead sculpin (22 mm). Anna Sermon, a local resident and valley historian, has fished in the drainage since about 1938 (personal communication). In the 1940's, her family fished in the drainage all but about five days each season. In the river below Big Springs Creek, they caught about 300 fish each year. In the same area, they would also catch about 100 fish annually from irrigation ditches when they went dry. However, only about 2 or 3 of the 400 fish caught each year in this area were bull trout.

Accounts from anglers suggest bull trout were not historically present in Deer Creek and Horse Creek. Anna Sermon has fished Deer Creek since about 1938 (personal communication). However, she has never caught a bull trout in that stream. In addition, her family often fished Deer Creek between the late 1930's and the late 1940's. Although they would catch between 50 and 150 fish in Deer Creek on a single outing, none of the fish were bull trout. Neil Reed, who has fished the Little Lost River drainage since the late 1930's, regularly fished Horse Creek. However, he has never caught a bull trout from that stream (Anna Sermon, valley historian, personal communication).

It is likely that bull trout were not able to become established in many streams and stream reaches due to their natural isolation. Some isolated streams such as Uncle Ike Creek, South Creek, Summerhouse Canyon Creek, and Hurst Canyon Creek have probably not had connections to other streams in the drainage for hundreds or thousands of years. Other stream reaches, such as the upper portion of Long Lost Creek, are isolated by large waterfalls. If bull trout invaded the Little Lost River basin after these streams or stream reaches became isolated, they would not have been able to access these streams. It is also possible that bull trout were never abundant or present in some streams with naturally high water temperatures such as Deer Creek, Horse Creek, and Summit Creek.

Life History Strategies

Bull trout in the Little Lost River use both resident and fluvial (migratory) life-history strategies. Resident fish spend their entire lives in small streams such as Williams Creek while fluvial fish spend a portion of their lives in the mainstem and migrate to headwater streams to spawn. Similarly, Fraley and Shepard (1989) found both resident and migratory forms of bull trout in the Flathead River drainage in Montana.

Bull trout in the mainstem (including Sawmill Creek) below Iron Creek Road are fluvial and migrate to headwater streams to spawn. During the current study, the smallest bull trout captured in the mainstem below Iron Creek Road (10 sampling sites) was 151 mm in length. Other data from below the Forest boundary (Corsi et al. 1986; Corsi and Elle 1986; Elle et al. 1987; Corsi and Elle 1989) also indicates a lack of small bull trout in the mainstem below this point. In 1987, Corsi and Elle (1989) found age one and age 2 bull trout in the Little Lost River drainage were 99 mm and 155 mm in length, respectively. The lack of young-of-the-year and age one bull trout in the mainstem below Iron Creek Road indicate that these fish are migrating elsewhere to spawn.

It appears the primary spawning areas for fluvial fish are tributary streams in the Sawmill Canyon drainage. Large bull trout over 300 mm in length have been observed in many streams in Sawmill Canyon in July, August, and/or September (present study, Corsi and Elle 1989), the spawning period. The large size of these fish relative to the size of the stream suggests they are migrant spawners that have moved into these streams to spawn. If this is true, some bull trout may be currently migrating over 30 km to spawn and historically may have moved over 80 km, the length of the river. The high densities of young bull trout in Smithie Fork, the mainstem above Smithie Fork, and Firebox Creek suggest these streams are the most important spawning and rearing tributaries for fluvial bull trout. In 1995, bull trout densities (fish >70 mm) were as high as 30.3 fish/100m^2 in Smithie Fork and 20.4 fish/100m^2 in the mainstem above Smithie Fork.

The size of bull trout in Big Creek suggests they are also part of a fluvial population. Creel census and electrofishing data indicate that bull trout up to 430 mm have been caught in Big Creek (USR file data, personal observation). In 1994, a 389 mm bull trout was captured immediately below the large beaver pond near the head of Big Creek. Another fish measuring 455 mm that appeared to be a brook trout x bull trout hybrid was captured in the same location. In 1997, an angler caught a 635 mm, 3.9 kg brook trout x bull trout hybrid from the large beaver pond (Big Creek Lake) near the head of Big Creek. The large size of these fish relative to the size of the stream suggests they may be fluvial fish that have migrated into Big Creek to spawn. If so, they are likely migrating from lower Wet Creek and/or the mainstem of the Little Lost River.

Likewise, some of the bull trout found in the upper reach of Wet Creek may be fluvial fish. Bull trout over 300 mm in length were observed while snorkeling in the beaver ponds immediately below Hilts Creek on July 2, 1996. The large size of these fish relative to the size of Wet Creek suggests they are fluvial fish and have migrated into these areas to spawn. As with Big Creek, they are likely migrating from lower Wet Creek and/or the mainstem of the Little Lost River. Length frequency data suggest the bull trout in Wet Creek above the falls located 0.8 km above Hilts Creek are resident fish. It is likely that the old diversion structure, falls, and cascades below this population limit the migration of fish upstream into this reach.

There is not sufficient data to determine if the bull trout found in Mill Creek, Quigley Creek, Squaw Creek (Sawmill Canyon), Slide Creek, North Fork Squaw Creek, Warm Creek, and Badger creeks are associated with a fluvial population. Length frequency distribution data and length at sexual maturity suggest that the bull trout in upper Squaw Creek (Sawmill Canyon) are resident fish. It is likely that fluvial bull trout from the mainstem historically used all of these streams for spawning and rearing. However, the bull trout currently found in these streams may now only comprise remnants of a former fluvial population that has reverted to residency. In addition, resident fish may be sympatric with fluvial fish in streams like Smithie Fork, although this distinction is difficult.

Although fluvial bull trout likely historically migrated into Williams Creek, these fish are now resident. Williams (1973) indicates that Williams Creek has been used for irrigation purposes since the late 1800's. Currently, Williams Creek is permanently diverted from the mainstem of the Little Lost River. As a result, bull trout are not able to migrate into Williams Creek.

Diet

The diet of bull trout in the Little Lost River has not been studied. However, data from elsewhere give an indication of what they eat. Juvenile bull trout in streams in the Flathead River drainage, Montana, fed on aquatic insects in approximately the same proportion they were available in streams (Fraley and Shepard 1989). However, once fish exceeded 110 mm in length they began eating small trout and sculpin. After bull trout moved into Flathead Lake they fed almost exclusively on fish. In Iron Creek, a stream in the upper Little Lost River drainage, a 260 mm bull trout had a 152 mm bull trout in its stomach (USR file data).

Growth

In 1987, Corsi and Elle (1989) studied bull trout growth in the Little Lost River drainage (Table 5). Most of the scales collected for this analysis were from bull trout in the mainstem (including Sawmill Creek) and tributaries in Sawmill Canyon (Chip Corsi, IDFG, personal communication). It is likely most of these fish were associated with the mainstem/Sawmill Canyon fluvial population. Mean length was 99, 155, 240, and 314 mm at age 1, 2, 3, and 4, respectively.

Table 5. Comparison of bull trout lengths at annulus from the Little Lost River to other systems.

		Length at Annulus								
Location	N	1	2	3	4	5	6	7	8	Source
Little Lost River[a]	85	99	155	240	314					Corsi and Elle 1989
Little Lost River (Sawmill Creek)	1	145	235	350	404	475	555	635[b]		Upper Snake Region file data
East Fork Salmon River, Id[c]	144	75	150	237	349	431	527	647		Elle 1995
Crooked River, Id[c]	106	66	119	189	286	371	424			Elle 1995
South Fork Salmon River, Id[c]	n/a	68	110	154	217	284				Thurow 1987
North Fork Flathead River, Mt[c]	929	73	117	165	301	440	538	574		Fraley and Shepard 1989
Middle Fork Flathead River, Mt[c]	1017	52	100	165	297	399	488	567	655	Fraley and Shepard 1989

[a] This sample may have included a combination of fluvial and resident fish.
[b] This was a male caught by an angler on July 14, 1984. The 635 mm length is the length of the fish at the time it was caught.
[c] This data represents fluvial populations.

Although the drainage is small, bull trout do reach large sizes. In July 1983, a six year old male measuring 635 mm was caught by an angler in the Little Lost River (Sawmill Creek) (USR file data). Other fish 400 mm and longer have been documented (present study, Corsi and Elle 1986, Corsi and Elle 1989, USR file data). The largest bull trout found during the present study was a 445 mm fish captured in Wet Creek immediately below Big Creek on July 2, 1997. The largest bull trout from the Sawmill Canyon drainage was a 406 mm fish collected in 1995 from the mainstem (Sawmill Creek) behind the Fairview Guard Station. In 1997, a 430 mm bull trout was caught in Williams Creek. How this fish was able to get this large in a small, disjunct stream is not clear.

Sexual Maturity

There is little data available relating to age and length at maturity for bull trout in the Little Lost River drainage. A literature review by Rieman and McIntyre (1993) found most bull trout mature between 5 and 7 years of age. However, bull trout maturing as early as age 3 has been reported (Scott and Crossman 1973). Dissection of a 286 mm female bull trout from lower Smithie Fork (likely a fluvial fish) indicated the fish was mature. The length frequency distribution of bull trout from this site and age at length data for bull trout from the Little Lost River (Corsi and Elle 1989) suggest this fish was 4 years old.

Limited data indicate resident fish mature at approximately age 4. Dissection of a 199 mm 4 year old female bull trout (age determined by scale analysis and length frequency) from upper Williams Creek indicated the fish was mature. A 2 year old (120 mm) and a 3 year old (approximately 140 mm) bull trout from the same site were not mature. Similarly, a 184 mm 4 year old female bull trout from upper Squaw Creek (Sawmill Canyon) was mature. Although length at maturity appears to differ between fluvial and resident fish, age at maturity appears to be similar.

Spawning, Incubation, and Rearing

Although there is little information regarding bull trout spawning, incubation, and rearing for the Little Lost River drainage, they have been studied extensively elsewhere. Fraley and Shepard (1989) studied adfluvial bull trout in the Flathead River drainage, Montana. They found that spawning adfluvial bull trout left Flathead Lake and began migrating upstream in April. The fish remained at the mouth of spawning streams for 2 to 4 weeks, then entered the streams at night between July and September. However, spawning, which occurred when stream temperatures dropped below 9 to 10°C, did not take place for a month or more after the fish entered the streams.

Swanberg (1997) studied the seasonal movement and habitat use of fluvial bull trout in the Blackfoot River drainage, Montana. He found that upstream migrations, which began in June, were associated with a decline in runoff and an increase in stream temperatures. The majority of bull trout began migrating during peaks in stream temperatures (mean stream temperature 17.7°C). Migration rates were correlated to average maximum daily temperature and ranged from 1.9 to 11.8 km/day. Fish entered tributaries in late June and early July, where they remained for up to 77 days before spawning in late September. Bull trout began moving downstream shortly after completion of spawning. Eighty-six percent of the fish returned to the same location occupied in the spring. Winter movements of bull trout were never greater than about 300 m.

In 1995 and 1996, the maximum daily stream temperature in headwater streams in the Sawmill Canyon drainage fluctuated above and below 10°C throughout the summer (see Appendix D). However, in September, a sharp drop in stream temperatures occurred in which the maximum daily stream temperatures fell and remained below 10°C. In 1997, the maximum daily stream temperature in headwater streams in Sawmill Canyon remained above 10°C throughout the summer. However, the maximum daily temperature in many of these streams dropped and remained below 10°C in mid September. This temperature shift may indicate the onset of bull trout spawning. In 1998, redds were observed in the drainage above Moonshine Creek in early October indicating at least some bull trout had spawned by that time.

In the Flathead River drainage, bull trout were highly selective in determining spawning sites. Spawning sites were characterized by gravel substrates, low compaction, low gradient, groundwater influence, and proximity to cover (Fraley and Shepard 1989). The high degree of selectivity resulted in spawning bull trout utilizing only 28% of available streams. Mean fecundity for 32 fluvial fish from Flathead Lake averaging 645 mm in length was 5,482 eggs. Resident fish (300 mm) in Washington had less than 200 eggs (Mullan et al. 1992). In Coal Creek, a tributary to the Flathead River, 50% hatch occurred 113 days (340 temperature units) after deposition (Fraley and Shepard 1989). Fry remained in the gravel for an additional 110 days (295 temperature units) before emerging. Eighteen percent of juvenile migratory bull trout left tributary streams in the Flathead River drainage at age one, 49% at age 2, 32% at age 3, and 1% at age 4. Length frequency data from the Little Lost River suggest that fluvial bull trout probably spend one or two years in headwater streams before moving into the mainstem.

Habitat Characteristics

Rieman and McIntyre (1993) identified 5 habitat characteristics that were critical to bull trout. These are channel stability, substrate composition, cover, temperature, and migratory corridors. During the present study, the highest densities of bull trout were found in the upper section of Smithie Fork, which had 30.3 fish/100 m^2 (fish >70 mm). Stream habitat data were gathered from this stream in 1994 (Table 6). Stream temperature data were collected in 1997 (Figure 4).

Stream temperatures are believed to be the most important factor affecting bull trout distribution (Rieman and McIntyre 1993). An extensive literature review completed by these authors found that temperatures in excess of about 15°C appear to limit distribution. A comparison of stream temperature data collected in 1997 from the mainstem of the Little Lost River and Wet Creek with population data collected between 1995-1997 supports this conclusion. Although bull trout were found in water that was 20°C, they comprised less than 50% of the salmonid composition in streams that had a maximum summer temperature that exceeded about 15°C (Figure 7 and 8, Table 7 and 8). When the maximum summer stream temperature exceeded about 17°C, bull trout generally comprised less than 10% of the species composition.

High groundwater temperatures and/or harsh winter conditions may preclude the successful incubation of bull trout eggs in some streams in the drainage and subsequently limit the distribution of bull trout in those same streams. McPhail and Murray (1979) found that water temperatures of 2 to 4°C were ideal for bull trout egg incubation. At waters temperatures of 8 to 10°C egg survival was 0 to 20%. Available data from the Little Lost River drainage indicate that bull trout are generally not found in streams whose primary source springs have water temperatures greater than about 7°C. It is possible that water in these streams emerges from the ground too warm to successfully incubate bull trout eggs. For example, bull trout were not found in the North Fork Deer Creek and South Fork Deer Creek. Both of these streams emerge from large single

Table 6. Comparison of bull trout densities and habitat characteristics from Smithie Fork (relatively high density) and Timber Creek (relatively low density).

	Stream Reach		
Characteristic	Smithie #1	Smithie #2	Timber #1
Bull trout/100 m^2 (1995)	26.4[a]	30.3	4.6[a]
Other salmonids present	rainbow trout	no	rainbow trout
Other fish present	no	no	shorthead sculpin
Reach length (m)	1203	3238	2949
Stream order	2	2	3
Mean width (m)	3.0	2.4	2.6
Mean width:depth ratio	15.3	12.7	15.9
Side channel:total reach length ratio	.09	.08	.04
Maximum summer stream temperature °C (1997)	15.5	n/a	15.8
% Pools	48	50	33
% Undercut bank	25	43	4
% Bank stability	94	99	85
Substrate coverage			
% Fines	15	12	10
% Small Gravel	12	6	8
% Gravel	20	15	21
% Small Cobble	27	27	28
% Cobble	22	21	19
% Small Boulder	9	21	15
% Boulder	8	33	0
% Bedrock	3	10	0
Mean % surface fines	13.9	11.0	9.7
# Large woody debris/100 m	7.9	4.9	4.3

[a] Calculated by multiplying the total trout density by the percent of fish captured that were bull trout.

Figure 7. Relationship between trout species composition (1995, 1996, or 1997) and maximum summer stream temperature in 1997 in the mainstem of the Little Lost River.

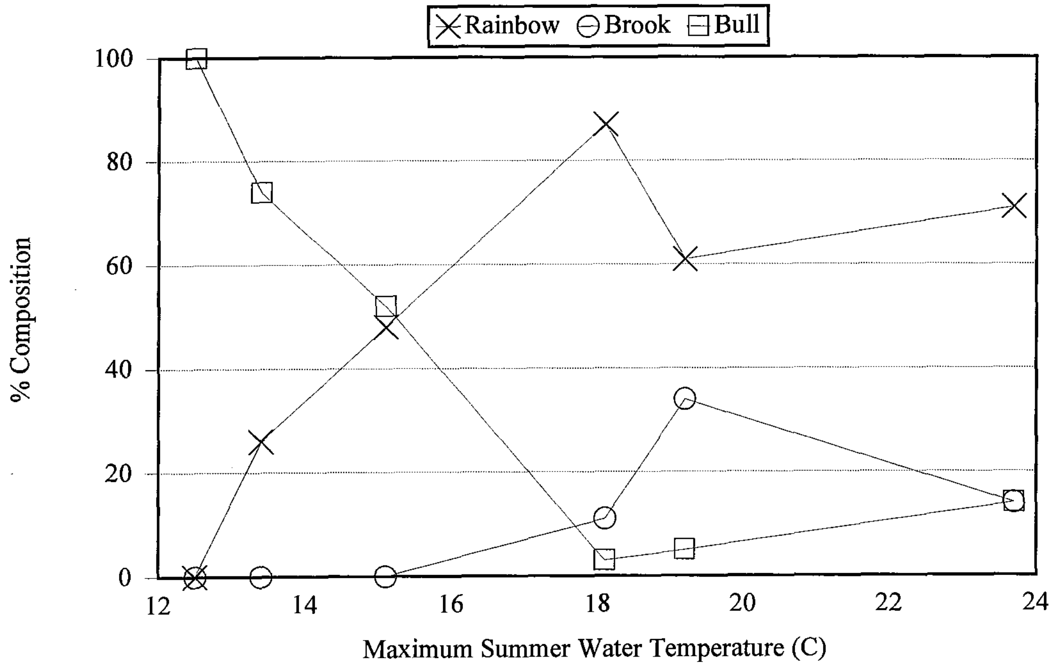

Figure 8. Relationship between trout species composition (1995, 1996, or 1997) and maximum summer stream temperature in 1997 in Wet Creek.

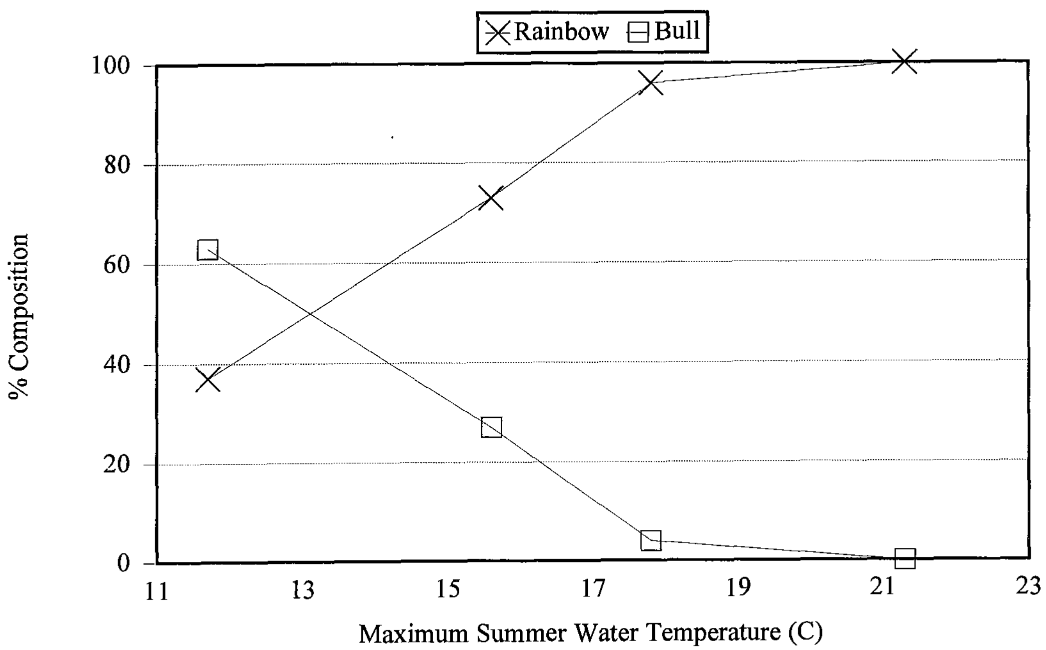

Table 7. Relationship between trout species composition (1995, 1996, or 1997) and maximum summer stream temperature in 1997 in the mainstem of the Little Lost River.

Reach	Maximum Summer Stream Temperature (°C) (1997)[a]	Year Population Data Collected	Species Composition		
			Rainbow	Brook	Bull
Above Smithie Fork	12.5	1995	0	0	100
Near Moonshine	13.4	1997	26	0	74
Below Timber Creek	15.1	1997	48	0	52
Above Squaw Creek	18.1	1997	87	11	3
Below Summit Creek	19.2	1997	61	34	5
Above Summit Creek	23.7	1997	71	14	14

[a] Stream temperature monitoring sites were not always located in the exact location of the population monitoring sites but should reflect maximum summer temperatures experienced at the population monitoring sites.

Table 8. Relationship between trout species composition (1995, 1996, or 1997) and maximum summer stream temperature in 1997 in Wet Creek.

Reach	Maximum Summer Stream Temperature (°C) (1997)[a]	Year Population Data Collected	Species Composition	
			Rainbow	Bull
Above Hilts Creek	11.7	1996	37	63
Above Coal Creek	15.6	1996	73	27
At Forest Boundary	17.8	1996	96	4
Above Dry Creek	21.3	1997	100	0

[a] Stream temperature monitoring sites were not always located in the exact location of the population monitoring sites but should reflect maximum summer temperatures experienced at the population monitoring sites.

springs. The water temperature at both of these springs was 13 °C on June 6, 1997 and May 19, 1998. Similar conditions occur in other streams such as Summit Creek and Horse Creek. Downstream of these springs and in other reaches lacking groundwater influence, extreme winter conditions (freezing or near freezing temperatures and anchor ice) may preclude the successful incubation of bull trout eggs. However, further research is needed before any definite conclusions can be drawn.

Population Trend

Limited data preclude determining a population trend for bull trout in most of the drainage. However, sufficient data have been collected to determine a trend for the mainstem above Summit Creek. Because not enough fish of each species were captured to calculate a species density estimate, it was estimated by multiplying the percent species composition by the total salmonid density. Although these data should be viewed cautiously due to differences in sampling times, temperature regimes, and natural fluctuations, they indicate that bull trout in this section have declined since 1984. Between 1984 and 1993, the number of bull trout per km of stream declined 91% in the mainstem between Summit Creek and the Forest boundary (Figure 9, Table 9). In the mainstem between the Forest boundary and Smithie Fork, the number of bull trout per km of stream declined 62% between 1987 and 1995 (Figure 10, Table 10). These declines were likely the result of low water resulting from drought, high stream temperatures resulting from drought and degraded habitat conditions below Warm Creek, and angler harvest.

Despite declines in the late 1980's and early 1990's, bull trout numbers in the mainstem appear to be increasing. Sampling in 1997 indicates that bull trout have increased in both sections of the mainstem (Figure 9 and 10, Table 9 and 10). It is likely that subsiding drought conditions, habitat improvements from changes in management, and the closure of bull trout to harvest in 1994 have resulted in increases in bull trout densities.

Although bull trout numbers have increased in the mainstem, they appear to be declining in other areas. As previously mentioned, bull trout have been found historically in Big Springs Creek, Squaw Creek (Wet Creek drainage), and the lower reach of the Little Lost River. Creel census data indicates bull trout were present in Big Springs Creek as recent as 1977 (Appendix C). However, additional creel census data, which was completed in 1978, 1979, and 1987 (Appendix C), and electrofishing data from 1987 (Corsi and Elle 1989) and 1993 (present study) indicate bull trout are no longer present in this tributary. Similarly, Corsi and Elle (1989) found small numbers of bull trout electrofishing 2 sites in lower Squaw Creek (Wet Creek drainage) in 1987. However, bull trout were not found electrofishing these same 2 sites in 1992. In 1983, bull trout were found in the mainstem near Howe (Corsi et al. 1986). However, the annual diversion of this reach for winter flood control since 1985 has rendered this portion of stream of little value to bull trout.

Bull trout appear to have been completely extirpated from Dry Creek. Jesse Strope, who moved to the Little Lost River valley in 1910, indicated that in the 1920's he caught only "dolly varden" in Dry Creek Reservoir and Dry Creek above the reservoir (personal communication). Rob Stauffer, an area resident, indicated that in the early 1960's "dolly varden" comprised about 10% of the fish he caught in Dry Creek (personal communication). He also reported catching brook trout and rainbow trout in Dry Creek. However, bull trout were not caught by anglers that were surveyed on Dry Creek in 1969, 1977, 1978, and 1979 (USR file data, Appendix C). Likewise, bull trout were not found in Dry Creek in electrofishing sampling in 1987 (Corsi and Elle 1989) or 1995 (present study).

springs. The water temperature at both of these springs was 13 °C on June 6, 1997 and May 19, 1998. Similar conditions occur in other streams such as Summit Creek and Horse Creek. Downstream of these springs and in other reaches lacking groundwater influence, extreme winter conditions (freezing or near freezing temperatures and anchor ice) may preclude the successful incubation of bull trout eggs. However, further research is needed before any definite conclusions can be drawn.

Population Trend

Limited data preclude determining a population trend for bull trout in most of the drainage. However, sufficient data have been collected to determine a trend for the mainstem above Summit Creek. Because not enough fish of each species were captured to calculate a species density estimate, it was estimated by multiplying the percent species composition by the total salmonid density. Although these data should be viewed cautiously due to differences in sampling times, temperature regimes, and natural fluctuations, they indicate that bull trout in this section have declined since 1984. Between 1984 and 1993, the number of bull trout per km of stream declined 91% in the mainstem between Summit Creek and the Forest boundary (Figure 9, Table 9). In the mainstem between the Forest boundary and Smithie Fork, the number of bull trout per km of stream declined 62% between 1987 and 1995 (Figure 10, Table 10). These declines were likely the result of low water resulting from drought, high stream temperatures resulting from drought and degraded habitat conditions below Warm Creek, and angler harvest.

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Although bull trout numbers have increased in the mainstem, they appear to be declining in other areas. As previously mentioned, bull trout have been found historically in Big Springs Creek, Squaw Creek (Wet Creek drainage), and the lower reach of the Little Lost River. Creel census data indicates bull trout were present in Big Springs Creek as recent as 1977 (Appendix C). However, additional creel census data, which was completed in 1978, 1979, and 1987 (Appendix C), and electrofishing data from 1987 (Corsi and Elle 1989) and 1993 (present study) indicate bull trout are no longer present in this tributary. Similarly, Corsi and Elle (1989) found small numbers of bull trout electrofishing 2 sites in lower Squaw Creek (Wet Creek drainage) in 1987. However, bull trout were not found electrofishing these same 2 sites in 1992. In 1983, bull trout were found in the mainstem near Howe (Corsi et al. 1986). However, the annual diversion of this reach for winter flood control since 1985 has rendered this portion of stream of little value to bull trout.

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Figure 9. Comparison of estimated trout/km in the Little Lost River between 1984 and 1997 (Elle et al. 1987, Corsi and Elle 1989, present study).

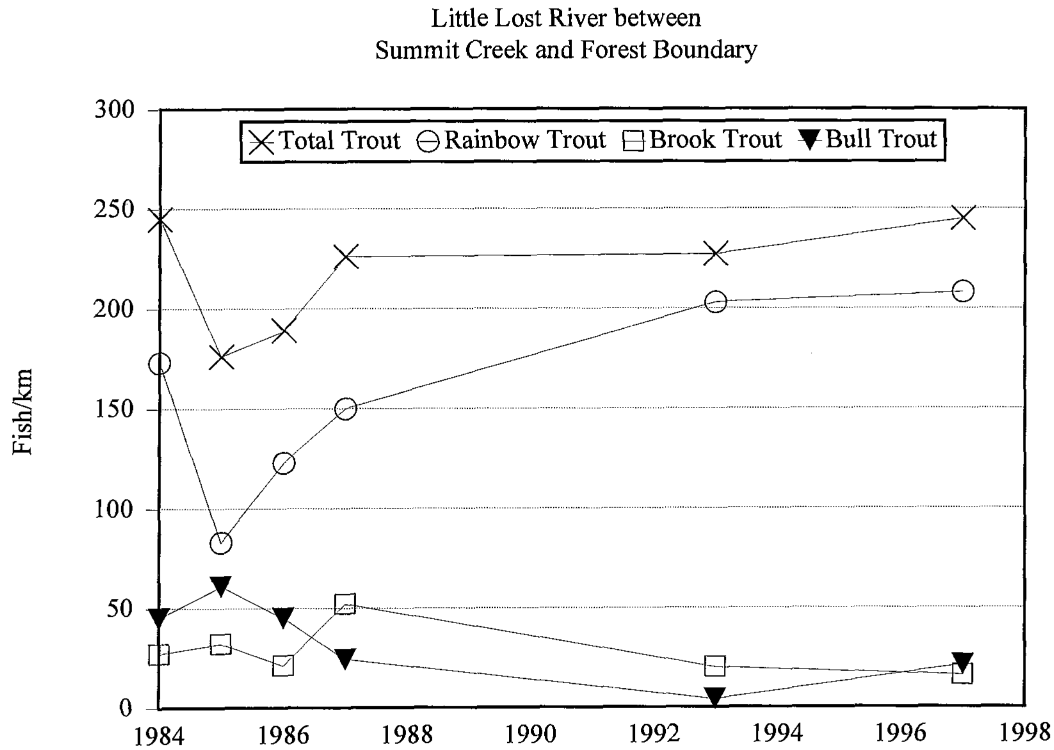

Figure 10. Comparison of estimated trout/km in the Little Lost River between 1987 and 1997 (Elle et al. 1987, Corsi and Elle 1989, present study).

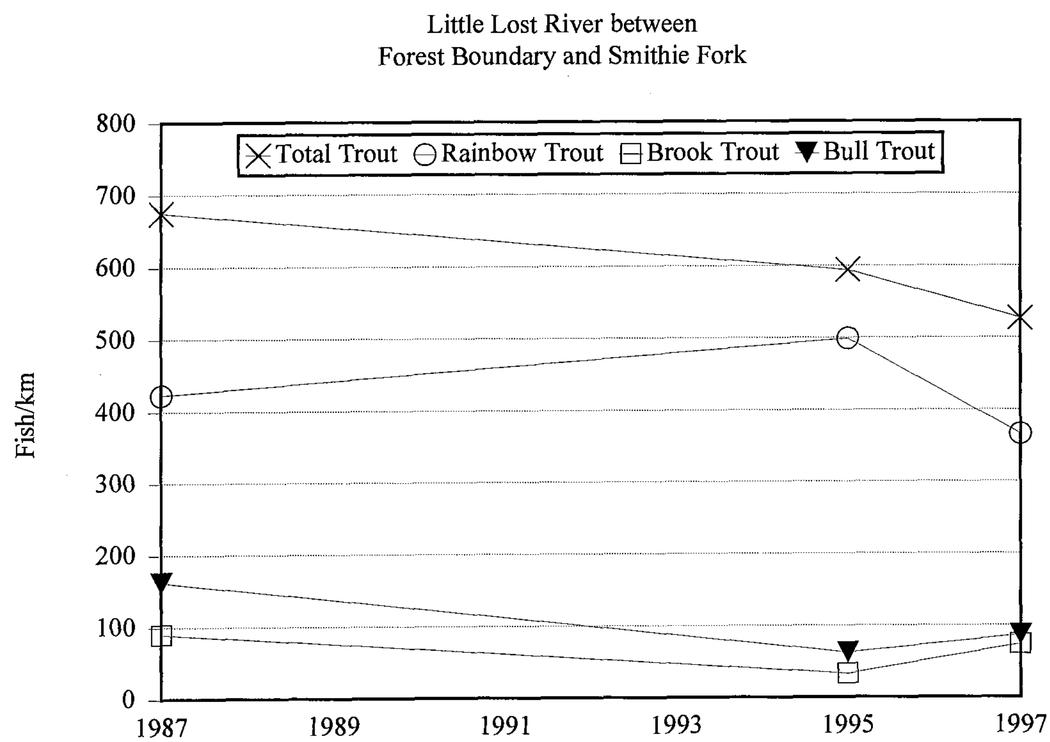

Table 9. Comparison of estimated trout/km in the Little Lost River between the Forest boundary and Summit Creek between 1984 and 1997 (Elle et al. 1987, Corsi and Elle 1989, present study).

Sampling Date	Total trout/km[a]	Rainbow trout/km	Brook trout/km	Bull trout/km
July 1997	245	208	16	21
August 1993	227	203	20	4
July 1987	226	150	52	24
July 1986	189	123	21	45
July 1985	176	83	32	61
October 1984	245	173	27	45

[a] This number represents the sum of the individual species densities and may different slightly from the actual mean density due to rounding errors.

Table 10. Comparison of estimated trout/km in the Little Lost River from the Forest boundary to Smithie Fork between 1987 and 1997 (Corsi and Elle 1989, present study).

Sampling Date	Total trout/km[a]	Rainbow trout/km	Brook trout/km	Bull trout/km
July 1997	527	366	74	87
August/ September 1995	594	499	33	62
July 1987	675	423	90	162

[a] This number represents the sum of the individual species densities and may different slightly from the actual mean density due to rounding errors.

Similarly, bull trout have nearly disappeared from Big Creek. Ted Rothwell, a longtime local resident, fished Big Creek in the 1940's, 1950's, and 1960's (personal communication). When he first began fishing the stream in the 1940's, most of the fish caught were bull trout up to 450 mm in length. A similar account is made by Albert Fullmer, Jr. (area resident, personal communication). In the 1950's, most of the fish he caught in Lower Big Creek Lake (beaver pond) were bull trout up to 1.8 kg. A photograph taken by Mr. Fullmer shows several bull trout approximately 300 to 500 mm in length that were caught in Lower Big Creek Lake (beaver pond) on June 4, 1958. Although the number of bull trout caught by anglers in Big Creek varied in the 1970's, creel census data indicate that in 1974 bull trout comprised 63% of the fish caught by anglers in Big Creek (Appendix C). In 1978, brook trout were introduced into the stream. By 1990, brook trout comprised 95% of the fish caught by anglers in the large beaver pond near the head of the stream (Lower Big Creek Lake) (Gamett 1990a). During the current study, brook trout comprised up to 77% of the fish captured greater than 100 mm in length. Of the 5 sampling sites in Big Creek (401 m total length) no bull trout smaller than 100 mm were found and only 2 bull trout over 100 mm were captured. Seven other fish appeared to be brook trout x bull trout hybrids. Similar bull trout declines associated with brook trout appear to be occurring in Mill Creek and lower Squaw Creek (Sawmill Canyon drainage).

Threats to Bull Trout Populations

Several factors appear to affect the distribution and/or abundance of bull trout in the Little Lost River drainage. These include high stream temperatures; hybridization, competition, and predation by exotic brook trout; disruption of migratory corridors; sediment; loss through irrigation ditches; artificial migration barriers; angler harvest; and loss of cover and habitat complexity. All of these issues are discussed below.

In addition, Rieman and McIntyre (1993) demonstrated that other factors such as stochastic (random) and genetic processes are important to the long term persistence of bull trout populations. Although these factors are not assessed in this paper, they will need to be addressed to ensure the long term survival of the population.

Stream Temperature - Although several factors appear to be limiting the abundance and distribution of bull trout in the drainage, high stream temperatures appear to be the most significant. A literature review by Rieman and McIntyre (1993) found that water temperatures greater than about 15°C appear to limit bull trout distribution. As previously discussed, data from the current study support this conclusion. Stream temperature data collected in 1997 indicates that approximately 50% of all fish bearing streams had stream temperatures exceeding 15°C for 50 days or more. Among those reaches experiencing this degree of heating were the entire mainstem downstream from Warm Creek, all of Big Springs Creek, and approximately 50% of Wet Creek. Although many stream reaches experience water temperatures exceeding those preferred by bull trout, the degree that management activities have altered natural stream temperature regimes is not clear.

Temperature data from several years are available for some locations, including the mainstem at the Forest boundary and above Summit Creek. Data were collected from these 2 sites in 1987, 1988, 1994, 1995, and 1997 (Appendices D and E). These data indicate that maximum stream temperatures at both stations were consistently above 15°C during the summer and often reached above 20°C. During 1994, a hot, dry year, stream temperatures at the Forest boundary exceeded 20°C for 17 days but did not exceed 25°C. However, in the mainstem above Summit Creek, stream temperatures exceeded 20°C for 55 days and exceeded 25°C for 10 days. Further down the mainstem, cooler waters from Wet Creek resulted in lower temperatures. The maximum stream temperature recorded in this stream reach was 27°C at the old gauging station in July 1994.

The high stream temperatures in the reach below Warm Creek appear to be a result of poor riparian and stream habitat conditions compounded by low stream flows as a result of several years of drought. SCS and BLM (1985) indicate that a fire burned the reach of the Little Lost River (Sawmill Creek) from Summit Creek to the Forest boundary. According to this report, the upper portion of this reach experienced good regeneration of riparian species, but heavy grazing along the lower portion did not allow woody riparian species to reestablish. Resulting stream bank erosion has led to an unstable channel and stream meandering (SCS and BLM 1985). In turn, the stream's width to depth ratio has increased resulting in an unnaturally wide, shallow stream.

This condition has likely affected stream temperature in at least 3 ways. First, limited woody riparian vegetation along the lower portion of this reach has resulted in a lack of stream shading. Second, the increased width of the stream has resulted in a larger stream surface area increasing the surface area to volume ratio. Subsequently, a greater percentage of the stream is exposed to solar radiation. Third, the increased stream width has reduced stream velocities. When these conditions were combined with low flows resulting from several years of drought, extremely high stream temperatures resulted. Stream temperatures likely would have remained more tolerable for bull trout had these conditions occurred independent of each other.

The poor condition of the habitat in and along the mainstem below Warm Creek has been recognized. In 1987, a stream improvement project was implemented along this reach as mitigation for flood control measures near Howe (See 'Little Lost River, Mainstem' for a complete description of the flood control and mitigation project.) In 1993, the riparian, channel, and bank conditions along the project area had greatly improved (IFD file data). As conditions along this reach continue to improve, stream temperatures should decline to limits more acceptable by bull trout.

Hybridization, Competition, and Predation by Exotic Brook Trout - Exotic brook trout appear to pose a significant threat to bull trout in the Little Lost River drainage. Hybridization, predation, and competition between bull trout and introduced species can negatively impact bull trout populations (Rieman and McIntyre 1993). These authors believed that hybridization between brook trout and bull trout could lead to the elimination of bull trout. In South Fork Lolo Creek, Montana, the rapid displacement of bull trout by brook trout was accompanied by extensive hybridization between the 2 species (Leary et al. 1993). Similarly, Mullan et al. (1992) believed that hybridization between brook trout and bull trout may have led to the elimination of bull trout in some streams in Washington.

In the Little Lost River drainage, the extirpation or decline of bull trout in some streams has been accompanied by the introduction and/or expansion of brook trout. The apparent extirpation of bull trout from Dry Creek appears linked to the introduction of brook trout. Jesse Strope, who moved to the Little Lost River in 1910, reported catching only "dolly varden" in Dry Creek Reservoir and Dry Creek above Dry Creek Reservoir in the 1920's (personal communication). At some time brook trout were introduced into Dry Creek. By the early 1960's, "dolly varden" comprised only about 10% of the fish caught by Rob Stauffer, an area resident (personal communication). However, no bull trout were found in Dry Creek in creel census work completed by the Idaho Department of Fish and Game in 1969, 1977, 1978, and 1979 (Appendix C) or in electrofishing sampling completed in 1987 (Corsi and Elle 1989). During the present study, none of the 159 fish collected in Dry Creek were bull trout (157 were brook trout and 2 were rainbow trout x cutthroat trout hybrids). Likewise, the introduction of brook trout into Big Creek in 1978 corresponds with the near disappearance of bull trout in that stream. Similar declines appear to be occurring in Mill Creek and Squaw Creek (Sawmill Canyon drainage). If these trends continue, it appears bull trout will disappear from these streams. Furthermore, an expansion of brook trout into additional bull trout streams such as Smithie Fork or Wet Creek may result in the elimination of bull trout in additional streams.

The early age at which brook trout reach sexual maturity is likely one reason brook trout may replace bull trout. An extensive literature review by Rieman and McIntyre (1993) indicated bull trout reach sexual maturity in 5 to 7 years although maturation as early as 3 years has been reported (see Scott and Crossman 1973). On the other hand, brook trout may mature as early as age one (present study, Corsi and Elle 1989). During the present study, age at maturity for brook trout in Mill Creek and Squaw Creek (Sawmill Canyon drainage) was determined. Sexual maturity was determined by analysis of the gonads. Age was determined through scale analysis. Ninety-one brook trout from Mill Creek and 43 from Squaw Creek were studied. Male brook trout began maturing at age one in both streams. All of the fish that could be distinguished as males were mature by age 2. Female fish also began maturing at age one in both streams. Over half were mature by age 2 and all by age 3. If bull trout in these streams do not reach maturity until age 3 or 4, the earlier maturity of brook trout could lead to a decline in bull trout, particularly when combined with hybridization.

Hybridization is likely another factor leading to bull trout declines. Although hybridization in the Little Lost River drainage does not appear widespread, it does appear to be a threat to bull trout in Big Creek, lower Squaw Creek (Sawmill Canyon), and Mill Creek. During the present study, fish appearing to be brook trout x bull trout hybrids were found in lower and mid Squaw Creek (Sawmill Canyon drainage), Mill Creek, the mainstem near Mill Creek, and the upper reach of Big Creek. These same stream reaches also had very few fish appearing to be pure bull trout. A fish that appeared to be a brook trout x bull trout hybrid measuring 455 mm was captured near the head of Big Creek in August 1994. In 1997, an angler caught a 635 mm, 3.9 kg fish from Big Creek Beaver Pond that appeared to be a brook trout x bull trout hybrid. This was confirmed by genetic testing at the University of Montana.

The extent of predation on bull trout by other species in the Little Lost River drainage is not clear. Rainbow trout and brook trout do utilize other fish for food (Simpson and Wallace 1982, Wydoski and Whitney 1979). Although the extent is not known, it is likely bull trout fry and juveniles are utilized by brook trout and rainbow trout, particularly in spawning and nursery streams.

The extent of interspecific competition between bull trout, brook trout, and rainbow trout, and the impact on bull trout populations in the drainage, is not known. A literature review by Rieman and McIntyre (1993) found that declines in bull trout populations have been associated with the introduction of nonnative fishes such as rainbow trout and brown trout. However, the decline in bull trout abundance accompanied by an increase in rainbow trout abundance in the mainstem Little Lost River is likely explained as a function of higher stream temperatures during drought selecting against bull trout rather than direct competition from rainbow trout.

Disruption of Migratory Corridors - Migratory corridors are stream reaches that connect mainstem adult habitat reaches to headwater spawning and nursery streams. The most important migratory corridors in the Little Lost River drainage are the Little Lost River between Summit Creek and Smithie Fork, and Wet Creek from the Little Lost River to Big Creek. Bull trout appear to be using both of these reaches to move between the mainstem and headwater streams.

Although the movement of fluvial bull trout through both of these reaches has been affected, these problems are being rectified. An aerial photograph taken on July 20, 1959, indicates that at approximately 8 km below Warm Creek, all of the Little Lost River was diverted across the alluvial fan into Summit Creek. This appears to have resulted in the complete dewatering of approximately 5 km of the Little Lost River above Summit Creek. This was likely done to reduce water loss in the main channel. Unless fluvial bull trout could negotiate this route, or if they migrated at a time when the diversion was not being used, they would have been blocked from spawning tributaries in Sawmill Canyon. However, this diversion was discontinued after about 1960 (James Andreason, local landowner, personal communication).

In the 1970's, a diversion structure was constructed on Wet Creek 1.5 km above the Little Lost River (James Andreason, landowner, personal communication). This structure may have been a complete barrier to upstream fish migration (Pat Koelsch, BLM, personal communication). If so, it would not be possible for fluvial bull trout in the Little Lost River or Wet Creek below the diversion to access headwater spawning tributaries in Wet Creek. In 1992, the BLM, in cooperation with the Idaho Department of Fish and Game and the Challis National Forest, constructed a fish ladder at this diversion to provide fish passage.

Loss Through Irrigation Ditches - Loss of bull trout through irrigation ditches may negatively affect populations. In the Little Lost River drainage, there are numerous diversions that divert all or a portion of the stream for irrigation and/or hydroelectric uses. However, the number of bull trout lost through irrigation ditches is not known.

The extent of this problem could easily be assessed by sampling irrigation ditches following the closure of the head-gate. If bull trout loss is significant, self-cleaning screens could be installed to eliminate the problem. This method has been used successfully in Montana to prevent bull trout loss to irrigation ditches (Swanberg 1997).

Artificial Migration Barriers - Artificial barriers prevent the natural movement of fish. These barriers may prevent bull trout from moving into stream reaches where they have been extirpated, prevent genetic exchange between populations, and preclude the movement of fluvial fish. In the Little Lost River drainage, potential artificial barriers include diversion structures, culverts, and dewatered or degraded stream channels. A preliminary assessment suggests bridges and culverts have not seriously impacted bull trout populations in the drainage. However, dewatered stream channels are a significant factor. For example, the diversion of lower Williams Creek has resulted in the isolation of bull trout in that stream. An effort should be made to identify each artificial migration barrier and correct the problem if possible.

Angler Harvest - Angler harvest has likely impacted bull trout populations in the Little Lost River drainage. Prior to 1994, anglers could harvest up to 6 bull trout per day. In 1987, bull trout comprised 53% of the fish caught by anglers in the Sawmill Creek reach of the Little Lost River (Corsi and Elle 1989). Seventy-one percent of the bull trout caught were harvested. In 1994, bull trout harvest was closed in the drainage.

However, illegal angler harvest may still be impacting bull trout populations. Bull trout and brook trout can be difficult to distinguish. This likely results in anglers accidentally harvesting bull trout. To overcome this problem, the Forest Service and Idaho Department of Fish and Game have initiated education efforts to help the public distinguish the 2 species. This involved a kiosk display in Mackay, placement of large signs at the Forest boundary in Sawmill Canyon and at the Timber Creek Campground, placement of small signs at key locations throughout the drainage, and distribution of bull trout pamphlets. However, discussions with anglers suggest that many are still not able to identify bull trout (personal observation).

Loss of Cover and Habitat Complexity - Bull trout require a high level of stream channel complexity, complex cover being an important element (Rieman and McIntyre 1993). Stream channels and cover in most headwater streams appear to be moderately to highly complex. Headwater tributary streams such as Smithie Fork have particularly complex cover and stream channels, large woody debris being an important component. On the Little Lost River between Warm Creek and Summit Creek past channelizing, heavy grazing, stream bank erosion, and stream meandering have led to a relatively homogeneous stream channel with little to no cover. However, this situation is being corrected through restoration efforts.

Sediment - Sediment is likely impacting bull trout spawning success in some streams. R1/R4 stream habitat data indicates that surface fines are less than 25% in most bull trout spawning streams (Appendix F). However, some bull trout spawning streams such as Redrock Creek, Wet Creek upstream from the old diversion above Hilts Creek, and Badger Creek above Bunting Canyon Creek had surface fines of 65%, 52%, and 37%, respectively (Appendix F). This level of sediment is likely having a negative impact on bull trout spawning success. In addition, other streams that could potentially support bull trout spawning also have high sediment levels. For example, bull trout were not found in Basin Creek and juvenile bull trout were not found in Quigley Creek. Basin Creek (which also has high stream temperatures) had 68% surface fines and Quigley Creek had 32% surface fines (Appendix F).

Brook Trout

Distribution

Although brook trout are widely distributed in the drainage (Figure 11), they are only abundant in a few stream reaches. Data indicate that brook trout occupy approximately 140 km of stream in the drainage. During the present study, brook trout were found in Big Creek, Big Springs Creek, Dry Creek, an unnamed tributary to Meadow Creek, Mill Creek, Squaw Creek (Sawmill Canyon), an unnamed tributary to Squaw Creek (Sawmill Canyon), North Fork Squaw Creek, upper Summit Creek, Uncle Ike Creek, Wet Creek, and portions of the mainstem. Brook trout comprised 25% or more of the salmonids captured in upper Big Creek, Dry Creek, the mainstem near Mill Creek, an unnamed tributary to Meadow Creek, Mill Creek, lower Squaw Creek (Sawmill Canyon), an unnamed tributary to Squaw Creek (Sawmill Canyon), the lower reach of North Fork Squaw Creek, and Uncle Ike Creek.

The range of brook trout has increased within the drainage during the last 25 years. In 1970, Andrews (1972) sampled the mainstem near Moonshine Creek, near the Forest boundary, near Summit Creek, near Big Springs Creek, and near Howe, and did not find any brook trout. Likewise, brook trout were not caught in the Sawmill Creek section of the mainstem in 18 hours of angling effort in 1970 (USR file data). In 1971, 2 brook trout were collected in 200 m of the mainstem near the Forest boundary (USR file data). In the 1980's and 1990's, brook trout were found throughout most of the mainstem (Corsi et al. 1986, Corsi and Elle 1986, Corsi and Elle 1989, present study). Similarly, creel census data indicate that brook trout were not present in Big Creek until the late 1970's (see Appendix C). Brook trout were introduced into Big Creek in 1978. In the sections of Big Creek sampled during the present study, brook trout comprised 19% to 77% of the salmonids captured.

Despite recent expansions, the upper limit of brook trout distribution in Sawmill Canyon appears to have remained stable since 1987. Data collected by Corsi and Elle (1989) indicated that in 1987 the upper limit of brook trout distribution in Sawmill Canyon was in the mainstem between Bear Creek and Moonshine Creek. During the present study, the upper limit was in the mainstem between Mill Creek and Timber Creek, still within those bounds observed in 1987.

Although the distribution of brook trout has recently expanded, high stream temperatures and steep stream gradients may be limiting further brook trout expansion in the drainage. Fausch (1989) found that in Rocky Mountain streams containing sympatric populations of brook trout and cutthroat trout, brook trout generally comprised a greater percentage of the species composition at low stream gradients. Similarly,

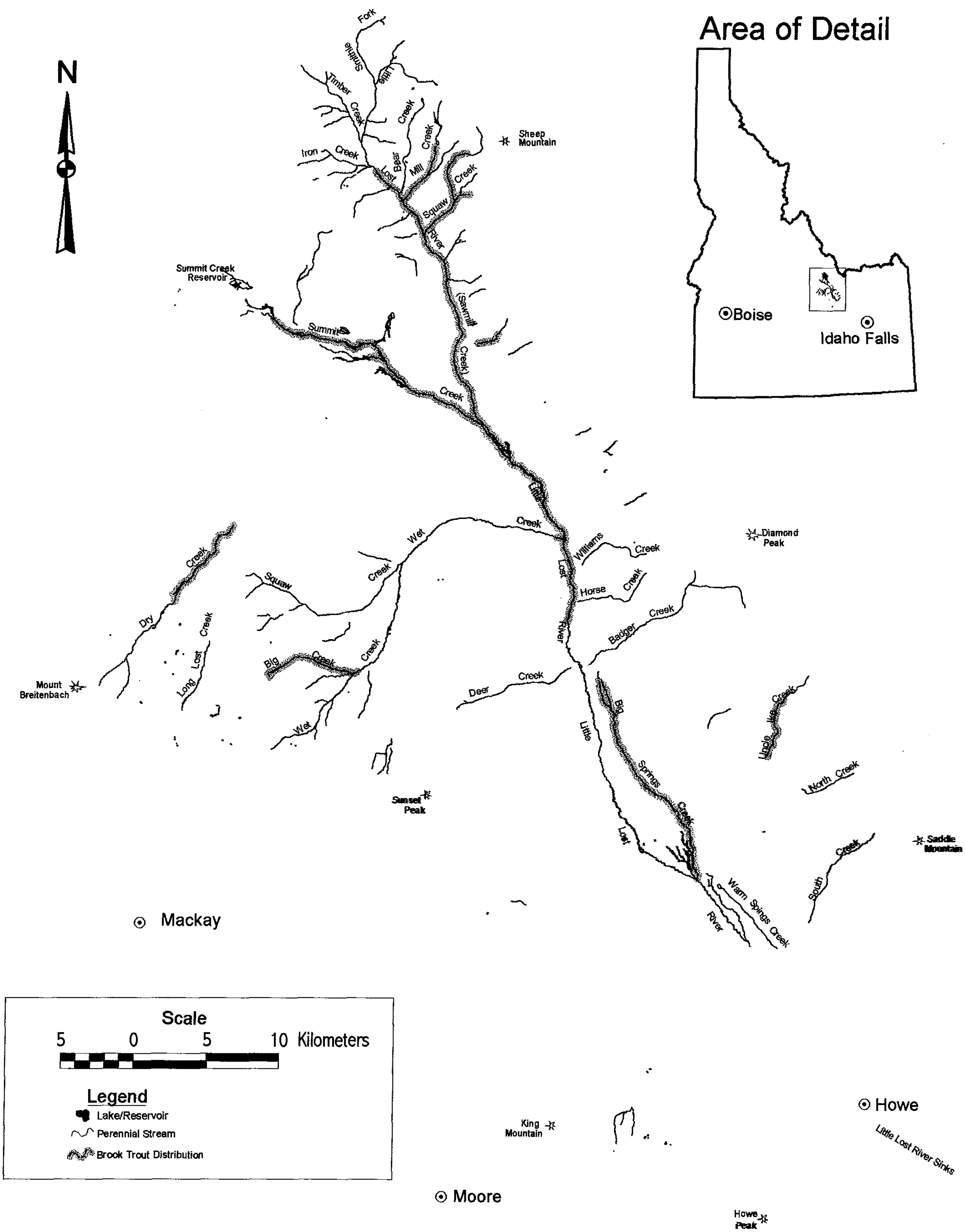

Figure 11. Current distribution of brook trout in the Little Lost River drainage (present study).

Chisholm and Hubert (1986) found that gradient had a negative influence on brook trout abundance in streams containing only brook trout. Mullan et al. (1992) believed stream temperatures influenced whether rainbow trout or brook trout prevailed in a stream. They believed that when mean summer temperature exceeded 18 °C rainbow trout would prevail, and temperatures below 15 °C would favor brook trout. Data from the Little Lost River suggest that both stream temperature and stream gradient affect the abundance and/or distribution of brook trout. However, further study is needed before the relationship can be defined.

Maturity

Brook trout in Squaw Creek and Mill Creek begin maturing at age one. During the present study, age at maturity for brook trout in Mill Creek and Squaw Creek (Sawmill Canyon drainage) was determined. Sexual maturity was determined by analysis of the gonads. Age was determined through scale analysis. Ninety-one brook trout from Mill Creek and 43 from Squaw Creek were studied. Male brook trout began maturing at age one in both streams. All of the fish that could be distinguished as males were mature by age 2. Female fish also began maturing at age one in both streams. Over half were mature by age 2 and all by age 3. No brook trout over 3 years of age were found. Similarly, Corsi and Elle (1989) believed that many brook trout in Medicine Lodge Creek were mature at age one (114 mm), and most were mature by age 2 (162 mm). In the upper Big Lost River, brook trout began maturing at age 2 (116 mm), and most were mature at age 3 (150 mm).

Growth

Brook trout in the Little Lost River drainage experience growth rates similar to brook trout in Medicine Lodge Creek (Table 11). Brook trout over 400 mm have reportedly been caught by anglers in Dry Creek, and a 365 mm brook trout was captured in the Little Lost River (Sawmill Creek) in 1987 (Corsi and Elle 1989). The largest brook trout captured during the current study was a 301 mm fish from Dry Creek 150 m above the Forest boundary. Another fish measuring 455 mm that appeared to be a brook trout x bull trout hybrid was captured in Big Creek immediately below the large beaver pond near the head of the stream. In 1997, an angler caught a 635 mm, 3.9 kg fish from Big Creek Beaver Pond that appeared to be a brook trout x bull trout hybrid. This was confirmed by genetic testing at the University of Montana. The oldest reported brook trout from the Little Lost River drainage is age 3 (Table 11).

Rainbow Trout

Distribution

Rainbow trout are the most widely distributed fish species in the Little Lost River. Data collected during the present study indicate rainbow trout occupy approximately 274 km of stream and are found in most streams in the drainage (Figure 12). They were also reported caught by anglers in Mill Creek Lake during a voluntary creel survey conducted by the Forest Service in 1994 (LRRD file data).

Table 11. Comparison of brook trout lengths at annulus from the Little Lost River drainage with brook trout from other systems.

Location	N	Length at Annulus 1	2	3	4	5	6	Source
Mill Creek	91	123	157	186				present study
Little Lost River (Sawmill Creek)	n/a	130	213	253				Corsi et al. 1986
Summit Creek (grazed)	22	156	218	247				Corsi et al. 1986
Summit Creek (ungrazed)	10	126	179	271				Corsi et al. 1986
Squaw Creek	43	121	172	213				present study
Medicine Lodge Creek	12	114	162					Corsi and Elle 1989
Big Lost, West Fork	42	92	142	181	228	367		Corsi 1989
Big Lost, Summit Creek	36	99	149	186				Corsi 1989
Big Lost, East Fork	14	94	143	186				Corsi 1989
Lower Big Lost	10	164	262	360	401			Corsi and Elle 1989
Lawrence Creek, WI	n/a	94	170	208	292	353	366	Wydoski and Whitney 1979

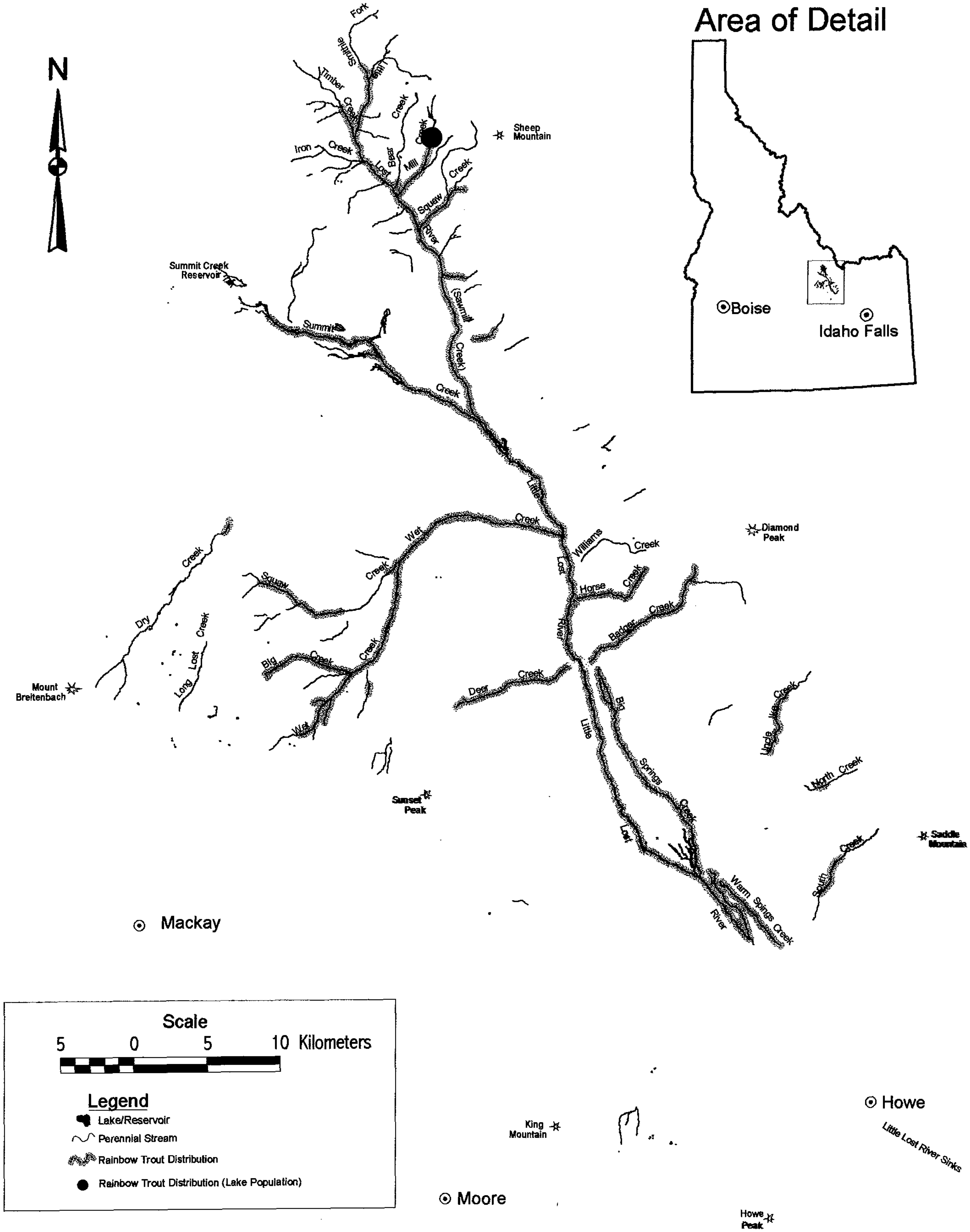

Figure 12. Current distribution of rainbow trout in the Little Lost River drainage (present study, Gamett 1990a).

Data indicate that since 1987, rainbow trout in Sawmill Canyon have expanded into areas previously occupied by only bull trout. In 1970 and 1987, only bull trout were collected in the Sawmill Canyon drainage above Mill Creek (Andrews 1972, Corsi and Elle 1989). Specifically, neither Andrews (1970) nor Corsi and Elle (1989) collected rainbow trout in the mainstem near Moonshine Creek. However, rainbow trout comprised 26% and 13% of the salmonids captured in this reach in 1995 and 1997, respectively. Likewise, bull trout were the only salmonid captured from lower Timber Creek in 1987 (Corsi and Elle 1989). In 1995 and 1997, rainbow trout comprised 14% and 5% of the salmonids collected in this reach, respectively. These data suggest that between 1987 and 1995, rainbow trout advanced between 1.9 km and 6.6 km up the mainstem and into the lower reaches of Timber Creek. Possible changes in stream temperatures resulting from drought and a large fire in the headwaters of the drainage may explain this expansion. If so, the upper limit of rainbow trout distribution may contract if stream temperatures cool.

Growth

Rainbow trout growth in the mainstem of the Little Lost River is similar to that exhibited by rainbow trout in the upper Big Lost River (Table 12). As expected, growth in the upper portion of the drainage is slower relative to that in the lower drainage.

Table 12. Comparison of rainbow trout lengths at annulus from the Little Lost River drainage with rainbow trout of other systems.

		Length at Annulus					
Location	N	1	2	3	4	5	Source
"Upper Little Lost" and Sawmill Creek	n/a	78	139	197			Corsi and Elle 1989
Little Lost River (Sawmill Creek)	27	79	138	202			Corsi et al. 1986
Summit Creek (ungrazed)	40	104	158	197			Corsi et al. 1986
Little Lost River	n/a	97	171	229	271		Corsi and Elle 1989
Wet Creek		89	132	209	250		Bruhn 1990
Big Lost River, West Fork	9	99	163	220	303	374	Corsi 1989
Big Lost River, Twin Bridges Creek	12	89	132	186	243		Corsi 1989
Big Lost River, Lower East Fork	8	91	142	196	258	349	Corsi 1989
Birch Creek, Lower	29	92	157	202	251		Corsi and Elle 1989
Birch Creek, Upper	98	94	150	197	241		Corsi and Elle 1989
Fish Lake, UT	n/a	74	191	315	391		

Shorthead Sculpin

The shorthead sculpin appears to be the only sculpin species present in the drainage. During the present study, 45 sculpin were collected and preserved from 8 locations. All of these fish were later identified as shorthead (Table 13, Figure 13). Sculpin were also collected from the Little Lost River drainage by Carl Hubbs in 1934 (UMMZ), Simpson in 1949 (UMMZ), and Andrews (1972) in 1970. All of the sculpin in these collections were shorthead (Table 13, Figure 13). Likewise, Simpson and Wallace (1982) reported shorthead as the only sculpin species in the Little Lost River drainage. The largest voucher specimen collected for identification during the present study was a 133 mm specimen from Wet Creek above the Forest boundary.

The shorthead sculpin is widely distributed in the drainage below 2,280 m elevation. Sculpin were not found above this point anywhere in the drainage although they had access to higher stream reaches. This suggests some factor or combination of factors is limiting their distribution. Data from Sawmill Canyon suggest that stream gradients greater than about 4% restrict the distribution of shorthead sculpin. Sculpin were absent from all streams not currently connected to the drainage net (Dry Creek, Uncle Ike Creek, South Creek, North Creek, Cedar Run Creek, Deep Creek, Bell Mountain Creek, and Mahogany Creek) except Williams Creek and Horse Creek.

Cutthroat Trout

Cutthroat trout have been introduced throughout the drainage. The earliest cutthroat trout introduction in the drainage may have been in Dry Creek in 1915. It is difficult to determine where fish were stocked before 1953 because introductions prior to this time are listed only by hatchery and/or county. This makes it difficult to distinguish 2 water bodies bearing the same name. However, state stocking records from 1915 indicate that on June 1, 25,000 "natives" (likely cutthroat trout), 10,000 brook trout, and 55,000 rainbow trout were given to E.H. Motts in Mackay for "Dry Creek." The June 2, 1915 edition of the Mackay Miner (a local newspaper based in Mackay) indicates that fish had been planted in Dry Creek. Since the Dry Creek in the upper Little Lost River drainage is the only Dry Creek in either the Little Lost River or Big Lost River, it is possible these fish were introduced into the Dry Creek in the upper Little Lost River. Cutthroat trout had definitely been introduced into the drainage by 1936 when 26,200 cutthroat trout were introduced into the Little Lost River. Cutthroat trout were specifically introduced into Big Creek and Wet Creek by at least 1947 and Dry Creek in 1964. Likewise, cutthroat trout have been introduced into Big Creek Lake #2, Copper Lake, Mill Creek Lake, Shadow Lake #1, Shadow Lake #2, Swauger Lake #1, and Swauger Lake #2. It appears that other cutthroat trout introductions occurred in the drainage in streams such as Mill Creek and Squaw Creek although this determination cannot be definite due to the method in which the introductions were recorded.

Most of the cutthroat trout introduced into the drainage have been the Yellowstone subspecies. However, westslope cutthroat trout were introduced into several lakes in 1988. Westslope cutthroat trout may have also been introduced into the drainage by early settlers from the Pahsimeroi River drainage.

The current distribution of cutthroat trout is limited primarily to mountain lakes (Figure 14). In 1994, anglers reported catching cutthroat trout in Swauger Lake #2 and Mill Creek Lake. The author found cutthroat trout in Swauger Lake #2 in 1989, 1990, and 1993; Swauger Lake #1 in 1993; and Mill Creek Lake in 1989 (personal observation). Cutthroat trout are stocked regularly in each of these lakes.

Table 13. Summary of sculpin collections from the Little Lost River drainage.

Sampling Location	Location	Date	Number Collected: Total	Adults	Juveniles	Species	Source
Badger Creek	T9N R27E S35	9/20/95	4	1	3	shorthead	present study
Big Springs Creek	T8N R28E S31	6/14/95	2	2	0	shorthead	present study
Big Springs Creek	near source	7/19/34	91	n/a	n/a	shorthead	UMMZ
Deer Creek	T8N R26E S12	6/15/95	4	4	0	shorthead	present study
Horse Creek	T9N R27E S13	6/21/95	3	3	0	shorthead	present study
Little Lost River	T9N R27E	7/20/34	1	0	1	shorthead	UMMZ
Little Lost River	near Moonshine Creek	10/70	5	n/a	n/a	shorthead	Andrews 1972
Little Lost River	near F.S. boundary	10/70	26	n/a	n/a	shorthead	Andrews 1972
Little Lost River	near Summit Creek	10/70	2	n/a	n/a	shorthead	Andrews 1972
Little Lost River	near Howe	10/70	86	n/a	n/a	shorthead	Andrews 1972
Little Lost River	"upper"	9/17/49	3	n/a	n/a	shorthead	UMMZ
Summit Creek	T11N R26E S33	6/22/95	5	4	1	shorthead	present study
Summit Creek	"mouth to head"	n/a	32	n/a	n/a	shorthead	UMMZ
Timber Creek	T12N R26E S6	8/07/95	6	5	1	shorthead	present study
Wet Creek	10 km above mouth[a]	7/20/34	12	n/a	n/a	shorthead	UMMZ
Wet Creek	T8N R25E S2	7/25/95	8	6	2	shorthead	present study
Wet Creek	1.6 km above Big Creek	7/20/34	10	n/a	n/a	shorthead	UMMZ
Wet Creek	T8N R25E S15	8/07/95	13	9	4	shorthead	present study
Total			313			shorthead	

[a] The collection records record this site as "Big Creek, trib of Little Lost River, ca 6 mi above mouth…" However, this seems to be present day Wet Creek.

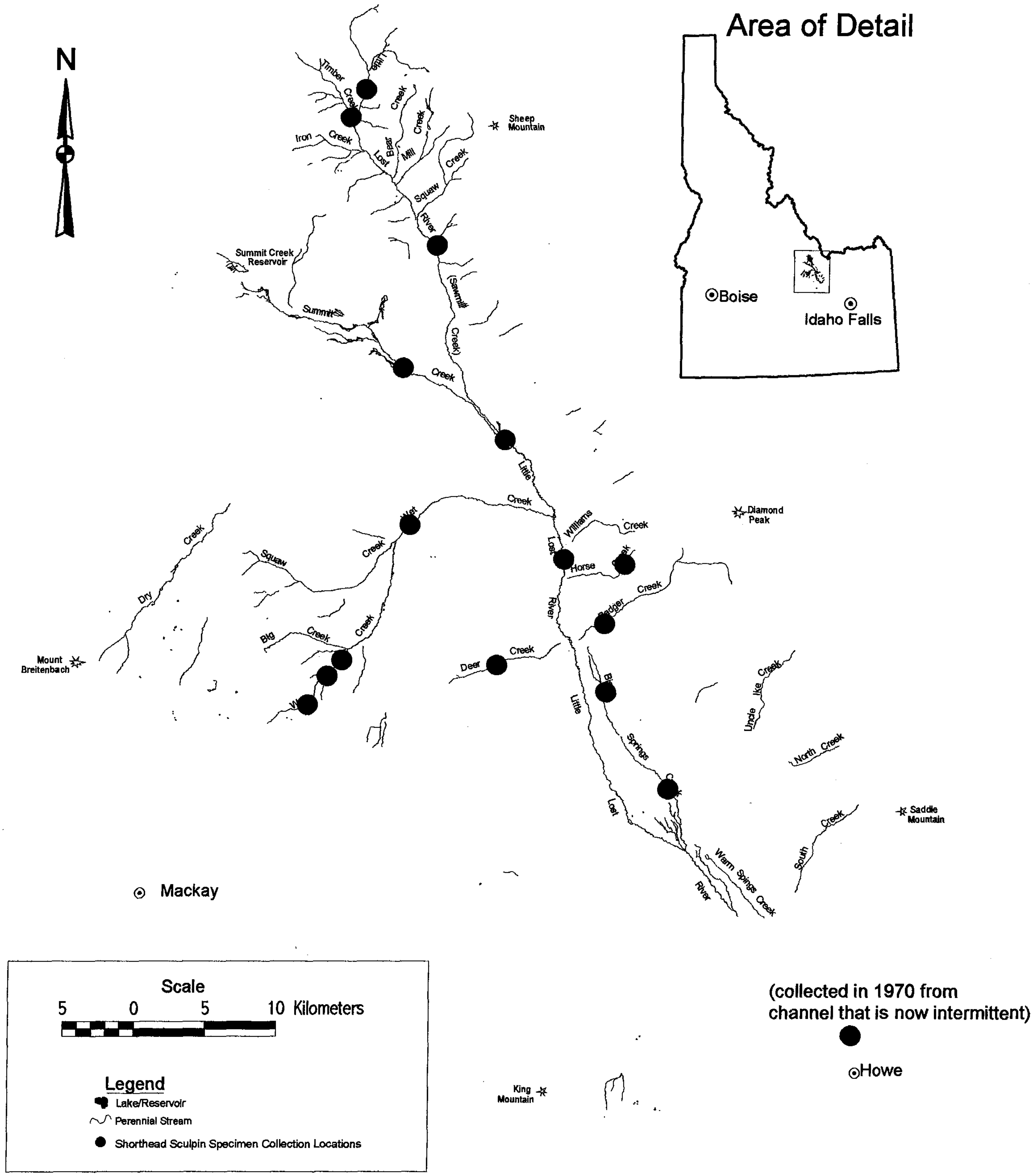

Figure 13. Museum specimen collection sites for shorthead sculpin in the Little Lost River drainage (see Appendix A for all sites in which sculpin were found during the present study).

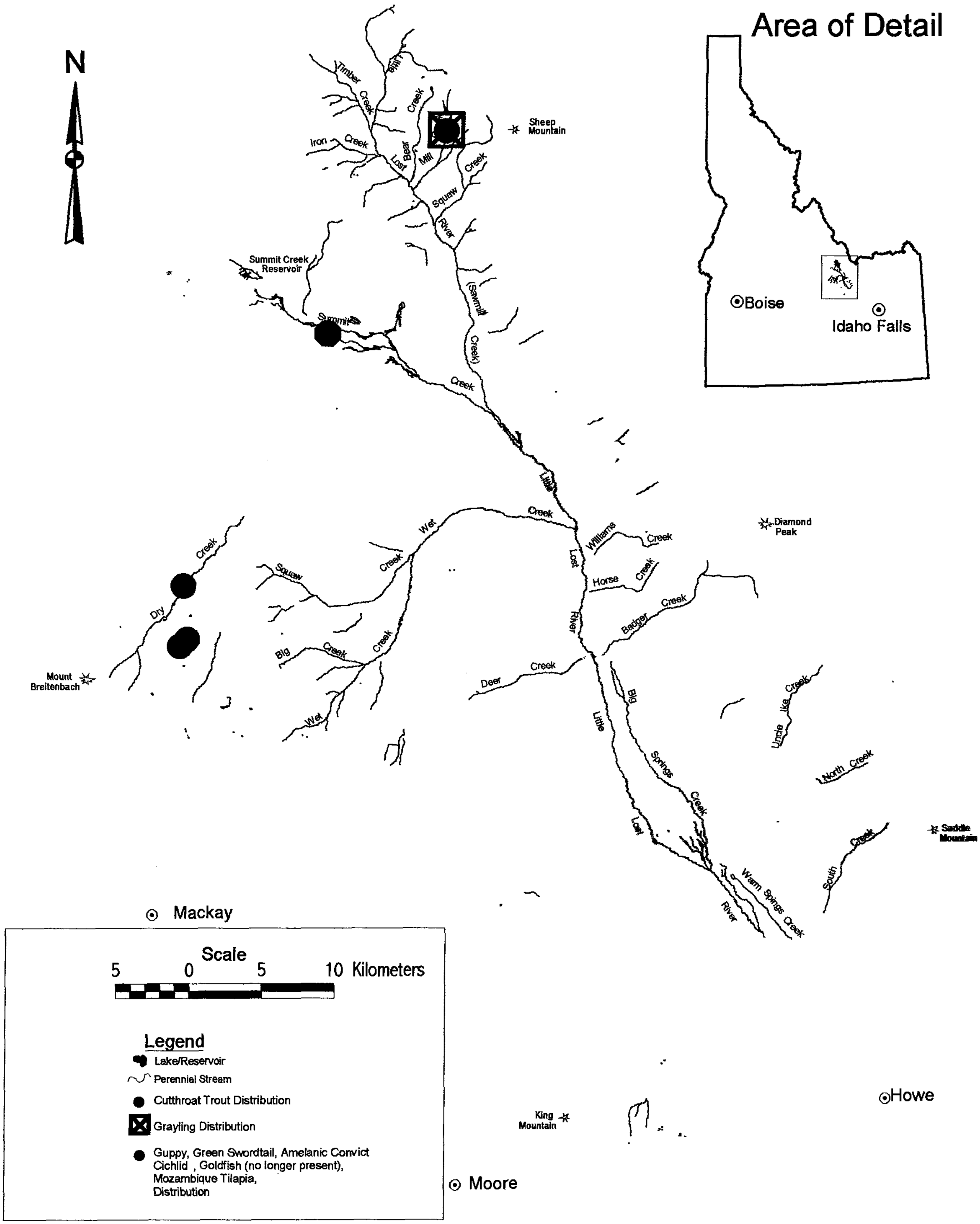

Figure 14. Distribution of cutthroat trout, grayling, guppy, green swordtail, amelanic convict cichlid, goldfish (no longer present), and Mozambique tilapia in the Little Lost River drainage (present study and Courtenay et al. 1987).

The current distribution of cutthroat trout in streams is very limited. The species was caught in Dry Creek by anglers in 1969, 1977, and 1978 (Appendix C) and was collected during electrofishing sampling in 1987 (Corsi and Elle 1989). Although pure cutthroat trout were not found in Dry Creek during current sampling efforts, in the fall of 1997, a Forest Service employee caught what appeared to be a pure cutthroat trout in a small spring adjacent to Dry Creek above the Forest boundary. Cutthroat trout were introduced into Dry Creek in 1964 and possibly in 1915. It is likely that this introduction is the reason for this species occurrence in this stream, rather than the fish being native. Migration of cutthroat trout out of Swauger Lakes into Dry Creek is unlikely (personal observation). It is also possible that one of the fish collected in Meadow Creek in 1995 was a pure cutthroat trout. Rainbow trout from Deer Creek, Big Creek, Badger Creek, and Meadow Creek showed strong evidence of hybridization with cutthroat trout. Several rainbow trout from Deer Creek and Badger Creek were sent to Dr. Robert J. Behnke at Colorado State University who confirmed the influence of cutthroat trout (Dr. Robert J. Behnke, Colorado State University, personal communication).

Guppy, Green Swordtail, Amelanic Convict Cichlids, Mozambique Tilapia, and Goldfish

Several species of tropical fish have been found in Barney Hot Springs and Barney Creek. Guppy, green swordtail, amelanic convict cichlids, and Mozambique tilapia were collected from Barney Hot Springs in September 1985 (Courtenay et al. 1987). At this same time, guppy, green swordtail, and amelanic convict cichlids were collected in Barney Creek immediately below Barney Hot Springs. These 4 species appeared to be present in brief checks of the hot springs in 1995 and 1997 (personal observation). Although goldfish were present in Barney Hot Springs in 1977 (USR file data), none were found in 1985 (Courtenay et al. 1987).

In May 1997, no fish were found in a visual survey of 50 m of Barney Creek approximately 1 km below Barney Hot Springs, where the water temperature was 20°C (personal observation). This suggests that the distribution of these tropical species is limited to Barney Hot Springs and a short reach of Barney Creek immediately below the hot springs.

Brown Trout

Brown trout have not been documented in the Little Lost River drainage. However, they have reportedly been caught in the lower portion of the drainage in recent years (Will Marcroft, LRRD, personal communication).

Golden Trout

There has been a single introduction of golden trout into the drainage. In 1986, 2,000 golden trout were introduced into Nolan Lake in the Wet Creek subdrainage. Due to the small, shallow nature of the lake, it is unlikely these fish survived. In October 1990, the lake was dry (personal observation).

Mountain Whitefish

Mountain whitefish may have been present in the drainage at one time. Mountain whitefish have not been found in fish collections completed in the drainage (present study, Gamett 1990a, Gamett 1990b, Corsi and Elle 1989, Courtenay et al. 1987, Elle et al. 1987, Corsi et al. 1986, Corsi and Elle 1986, Ball and Jeppson 1978, Jeppson and Ball 1978, Andrews 1972, USR file data, UMMZ). However, this species was reportedly present in the Little Lost River in the early 1900's. James Waymire, a local resident, indicated that the Basinger family and other early residents of the valley reported catching whitefish in the Little Lost River near Wet Creek (personal communication). The last whitefish that Mr. Waymire knew of in the drainage was caught in 1939. These fish could either have been native or originated from introductions. On May 2, 1960, 500 whitefish from "MACKAY SALVAGE" were released into the Little Lost River. Likely these fish were mountain whitefish salvaged from the Big Lost River drainage. However, the lack of whitefish in recent sampling indicates the species has not persisted in the drainage.

Grayling

In 1995, grayling were introduced into Mill Creek Lake. In July 1997, a 243 mm grayling was caught from the lake by an angler and turned into the Lost River Ranger District Office (personal observation). This species may be able to reproduce in the lakes inlet, and a reproducing population may become established. Outmigration from the lake into lower Mill Creek cannot occur due to the lack of an overland connection between the lake and Mill Creek.

Part 3: Subdrainages

Introduction

Between 1992 and 1997, each subdrainage in the Little Lost River drainage was evaluated for fish. This section presents an overview for the subdrainages, which are listed alphabetically. Lakes and reservoirs within these subdrainages are discussed separately in Part 4.

Aspen Creek

Aspen Creek, a tributary to the mainstem of the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Aspen Creek could not be clearly determined from an aerial photograph, but the stream appears to be approximately 2.5 km long. In November 1995, a visual survey of the stream was conducted approximately 1.5 km above the confluence with the Little Lost River. Flows were limited, and fish habitat was essentially nonexistent (personal observation).

Badger Creek

Badger Creek, located in the southern end of the Lemhi Mountain Range, is a tributary to the mainstem of the Little Lost River. Badger Creek originates at 2 springs 2.4 km above the Forest boundary and is a total of 10.8 km in length. The water temperature at these 2 springs was 6°C on June 29, 1998. Total stream lengths on Forest, BLM, and private lands are 1.4, 7.6, and 1.8 km, respectively. The stream is intermittently diverted for irrigation approximately 200 m above the Little Lost River. Stream temperatures were monitored in Badger Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Badger Creek in 1997 (Appendix F). At this time, the inventory crew found a falls created by debris approximately 1.5 m high located on Badger Creek approximately 3.0 km above the Little Lost River.

Both rainbow trout and brook trout have been introduced into Badger Creek. Available records indicate Badger Creek was stocked with rainbow trout between 1941 and 1965. A single introduction of brook trout was made in 1943.

In 1995, rainbow trout, bull trout, and sculpin were found in Badger Creek (Table 14, Appendices A and B). While rainbow trout occupy the entire stream, bull trout appear to be confined to the upper reach above the Forest boundary. Although trout densities near Bunting Creek were higher in 1995 compared to 1987 (Table 14), this may be due to differences in the location and time of the sample. The 1995 sample took place in June and was above the confluence with Bunting Creek. The stream here is entirely spring fed and fish may have been concentrated for spawning. As expected, fish densities are higher in the canyon (above Forest boundary) compared to the lower stream reach, where the high gradient nature of the stream limits habitat.

Table 14. Summary of electrofishing data from Badger Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
0.3 km above private/BLM boundary	7/98	6.0	100			Idaho Division of Environmental Quality
3.2 km above Little Lost River	9/95	n/a	100			present study
1.4 km above Forest boundary	9/95	n/a	92		8	present study
0.3 km above Bunting Creek[a]	7/97	44.4	100		[b]	present study
0.3 km above Bunting Creek[a]	6/95	64.1	94		6	present study
0.3 km above Bunting Creek[a]	8/87	33.1	100			Corsi & Elle 1989

[a] Although the 1987 site could not be relocated, the 1995 site should be in the same area.

[b] Young-of-the-year bull trout were captured.

In 1997, the site above Bunting Creek was resampled (Table 14, Appendices A and B). Rainbow trout and bull trout young-of-the-year were found.

In 1998, the Idaho Division of Environmental Quality sampled a 100 m section of Badger Creek located 300 m above the private/BLM boundary (Table 14). As in 1995, only rainbow trout were found.

Sculpin were found at the location 3.2 km above the Little Lost River in 1995 (Appendix A). Four of these fish were collected, preserved, and later identified as shorthead (Table 14). The lack of sculpin at the upper 2 sampling sites suggests sculpin distribution is limited to the stream below the canyon mouth.

Barney Creek (Including Barney Hot Springs)

Barney Creek, located in the upper, central portion of the Little Lost River Valley, is a tributary to Summit Creek. Barney Hot Springs, a pool approximately 15 m wide and maximum depth of 1 m, is the point of origin for Barney Creek. The stream flows for 5.0 km to Summit Creek. In September 1985, the water temperature along the edge of Barney Hot Springs was 27°C (Courtenay et al. 1987). On June 20, 1996, the temperature at the outflow of the pool was 28°C. The water temperature on May 31, 1997, was 28°C (air temperature 20°C) at the outflow and within the pool. The presence of tropical fish in the hot springs and its close proximity to the Little Lost\Pahsimeroi road make Barney Hot Springs a popular attraction for swimmers and picnickers.

Several species of tropical fish have been found in Barney Hot Springs and Barney Creek. Guppy, green swordtail, amelanic convict cichlids, and Mozambique tilapia were collected from Barney Hot Springs in September 1985 (Courtenay et al. 1987). At this same time, guppy, green swordtail, and amelanic convict cichlids were collected in Barney Creek immediately below Barney Hot Springs. These 4 species appeared to be present in brief checks of the hot springs in 1995 and 1997 (personal observation). Although goldfish were present in Barney Hot Springs in 1977 (USR file data), none were found in 1985 (Courtenay et al. 1987). In May 1997, no fish were found in a visual survey of 50 m of Barney Creek approximately 1 km below Barney Hot Springs, where the water temperature was 20°C (personal observation). This suggests that the distribution of these tropical species is limited to Barney Hot Springs and a short reach of Barney Creek immediately below the hot springs (personal observation).

Barney Hot Springs

See Barney Creek

Basin Creek

Basin Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. Based on a review of an aerial photograph taken on August 3, 1979, and vegetation patterns observed in the stream channel, it appears that the stream between Pine Creek and Black Tail Canyon is intermittent. Below Pine Creek, the stream flows for 2.4 km to Wet Creek; 1.1 km occur on Forest and 1.3 km on BLM.

Stream temperatures were monitored in Basin Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Basin Creek between Wet Creek and Pine Creek in 1997 (Appendix F).

In 1997, rainbow trout were found in Basin Creek (Table 15, Appendices A and B). Visual surveys were conducted approximately 6.5 km above Wet Creek in early July 1995, and 0.5 km above Wet Creek in September 1995 (Table 15, Appendix A). No fish were found at these 2 sites. In July 1997, 138 m of Basin Creek were electrofished approximately 300 m below Pine Creek (Table 15, Appendix A). Two rainbow trout were captured at this site.

Table 15. Summary of electrofishing data from Basin Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.4 km above Wet Creek	9/95	none				present study
300 m below Pine Creek	7/97	n/a	100			present study
6.4 km above Wet Creek	7/95	none				present study

R1/R4 survey data indicates that stream habitat between Wet Creek and Pine Creek is in poor condition (Table 16). This 2,473 m stream reach was characterized by a high width to depth ratio, low percentage of pools, no large woody debris, moderate bank stability, low percentage of undercut banks, and high surface fines. Stream surveyors found that in some areas the stream had downcut 1.5 m resulting in up to 2 m of raw bank. In 1997, stream temperatures in Basin Creek immediately above the confluence with Wet Creek exceeded 20°C for 49 days and 25°C for 3 days (Appendix E). Water temperatures at 7 of the springs feeding Basin Creek (6 of which were in Pine Creek) had temperatures between 6 and 10°C on June 29, 1998. This indicates that water temperatures in Basin Creek increase considerably before entering Wet Creek. Poor habitat and high stream temperatures limit this stream's ability to support fish.

Table 16. Habitat characteristics of Basin Creek between Wet Creek and Pine Creek in 1997 (Forest Service R1/R4 stream habitat inventory).

Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Width:Depth	Pools (%)	Large Woody Debris/100 m	Bank Stability (%)	Undercut Banks (%)	Surface Fines (%)
2,473	4.4	0.9	24.3	0.8	0.0	73	25	68

Basinger Canyon

See Bell Mountain Creek (Basinger Canyon)

Bear Canyon

Bear Canyon is located west of Sawmill Canyon in the Lemhi Mountain Range. A review of an aerial photograph taken August 6, 1979 indicated there is a small perennial stream in Bear Canyon. However, flows appear very limited and the stream runs only about 1.5 km before sinking. Due to the disjunct nature of the stream and limited flow, the presence of fish is unlikely. Therefore, the stream was not surveyed.

Bear Creek

Bear Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Bear Creek could not be clearly determined from an aerial photograph, but the stream appears to be approximately 5.6 km long. Stream temperatures were monitored in Bear Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the fish bearing portion of Bear Creek in 1994 (Appendix F).

In 1995, rainbow trout were found in Bear Creek (Table 17, Appendices A and B). Fish distribution appears to be limited to approximately the first 1.2 km of stream. The upstream distribution of fish appears limited by stream gradient. Unlike other tributaries in Sawmill Canyon with fish populations, no bull trout were found in Bear Creek. High stream temperatures possibly explain the absence of bull trout. The high numbers of small fish indicate Bear Creek is an important spawning and nursery area for rainbow trout. Seventy-five percent of the 20 fish sampled were under 100 mm and were likely age one fish. In addition, numerous young-of-the-year rainbow trout (approximately 30 mm in length) were observed.

Table 17. Summary of electrofishing data from Bear Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
0.6 km above Sawmill Road	9/95	n/a	100			present study

The stream and riparian habitat of lower Bear Creek has been degraded by grazing. In 1994, the Forest Service R1/R4 stream habitat survey was conducted on the lower 1.5 km of Bear Creek (Table 18). The stream was characterized by a high width to depth ratio, a high percentage of pools, low amounts of large woody debris, high bank stability, low percentage of undercut banks, and high surface fines. In 1997, stream temperatures in Bear Creek immediately above the confluence with the Little Lost River exceeded 15°C for 58 days, 20°C for 1 day, and did not exceed 25°C (Appendix E).

Table 18. Habitat characteristics of the lower 1.5 km of Bear Creek in 1994 (Forest Service R1/R4 stream habitat inventory).

Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Width:Depth	Pools (%)	Large Woody Debris/100 m	Bank Stability (%)	Undercut Banks (%)	Surface Fines (%)
1,593	5.5	3.8	19.5	44	1.1	97	5	44

Bell Mountain Creek (Basinger Canyon)

Bell Mountain Creek, located in the central portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. The entire stream is diverted into the Telford pipeline approximately 1 km below the Forest boundary. The point of origin was not clearly determined. In 1995, there were good flows in the stream above the large spring near the point of diversion. However, limited flows observed in 1997 suggest the stream above this spring may be intermittent.

No fish were found in Bell Mountain Creek. In June 1995, the stream was electrofished for approximately 10 m at the diversion pool and electrofished/visually surveyed for approximately 50 m 0.4 km above the diversion (Appendix A). No fish were found at either of these 2 sites. Any fish present would likely have been detected, particularly at the diversion pool.

Big Creek

Big Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. Big Creek originates at a series of springs 6.6 km above the confluence with Wet Creek. The stream flows for 4.5 km on Forest land, 0.8 km on private land, 0.8 km on BLM land, then re-enters private land for 0.5 km, where it enters Wet Creek. Both dispersed recreation and grazing along the lower reach of the stream are heavy and appear to be having negative impacts on the riparian area (personal observation). Stream temperatures were monitored in Big Creek in 1995, 1996 (Appendix D), and 1997 (Appendix E). In 1997, the stream temperature at the source of Big Creek was 7°C. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Big Creek in 1994 (Appendix F). At this time, the inventory crew found a series of falls and cascades approximately 4 km above the Forest boundary. These falls and cascades should be quantified to determine their impact on fish movement.

There is one lake and one large beaver pond (known locally as Big Creek Lake) in Big Creek. Due to the beaver ponds large size and semi-permanent nature, the Forest Service cataloged it as a mountain lake in 1990. (See Lower Big Creek Lake and Upper Big Creek Lake in Part 4).

Big Creek has been stocked with rainbow trout, cutthroat trout, and brook trout. Rainbow trout were introduced by at least 1941, and cutthroat trout were introduced by at least 1947. A single introduction of brook trout was made in 1978.

In 1994, rainbow trout, brook trout, bull trout, brook trout x bull trout hybrids, and sculpin were found in Big Creek (Table 19, Appendices A and B). Rainbow trout were the most abundant species below the beaver pond. Above the beaver pond, brook trout became the dominant species. Bull trout were found only in the immediate vicinity of the beaver pond.

Table 19. Summary of electrofishing data from Big Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
0.8 km above Wet Creek[a]	9/96	n/a	86	14		present study
0.8 km above Wet Creek[a]	8/94	8.0	81	19		present study
0.8 km above Wet Creek[a]	8/87	14.3	100			Corsi & Elle 1989
20 m above Forest boundary	9/96	n/a	37	63		present study
At trailhead	9/94	33.6	52	48		present study
Immediately below beaver pond	8/94	42.3	60	38	2[b]	present study
Above beaver pond	9/94	137	18	77	6[c]	present study

[a] Although the 1987 site could not be relocated, the 1994 site should be in the same area.
[b] One bull trout appeared to be a hybrid.
[c] All bull trout appeared to be hybrids.

Rainbow trout near the beaver pond showed evidence of hybridization with cutthroat trout. These fish had extremely large spots over much of the body indicating a Yellowstone cutthroat trout influence. It is likely that this was the subspecies of cutthroat trout introduced into Big Creek.

In 1996, brook trout, rainbow trout, and sculpin were found in Big Creek (Table 19, Appendices A and B). Two sites were sampled in Big Creek in 1996. The lower site was in approximately the same location as the lower 1994 site. As in 1994, rainbow trout were the dominant trout species present. At the site near the Forest boundary, brook trout comprised the majority of the salmonids sampled. No bull trout were found in either location. Sculpin were collected in both locations.

Brook trout do not appear to have been present in Big Creek until the 1970's. Ted Rothwell, a local resident, fished Big Creek in the 1940's, 1950's, and 1960's (personal communication). When he first began fishing the stream in the 1940's, most of the fish caught were bull trout up to 450 mm in length. A similar account is made by Albert Fullmer, Jr. (area resident, personal communication). In the 1950's, most of the fish he caught in Lower Big Creek Lake (beaver pond) were bull trout up to 1.8 kg. A photograph taken by Mr. Fullmer shows several bull trout approximately 300 to 500 mm in length that were caught in Lower Big Creek Lake (beaver pond) on June 4, 1958. Creel census data are available from Big Creek for 1969, 1971, 1972, 1974, 1977, and 1979 (USR file data). Between 1969 and 1974, 47 anglers who had fished a total of 177 hours were interviewed. Although these anglers caught 197 fish (170 rainbow trout and 27 bull trout), they did not catch any brook trout. In 1977, 33 anglers fished for 70 hours, catching 58 rainbow trout, 12 bull trout, and 5 brook trout. In 1978, 2,025 fingerling brook trout were released into the stream. By 1990, brook trout comprised 95% of the fish caught by anglers in the large beaver pond in the head of Big Creek (Gamett 1990a). In 1994, brook trout were found in all 4 of the sites sampled in Big Creek, where they comprised up to 77% of the species composition (Table 19, Appendix A).

The bull trout found in Big Creek may be fluvial fish that migrate from lower Wet Creek and/or the mainstem of the Little Lost River to the headwaters of Big Creek to spawn. Large bull trout up to approximately 430 mm in length have been caught in Big Creek (personal observation, USR file data). An apparent brook trout x bull trout hybrid measuring 455 mm was captured in 1994 (present study). The large size of these fish would indicate they are not resident to Big Creek. If this is true, they are likely migrating from lower Wet Creek or the mainstem of the Little Lost River to spawn.

Hybridization and competition between brook trout and bull trout appear to be a significant threat to bull trout in Big Creek. In 1994, no bull trout young-of-the-year were captured in Big Creek, and it is likely many are falling prey to brook trout. All 6 bull trout captured above the beaver pond appeared to be hybrids, and 1 of the 3 bull trout captured below the beaver pond appeared to be a hybrid. It is likely that competition and hybridization will lead to the extinction of this bull trout population.

Big Springs Creek

Big Springs Creek, located in the lower central portion of the Little Lost River Valley, is a tributary to the Little Lost River. The stream originates at several springs on private land and flows 15.0 km to the mainstem of the Little Lost River. The water temperature at 5 of these springs ranged between 6 and 9°C on May 19, 1998. Approximately half of the stream is on BLM land; the remainder is on private. Stream temperatures were monitored in Big Springs Creek in 1997 (Appendix E).

Rainbow trout have been introduced into Big Springs Creek. It is currently stocked with catchable rainbow trout and is the only stream in the Little Lost that is stocked (Bruce Rich, USR, personal communication).

In 1993, wild rainbow trout, hatchery rainbow trout, and brook trout, were found in Big Springs Creek (Table 20, Appendices A and B). Trout densities were similar in 1987 and 1993.

Sculpin were found in the mid section of the stream in 1995 (Appendix A). Two of these fish were collected, preserved, and later identified as shorthead (Table 13). In 1934, Carl Hubbs collected 91 shorthead sculpin, a brook trout, and 7 rainbow trout from Big Springs Creek (UMMZ).

Creel census data indicate bull trout were present in Big Springs Creek as recent as 1977 (Appendix C). However, additional creel census data, which were collected in 1978, 1979, and 1987 (Appendix C), and electrofishing data from 1987 (Corsi and Elle 1989) and 1993 (present study), indicate they are no longer present.

Table 20. Summary of electrofishing data from Big Springs Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
0.8 km above road crossing[a]	9/93	20.9	80	20		present study
0.8 km above road crossing[a]	8/87	20.1	94[b]	6		Corsi & Elle 1989
"near source" (T8N R27E)	7/34	n/a	[c]	[c]		UMMZ

[a] Although the 1987 site could not be relocated, the 1993 site should be in the same area.
[b] One hatchery rainbow.
[c] Seven rainbow trout 38-48 mm, One brook trout 60 mm.

Birch Basin

Birch Basin is located in the central portion of the Lemhi Mountain Range. A field survey of the basin in June 1995 indicated a small perennial spring and no fish habitat (Appendix A).

Bird Canyon

Bird Canyon is located in the southern end of the Lost River Mountain Range. There are no perennial streams in the canyon (personal observation).

Black Canyon

Black Canyon is located in the southern end of the Lemhi Mountain Range. A review of aerial photographs taken on July 31, 1979 and a field inspection indicated there are no perennial streams in this drainage (personal observation; Janet Valle, LRRD, personal communication).

Black Creek

Black Creek, located in the central portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. The only perennial flow in the canyon is from a small spring. The stream has a 20% gradient (map gradient). The water from this spring flows for approximately 0.8 km, where it is diverted into a pipeline approximately 1 km above the Forest boundary. This pipeline enters the Deep Creek pipeline 1.8 km south of the point of diversion.

In July 1997, a visual survey of the diversion pool and the stream immediately above the pool was completed (Appendix A). No fish were found, and fish habitat is essentially non-existent.

Black Tail Canyon

Black Tail Canyon is located in the southern end of the Lost River Mountain Range. A field review in July 1995 indicated there are no perennial streams in the subdrainage.

Boulder Creek and Fowler Springs

Boulder Creek and Fowler Springs are located in the southern end of the Lemhi Mountain Range. A review of an aerial photograph taken on August 3, 1979 indicated that, with the exception of Fowler Springs, there are no perennial waters in this subdrainage. Fowler Springs has a limited flow approximately 1 km long. Due to the limited flow and disjunct nature of Fowler Springs, it is unlikely fish are present. Therefore, the stream was not surveyed.

Briggs Canyon

Briggs Canyon is located in the southern end of the Lost River Mountain Range. A field check of Briggs Canyon at the Forest boundary in November 1995 indicated there are no perennial streams in this subdrainage (personal observation).

Buck Canyon

Buck Canyon is located in the southern end of the Lost River Mountain Range. There are no perennial streams in this subdrainage (personal observation).

Bull Creek

Bull Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Bull Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2.5 km long.

No fish were found in Bull Creek. In 1995, the stream was electrofished for approximately 70 m at 0.8 km above the Little Lost River and for approximately 30 m at 1.2 km above the Little Lost River (Appendix A). No fish were found at either site.

Bunting Canyon

Bunting Canyon Creek, located in the southern end of the Lemhi Mountain Range, is a tributary to Badger Creek. The origin of the stream could not be clearly determined from an aerial photograph, but it appears to be a spring 3.4 km above the confluence with Badger Creek. The entire stream is on Forest land except for the extreme lower portion, which is private. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on lower Bunting Creek in 1997 (Appendix F).

The fish population in Bunting Canyon Creek is very limited. In 1987, one bull trout and 2 rainbow trout were captured near the confluence with Badger Creek (Corsi and Elle 1989). In 1997, 43 m of stream in this same area were sampled (Table 21, Appendices A and B). Three bull trout, 3 rainbow trout, and 3 young-of-the-year bull trout were captured. Although the high stream gradient limits fish habitat, it is possible that bull trout from Badger Creek use this stream for spawning.

A falls, 1 m in height, located approximately 300 m above Badger Creek, appears to be a barrier to fish migration. In 1995, the stream was electrofished for approximately 60 m 0.4 km above Badger Creek and for approximately 50 m 2.0 km above Badger Creek (Table 21, Appendix A). No fish were found at either of these 2 sites.

Table 21. Summary of electrofishing data from Bunting Canyon Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
175 m above Badger Creek[a]	7/97	n/a	50		50	present study
175 m above Badger Creek[a]	8/87	n/a	67		33	Corsi and Elle 1989
0.8 km above Badger Creek	6/95	none				present study
2.0 km above Badger Creek	6/95	none				present study

[a] Although the 1987 site could not be relocated, the 1997 site should be in the same area.

Cabin Fork

See Cedarville Canyon

Camp Creek (Sawmill Canyon)

Camp Creek, a tributary to Timber Creek, is located in Sawmill Canyon. Although the tributary is unnamed on the USGS orthophoto and Forest Service map, a sign along the stream designated it as Camp

Creek. The stream is located immediately south of Redrock Creek. The origin of Camp Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2.4 km long. Stream bank erosion has created a barrier approximately 1 m high immediately above Timber Creek. This barrier likely restricts fish movement into the stream. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Camp Creek in 1997 (Appendix F).

In 1995, bull trout were found in Camp Creek (Table 22, Appendices A and B). Two sites were electrofished. The lower site was approximately 100 m above Timber Creek. The upper site was near the road 1.6 km above Timber Creek. In the lower section, 5 bull trout were collected. All of these fish were between 84 mm and 137 mm in length. No fish were found at the second sampling site. Based on sampling and a field review of the drainage, fish distribution appears to be limited to approximately the lower 1 km of stream.

Table 22. Summary of electrofishing data from Camp Creek (Sawmill Canyon).

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
100 m above Timber Creek	9/95	n/a			100	present study
1.6 km above Timber Creek	9/95	none				present study

Camp Creek (Southern Lemhi Mountain Range)

Camp Creek is located in the southern end of the Lemhi Mountain Range. A review of an aerial photograph taken August 3, 1979 indicated there are no perennial streams in this subdrainage.

Cedar Run Canyon and Mud Spring

Cedar Run Canyon Creek and Mud Spring are located in the central portion of the Lemhi Mountain Range. Although flows do intermittently reach the mainstem, the stream is usually disjunct from the Little Lost River. The streams source appears to be a spring 1.5 km above the Forest boundary. The stream flows for 1 km, where it is diverted into a canal. Mud Spring, which is located near the mouth of the canyon, is diverted into this canal.

No fish were found in Cedar Run Canyon Creek or Mud Spring. Cedar Run Canyon Creek, Mud Spring, and the canal they are diverted into were surveyed for fish in June 1995. Cedar Run Canyon Creek was electrofished near the diversion for approximately 50 m, Mud Spring was visually surveyed for approximately 50 m, and the canal into which they are diverted was electrofished/visually surveyed for approximately 50 m (Appendix A). No fish were found at any of the sites.

Cedarville Canyon (including North Fork and Cabin Fork)

The Cedarville Canyon drainage, including North Fork and Cabin Fork, is located in the southern end of the Lost River Mountain Range. A review of aerial photographs taken on August 3, 1979 indicated there are no significant perennial streams in Cedarville Canyon or North Fork. One perennial stream was found in the Cabin Fork. The stream originates at a large spring near the end of the road in Cabin Fork. This spring emits enough water to sustain a flow for several hundred meters. The stream is 1 to 2 m wide and has an approximate mean depth of 0.1 m. No fish were observed during a visual survey of approximately 50 m of the stream in November 1995 (Appendix A).

Chicken Creek

Chicken Creek, located in the central portion of the Lost River Mountain Range, is disjunct from Squaw Creek. A review of an aerial photograph taken August 3, 1979 indicates the stream's source is a spring 1.8 km above the Forest boundary. The stream crosses Forest land for 1.8 km, private land for 0.8 km, then sinks after crossing approximately 3.2 km of BLM land.

No fish were found in Chicken Creek. The stream was electrofished and visually surveyed for approximately 20 m at the BLM/private property line in September 1995 (Appendix A). Fish habitat was essentially nonexistent, and no fish were found.

Coal Creek

Coal Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. Based on a review of an aerial photograph taken on August 3, 1979, Coal Creek originates at a spring 0.8 km above its confluence with Wet Creek. The entire stream is on Forest land. Stream temperatures were monitored in Coal Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Coal Creek in 1997 (Appendix F).

In 1995, rainbow trout were found in Coal Creek (Table 23, Appendices A and B). It appears fish are confined primarily to the upper reach of the stream because habitat in the lower reach is limited due to the steep stream gradient.

Table 23. Summary of electrofishing data from Coal Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Below Gate	7/95	11.2	100			present study

Corral Canyon Creek

Corral Canyon Creek, located in the southern end of the Lost River mountain range, is a tributary to Horsethief Canyon Creek. In July 1997, a visual survey of approximately 30 m of stream was conducted 20 m above Horsethief Canyon Creek (Appendix A). No fish were found. Vegetation patterns and flows near Horsethief Canyon Creek suggest the stream is intermittent.

Corral Creek

Corral Creek, located between Squaw Creek and Dry Creek, is disjunct from Wet Creek. The stream is approximately 0.5 m wide. Fish habitat is limited by the stream's small size and limited flow.

In June 1997, 50 m of stream were visually surveyed approximately 1 km above the Wet Creek Road (Appendix A). No fish were found.

Cub Canyon

Cub Canyon Creek, located west of Sawmill Canyon in the Lemhi Mountain Range, is disjunct from the Little Lost River. The point of origin is a series of springs approximately 1.5 km above the Forest boundary. After leaving Forest lands, the stream crosses approximately 1.5 km of private land, where the water is stored in a pond for livestock use. A field check of the stream in September and November 1995 indicated habitat was limited due to small flows.

Deep Creek

Deep Creek, located in the central portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. Based on a review of an aerial photograph, the stream's source is a spring 2.3 km above the Forest boundary. The stream flows 1.5 km, where it is diverted into a hydroelectric pipeline. The settling pond at the point of diversion is approximately 15 m wide and 2 m deep. A small, unnamed tributary enters Deep Creek from the south just above the settling pond.

No fish were found in Deep Creek. Three locations were surveyed in 1995 (Appendix A). A visual survey was conducted of the diversion pool. The stream was electrofished immediately above the diversion pool and approximately 200 m above the diversion pool. A total of approximately 50 m was electrofished. No fish were found at any of these sites.

Deer Creek (see also Deer Creek, North Fork; Deer Creek, South Fork)

Deer Creek, located in the southern end of the Lost River Mountain Range, is a tributary to the mainstem of the Little Lost River. Deer Creek originates at the confluence of the South Fork Deer Creek and

North Fork Deer Creek and flows for 8.2 km to the Little Lost River. The stream originates on Forest land and flows for 1.3, 6.4, and 0.5 km on Forest, BLM, and private lands, respectively. Stream temperatures were monitored in Deer Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Deer Creek in 1997 (Appendix F).

Accounts from anglers suggest bull trout were not historically present in Deer Creek. Anna Sermon has fished Deer Creek since about 1938 (personal communication). However, she has never caught a bull trout in that stream. In addition, her family often fished Deer Creek between the late 1930's and the late 1940's. Although they would catch between 50 and 150 fish in Deer Creek on a single outing, none of the fish were bull trout.

A single introduction of 1,200 rainbow trout ranging between 13 cm and 20 cm in length was made in 1954.

Rainbow trout and sculpin were found in Deer Creek (Table 24, Appendices A and B). In 1992, the lower 2 transects were sampled. These same sites were also sampled in 1987 (Corsi and Elle 1989). Densities decreased from 1987 to 1992 in both of these transects. In 1995, an additional site was sampled at the Forest boundary. Rainbow trout were the only salmonid collected from Deer Creek in 1987, 1992, and 1995. It is likely the naturally high stream temperature of Deer Creek precludes bull trout from successfully spawning in Deer Creek, North Fork Deer Creek, and South Fork Deer Creek. This may explain the absence of bull trout in these streams.

In 1998, the Idaho Division of Environmental Quality sampled a 100 m section of Deer Creek located 300 m above the private/BLM boundary (Table 24). This was done to help confirm the absence of bull trout in this stream. Only 2 rainbow trout 20-29 mm in length were captured.

Sculpin were found near the Forest boundary in 1995 (Appendix A). Four of these fish were collected, preserved, and later identified as shorthead (Table 13). No sculpin were found in the South Fork Deer Creek or North Fork Deer Creek. A small falls, 0.6 m in height near the Forest boundary, has likely blocked their passage.

Deer Creek, North Fork

North Fork Deer Creek, located in the southern end of the Lost River Mountain Range, is a tributary to Deer Creek. North Fork Deer Creek originates at a spring 0.8 km above the confluence with the South Fork Deer Creek. The water temperature at this spring was 13 °C on June 6, 1997, and on May 19, 1998. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on North Fork Deer Creek in 1997 (Appendix F).

In 1995, rainbow trout were found in the North Fork Deer Creek (Table 25, Appendices A and B). The 357.4 fish/100 m^2 density likely reflects a high concentration of spawning fish. This high density may also be explained by fish moving into the transect between passes. It is doubtful densities remain this high year round, particularly due to the lack of habitat (i.e.- pools, cover, etc.). Fish occupy the entire stream reach. It is likely the naturally high stream temperature precludes bull trout from successfully spawning in the stream. This may explain the absence of bull trout in this stream and Deer Creek.

Table 24. Summary of electrofishing data from Deer Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.3 km above private/BLM boundary	7/98	0.0	[a]			Idaho Division of Environmental Quality
2.1 km above Little Lost River -BLM #1[b]	8/92	22.4	100			present study
2.1 km above Little Lost River -BLM #1[b]	8/87	45.9[c]	100			Corsi & Elle 1989
1.6 km below Forest boundary -BLM #2[d]	8/92	20.7	100			present study
1.6 km below Forest boundary -BLM #2[d]	8/87	28.2[c]	100			Corsi & Elle 1989
At Forest boundary	6/95	42.5	100			present study

[a] Only two rainbow trout 20-29 mm in length were captured.

[b] Old BLM site #2.

[c] Bureau of Land Management file data indicates there was an error in the 1987 mean stream widths supplied to the Department of Fish and Game for Deer Creek. Subsequently, the fish densities in Corsi and Elle (1989) were incorrect. Fish densities for Deer Creek shown here for 1987 have been recalculated based on the stream width in 1992. Therefore, they do not match those reported for Deer Creek in 1987 by Corsi and Elle (1989).

[d] Old BLM site #3.

Table 25. Summary of electrofishing data from Deer Creek, North Fork.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
0.2 km above South Fork	6/95	357.4[a]	100			present study

[a] More fish were captured in this transect than could be held between passes. Therefore, fish were released below the transect between passes. It may be possible that some of these fish moved back into the transect, were recaptured, and recounted.

Deer Creek, South Fork

South Fork Deer Creek, located in the southern end of the Lost River Mountain Range, is a tributary to Deer Creek. South Fork Deer Creek originates at a spring 0.9 km above the confluence with the North Fork Deer Creek. The water temperature at this spring was 13 °C on June 6, 1997, and on May 18, 1998. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on South Fork Deer Creek in 1997 (Appendix F).

In 1995, rainbow trout were found in South Fork Deer Creek (Table 26, Appendices A and B). Fish occupy the entire stream reach. It is likely the naturally high stream temperature precludes bull trout from successfully spawning in the stream. This may explain the absence of bull trout in this stream and Deer Creek.

Table 26. Summary of electrofishing data from Deer Creek, South Fork.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
0.5 km above North Fork	6/95	37.5	100			present study

Dry Creek

Dry Creek, located in the central portion of the Lost River Mountain Range, is disjunct from Wet Creek and the Little Lost River. The origin of Dry Creek could not be clearly determined from an aerial photograph. However, in August 1995, the stream was flowing 7.5 km above the Forest boundary, indicating the stream is at least 13.2 km long. The stream flows at least 7.5 km on Forest land and 5.8 km on BLM land, where it is diverted into a hydroelectric pipeline. There are 8 lakes in Dry Creek. At one time, a reservoir (Dry Creek Reservoir) existed on Dry Creek below Long Lost Creek, but has since failed. (See Dry Creek Lake #1, Dry Creek Lake #2, Dry Creek Lake #3, Dry Creek Lake #4, Dry Creek Pond, Dry Creek Reservoir, Copper

Lake, Swauger Lake #1, Swauger Lake #2, and Swauger Lake #3 in Part 4.) Stream temperatures were monitored in Dry Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the fish bearing portion of Dry Creek and an unnamed tributary in 1997 (Appendix F).

Several water development projects have been carried out on Dry Creek. These include construction of a dam (see Dry Creek Reservoir in Part 4), wooden pipeline, cement canal, and hydroelectric pipeline. Williams (1973) indicates that in the late 1800's or early 1900's, a canal was constructed in Dry Creek in an effort to reduce water loss in the main channel. Later, a 1.2 m wide redwood pipeline was used to carry water from Dry Creek Reservoir to Wet Creek (Rob Stauffer, area resident, personal communication). In the mid 1960's, a cement canal was built to carry water from approximately 2.5 km below the dam site to Wet Creek. In the 1980's, this canal was replaced by a hydroelectric pipeline, which originates at the same point as the canal. The pipeline terminates at a power plant near Wet Creek. Except in periods of high water, the entire stream is diverted into the pipeline.

Dry Creek was stocked with rainbow trout between 1948 and 1964. A single cutthroat trout introduction was made in 1964. Cutthroat trout, rainbow trout, and brook trout may have been introduced into Dry Creek in 1915 (see Part 2: Species, Cutthroat Trout).

In 1995, brook trout and rainbow trout x cutthroat trout hybrids were found in Dry Creek (Table 27, Appendices A and B). Fish densities were the highest above the dam site and lowest near the diversion. Although Corsi and Elle (1989) found cutthroat trout in Dry Creek in 1987, none were found during sampling efforts in 1995. In 1997, a Forest Service employee caught what appeared to be a pure cutthroat trout from the large spring adjacent to Dry Creek 1.2 km above the Forest boundary.

No fish were found in the upper reach of Dry Creek. A single waterfall 4.5 m in height is located on Dry Creek approximately 1.5 km above the Forest boundary. Four locations above these falls were surveyed in August 1995. The first 2 sections, a 60 m section 0.4 km above the falls and an 80 m section 0.8 km above the falls, were electrofished. The other 2 sections, a series of beaver ponds adjacent to Dry Creek 3.2 km above the falls and a 30 m reach of stream 4.8 km above the falls, were visually surveyed. No fish were found at any of these sites. Likewise, a Forest Service R1/R4 fish habitat crew found no fish in a visual survey of portions of a 1.5 km reach of Dry Creek above the falls.

The cutthroat trout and associated hybrids found in Dry Creek (USR file data, Corsi and Elle 1989, present study) are likely the result of introductions of this species. Corsi and Elle (1989) speculated that emigration of cutthroat trout from Swauger Lakes to Dry Creek may explain the occurrence of this species in this stream. However, the nature of the outlet between these lakes and Dry Creek suggests that movement of fish between the lakes and Dry Creek is unlikely (personal observation).

Apparently, bull trout were historically present in Dry Creek. Jesse Strope, who moved to the Little Lost River valley in 1910, indicated that in the 1920's he caught only "dolly varden" in Dry Creek Reservoir and Dry Creek above the reservoir (personal communication). Likewise, Rob Stauffer, an area resident, indicated that in the early 1960's, "dolly varden" comprised about 10% of the fish he caught in Dry Creek (personal communication). He also reported catching brook trout and rainbow trout in Dry Creek.

Table 27. Summary of electrofishing data from Dry Creek.

Site	Date	Fish/100 m²	Species Composition (%)			Source
			Rb	Bk	Bl	
50 m above diversion pool	8/95	n/a	67[a]	33		present study
0.8 km above diversion	8/95	4.1		100		present study
150 m above Forest boundary[b]	8/95	8.9		100		present study
150 m above Forest boundary[b]	8/87	3.9		87[c]		Corsi & Elle 1989
Pool adjacent to above site[d]	8/95	n/a		100		present study
Spring adjacent to Dry Creek 1.2 km above Forest boundary	8/95	n/a		100[e]		present study
0.4 km above the falls	8/95	none				present study
0.8 km above the falls	8/95	none				present study
Beaver ponds adjacent to Dry Creek 3.2 km above the falls[f]	8/95	none				present study
4.8 km above the falls[f]	8/95	none				present study

[a] These fish were rainbow trout x cutthroat trout hybrids.
[b] Although the 1987 site could not be relocated, the 1995 site should be in the same area.
[c] Cutthroat trout comprised 13% of the sample.
[d] This was a pool adjacent to the stream, and fish were likely concentrated in the pool following high flows.
[e] All fish were between 70 and 140 mm.
[f] These sites were visually surveyed.

East Canyon

East Canyon is located in the southern end of the Lemhi Mountain Range. A review of aerial photographs taken on July 31, 1979 and field observations indicate there are no perennial streams in this subdrainage.

Eightmile Canyon (including Right and Left forks)

Eightmile Canyon is located in the southern end of the Lost River Mountain Range. A field review indicated there are no perennial streams in this subdrainage (personal observation).

Fallert Springs

Fallert Springs is located in the southern end of the Lemhi Mountain Range. Water flows for a short distance from the springs, where it is diverted into the Uncle Ike Creek pipeline. The steep stream gradient (15% map gradient) and limited flows limit fish habitat, and it is doubtful any fish are present. Therefore, the stream was not surveyed.

Fallert Springs Creek

Fallert Springs Creek, located in the lower, central portion of the Little Lost River Valley, is a tributary to the Little Lost River. It originates at a spring on private land and flows 6.3 km to the mainstem of the Little Lost River. Approximately 1.2 km are on private land, the remainder on BLM. The stream temperature near the source spring was 15°C on June 17, 1997. The temperature at the source spring was 9°C on May 19, 1998. Stream temperatures were monitored in Fallert Springs Creek in 1997 (Appendix E).

In 1993, rainbow trout were found in Fallert Springs Creek (Table 28, Appendices A and B). In 1987, both rainbow trout and brook trout were found (Corsi and Elle 1989). In 1993, dense aquatic vegetation made sampling very difficult and a population estimate was not possible.

Table 28. Summary of electrofishing data from Fallert Springs Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Upstream from Fallert Springs Bridge	9/93	n/a	100[a]			present study
Upstream from Fallert Springs Bridge	8/87	0.8	80	20		Corsi & Elle 1989

[a] One hatchery rainbow trout collected.

Firebox Creek

Firebox Creek, a tributary to the mainstem of the Little Lost River, is located in Sawmill Canyon. The origin of Firebox Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2.5 km long. The majority of the drainage was burned in 1988. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Firebox Creek in 1994 (Appendix F).

In 1997, bull trout were found in Firebox Creek (Table 29, Appendices A and B). Densities were relatively high at 16.6 fish/100 m^2. The largest bull trout captured was 403 mm. In 1994, a Forest Service habitat crew observed bull trout up to approximately 350 mm in the stream (LRRD file data). At that time, smaller bull trout were observed in stream reaches with gradients in excess of 10%. The presence of large bull trout suggests that Firebox Creek serves as a spawning and rearing area for fluvial bull trout.

Table 29. Summary of electrofishing data from Firebox Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
400 m above Little Lost River	7/97	16.6			100	present study

Fowler Springs

See Boulder Creek

Garfield Creek

Garfield Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. Garfield Creek originates at a spring 2.5 km above the Little Lost River. The stream flows for 2.2 km on Forest land, then 0.3 km on BLM land. Limited stream flows (approximately 0.5 m wide and 0.1 m deep) limit fish habitat.

No fish were found in Garfield Creek. The stream was electrofished for approximately 75 m, 200 m above the Forest boundary (Appendix A). No fish were found.

Hawley Canyon

Hawley Canyon is located on Hawley Mountain in the central portion of the Little Lost River Valley. There are no perennial streams in this subdrainage (personal observation).

Hawley Creek

Hawley Creek, a tributary to Iron Creek, is located in Sawmill Canyon. The origin of Hawley Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2.5 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Hawley Creek in 1997 (Appendix F).

In 1995, one bull trout measuring 199 mm was captured in Hawley Creek (Table 30, Appendices A and B). The stream was electrofished for 47 m immediately above the Iron Creek Road. Based on length at age data for bull trout in the Little Lost River (Corsi and Elle 1989), this was probably an age 2 fish. In 1997, a Forest Service R1/R4 fish habitat crew observed several bull trout up to 200 mm in length in the stream approximately 1,500 m above Iron Creek.

Table 30. Summary of electrofishing data from Hawley Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Immediately above Iron Creek Road	9/95	n/a			100	present study

Hell Canyon

Hell Canyon Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Long Lost Creek. The stream originates at Shadow Lakes and flows approximately 3.0 km to Long Lost Creek. However, aerial photographs suggest the stream is intermittent for much of this distance. Although the stream was not surveyed, limited flow and fish habitat suggest that fish are not present in this stream. This conclusion is also supported by the lack of fish in Long Lost Creek.

Hilts Creek

Hilts Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. The origin of the stream was not apparent from an aerial photograph taken August 3, 1979, but the stream appears to be approximately 1.5 km long. Due to limited flows and potential winter freezing, fish habitat is limited, and it is unlikely fish are present in this stream.

Horse Creek

Horse Creek, located in the southern portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. Horse Creek originates at springs near the Forest Boundary and flows for 5.8 km on BLM land. Upon entering private land, it is either diverted for irrigation or sinks into the ground (Connie Oar, landowner, personal communication). The water temperature at the 3 main springs feeding Horse Creek ranged between 8 and 9°C on June 29, 1998.

One account from an angler suggests that bull trout were not historically present in Horse Creek. Neil Reed, who fished the Little Lost River drainage since the late 1930's, regularly fished Horse Creek. However, he has never caught a bull trout from that stream (Anna Sermon, valley historian, personal communication).

In 1995 and 1997, rainbow trout and sculpin were found in Horse Creek (Table 31, Appendices A and B). Although densities are relatively high, riparian habitat along the lower reach of the stream has been negatively impacted by grazing. Three sculpin were collected, preserved, and later identified as shorthead (Table 13). It appears that sculpin and rainbow trout occupy the majority of the stream reach.

Table 31. Summary of electrofishing data from Horse Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
At BLM / private line	7/97	27.3	100			present study
0.8 km below Forest boundary	6/95	38.8	100			present study

Horse Lake Creek

Horse Lake Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Horse Lake Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 1.5 km long. There is one lake in Horse Lake Creek (see Horse Lake in Part 4).

No fish were found in Horse Lake Creek. In June 1997, approximately 75 m of stream were visually surveyed 300 m above the Little Lost River (Sawmill Creek) (Appendix A). No fish were found. Steep stream gradients and low flows limit fish habitat. Furthermore, it is unlikely fish can access the stream due to the complexity of the stream channel near the Little Lost River.

Horsethief Canyon Creek

Horsethief Canyon Creek, located in the southern end of the Lost River Mountain Range, is a tributary to Hurst Creek. In July 1997, a 30 m section of stream located 20 m above Corral Canyon Creek was visually surveyed (Appendix A). No fish were found. Flows and vegetation patterns suggest the stream is intermittent.

Hurst Canyon

Hurst Canyon Creek, located in the southern end of the Lost River Mountain Range, is disjunct from the Little Lost River. In July 1997, a visual survey of approximately 50 m of stream was conducted near the right and left forks (Appendix A). No fish were found. Flows and vegetation patterns suggest the stream is intermittent below the Forest boundary.

Iron Creek

Iron Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Iron Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 4.8 km long. Stream temperatures were monitored in Iron Creek in 1996 (Appendix D) and 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Iron Creek in 1994 and the forks of Iron Creek in 1997 (Appendix F).

In 1995, bull trout were found in Iron Creek (Table 32, Appendices A and B). In 1987, Corsi and Elle (1989) found both rainbow trout and bull trout 1.5 km below the 1995 site. A comparison of their data with that gathered in 1995 indicates rainbow trout are confined to the lower 0.8 km of the stream and have not advanced further up Iron Creek.

In 1996, the 1995 site was resampled to verify the absence of brook trout and rainbow trout (Table 32, Appendices A and B). Only bull trout were found.

Table 32. Summary of electrofishing data from Iron Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
Just above Iron Creek Road[a]	9/96	n/a			100	present study
Just above Iron Creek Road[a]	8/95	10.1			100	present study
0.5 km above the Little Lost River (Sawmill Creek)	7/87	6.6	4		96	Corsi & Elle 1989

[a] The 1995 and 1996 sites are approximately 1.5 km above the 1987 site.

Iron Creek appears to be an important spawning area for fluvial bull trout. On August 23, 1995, 14 bull trout were collected in Iron Creek. Two of these were 372 mm and 274 mm in length. The size of these fish relative to the small size of the stream suggests these fish are fluvial bull trout that have moved into the stream to spawn. The remainder of the fish collected were between 77 and 159 mm.

In October 1997, a Forest Service R1/R4 fish habitat crew found bull trout in the right and left forks of Iron Creek. In the right fork, fish were only observed a short distance above the forks, and their distribution is limited by a lack of habitat. Fish movement into the left fork appears restricted by a falls approximately 1 m high, which is created by a large downed tree. While this falls likely blocks the movement of fluvial bull trout into this fork, bull trout were observed for approximately 500 m above the falls. At this same time, a large pair of bull trout approximately 350 mm long (likely fluvial fish) were observed in Iron Creek immediately below the forks.

Jackson Creek

Jackson Creek, a tributary to Iron Creek, is located in Sawmill Canyon. The origin of Jackson Creek could not be clearly determined from an aerial photograph but it appears to be approximately 2.5 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Jackson Creek in 1997 (Appendix F).

In 1995, bull trout were found in Jackson Creek (Table 33, Appendices A and B). The stream was electrofished for 73 m immediately above the Iron Creek Road. Only 2 bull trout measuring 134 and 155 mm were captured. Based on length at age data for bull trout in the Little Lost River (Corsi and Elle 1989) these were likely age 2 fish. Although the stream does not support large numbers of fish, it appears the stream serves as a rearing area for bull trout.

Table 33. Summary of electrofishing data from Jackson Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Just above Iron Creek Road	9/95	n/a			100	present study

Jumpoff Canyon

Jumpoff Canyon is located in the southern end of the Lost River Mountain Range. There are no perennial streams in this subdrainage (personal observation).

Little Lost River, Mainstem (including Sawmill Creek)

(Note: That portion of the mainstem of the Little Lost River from Summit Creek to Timber Creek is referred to as Sawmill Creek. The stream above and below this reach is the mainstem of the Little Lost River. For purposes of uniformity, Sawmill Creek will be treated as part of the mainstem of the Little Lost River.)

The mainstem of the Little Lost River originates in the head of Sawmill Canyon above Firebox Creek. The river continues down Sawmill Canyon and the Little Lost River Valley where, when undiverted, it sinks southeast of the town of Howe. The mainstem is approximately 88 km long. Stream temperatures were monitored in the Little Lost River in 1987, 1988, 1994, 1995, 1996 (Appendix D), and 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the Little Lost River between the Sawmill Canyon road (#101) near the Forest boundary and Firebox Creek (excluding private sections) in 1994 (Appendix F). That portion above Firebox Creek, including an unnamed tributary (described as "right fork" by the inventory crew), was inventoried in 1997 (Appendix F).

Species introduced into the mainstem of the Little Lost River (including Sawmill Creek) have included rainbow trout, brook trout, cutthroat trout, and mountain whitefish.

The mainstem has undergone extensive channelization and diversion. Williams (1973) indicated that settlers to the valley in the late eighteen or early nineteen hundreds "found certain streams in the valley in which most of the water was going to waste because the channels overflowed most of the time or followed long routes through porous gravel, allowing the water to sink." This reference specifically mentions the "'Saw Mill Canyon Rights' where old channels were repaired and new ones made where necessary." Indeed, reviews of aerial photographs indicate that much of the mainstem between the Forest boundary and Summit Creek has been channelized. Currently, there is no effort to maintain this channelization and the stream channel is returning to a natural condition.

An aerial photograph taken on July 20, 1959 indicates that at that time, all of the Little Lost River was being diverted across the alluvial fan into Summit Creek. The point of diversion was approximately 8 km below Warm Creek. This appears to have resulted in the complete dewatering of approximately 5 km of the Little Lost River above Summit Creek. This was likely done to reduce water loss in the main channel. This diversion has not been used since 1960 (James Andreason, local landowner, personal communication).

Since 1985, the lower portion of the mainstem has been dewatered annually for winter flood control. The following summary of this flood control project and related mitigation project on the Little Lost River between Warm Creek and Summit Creek (lower Sawmill Creek) is taken from the *Little Lost River Flood Control Measure Plan and Environmental Impact Statement* (SCS and BLM 1985), Devoe (no date), IFD file data, and Anderson (1988).

Prior to 1985, freezing on the lower Little Lost River resulted in severe flooding in and around the community of Howe. Limited stream flow and low stream gradient in the lower reach of river resulted in the formation of ice in the river channel. Subsequently, water would leave the channel and flood between 600 and 2,900 hectares annually. Mean annual damages from flooding were approximately $75,400. However, in 1969, an estimated $442,600 in damages occurred.

In the early 1980's, a plan to alleviate flooding was developed. In 1985, a draft environmental impact statement (EIS) had been prepared when the threat of severe flooding prompted emergency action. During this time, the selected alternative for flood control identified in the draft EIS was partially implemented. This involved diverting the entire river into two 0.8 km long 3 m deep infiltration trenches approximately 14 km north of Howe. This resulted in the total dewatering of the lower 16.9 km of the river and an estimated loss of 4,200 trout. Later, the remainder of the project was implemented, and the river continues to be dewatered on an annual basis.

To offset the loss of trout, a mitigation project was designed for the mainstem above Summit Creek (Sawmill Creek). The purpose of the project was to improve fishery habitat between the Sawmill Canyon Road and the old USGS gauging station above Summit Creek. Most of the riparian vegetation in this reach had been burned by a range fire several years before. Although regeneration in the upper portion of this reach was good, the re-establishment of tree and shrub riparian species in the lower reach was limited by heavy grazing. Subsequently, stream bank erosion began to occur. The purpose of the mitigation project was to establish enough permanent fishery habitat in this reach to replace fish lost in the lower Little Lost River as a result of flood control. The specific objectives of the mitigation project during the first 20 years were to increase fish populations by 50%, decrease stream width by 30%, increase stream depth by 30%, and increase woody riparian species by 75%. This was to be accomplished by fencing the entire stream reach to eliminate or temporarily exclude warm season cattle grazing on 81 hectares, piping water to provide a water source for cattle, placing rock and rock diversions in the upper stream reach, planting vegetation in both reaches with emphasis on the lower reach, and installing log deflectors in the lower reach.

Implementation of the project began in 1986. At that time, the exclosure fence was constructed. In 1987, the pipeline was installed, and willows were planted in 1988. Vegetation began to respond immediately after implementation. However, due to drought and browsing by big game, willow survival was only 25%. By 1993, riparian habitat and channel and bank conditions within the project area had improved. The placement of rocks and structures is to take place once the stream banks have stabilized.

Rainbow trout, brook trout, bull trout, and sculpin were found in the mainstem (including Sawmill Creek) during the current study (Table 34, Appendices A and B). Fish occupy the entire mainstem. Bull trout are the only species present in the upper reach. Rainbow trout are the dominant species below Iron Creek.

Trout populations declined sharply in the mainstem between 1987 and the 1990's (Table 34; see also Part 2, Bull Trout). This is particularly evident in the transect below Big Springs Creek and the transect below Deer Creek. These two sites are permanent stations that were sampled in 1987 by Corsi and Elle (1989) and resampled during the present study. In 1987, the site below Big Springs Creek had a population estimate of 348 fish and a density of 35.9 fish/100 m^2 (Corsi and Elle 1989). In 1993, only 6 fish were captured from the same site. In 1987, the site below Deer Creek had a population estimate of 108 fish and a density of 11.1 fish/100 m^2 (Corsi and Elle 1989). In 1993, the same site had a population estimate of 16 fish and a density of 1.6 fish/100 m^2.

The reason for these declines is not clear. It is possible the decline is related to drought during the late 1980's and early 1990's. It is also possible that whirling disease, which has recently been detected in the drainage (Steve Elle, Idaho Department of Fish and Game, personal communication), is linked to the decline. However, further study is needed before any conclusions can be drawn.

In 1934, Carl Hubbs collected 2 rainbow trout, a bull trout, and a shorthead sculpin from the mainstem between Badger Creek and Wet Creek (UMMZ).

Table 34. Summary of electrofishing data from mainstem Little Lost River (including Sawmill Creek).

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Near Howe below first road culvert north of Howe	9/83	n/a	88	6	6	Corsi et al. 1986
Near Howe below first road culvert north of Howe	10/70[a]	n/a	100			Andrews 1972
Below Big Springs Creek	9/93	n/a	100			present study
Below Big Springs Creek	8/87	35.9	100			Corsi & Elle 1989
Below Big Springs Creek	10/70[a]	n/a	100			Andrews 1972

Table 34. Continued.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
Below Buck and Bird Road	9/93	1.6	92		8	present study
Below Buck and Bird Road	8/87	11.1	100			Corsi & Elle 1989
Between Badger and Wet Creek	7/34	n/a	[b]		[b]	UMMZ
Clyde Campground	9/93	14.3	96	1	3	present study
Clyde Campground	11/87	n/a	64	34[c]	2	Corsi & Elle 1989
Clyde Campground	7/87	28.2	95	1	4	Corsi & Elle 1989
BLM Sawmill #4 - Lower end of lower pasture	7/97	1.8	71	14	14	present study
BLM Sawmill #4 - Lower end of lower pasture	8/93	2.7	93	7		present study
BLM Sawmill #4 - Lower end of lower pasture	7/87	4.1	45	33	22	Corsi & Elle 1989
BLM Sawmill #4 - Lower end of lower pasture	7/86	5.2[d,e]	73	4	23	Elle et al. 1987
BLM Sawmill #4 - Lower end of lower pasture	7/85	1.0[d]	100			Elle et al. 1987
BLM Sawmill #4 - Lower end of lower pasture	10/84	1.0[d]	67		33	Elle et al. 1987
BLM Sawmill #4 - Lower end of lower pasture	10/70[a]	n/a	100			Andrews 1972
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	7/97	2.2	75	8	17	present study
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	8/93	2.0	70	20	10	present study
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	7/87	2.2	68	18	14	Corsi & Elle 1989
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	7/86	1.3[d]	64	18	18	Elle et al. 1987
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	7/85	1.6[d]	22	56	22	Elle et al. 1987
BLM Sawmill #3 - Above Mahogany Creek Rd crossing	10/84	3.0[d]	59	12	29	Elle et al. 1987

Table 34. Continued.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
BLM Sawmill #2 - Lower portion of upper exclosure	7/97	3.5	93		7	present study
BLM Sawmill #2 - Lower portion of upper exclosure	8/93	6.6[f]	93	2	5	present study
BLM Sawmill #2 - Lower portion of upper exclosure	7/87	1.5	43	57		Corsi & Elle 1989
BLM Sawmill #2 - Lower portion of upper exclosure	7/86	3.7[d]	50	14	36	Elle et al. 1987
BLM Sawmill #2 - Lower portion of upper exclosure	7/85	4.4[d]	50	12	38	Elle et al. 1987
BLM Sawmill #2 - Lower portion of upper exclosure	10/84	4.1[d]	80	13	7	Elle et al. 1987
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	7/97	5.7	90	8	3	present study
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	8/93	7.0	91	9		present study
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	7/87	6.2	77	17	6	Corsi & Elle 1989
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	7/86	3.1[d]	72	12	16	Elle et al. 1987
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	7/85	3.7[d]	48	11	41	Elle et al. 1987
BLM Sawmill #1 - 2.4 km below Sawmill Canyon Rd	10/84	5.7[d]	72	11	17	Elle et al. 1987
At Forest boundary[g]	7/97	4.2	92	3	5	present study
At Forest boundary[g]	9/95	11.2	93	4	3	present study
At Forest boundary[g]	7/87	7.1	89	2	9	Corsi & Elle 1989
At Forest boundary[g]	10/70[a]	n/a	86		14	Andrews 1972
Behind Fairview Guard Station[g]	7/97	6.4	87	11	3	present study
Behind Fairview Guard Station[g]	9/95	8.1	93	4	3	present study

Table 34. Continued.

Site	Date	Fish/100 m²	Species Composition (%) Rb	Bk	Bl	Source
Behind Fairview Guard Station[g]	7/87	10.1	63	16	21	Corsi & Elle 1989
Above Mill Creek[g]	7/97	9.6	65	35		present study
Above Mill Creek[g]	9/95	8.8	80	14	6	present study
Above Mill Creek[g]	7/87	7.8	51	16	33	Corsi & Elle 1989
10 m above Iron Creek Road	8/97	n/a	39	3	58	present study
10 m above Iron Creek Road	9/96	n/a	60		40	present study
0.4 km below Timber Creek	7/97	4.5	48		52	present study
0.4 km below Timber Creek	9/95	3.6	65		35	present study
0.8 km above Moonshine Ck[g]	7/97	8.1	13		87	present study
0.8 km above Moonshine Ck[g]	8/95	4.6	26		74	present study
0.8 km above Moonshine Ck[g]	7/87	3.9			100	Corsi & Elle 1989
0.8 km above Moonshine Ck[g]	10/70[a]	n/a			100	Andrews 1972
1.6 km above Smithie Fork	8/95	20.4			100	present study
400 m above Firebox Creek	7/97	n/a			100	present study

[a] Andrews (1972) sampling locations were in the approximate location of these sites with one exception. The site that is reported here under Sawmill (BLM #4) was approximately 1.6 km downstream from the actual location of the Sawmill Creek (BLM #4) transect.

[b] One bull trout 136 mm, 2 rainbow trout 56 and 136 mm.

[c] Brook trout spawning.

[d] The densities reported for these 4 stream sections on page 36 of Elle et al. (1987) and page 32 of Corsi and Elle (1989) is incorrect. These reports indicate that the number shown represents fish/100 m² when it is actually fish per 100 linear m of stream. The fish density in this report has been changed to fish/100 m² based on the population estimate and section length provided by Elle et al. (1987) and Corsi and Elle (1989) and the mean width of these sections in 1987 provided by Corsi and Elle (1989).

[e] Due to an apparent typographical error in Elle et al. (1987), the length of this transect was reported as 10 meters. However, based on the population estimate and density indicated in the report, it appears this transect was actually 100 meters long. Therefore, the density reported here was calculated for a transect length of 100 meters.

[f] The BLM Sawmill transects were established in 1985 to monitor changes resulting from a habitat improvement project. Therefore, these sites have established lengths. However, when this transect was sampled in 1993, the BLM crew mistakenly sampled an extra 44 meters outside of the established transect. These results include those fish captured in the additional section.

[g] Although the 1987 sites were not relocated, the 1995 sites should be in the same approximate location.

Long Lost Creek

Long Lost Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Dry Creek. The point of origin seems to vary depending on runoff, but is approximately 10.3 km above the confluence with Dry Creek. From this point, the stream flows 8.5 km on Forest land and 1.8 km on BLM land, where it enters Dry Creek. Aerial photographs and personal observations indicate that in some years, sections of the stream are intermittent. A waterfall, approximately 10 m high, is located on Long Lost Creek 4.0 km above its confluence with Dry Creek, and 1.8 km above the Forest boundary. This waterfall serves as a complete fish migration barrier. There are 3 lakes in Long Lost Creek (see Shadow Lake #1 (lower), Shadow Lake #2 (upper), and Long Lost Creek Lake in Part 4).

No fish were found in Long Lost Creek. In 1995, Long Lost Creek was electrofished at 4 locations (Appendix A). The first transect was approximately 50 m long and was located 3.2 km above Dry Creek (below the falls). The second transect was approximately 80 m long and located 0.8 km above the falls. The third transect was approximately 100 m long and located 1.5 km below Hell Canyon Creek. The fourth transect was approximately 100 m long and was located 100 m above the third transect. No fish were found at any of these sites despite the upper 2 transects having good stream flows and habitat. It is possible that fish from Dry Creek intermittently occupy the lower reach of Long Lost Creek below the falls. However, the intermittent nature of the stream does not allow it to support a permanent fish population.

Magpie Springs

Magpie Springs is a series of springs located in the central portion of the Lemhi Mountain Range between Basinger Canyon and Mahogany Creek. Water from the springs flows approximately 1 km where it is diverted into a canal at the Forest boundary. This canal terminates in the Telford Pipeline (see Bell Mountain Creek). A visual check of approximately 5 m of the outflow between the springs and canal revealed limited flows (approximately 0.5 m wide and 0.1 m deep) and poor habitat (Appendix A). No fish were observed.

Mahogany Creek

Mahogany Creek, located in the central portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. The point of origin is a spring 1.8 km above the Forest Boundary. The stream is diverted at the Forest boundary into a canal that terminates in the Telford Pipeline (see Bell Mountain Creek). There has been severe downward erosion of the stream channel; nearly two meters in areas.

No fish were found in Mahogany Creek (Appendix A). In June 1995, a total of approximately 75 m of stream was electrofished and/or visually surveyed at 3 separate locations above the diversion. The canal was also electrofished for approximately 20 m 200 m below the diversion. No fish were found at any of these locations.

Main Fork Little Lost River

The section of the Little Lost River above Timber Creek is sometimes referred to as Main Fork Little Lost River. For purposes of uniformity and clarity, the mainstem from the sinks to the headwaters, including Sawmill Creek and Main Fork Little Lost River, is treated as part of the mainstem of the Little Lost River. Therefore, information pertaining to the Main Fork Little Lost River reach can be found under that heading (see Little Lost River, Mainstem).

Massacre Creek

Massacre Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Squaw Creek. Massacre Creek originates at a spring 1.1 km above the confluence with Squaw Creek. This portion of the stream is on BLM land. There is some perennial water in the head of the canyon, but it is limited and not connected to the lower stream reach.

In 1997, rainbow trout were found in Massacre Creek (Table 35, Appendices A and B). A 200 m long section of Massacre Creek beginning 40 m above Squaw Creek was electrofished in July 1997. Two fish were observed but uncaptured. One of these was positively identified as a rainbow trout.

Table 35. Summary of electrofishing data from Massacre Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
40 m above Squaw Creek	7/97	n/a	100			present study

Meadow Creek

Meadow Creek, a tributary to the Little Lost River (Sawmill Creek), is located in the central portion of the Lemhi Mountain Range. A review of an August 1979 aerial photograph and a field check at the Forest boundary on June 28, 1995 indicated there are no perennial streams in Meadow Creek above the unnamed tributary near the Forest boundary. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Meadow Creek and the unnamed tributary (grouped collectively as "Meadow Creek" by the inventory crew) in 1997 (Appendix F).

This unnamed tributary originates at a spring in an unnamed canyon north of Meadow Creek. The stream flows for 1.3 km on the Forest and across BLM, where it intermittently reaches the Little Lost River.

In 1995, brook trout and rainbow trout were found in this tributary (Table 36, Appendices A and B). Brook trout were the dominant species, comprising 88% of the fish sampled. One of the fish collected at this site may have been a pure cutthroat trout. The stream was also electrofished and visually surveyed for approximately 50 m 0.8 km above the Forest boundary. No fish were collected at this site. This indicates the upper limit of fish distribution extends just above the Forest boundary.

Table 36. Summary of electrofishing data from an unnamed tributary to Meadow Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
At Forest boundary	6/95	35.5	12[a]	88		present study
0.8 km above Forest boundary	6/95	none				present study

[a] One of these fish may have been a pure cutthroat trout.

Middle Canyon

Middle Canyon is located in the southern end of the Lemhi Mountain Range. A review of aerial photographs taken in July 1979 indicated there are no perennial streams in this subdrainage.

Mill Creek

Mill Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Mill Creek could not be clearly determined from an aerial photograph, but the stream appears to be approximately 5.5 km long. There is one lake in Mill Creek (see Mill Creek Lake in Part 4). Stream temperatures were monitored in Mill Creek in 1996 (Appendix D) and 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Mill Creek in 1994 (Appendix F).

Rainbow trout, cutthroat trout, and grayling have been stocked in Mill Creek Lake. However, outmigration of these species into Mill Creek is not possible because there is no overland outlet from the lake to Mill Creek. Brook trout and cutthroat trout may have been introduced into Mill Creek. However, the nature of the stocking records make this determination difficult.

Brook trout, rainbow trout, and bull trout were found in Mill Creek (Table 37, Appendices A and B). In 1995, Mill Creek was sampled near the trailhead. Brook trout were the dominant species, comprising 52% of the fish captured. Hybridization between brook trout and bull trout was also evident. This site was resampled in 1997 (Table 37, Appendices A and B). Although densities remained relatively unchanged, the bull trout composition dropped from 36% to 4%. These numbers may have been skewed by the ability to distinguish hybrids improving between 1995 and 1997.

Table 37. Summary of electrofishing data from Mill Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
At Mill Creek Campground	8/97	20.7	3	93	4	present study
At Mill Creek Campground	8/95	20.0	12	52	36	present study
0.5 km above trailhead	9/96	n/a	[a]	67	33	present study

[a] One rainbow trout was observed within the transect but not captured; 3 of the 6 fish captured showed evidence of hybridization.

In 1996, two additional sites were sampled in Mill Creek (Table 37 and Appendices A and B). The first site was located in the main channel of Mill Creek approximately 0.5 km above the trailhead. Hybridization between brook trout and bull trout appeared to be extensive in this reach with 3 of the 6 fish captured showing evidence of hybridization. A small tributary that enters Mill Creek approximately 0.5 km above the trailhead was electrofished for approximately 25 m. No fish were found. The small nature of this tributary limits fish habitat. There are not sufficient data to clearly determine whether or not fluvial fish utilize Mill Creek for spawning.

In 1994, a Forest Service habitat crew observed bull trout in Mill Creek up to the landslide that forms Mill Creek Lake (Brett Gamett, USFS, personal communication). Migration further up the stream and into the lake is prohibited by the landslide. In August 1995, no fish were found in a visual survey of Mill Creek above the lake (Appendix A).

Recreation activity associated with the trailhead is negatively impacting the north stream bank near the trailhead. In June 1996, bank stability along the north bank (the same side as the trailhead) was approximately 15% (Jeff Knisley, USFS, personal communication). This could be remedied by relocating the trailhead and campground.

Moffett Creek (including Moffett Springs)

Moffett Creek, located in the upper central portion of the Little Lost River Valley, is a tributary to Barney Creek. The stream originates at Moffett Springs. The stream temperature near the Howe-Clyde-Goldburg road on May 20, 1996 and May 31, 1997 was 16°C.

Moffett Springs

See Moffett Creek

Moonshine Creek

Moonshine Creek, a tributary to the mainstem of the Little Lost River, is located in Sawmill Canyon. The origin of Moonshine Creek could not be clearly determined from an aerial photograph, but the stream appears to be approximately 1.5 km long.

Despite good habitat, no fish were found in Moonshine Creek (Appendix A). In September 1995, two sections of Moonshine Creek were electrofished. The first section, located immediately below the Sawmill Canyon Road, was electrofished for approximately 5 m. The second section, located immediately above the Sawmill Canyon Road, was electrofished for approximately 20 m. No fish were found at either location. Another 72 m section located 250 m above the Sawmill Canyon Road was electrofished in June 1997. Likewise, no fish were found at this site. The culvert under road #101 may be restricting fish movement into the stream.

Mormon Gulch

Mormon Gulch is located in the southern end of the Lemhi Mountain Range. A review of an aerial photograph taken August 1979 indicated there are no perennial streams in this subdrainage.

Mud Springs

See Cedar Run Canyon

North Creek

North Creek, located in the southern end of the Lemhi Mountain Range, is disjunct from the Little Lost River. A review of aerial photographs indicate North Creek originates at a spring 2.5 km above the Forest boundary. At the Forest boundary, the stream is diverted for irrigation. The entire stream is on Forest land with the exception of 0.5 km that is private. It appears from vegetation patterns that undiverted water intermittently flows for about 1 km past the diversion, where it sinks into the alluvial fan. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on North Creek in 1997 (Appendix F).

In 1995, one rainbow trout was captured in North Creek (Table 38, Appendices A and B). Two sites were sampled in August 1995. The first site was located 0.4 km above the Forest boundary. One rainbow trout approximately 100 mm in length was captured. Once the presence of fish in the stream was confirmed, sampling was discontinued. Therefore, only 2 m of stream were sampled. The second site, approximately 0.8 km above the Forest boundary was electrofished for approximately 40 m. No fish were collected at this site.

Table 38. Summary of electrofishing data from North Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
0.4 km above Forest boundary	8/95	n/a	100			present study
0.8 km above Forest boundary	8/95	none				present study

North Fork (Cedarville Canyon)

See Cedarville Canyon

Pine Creek

Pine Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Basin Creek. Pine Creek originates at a spring on Forest Land 2.0 km above Basin Creek. Based on a review of an aerial photograph, flows are limited. The water temperature near the source of Pine Creek was 13°C in 1997.

No fish have been found in Pine Creek. No fish were observed in Pine Creek in the summer of 1995 (Janet Valle, USFS, personal communication). In June 1997, a 100 m section of Pine Creek located 1 km above Basin Creek was visually surveyed. No fish were found. Likewise, in September 1997, a Forest Service R1/R4 fish habitat crew found no fish in a visual survey of a 50 m reach of Pine Creek immediately above Basin Creek. Although no fish were observed, there was suitable fish habitat in this section.

Quigley Creek

Quigley Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Quigley Creek could not be clearly determined from an aerial photograph but the stream appears to be approximately 2.5 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the fish bearing portion of Quigley Creek in 1997 (Appendix F).

A single bull trout was found in Quigley Creek in 1997 (Table 39, Appendices A and B). Two sections of Quigley Creek were sampled in June 1997. The first was a 21 m section 25 m above the Sawmill Canyon Road. A single bull trout measuring 195 mm was captured at this site. The second section was an 87 m section located 200 m above the Sawmill Canyon Road. Although good habitat was present at this site, no fish were found. A series of old decadent beaver dams immediately below this site may be interfering with the movement of fish into this reach.

Table 39. Summary of electrofishing data from Quigley Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
25 m above Sawmill Canyon Rd	6/97	n/a			100	present study
200 m above Sawmill Canyon Rd	6/97	none				present study

Redrock Creek

Redrock Creek, a tributary to Timber Creek, is located in Sawmill Canyon. The origin of Redrock Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2.5 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Redrock Creek between Timber Creek and the forks in 1997 (Appendix F).

In 1995 and 1997, bull trout were found in Redrock Creek (Table 40, Appendices A and B). In 1995, a 42 m section of stream 200 m above Timber Creek was electrofished. In 1997, another 90 m section of stream below road 460A was electrofished. Bull trout were found at both sites.

In 1997, no fish were found in the right and left hand forks of Redrock Creek (Appendix A). A 52 m section of the right fork located 400 m above the left fork was electrofished in June 1997. At this same time, a 56 m section of the left fork located 200 m above the right fork was also electrofished. No fish were found at either site. The lack of bull trout in the right and left hand forks suggests that the distribution of bull trout in Redrock Creek extends upstream to the forks.

Table 40. Summary of electrofishing data from Redrock Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.2 km above Timber Creek	9/95	n/a			100	present study
Top end of transect is road 460A	6/97	n/a			100	present study
Right fork 400 m above left fork	6/97	none				present study
Left fork 200 m above right fork	6/97	none				present study

Rocky Run Creek (Sunny Bar Canyon)

Rocky Run Creek, located in the southern end of the Lemhi Mountain Range, is disjunct from the Little Lost River. Rocky Run Creek is diverted into a pipeline approximately 0.8 km below the Forest boundary.

No fish were found in Rocky Run Creek (Appendix A). A 101 m section of the stream located 0.5 km above the diversion was electrofished in July 1997. No fish were found. Due to the small nature of the stream and steep stream gradient (17% map gradient), fish habitat is limited.

Sands Canyon

Sands Canyon is located in the southern end of the Lost River Mountain Range. Based on a field review in October 1996, there are no perennial streams in the drainage.

Sands Creek

Sands Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. A review of an aerial photograph indicates Sands Creek originates on Forest land at a spring 4.3 km above its confluence with Wet Creek. Sands Creek flows for 2.4 km on Forest Land, 1.3 km on private land, and 0.6 km on BLM land. In July 1995, there had been extensive beaver activity along Sands Creek on Forest land. The water temperature near the springs in the right fork were 6 and 7°C in 1997. In the left fork near the source springs, the water temperature was 12°C in 1997.

No fish were found in Sands Creek (Appendix A). Forty meters of stream were electrofished 200 m above the Forest boundary. Another 100 m section located 1.2 km above the Forest boundary was also electrofished. In addition, two beaver ponds 0.8 km above the Forest boundary were visually surveyed. Despite moderate flows and large, relatively deep beaver ponds, no fish were found. It is possible that fish have not been able to naturally gain access to the upper portion of Sands Creek due to the nature of the lower reach of stream.

Sawmill Canyon

See individual streams

Sawmill Creek

The section of the Little Lost River between Summit Creek and Timber Creek is sometimes referred to as Sawmill Creek. The stream below this reach is the Little Lost River and the stream above this reach is the Main Fork Little Lost River. For purposes of uniformity and clarity, the mainstem from the sinks to the headwaters, including Sawmill Creek and Main Fork Little Lost River, is treated as part of the mainstem of the Little Lost River. Therefore, information pertaining to the Sawmill Creek reach can be found under that heading (see Little Lost River, Mainstem).

Sixmile Canyon

Sixmile Canyon is located in the southern end of the Lost River Mountain Range. There are no perennial streams in this subdrainage (personal observation).

Slide Creek

Slide Creek, a tributary to Timber Creek, is located in Sawmill Canyon. The origin of Slide Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 2 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the fish bearing portion of Slide Creek in 1997 (Appendix F).

In 1997, bull trout were found in Slide Creek (Table 41, Appendices A and B). Two sections of Slide Creek were electrofished. The first was a 107 m section located 100 m above Timber Creek. Eight bull trout were captured at this site. Although a population estimate was not completed, the small number of fish collected indicates the density is low. The second electrofishing site was a 65 m section 0.9 km above Timber Creek. Despite high quality habitat no fish were found. It may be that a gradient barrier between the first and second sampling sites prevents fish from accessing the upper reach of Slide Creek.

Table 41. Summary of electrofishing data from Slide Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
100 m above Timber Creek	6/97	n/a			100	present study
0.9 km above Timber Creek	6/97	none				present study

Smithie Fork

Smithie Fork, a tributary to the mainstem of the Little Lost River, is located in Sawmill Canyon. The origin of Smithie Fork is a series of springs near the head of the right fork of the canyon. The stream is 6.0 km long. Stream temperatures were monitored in Smithie Fork in 1997 (Appendix E). The Forest Service R1/R4

Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Smithie Fork in 1994 (Appendix F). The unnamed tributaries (described as "right fork" and "west fork" by the inventory crew) were inventoried in 1997 (Appendix F). At that time, a Forest Service habitat crew found a falls approximately 1.5 m high located on Smithie Fork in reach 2 of the survey.

Although a large fire burned most of the drainage in 1988, fish populations and habitat are in excellent condition. In 1988, an intense crown fire burned approximately 75% of the Smithie Fork drainage. Prior to this fire, approximately 95% of the stream riparian area was dominated by large coniferous trees. Following the fire, live large coniferous trees remained along only 14% of the stream (review of aerial photographs from 1979, 1987, and 1991). Following the fire, a dense, lush, deciduous riparian area developed along the stream. By 1994, bank stability along the main stream ranged from 94-99% (Appendix F). Percent surface fines were 11-14%. Large burned trees falling into the stream have increased the amount of large woody debris in the stream. This appears to have increased habitat complexity, the number and size of pools, and cover.

In 1995, bull trout and rainbow trout were found in Smithie Fork (Table 42, Appendices A and B). At the upper site, the bull trout density was 30.3 fish/100 m^2 (fish >70 mm). This is the highest bull trout density ever reported in the Little Lost River drainage. Based on age at length data for bull trout in the Little Lost River (Corsi and Elle 1989) and length frequency data from sampling in 1995, approximately 90% of the bull trout in Smithie Fork are age one or age 2 fish. Bull trout young-of-the-year measuring between 30 and 52 mm in length were also captured and observed at the upper sampling site in August 1995. In 1994, bull trout were found near the source of the stream (Brett Gamett, USFS, personal communication), indicating bull trout occupy the majority of the stream reach. In 1997, the lower site was resampled (Table 42). In 1997, one bull trout was found in a 45 m section of the unnamed tributary to Smithie Fork (termed "West Fork Smithie Creek by the Forest Service R1/R4 Fish Habitat Standard Inventory crew) located approximately 4 km above the Little Lost River (Table 42, Appendices A and B).

Table 42. Summary of electrofishing data from Smithie Fork.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Just above Sawmill Road Bridge	7/97	20.1	3		97	present study
Just above Sawmill Road Bridge	8/95	28.4	7		93	present study
3.2 km above Little Lost River	8/95	30.3			100	present study
Unnamed tributary	9/97	n/a			100	present study

Smithie Fork appears to be one of the most important spawning and rearing tributaries for fluvial bull trout in the Little Lost River drainage. On August 2, 1995, one bull trout 364 mm in length was collected in the upper transect and another approximately 400 mm in length was observed. These fish appeared to be a spawning pair and are likely fluvial fish from the mainstem that had moved into the stream to spawn. The presence of these fish and the length frequency distribution suggest Smithie Fork is used by fluvial bull trout for spawning and rearing.

Rainbow trout densities in Smithie Fork are low, and their range appears to be restricted to the lower portion of the stream. It appears that rainbow trout have moved into Smithie Fork since 1987.

South Creek

South Creek, located in the southern end of the Lemhi Mountain Range, is disjunct from the Little Lost River. A review of aerial photographs indicates South Creek originates at a spring near the head of the canyon. The stream flows approximately 8.5 km where, when undiverted, it sinks into the South Creek alluvial fan; 6.4 km of the stream are on Forest land, 0.3 on BLM land, and 1.8 on private land. There is an irrigation diversion just below the Forest Boundary. Overflow from the diversion continues onto the alluvial fan, where it sinks before reaching the Little Lost River. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on South Creek in 1997 (Appendix F).

In 1995, rainbow trout were found in South Creek (Table 43, Appendices A and B). Although the stream gradient at the site 2.0 km above the Forest boundary was 8% (field gradient), the density was 33.9 fish/100 m^2. The lack of fish at the upper site suggests fish occupy approximately the lower half of the stream.

In 1998, the Idaho Division of Environmental Quality sampled a 100 m section of South Creek located 60 m above the diversion (Table 43). This was done to help confirm the absence of bull trout and sculpin in this stream. As in 1995, only rainbow trout were found.

Table 43. Summary of electrofishing data from South Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
At diversion	6/95	n/a	100			present study
60 m above diversion	7/98	23.3	100			Idaho Division of Environmental Quality file data
200 m above diversion	8/95	none				present study
2.0 km above Forest boundary	8/95	33.9	100			present study
3.2 km above Forest boundary	8/95	none				present study

Squaw Creek (Sawmill Canyon)

Squaw Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Squaw Creek could not be clearly determined, but it is at least 4.3 km long. Stream temperatures were monitored in Squaw Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on the lower and mid reach of Squaw Creek in 1994 (Appendix F). The upper reach of Squaw Creek and an unnamed tributary (described as "south fork" by the survey crew) were inventoried in 1997 (Appendix F). In 1994, the Forest Service R1/R4 Fish Habitat Standard Inventory crew found a waterfall approximately 1 m high located on Squaw Creek below North Fork Squaw Creek. It is likely this fall is interfering with fish passage into the upper reach of the stream.

Rainbow trout, brook trout, bull trout, and sculpin were found in Squaw Creek (Table 44, Appendices A and B). Squaw Creek was sampled in 1995, 1996, and 1997. Brook trout are the dominant species at all but the upper site. Several of the fish captured at the site 4.0 km above the Sawmill Canyon Road showed signs of hybridization. Hybridization was not evident at the other sites. Only bull trout were found in the upper site, which had a 7.8% gradient (field gradient). The lower sampling sites in which brook trout were found had stream gradients of 4.6 and 3.6%. This suggests that stream gradient may be affecting brook trout distribution within Squaw Creek. Fish appear to occupy the majority of the stream reach.

Table 44. Summary of electrofishing data from Squaw Creek (Sawmill Canyon drainage).

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
0.8 km above Sawmill Canyon Rd	9/96	n/a	33	52	15	present study
4.0 km above Sawmill Canyon Rd	7/97	24.1	41	48	11	present study
4.0 km above Sawmill Canyon Rd	8/95	12.3	23	58	19	present study
0.9 km above North Fork	8/96	n/a			100	present study
Unnamed tributary above Squaw Creek #2 on south side of road	8/95	n/a	33	67		present study

Squaw Creek (Sawmill Canyon), North Fork

North Fork Squaw Creek, a tributary to Squaw Creek, is located in Sawmill Canyon. The origin of North Fork Squaw Creek could not be clearly determined, but the stream appears to be approximately 5 km long. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on North Fork Squaw Creek in 1997 (Appendix F).

In 1996 and 1997, brook trout and bull trout were found in North Fork Squaw Creek (Table 45, Appendices A and B). In 1996, a 57 m section of North Fork Squaw Creek located 0.6 km above Squaw Creek was electrofished. Both brook trout and bull trout were captured. Brook trout were the dominant species comprising 56% of the trout collected. In 1997, a 114 m section of stream located 1.8 km above Squaw Creek was electrofished. At this section, only one of the 12 fish captured was a brook trout; the remainder were bull trout.

Table 45. Summary of electrofishing data from Squaw Creek (Sawmill Canyon), North Fork.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
0.6 km above Squaw Creek	9/96	n/a		56	44	present study
1.8 km above Squaw Creek	6/97	n/a		13	88	present study

Squaw Creek (Wet Creek)

Squaw Creek, located in the central portion of the Lost River Mountain Range, is a tributary to Wet Creek. The exact point of origin was not determined. However, aerial photographs taken in August 1979 and September 1991 indicate the origin of Squaw Creek is approximately 11.4 km above the confluence with Wet Creek (3.2 km above the confluence with Massacre Creek). On these photographs, it appeared that portions of Squaw Creek above Massacre Creek were dry during the low water year of 1991, although beaver ponds continued to hold water. Squaw Springs, a series of large springs approximately 1 km above Wet Creek, contribute most of the stream flow to lower Squaw Creek. A reach of Squaw Creek between Massacre Creek and Squaw Springs was dry during the drought of the late 1980's and early 1990's (Pat Koelsch, BLM, personal communication). Stream temperatures were monitored in Squaw Creek below Squaw Springs in 1997 (Appendix E).

Rainbow trout and sculpin were found in Squaw Creek (Table 46, Appendices A and B). In 1992, two sites were sampled near the confluence with Wet Creek. Trout densities have declined in both of these sections since 1987 (Table 46). This decline may be associated with a similar decline in Wet Creek (see Wet Creek). In 1996, a 30 m stream reach approximately 1.9 km below Massacre Creek was sampled. Rainbow trout were collected at this site. In 1997, a 100 m section of stream 65 m above Massacre Creek was sampled. Likewise, rainbow trout were found at this location. Sculpin were collected from all 4 sampling locations. Although bull trout were collected in the lower 2 sites in 1987 (Corsi and Elle 1989), they were not collected in Squaw Creek during the present study.

Table 46. Summary of electrofishing data from Squaw Creek (Wet Creek).

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
Just above Wet Creek Road	8/92	43.9	100			present study
Just above Wet Creek Road	8/87	78.0[a]	97[b]		1	Corsi and Elle 1989
168 m above #1	8/92	36.2	100			present study
168 m above #1	8/87	57.8[a]	99		1	Corsi and Elle 1989
1.9 km below Massacre Creek	6/96	n/a	100			present study
65 m above Massacre Creek	7/97	n/a	100			present study

[a] IFD file data indicates there was an error in the 1987 mean stream width data supplied to the Department of Fish and Game for Squaw Creek. Subsequently, the fish densities shown for Squaw Creek in Corsi and Elle (1989) were incorrect. Densities for Squaw Creek in 1987 shown here have been recalculated based on the stream width in 1992. For this reason they do not match those reported for Squaw Creek in 1987 by Corsi and Elle (1989).

[b] Two percent of the fish captured were listed as rainbow/cutthroat hybrids.

The lower reach of Squaw Creek may be an important spawning area for rainbow trout. The reach of the stream below Squaw Springs has excellent spawning and rearing habitat (IFD file data). In the spring of 1992, many rainbow trout were observed spawning in section 1 (IFD file data). The majority of fish collected in this reach in August 1992 were under 130 mm.

Summerhouse Canyon

Summerhouse Canyon Creek, located west of Sawmill Canyon in the Lemhi Mountain Range, is disjunct from Summit Creek. The point of origin is not clear. In July 1995, the point of origin appeared to be a spring in the head of the canyon 3.2 km above the Forest boundary. However, aerial photographs taken on August 2, 1979 and August 9, 1991 suggest portions of the stream 1.8 km below this spring may be dry by late summer. Assuming this is true, the perennial portion of the stream begins 1.4 km above the Forest boundary and continues for approximately 3.2 km across BLM land, where it sinks into the valley floor. Additional water is contributed to the stream from a small tributary which originates at a spring near the canyon mouth and flows for approximately 1.2 km to Summerhouse Canyon Creek. Stream temperatures were monitored in Summerhouse Creek in 1997 (Appendix E).

No fish were found in Summerhouse Canyon Creek (Appendix A). The stream was surveyed at 4 locations. Three sections were electrofished. These included a 100 m section approximately 1.2 km below the Forest boundary, a 50 m section 1.6 km above the Forest boundary, and a 100 m section 3.2 km above the Forest boundary. Another site approximately 100 m long was visually surveyed 0.8 km above the Forest boundary. No fish were found at any of these locations.

Summit Creek

Summit Creek, located in the upper, central portion of the Little Lost River Valley, is a tributary to the Little Lost River. Summit Creek originates at springs below Summit Creek Reservoir and flows 19.3 km to the mainstem of the Little Lost River. There is one reservoir in the drainage (see Summit Creek Reservoir in Part 4). A small canal brings water from Big Gulch Creek in the Pahsimeroi River drainage into the upper portion of the Summit Creek drainage above Summit Creek Reservoir. Water from this canal intermittently runs into Summit Creek Reservoir. As a result, it may be possible for fish (particularly bull trout and shorthead sculpin which are present in Big Gulch Creek) to move from the Pahsimeroi River drainage into the Little Lost River drainage. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Summit Creek above the Summit Creek Campground in 1995 (Appendix F).

The majority of Summit Creek originates at Iron Springs, which has relatively constant flow and temperature. In both August 1977 and August 1978, the stream flow 0.8 km below Iron Springs was 0.27 m^3/s, despite 1977 being a dry year (Keller et al. 1979). Between January 10 and May 10, 1978, stream temperatures near the springs remained between 9°C and 13°C. However, 3.2 km downstream, stream temperatures fluctuated between 1°C and 16°C. On May 19, 1998, the water temperature at Iron Springs varied between 9 and 10°C depending on the individual spring. Stream temperatures were monitored in Summit Creek in 1994, 1995 (Appendix D), and 1997 (Appendix E).

The relatively constant temperature and flow in the upper portion of the stream provides an excellent spawning and wintering area for trout. Keller et al. (1979) reported "Idaho Department of Fish and Game Biologists believe that the upper few miles of Summit Creek furnish most of the spawning habitat for the entire Little Lost River and that it is a major wintering area for fish escaping the harsh winter environment lower in the drainage."

The Idaho Department of Fish and Game and Bureau of Land Management have implemented habitat improvement projects in the upper portion of the stream. The objectives of these projects were to improve and protect fish habitat and increase trout densities. In 1968, an experimental trash collector was constructed on upper Summit Creek, and trout populations increased in the vicinity (USR file data). In 1971, nine more trash collectors and 12 bridge timbers and planks were installed in the stream between 0.4 km and 1.2 km below Iron Springs. By 1997, most of these structures were dysfunctional (personal observation).

In 1975, 3.2 km of Summit Creek near the BLM campground were fenced to protect the riparian area and improve fish habitat. The project and improvements in the fish population and habitat are described in detail by Keller and Burnham (1982) and Keller et al. (1979). The project, which created a 122 hectare exclosure, resulted in dramatic improvements in the stream and riparian habitat and the trout population. By 1978, there had been a subsequent increase in bank stability, reinvigoration of birch and willow along the stream, a general narrowing and deepening of the stream, and the establishment of islands of vegetation within the stream. By 1979, trout densities were higher in the ungrazed section relative to the grazed section (Table 47).

Table 47. Mean trout densities for three grazed (untreated) and three ungrazed sections (treated) of Summit Creek in 1979 (adapted from Keller and Burnham 1982).

	Mean Density (fish/100 m^2)	
Species	Grazed Sections	Ungrazed Sections
Rainbow trout	77.6	111.3
Brook trout	4.9	17.1
All trout	82.5	128.4

Rainbow trout, brook trout, bull trout, and sculpin were found in Summit Creek during the present study (Table 48, Appendices A and B). In 1992, three sections of Summit Creek were sampled below the Sawmill Canyon Road. Rainbow trout were the only species collected at the upper 2 sites, while rainbow trout and lesser numbers of brook trout were captured at the lower site. Two additional sites were sampled near Iron Springs in 1997. Rainbow trout were collected at these sites.

Table 48. Summary of electrofishing data from Summit Creek.

			Species Composition (%)			
Site	Date	Fish/100 m^2	Rb	Bk	Bl	Source
Near mouth	8/87	40.4	99	1		Corsi and Elle 1989
4.0 km below Sawmill Road (BLM #3)	8/92	16.0	91	9		present study
4.0 km below Sawmill Road (BLM #3)	8/87	26.4	82	18		Corsi and Elle 1989
1.6 km below Sawmill Road (BLM #2)	8/92	24.3	100			present study
1.6 km below Sawmill Road (BLM #2)	8/87	18.7	91	9		Corsi and Elle 1989
0.8 km below Sawmill Road (BLM #1)	8/92	39.4	100			present study
At county line	8/87	8.8	98		2	Corsi and Elle 1989
0.4 km below Sawmill Road	10/95	n/a	95	3	2	present study
100 m below Iron Spring	6/97	n/a	100			present study
Iron Springs	6/97	n/a	100			present study

Although bull trout were not found in Summit Creek during sampling in 1992 and 1997, an angler caught 2 bull trout in Summit Creek at the Sawmill Canyon Road crossing in May 1995 (Dan Cunderman, USFS, personal communication). Likewise, a single bull trout approximately 200 mm long was captured 0.8 km downstream of this point during disease sampling in October 1995 (Table 48, Appendices A and B). Corsi and Elle (1989) also reported small numbers of bull trout in Summit Creek in 1987 (Table 48).

Five sculpin were collected and preserved from Summit Creek 0.8 km below the Sawmill Canyon Road in 1995 (Appendix A). These fish were later identified as shorthead (Table 13).

Sunny Bar Canyon

See Rocky Run Creek

Taylor Canyon

Taylor Canyon is located in the southern end of the Lost River Mountain Range. There are no perennial streams in the subdrainage (personal observation).

Timber Creek

Timber Creek, a tributary to the Little Lost River (Sawmill Creek), is located in Sawmill Canyon. The origin of Timber Creek could not be clearly determined from an aerial photograph, but it appears to be approximately 5.6 km long. Stream temperatures were monitored in Timber Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Timber Creek between the Little Lost River and Slide Creek in 1994 (Appendix F). That portion of Timber Creek above Slide Creek was inventoried in 1997 (Appendix F).

In 1995, bull trout, rainbow trout, and sculpin were found in Timber Creek (Table 49, Appendices A and B). In August 1995, a 133 m section of stream located 0.8 km above the mainstem Little Lost River (Sawmill Creek) was electrofished. Bull trout comprised 86% of the trout captured, and rainbow trout made up the remainder. Rainbow trout were not found in this site in 1987 (Corsi and Elle 1989) and have likely moved into Timber Creek since that time. Based on length at age data for bull trout in the Little Lost River (Corsi and Elle 1989), it appears approximately 20% of the bull trout in this reach were age one or younger. Most of the remaining bull trout appeared to be age 2 (Appendix B). This may indicate that the lower reach of Timber Creek does not serve as a spawning area for bull trout, but that fish move into this reach after age one. It is possible that bull trout spend their first summer in tributaries such as Redrock Creek and Slide Creek, then move into lower Timber Creek at the end of their first summer. This section was resampled in 1997 (Table 49, Appendices A and B). Fish densities were similar to other years.

Table 49. Summary of electrofishing data from Timber Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.8 km above Little Lost River[a]	7/97	6.9	5		95	present study
0.8 km above Little Lost River[a]	8/95	5.5	17		83	present study
0.8 km above Little Lost River[a]	7/87	7.5			100	Corsi & Elle 1989
100 m above Slide Creek	6/97	n/a			100[b]	present study

[a] Although the 1987 site was not relocated, the 1995 site should be in the same general location.
[b] Hook and line sample.

In July 1997, the stream was sampled with hook and line 100 m above Slide Creek. One bull trout 165 mm in length was captured. Approximately 5 other bull trout 100 to 200 mm in length were observed. No rainbow trout were caught or observed at this site. The presence of bull trout in this reach indicates that fish occupy most, if not all, of Timber Creek.

Six sculpin were collected and preserved from the stream 0.8 km above the mainstem of the Little Lost River. These were all later identified as shorthead (Table 13).

Uncle Ike Creek

Uncle Ike Creek, located in the southern end of the Lemhi Mountain Range, is disjunct from the Little Lost River. Uncle Ike Creek originates at a series of springs near the head of the canyon and flows for 8.2 km, where it is diverted into a pipeline immediately above the Forest boundary. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Uncle Ike Creek in 1997 (Appendix F).

Uncle Ike Creek was stocked with 960 brook trout 19 to 25 cm long in 1953.

In 1995, rainbow trout and brook trout were found in Uncle Ike Creek (Table 50, Appendices A and B). Fish appear to occupy approximately the lower half of the stream.

Table 50. Summary of electrofishing data from Uncle Ike Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
At diversion	9/95	n/a	33	67		present study
1.6 km above diversion	9/95	n/a	67	33		present study
4.8 km above Forest boundary	9/95	none				present study

Van Dorn Canyon

Van Dorn Canyon is located in the southern end of the Lost River Mountain Range. Perennial water is limited to springs near the head of the canyon which sink near their source (personal observation).

Warm Creek

Warm Creek, located in the central portion of the Lemhi Mountain Range, is a tributary to the Little Lost River (Sawmill Creek). The stream originates at a spring 3.6 km above the confluence with the Little Lost River. It flows for 1.4 km on Forest, crosses BLM land for 1.3 km, re-enters and crosses Forest land for 0.8 km, then re-enters BLM land and flows for 0.1 km to the mainstem. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Warm Creek in 1997 (Appendix F).

In 1995, rainbow trout and bull trout were found in Warm Creek (Table 51, Appendices A and B). Although fish appear to occupy the entire stream reach, only rainbow trout were found in the lower stream reach, and only bull trout were found in the upper stream reach. It is not clear if the bull trout population is resident, migratory, or a combination of both. However, the presence of small bull trout indicates reproduction is occurring.

Table 51. Summary of electrofishing data from Warm Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.4 km above Little Lost River	6/95	6.7	100			present study
0.6 km above upper Forest boundary	6/95	n/a			100[a]	present study

[a] Two other bull trout approximately 70 and 110 mm in length were seen in transect.

Warm Springs Creek

Warm Springs Creek, located in the lower central portion of the Little Lost River Valley, is disjunct from the Little Lost River. This stream is also referred to by some local residents as Tiny Creek. Warm Springs Creek originates at springs on BLM land. Prior to October 1991, Warm Springs Creek was diverted into a canal immediately below the highway (approximately 0.4 km below the stream source). Water flowed through this canal for approximately 1.5 km, then re-entered the natural stream channel. In October 1991, the stream was diverted back into the natural stream channel. The stream now flows for about 4 km where it sinks into the valley floor. The water temperature at the primary source spring for Warm Springs Creek was 10°C on May 19, 1998.

In 1993, rainbow trout were found in Warm Springs Creek (Table 52, Appendices A and B). Numerous young-of-the-year rainbow trout were present.

Table 52. Summary of electrofishing data from Warm Springs Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
Immediately below highway	8/93	24.8	100			present study

Wet Creek

Wet Creek, located in the central portion of the Lost River Mountain Range, is a tributary to the Little Lost River. Wet Creek originates near the Loristaca Campground and flows approximately 31 km to the mainstem of the Little Lost River. The stream crosses approximately 5 km of Forest land, 21 km of BLM land, 3 km of private land, and 2 km of state land. Mangum (1983) stated that grazing within the Wet Creek drainage had reduced the ability of the aquatic ecosystem to support a macroinvertebrate community or a fishery. In 1995, grazing utilization along Wet Creek on the Forest was 40-69% (LRRD file data). However, the private land above Coal Creek has been excluded from grazing for about 5 years. Bruhn (1990) describes an extensive riparian fencing project on lower Wet Creek and the response of the habitat and fish community. Stream temperatures were monitored in Wet Creek in 1994, 1995, 1996 (Appendix D), and 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on that portion of Wet Creek between the diversion structure above Hilts Creek and the 2 m high falls in 1996 (Appendix F). That portion of Wet Creek between Basin Creek and the diversion structure above Hilts Creek were inventoried in 1997 (Appendix F).

A diversion structure that was constructed on Wet Creek 1.5 km above the Little Lost River in the 1970's (James Andreason, landowner, personal communication) was a near complete barrier to upstream fish migration (Pat Koelsch, BLM, personal communication). In 1992, the BLM, in cooperation with the Idaho Department of Fish and Game and the Challis National Forest, constructed a fish ladder at this diversion to provide fish passage.

Rainbow trout, bull trout, brook trout, and sculpin were found in Wet Creek (Table 53, Appendices A and B). With the exception of the extreme upper reach, rainbow trout are the dominant species throughout Wet Creek and are the only salmonid species found in the middle reach of the stream (Corsi and Elle 1989, present study). Although brook trout are found throughout Big Creek (a tributary to upper Wet Creek), this species was completely absent from Wet Creek in 1987 (Corsi and Elle 1989). During the present study, they were found in Wet Creek only below the Pancheri diversion and immediately below the mouth of Big Creek. It appears that some factor or group of factors (possibly stream temperature) is preventing brook trout in Big Creek from expanding into Wet Creek.

A falls approximately 2 m in height is located on Wet Creek 1.5 km above Hilts Creek. It appears this falls has acted as a complete barrier to fish migration. Although there is good fish habitat available, no fish were found in the 135 m of stream that were electrofished above these falls in 1995 (Table 53, Appendix A).

In 1995, a previously undocumented localized population of bull trout was found in the upper reach of Wet Creek below these falls. These bull trout are generally confined to the 3.2 km stream reach between Coal Creek and the 2 m high falls 1.5 km above Hilts Creek.

It appears that this population is at least partially divided into two sub-populations by an old diversion structure and gradient barrier located 0.8 km above Hilts Creek. This diversion structure and gradient barrier at least partially, if not totally, restrict the upstream movement of fish. Sampling data suggest that the bull trout found above this diversion and gradient barrier are resident fish and the population is comprised of less than 200 age one and older bull trout. Rainbow trout comprised between 28 and 36% of the fish sampled in this reach.

Table 53. Summary of electrofishing data from Wet Creek.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
Just below Pancheri diversion – BLM #7	8/92	6.4	85	7	7	present study
Just below Dry Creek hydro – BLM #6[a]	8/92	1.2	75		25	present study
Just below Dry Creek hydro – BLM #6[a]	8/87	5.4	100			Corsi & Elle 1989
3.6 km below Squaw Creek – BLM #5[b]	8/92	5.1	96		4	present study
3.6 km below Squaw Creek – BLM #5[b]	8/87	6.9	97		3	Corsi & Elle 1989
2.0 km below Squaw Creek – BLM #4[c]	8/92	5.9	100			present study
2.0 km below Squaw Creek – BLM #4[c]	8/87	5.5	96		4	Corsi & Elle 1989
2.0 km below Squaw Creek – BLM #4[c]	7/34[d]	n/a	[e]			UMMZ
1.2 km above Squaw Creek – BLM #3[f]	8/92	6.6	94		6	present study
1.2 km above Squaw Creek – BLM #3[f]	8/87	8.8	100			Corsi & Elle 1989
0.8 km below BLM #1 – BLM#2[g]	8/92	5.2	100			present study
0.8 km below BLM #1 – BLM #2[g]	8/87	14.3	100			Corsi & Elle 1989
2.4 km below Forest boundary – BLM #1[h]	8/92	5.7	100			present study
2.4 km below Forest boundary – BLM #1[h]	8/87	10.9	100			Corsi & Elle 1989
Top end of transect is Big Creek	7/97	n/a	81	13	6	present study

Table 53. Continued.

Site	Date	Fish/100 m^2	Species Composition (%)			Source
			Rb	Bk	Bl	
0.6 km above Forest boundary[i]	7/96	n/a	96		4	present study
0.6 km above Forest boundary[i]	7/95	8.3	100			present study
0.6 km above Forest boundary[i]	8/87	12.1	100			Corsi & Elle 1989
250 m above Coal Creek	7/96	n/a	73		27	present study
250 m above Coal Creek	7/34[j]	n/a	k			UMMZ
At Hilts Creek	8/97	18.8	37		63	present study
At Hilts Creek (in beaver ponds)	7/96	n/a	40[l]		60[l]	present study
0.5 km above Hilts Creek (top end of private land)	8/95	2.4	75		25	present study
0.8 km above Hilts Creek (in meadow)	6/96	11.3	28		72	present study
0.8 km above Hilts Creek (in meadow)	8/95	12.1	31		69	present study
108 m above previous site	6/96	8.2	36		64	present study
2.2 km above Hilts Creek	7/95	none				present study

[a] This site replaced the 1987 site which could not be located. This site is likely 150 m to 300 m above original site.

[b] The 1992 site was moved 2.4 km upstream since beaver activity prohibited resampling the 1987 site.

[c] Old BLM station #20 (BLM file data).

[d] The location of the 1934 collection is described as "Big Creek, trib of Little Lost River, ca 6 mi above mouth..." However, this seems to be present day Wet Creek at this approximate location.

[e] Sixteen rainbow trout 30-188 mm.

[f] Old BLM station #14 (BLM file data).

[g] Old BLM station #4 (BLM file data).

[h] Beaver activity prohibited resampling the 1987 site. The 1992 site was moved downstream approximately 460 m.

[i] The 1995 site is located approximately 0.8 km below the 1987 site.

[j] The location of the 1934 site is described as "Wet Creek, in Lost River Mountains, ca 1 mile above mouth into Big Creek..." This seems to be in the approximate location of the 1996 site.

[k] Four rainbow trout 22-196 mm, one rainbow trout x cutthroat trout hybrid 146 mm.

[l] An approximation.

Fluvial bull trout appear to be using lower Wet Creek as a migration corridor to Big Creek and possibly as an adult rearing area. However, it is not clear if the bull trout in Wet Creek between Coal Creek and the diversion structure above Hilts Creek are part of a fluvial population. It is likely that fluvial bull trout historically migrated from lower Wet Creek and the mainstem of the Little Lost River into this reach to spawn.

The Wet Creek fishery appears to be in a downward trend. Trout densities decreased in all but one of the 7 transects that were sampled in 1987 and resampled in 1992 or 1995. The cause of this decline is not clear.

Twenty-one sculpin were collected from 2 sites in Wet Creek, preserved, and later identified as shorthead (Table 13).

In 1934, Carl Hubbs collected fish from Wet Creek. He collected 16 rainbow trout and 12 shorthead sculpin from Wet Creek[1] approximately 10 km above the Little Lost River (UMMZ). At another site approximately 1.6 km above Big Creek, he collected 4 rainbow trout, a cutthroat trout x rainbow trout hybrid, and 10 shorthead sculpin. The lack of bull trout in these sites suggests that this species was not abundant in these stream reaches at the time of this collection in 1934. However, Carl Hubbs recorded in his 1934 field notes (UMMZ) that:

> *Dr. Baker, druggist of Mackay and a long-time resident of the region, says that there are several "bottomless holes" in the course of Wet Creek, which until they were dynamited a few months ago were "full" of bull trout (Dolly Vardens).*

There is a small unnamed tributary that enters Wet Creek just below the confluence of Wet Creek and Coal Creek. This stream originates at springs approximately 2.3 km above the confluence with Wet Creek. The entire stream is on Forest land. In 1997, the water temperature near the source springs in the right and left hand forks was 13°C and 12°C respectively. The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on this tributary in 1997 (Appendix F).

In 1995 and 1997, rainbow trout were captured in this stream (Table 54, Appendices A and B). In September 1995, a 34 m section of stream located approximately 100 m above Wet Creek was electrofished. All of the fish captured at this site were rainbow trout between 35 and 65 mm in length. No other species were found. In July 1997, a 91 m section located 0.6 km above Wet Creek was electrofished. Rainbow trout were the only species collected. The length frequency distribution of fish from this stream suggests that the stream may serve as a spawning and rearing area for rainbow trout from Wet Creek.

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[1] This collection site is described as "Big Creek, trib of Little Lost River, ca 6 mi above mouth..." However, this seems to be present day Wet Creek.

Table 54. Summary of electrofishing data from an unnamed tributary to Wet Creek.

Site	Date	Fish/100 m^2	Species Composition (%) Rb	Bk	Bl	Source
100 m above Wet Creek	9/95	n/a	[a]			present study
0.6 km above Wet Creek	7/97	n/a	100			present study

[a] All fish captured were rainbow trout 35-65 mm.

Williams Creek

Williams Creek, located in the central portion of the Lemhi Mountain Range, is disjunct from the Little Lost River. The origin of Williams Creek was not clearly determined, but it appears to be a spring 2.3 km above the Forest boundary. The stream flows a total of 3.9 km, where it is intermittently diverted for irrigation. Approximately 1.5 km below this diversion, the entire stream is diverted into a pipeline. Williams (1973) indicates that Williams Creek has probably been used for irrigation purposes since the 1880's. Aerial photographs and a field review suggest that due to the diversions the stream does not regularly flow into the Little Lost River. This was confirmed by Don Phillips, a local landowner (personal communication). It appears a large amount of sediment was historically added to Williams Creek from a canal coming from Cedar Run Canyon. Stream temperatures were monitored in Williams Creek in 1997 (Appendix E). The Forest Service R1/R4 Fish Habitat Standard Inventory (Overton et al. 1997) was conducted on Williams Creek in 1997 (Appendix F).

In 1995, bull trout and sculpin were found in Williams Creek (Table 55, Appendices A and B). This bull trout population is unique in that it is the only bull trout population in the Little Lost River drainage that is completely disjunct from other streams. Although bull trout appear to occupy the entire stream, densities are low in the lower reach. Only one bull trout was captured in a 75 m section of stream that was electrofished approximately 1.6 km below the Forest boundary. In 1997, a 430 mm bull trout was caught in Williams Creek. Although sculpin were present in the lower sampling site, they were not found in the upper site.

On June 7, 1997, a small beaver pond near the Forest boundary was sampled by hook and line to help confirm the absence of brook trout in this stream. Seven bull trout measuring between 190 and 237 mm in length were captured. No other species were caught or observed.

Table 55. Summary of electrofishing data from Williams Creek.

Site	Date	Fish/100 m²	Species Composition (%)			Source
			Rb	Bk	Bl	
1.6 km below Forest boundary	6/95	n/a			100	present study
Beaver pond at Forest boundary	6/97	n/a			100[a]	present study
1.6 km above Forest boundary	6/95	10.4			100	present study

[a] Hook and line sample.

Y Springs

Y Springs is located in the central portion of the Lemhi Mountain Range. Water from Y Springs flows approximately 1.5 km, where it sinks into the valley floor. A field check on June 28, 1995 indicated flows were limited, and a visual survey of a section of the stream revealed no fish (Appendix A).

Unnamed Tributary (1 km south of Warm Creek)

This small, unnamed tributary is located in the Lemhi Mountain Range approximately 1 km south of Warm Creek. The stream is disjunct from the Little Lost River. A 50 m section of the stream near the Forest boundary was visually surveyed in June 1995 (Appendix A). Habitat is limited, and no fish were found.

Other unnamed drainages

Based on field reviews, personal observations, reviews of maps, and/or reviews of aerial photographs, unnamed drainages in the Little Lost River drainage, other than those previously discussed, have no fishery habitat or it is so limited that fish are likely not present.

Part 4: Lakes and Reservoirs

Introduction

There are 17 lakes, 1 reservoir, 3 dysfunctional reservoirs, and several private ponds in the Little Lost River drainage (LRRD file data, personal observation). All of the lakes in the drainage are small (less than

6 hectares) mountain lakes. This section presents an overview of the lakes and reservoirs; small private ponds are not included. Subdrainages containing lakes are listed in alphabetical order. Individual lakes are listed in the ascending order of occurrence within a subdrainage.

Big Creek

Lower Big Creek Lake (beaver pond)

Lower Big Creek Lake is actually a large semi-permanent beaver pond located on the main channel of Big Creek 6.1 km above Wet Creek. The pond, which has existed since at least 1955 (Bud Gamett, area resident, personal communication), is approximately 1.0 hectares in size. It is referred to locally as Big Creek Lake or Big Creek Beaver Pond. Due to the pond's relatively large size and semi-permanent nature, the Forest Service cataloged it as a lake in 1990 (Gamett 1990b). Easy access (a flat, 2 km hike) makes it a popular recreation destination. Access to the lake is currently closed to motorized vehicles.

The Forest Service collected angling data from 21 anglers visiting the pond in 1990 (Gamett 1990a). These anglers had fished a total of 80 hours and caught 155 fish (1.94 fish/hour). Ninety-five percent of the fish caught were brook trout, and the remaining 5% were rainbow trout. Harvest rates for brook trout and rainbow trout were 42% and 0%, respectively. Fish averaged approximately 230 mm in length.

Big Creek Lake #2

Big Creek Lake #2, located in the head of Big Creek, is approximately 1.0 hectares in size. Although the lake has been stocked with both rainbow trout and cutthroat trout since 1959, it is not known if the lake sustains fish. Although stocking records indicate fish were introduced into the lake in 1984 and 1988, no fish were found in the lake in 1990 (Gamett 1990b). However, it is possible the lake was not identified correctly in 1984 and 1988 and not actually planted. Therefore, the lake will continue to be stocked with 500 rainbow trout every 3 years until determination can be made as to whether or not it will support fish. Outmigration of fish from the lake into Big Creek is unlikely (personal observation). Access to the lake is closed to motorized vehicles.

Dry Creek

Dry Creek Reservoir

Dry Creek Reservoir was located on Dry Creek immediately below the confluence of Long Lost Creek and Dry Creek. Construction on the dam began in 1909 and was completed in 1925. The dam consisted of a concrete exterior and earth filled interior. Survey records indicate the spillway was 24.4 m in elevation, the reservoir surface area was 39.4 hectares, and the reservoir volume was 2.95 million m^3 (John E. Hayes Collection, Special Collections and Archives, University of Idaho Library). In the mid 1930's, the dam was dynamited in a water war. In June 1956, high water resulted in the failure of the dam and the ensuing flood killed 2 people below the reservoir. A remnant of the dam remains today. Apparently, bull trout were present in the reservoir in the 1920's. Jesse Strope, who moved to the Little Lost River valley in 1910, indicated that in the 1920's he caught only "dolly varden" in the reservoir and in Dry Creek above the reservoir (personal communication). Stocking records indicate the reservoir was stocked with rainbow trout between 1951 and 1953. However, rainbow trout were caught in the reservoir as early as 1942 (Mounty Dick, area resident, personal communication) indicating this species had been introduced into the reservoir and/or Dry Creek by at least 1942. Rainbow trout up to 460 mm were caught in the reservoir (Mounty Dick, area resident, personal communication).

Copper Lake

Copper Lake, located on the ridge between Long Lost Creek and Dry Creek, is approximately 1.0 hectares in size. In 1990, no fish were observed in the lake despite introductions in both 1984 and 1988 (Gamett 1990b). Fish were again introduced in the fall of 1990, and small fish were observed in the lake approximately 3 weeks later (Gamett 1990b). However, no fish were found in the lake in 1993 (personal observation). It is likely the lake's shallow depth does not allow it to overwinter fish. Therefore, stocking is being discontinued. It is unlikely that any fish introduced into the lake were able to move into Dry Creek (personal observation). Access to the lake is open to motorized vehicles.

Dry Creek Pond

Dry Creek Pond, located in the bottom of Dry Creek, is approximately 0.5 hectares in size. There is no record of the lake being stocked, and no fish were observed in the lake in 1988 or 1995 (personal observation). Recreation at the lake appears limited and is likely incidental to recreation associated with upper Dry Creek and Swauger lakes.

Dry Creek Lake #1

Dry Creek Lake #1, located on the ridge between Long Lost Creek and Dry Creek, is approximately 1.0 hectares in size. There is no record of the lake being stocked, and the lake appears to receive very little use. No fish were observed in the lake in 1990 (Gamett 1990b).

Swauger Lake #1

Swauger Lake #1, located on the ridge between Dry Creek and Long Lost Creek immediately below Swauger Lake #2, is approximately 0.25 hectares in size. The lake's outlet sinks into the talus slope near the mouth of the lake. In the fall of 1976, an attempt was made to seal this sink and increase the size of the lake (LRRD file data). This involved removing rock from around the seepage area, applying a layer of bentonite, then refilling the hole with fine soil. Although the lake increased in size and depth during runoff the following spring, it was within 0.3 m of the original level by July.

Following completion of the project in 1976, cutthroat trout were introduced into the lake. This species has been stocked regularly since that time. A single introduction of rainbow trout was made in 1982. Although the lake occasionally winterkills, it generally supports fish. In 1995, a 560 mm cutthroat trout was caught in the lake by an angler. There does not appear to be any natural recruitment into the lake (personal observation). The current management plan calls for the lake to be stocked every 3 years with 500 cutthroat trout. Outmigration of fish into Dry Creek is unlikely (personal observation). Recreational use at the lake appears mostly incidental to use at Swauger Lake #2. Access to the lake is open to motorized vehicles.

Swauger Lake #2

Swauger Lake #2, located on the ridge between Long Lost Creek and Dry Creek immediately above Swauger Lake #1, is approximately 1.0 hectares in size. Recreational use at the lake is relatively high. Cutthroat trout, which were first introduced in 1962, have been the only species introduced into the lake. The length frequency of fish observed and caught in the lake in 1990 and 1993 suggests there is no natural recruitment into the lake. In 1994, the Forest Service collected creel data from 39 visitors to the lake (LRRD file data). These anglers had fished 140 hours and caught 23 fish (0.2 fish/hour). Cutthroat trout were the only species caught, 78% of which were harvested. Thirteen anglers rated their angling experience. Thirty-one percent rated it as poor, 38% as fair, 15% as good, and 15% as excellent. Fourteen anglers indicated their angling methods. Twenty-nine percent fished with bait; 14% with lure; 14% with bait and lure; 7% with bait and fly; 7% with lure and fly; and 29% with bait, fly, and lure. To improve catch rates, the stocking rate was increased in 1995 from 2,000 fish every 3 years to 3,000 fish every 3 years. The lake is open to access by motorized vehicles.

Trout growth in the lake is relatively rapid. Because the lake has traditionally been stocked with Yellowstone cutthroat trout, a single introduction of westslope cutthroat trout in 1988 provided an opportunity to monitor growth rates within the lake. The westslope cutthroat trout were young-of-the-year at the time of their introduction in 1988. In 1990, the lake was sampled by hook and line (Gamett 1990b). The average length of the westslope cutthroat trout captured (n=20) was 34 cm. The rapid growth rate is likely due to the high density of macroinvertebrates in the lake (personal observation).

Swauger Lake #3

Swauger Lake #3, located on the ridge between Long Lost Creek and Dry Creek, is approximately 0.25 hectares in size. There is no record of the lake being stocked, and the lake likely receives little use.

Dry Creek Lake #2

Dry Creek Lake #2, located on the ridge between Long Lost Creek and Dry Creek, is approximately 0.5 hectares in size. There is no record of the lake being stocked. The lake likely receives little use due to difficult access.

Dry Creek Lake #3

Dry Creek Lake #3 is located on the ridge between Dry Creek and West Fork Burnt Creek (Pahsimeroi River drainage). An aerial photograph taken July 1, 1961 indicates the lake was about 0.25 hectares in size. However, an aerial photograph taken August 4, 1979 indicates the lake was nearly dry. This suggests this lake is intermittent. There is no record of the lake being stocked. The lake likely receives little use due to difficult access.

Dry Creek Lake #4

Dry Creek Lake #4, located on the ridge between Upper Cedar Creek (Big Lost River drainage) and Dry Creek, is approximately 0.25 hectares in size. There is no record of the lake being stocked. The lake likely receives little use due to difficult access.

Horse Lake Creek

Horse Lake

Horse Lake, located in Horse Lake Creek in the Sawmill Canyon drainage, is approximately 0.5 hectares in size. There is no record of the lake being stocked, and the lake likely receives very little use. No fish were observed in the lake in June 1997 (personal observation). However, spotted frogs *Rana luteiventris* were abundant.

Long Lost Creek

Shadow Lake #1 (lower)

Shadow Lake #1, located in Hell Canyon, is approximately 0.5 hectares in size. Although the lake was stocked with cutthroat trout in 1984 and 1990, no fish were caught or observed in the lake in 1993 (personal observation). Due to the lake's apparent inability to support fish, it will no longer be stocked. Outmigration of any fish introduced into the lake into Hell Canyon Creek or Long Lost Creek is unlikely (personal observation).

Shadow Lake #2 (upper)

Shadow Lake #2, located in Hell Canyon immediately above Shadow Lake #1, is approximately 1.5 hectares in size. Rainbow trout, stocked into the lake in 1964, were the first fish introduced into the lake. The first introduction of cutthroat trout was made in 1975. Between 1982 and 1994, rainbow trout were introduced

5 times. However, in 1993 no fish were observed in the lake (personal observation). During a volunteer trailhead survey conducted by the Forest Service in 1994, two anglers reported fishing one hour in "Shadow Lake" (LRRD file data). This was likely Shadow Lake #2. They did not catch any fish. The one angler that responded rated the angling experience as poor. Due to the lake's apparent inability to support fish, it will no longer be stocked.

Long Lost Creek Lake

Long Lost Creek Lake, located on the ridge between Long Lost Creek and Upper Cedar Creek (Big Lost River drainage), is approximately 0.25 hectares in size. There is no record of the lake being stocked. The lake likely receives little use due to difficult access.

Mill Creek

Mill Creek Lake

Mill Creek Lake is located in Mill Creek in the Sawmill Canyon drainage. The lake was formed by a landslide that blocked Mill Creek. At maximum level the lake is 5 to 6 hectares in size. However, seepage out of the lake through the landslide reduces the surface area by late summer. Historically, the lake was about one hectare in size by late summer (LRRD file data). In the early 1970's, a liner was installed near the seep to maintain higher water levels year round (LRRD file data). Although seepage continues to lower lake levels by late summer, it appears the lake maintains a higher minimum level than before the project was completed (personal observation).

In 1941 and 1969, rainbow trout were introduced into the lake. Cutthroat trout have been stocked in recent years, and a single introduction of grayling was made in 1995. The current management plan calls for the introduction of cutthroat trout every 3 years.

In 1994, the Forest Service collected creel data from 25 visitors to the lake (LRRD file data). These anglers had fished 53.5 hours and caught 40 fish (0.8 fish/hour). Cutthroat trout comprised 75% of the fish caught; rainbow trout comprised the remainder. Twenty-five percent of the fish caught were harvested. Ten anglers rated their angling experience. Thirty percent rated it as poor, 20% as fair, 40% as good, and 10% as excellent. Ten anglers indicated their angling methods. Twenty percent fished with bait; 50% with lure; 10% with bait and lure; and 20% with lure and fly. In 1997, a 243 mm grayling caught from the lake was turned into the Lost River Ranger District (personal observation).

The length frequency distribution of fish caught in the lake and the presence of rainbow trout in recent years indicates there is some natural recruitment into the lake. Outmigration of fish from the lake into lower Mill Creek is not possible due to the lack of an overland connection between the lake and the stream. No fish were observed in an ocular survey of approximately 100 m of Mill Creek immediately above the lake in August 1995. However, it is likely that fish from the lake use it for spawning (personal observation). The grayling introduced in 1995 may also spawn in the stream and establish a reproducing population.

Summit Creek

Summit Creek Reservoir

Summit Creek Reservoir, located near the Little Lost River and Pahsimeroi River divide, is approximately 40 hectares in size at maximum capacity. There is no record of fish being introduced into the reservoir, and it is not known if it contains a fish population. The reservoir is utilized during the spring, summer, and fall by a variety of waterfowl species and probably serves as a nesting area.

Wet Creek

Nolan Lake

Nolan Lake, located in the head of Wet Creek, is approximately 0.25 hectares in size. A single introduction of golden trout was made into the lake in 1986. However, these fish likely did not survive due to the lake's small, shallow nature. In October 1990, the lake was dry (personal observation) and is no longer stocked. Outmigration of fish into Wet Creek is not possible (personal observation).

RECOMMENDATIONS

Habitat Management

1. Improve riparian habitat and reduce sediment levels in the Wet Creek subdrainage. Reaches of emphasis are Wet Creek above Basin Creek, Coal Creek, the unnamed tributary to Wet Creek below Coal Creek, Basin Creek, and Squaw Creek. This could be accomplished through riparian pastures to better regulate grazing.

2. Relocate the Mill Creek trailhead to reduce impacts to the stream associated with this development.

3. Relocate the Timber Creek trail below the confluence of Slide Creek and Timber Creek. This would involve moving the trail approximately 50 to 100 m downstream of the present location. It would result in the trail crossing only Timber Creek instead of Timber Creek and Slide Creek.

4. Assess potential culvert barriers in Moonshine Creek and Redrock Creek.

5. If there are willing sellers, acquire land or easements on private land along perennial stream reaches to prevent housing development. Emphasis should be on Wet Creek, Big Creek, Summit Creek, Badger Creek, Squaw Creek (Wet Creek drainage), and the Little Lost River.

6. Evaluate removing natural "semi-permanent" barriers that may be blocking the migration of fish into several stream reaches. These include barriers on Badger Creek 3.0 km above the Little Lost River, Bunting Creek 300 m above Badger Creek, Quigley Creek approximately 400 m above the Little Lost River, and Camp Creek immediately above Timber Creek.

7. Evaluate reconnecting Williams Creek to the Little Lost River.

8. Evaluate irrigation diversion barrier and connectivity between Badger Creek and the Little Lost River.

9. Evaluate the potential for Horse Creek to support bull trout. If it is suitable, evaluate the possibility of reconnecting the stream to the Little Lost River.

10. Relocate the Williams Creek Road (# 405) above the stream crossing approximately 1 km above the Forest boundary out of the riparian area.

11. Work with cooperating landowners to improve riparian habitat on private land. Emphasis should be on the Little Lost River between Badger Creek and the private property line above Summit Creek.

12. Reduce summer stream temperatures wherever possible. Emphasis should be on the Little Lost River and tributaries above Summit Creek and the Wet Creek drainage.

13. Reduce sediment levels and stream temperatures in Bear Creek.

14. Reduce sediment levels in Deer Creek and Redrock Creek.

15. Reduce sediment levels and improve riparian conditions on Meadow Creek.

Fish Management

1. Continue to monitor the Little Lost River at Iron Creek and Wet Creek at the Forest Boundary for brook trout expansion. These sites are above the upper limit of brook trout distribution in these 2 subdrainages and are being monitored to detect an expansion of brook trout into key bull trout streams.

2. Control brook trout expansion wherever possible.

3. Eradicate brook trout in Big Creek, Squaw Creek (Sawmill Canyon), Mill Creek, and the Little Lost River above Summit Creek.

4. Confirm the existence of brown trout. If found, work to eradicate this species before it becomes established elsewhere in the drainage.

5. Assess the loss of bull trout through irrigation diversions on Williams Creek, Wet Creek, and Sawmill Creek near Timber Creek.

6. Assess the feasibility of eradicating brook trout in Meadow Creek and Dry Creek and introducing bull trout.

7. Determine the degree of illegal and unintentional bull trout harvest.

Education

1. Continue efforts to educate the public about the no harvest bull trout rule and identification of bull trout through annual placement of identification posters throughout the Little Lost River drainage.

2. Maintain the large bull trout identification signs at the Timber Creek Campground and Sawmill Canyon at the Forest Boundary.

3. Expand efforts to educate the public about the no harvest bull trout rule and identification of bull trout by placement of large bull trout identification signs at the Pass Creek/Wet Creek summit, at the Summit Creek summit, and north of Howe.

4. Expand efforts to educate the public about the no harvest bull trout rule and identification of bull trout through distribution of bull trout pamphlets through Forest Service, Fish and Game, and Bureau of Land Management personnel and offices; local businesses; and tourism centers.

5. Begin efforts through the news media and other means to inform the public about fish ecology, fish management, and fish management issues in the Little Lost River drainage. Emphasis should be on bull trout and bull trout recovery efforts being made by various agencies.

6. Increase enforcement activities relating to the no bull trout harvest rule. Efforts should be concentrated along the Little Lost River and tributaries above Summit Creek.

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APPENDICES

APPENDIX A

Appendix A. Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Aspen Creek	1.5 km above Little Lost River	visual	11/95	--	--	--	--	--	--	--	--	--	--	due to limited habitat a fish survey was not conducted
Badger Creek #1	3.2 km above the Little Lost River	1 pass	9/95	52	2.5	6	4 (4)	--	--	100	--	--	yes	
Badger Creek #2	1.4 km above the Forest boundary	1 pass	9/95	96	2.4	6	12 (14)	--	--	92	--	8	no	
Badger Creek #3	0.3 km above Bunting Canyon Creek	2 pass	7/97	20	1.8	7	16 (19)	16 (16-18)	44.4	100	--	--	no	
		2 pass	6/95	20	1.4	7	17 (18)	17 (17-18)	64.1	94	--	6	no	
Barney Creek	1 km below Barney Hot Springs	visual	5/97	50[2]	0.5	20	none observed	--	--	--	--	--	no	
Basin Creek #1	0.4 km above Wet Creek	visual	9/95	200[2]	0.75[2]	--	none observed	--	--	--	--	--	no	
Basin Creek #2	300 m below Pine Creek	1 pass	7/97	138	1.1	7	2 (2)	--	--	100	--	--	no	
Basin Creek #3	6.4 km above Wet Creek	visual	7/95	50[2]	0.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Bear Creek #1	0.6 km above Sawmill Canyon Road	1 pass	9/95	53	2.0	--	20 (20)	--	--	100	--	--	no	
Bear Creek #2	0.8 km above #1	1 pass	9/95	30[2]	1[2]	--	none observed	--	--	--	--	--	no	15-25% gradient limited habitat
Bell Mt. Creek #1	in spring at diversion	1 pass	6/95	10[2]	2[2]	--	none observed	--	--	--	--	--	no	
Bell Mt. Creek #2	3 separate locations 0.4 km above diversion	1 pass/ visual	6/95	50[2]	1.5[2]	--	none observed	--	--	--	--	--	no	this section was intermittent in 1997
Big Creek #1	0.8 km above Wet Creek	1 pass	9/96	68	2.2	11	7 (14)	--	--	86	14	--	yes	
		2 pass	8/94	95	2.1	--	16	16 (16-17)	8.0	81	19	--	--	
Big Creek #1a	20 m above Forest boundary	1 pass	9/96	54	2.4	10	30 (36)	--	--	37	63	--	yes	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp°C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Big Creek #2	at trailhead	2 pass	9/94	88	2.2	--	54 (n/a)	65 (56-75)	33.6	52	48	--	--	
Big Creek #3	immediately below beaver pond	2 pass	8/94	91	4.0	--	123 (n/a)	154 (138-170)	42.3	60	38	2	--	1 fish appeared to be a Bk-Bl hybrid
Big Creek #4	above beaver pond	2 pass	9/94	73	1.6	--	125 (n/a)	160 (142-179)	137	18	77	6	--	all bull trout appeared to be Bk-Bl hybrids
Big Springs Creek (BLM)	0.8 km above Buck and Bird Rd.	2 pass	9/93	117	5.1	--	98 (n/a)	125 (109-141)	20.9	80	20	--	yes (9/97)	
Birch Basin	at Forest boundary	visual	6/95	--	--	--	--	--	--	--	--	--	--	due to limited habitat a fish survey was not conducted
Black Creek	diversion pool	visual	7/97	7	7	--	none observed	--	--	--	--	--	no	habitat limited
Bull Creek #1	0.8 km above Little Lost	1 pass	8/95	70[2]	1[2]	--	none observed	--	--	--	--	--	no	
Bull Creek #2	1.2 km above Little Lost	1 pass	9/95	30[2]	1[2]	--	none observed	--	--	--	--	--	no	
Bunting Canyon #1	175 m above Badger Creek	1 pass	7/97	43	1.6	6	6 (9)	--	--	50	--	50	no	
Bunting Canyon #2	0.8 km above Badger Creek	1 pass	6/95	60[2]	1.5[2]	--	none observed	--	--	--	--	--	no	included 2 separate sections
Bunting Canyon #3	2 km above Badger Creek	1 pass	6/95	50[2]	1[2]	--	none observed	--	--	--	--	--	no	
Camp #1(Sawmill Canyon)	100 meters above Timber Creek	1 pass	9/95	25	1.2	7	5 (5)	--	--	--	--	100	no	
Camp #2 (Sawmill Canyon)	1.6 km above Timber Creek	1 pass visual	9/95	10[2]	1[2]	--	none observed	--	--	--	--	--	no	habitat limited
Cedarville (Cabin Fork)	at end of road	visual	11/95	50[2]	1.5[2]	--	none observed	--	--	--	--	--	no	

Appendix A (continued). **Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)**

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m^2	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Cedar Run #1	Mud Spring inflow	visual	6/95	50[2]	1.0[2]	--	none observed	--	--	--	--	--	no	
Cedar Run #2	at diversion	1 pass	6/95	50[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
Cedar Run #3	in canal 0.8 km above Williams Creek	1 pass/ visual	6/95	50[2]	1[2]	--	none observed	--	--	--	--	--	no	habitat limited
Chicken Creek	private/BLM property line	1 pass/ visual	9/95	20	.5	--	none observed	--	--	--	--	--	no	habitat limited
Coal Creek	below Gate	2 pass	7/95	52	1.6	10	9 (9)	9 (9)	11.2	100	--	--	no	
Corral Canyon Creek (Arco Pass)	20 m above Horsethief Canyon Creek	visual	7/97	30	--	15	none observed	--	--	--	--	--	no	stream appeared intermittent
Corral Creek (Wet Creek)	500 m above Wet Creek Road	visual	6/97	50[2]	0.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Cub Canyon Creek	on private land	visual	9/95	--	--	--	--	--	--	--	--	--	--	due to limited habitat a survey was not conducted
Deep Creek #1	diversion pool	visual	6/95	15[2]	15[2]	--	none observed	--	--	--	--	--	no	
Deep Creek #2	immediately above diversion pool and 200 meters above diversion pool	1 pass	6/95	50[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
Deer Creek (BLM) #1	2.1km above Little Lost River	3 pass	8/92	109	.9	--	21 (n/a)	22 (21-24)	22.4	100	--	--	--	probably an underestimate due to difficult sampling
Deer Creek (BLM) #2	1.6 km below Forest boundary	3 pass	8/92	152	1.4	--	43 (n/a)	44 (43-47)	20.7	100	--	--	--	
Deer Creek (FS)	at Forest boundary	3 pass	6/95	55	1.6	16	38 (38)	38 (38)	42.5	100	--	--	yes	
Deer Creek, N.F.	0.2 km above S.F.	4 pass	6/95	30	1.7	14	176 (178)	180 (176-185)[3]	357.4	100	--	--	no	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Deer Creek, S.F.	0.5 km above North Fork	2 pass	6/95	56	1.2	16	25 (29)	25 (25-26)	37.5	100	--	--	no	
Dry Creek #1	50 meters above diversion pool	1 pass	8/95	84	5.3	--	3 (4)	--	--	67	33	--	no	rainbow trout had a strong cutthroat trout influence
Dry Creek #2	0.8 km above diversion	2 pass	8/95	147	4.7	9	21 (21)	28 (21-37)	4.1	--	100	--	no	
Dry Creek #3	150 meters above Forest boundary	2 pass	8/95	146	4.3	9	52 (57)	56 (52-60)	8.9	--	100	--	no	
Dry Creek #4	pool adjacent to #3	1 pass	8/95	22	4.5	--	60 (67)	--	–	–	100	–	no	
Dry Creek #5	spring adjacent to Dry Creek 1.2 km above Forest boundary	1 pass	8/95	3[2]	1.5[2]	--	-- (10[2])	--	--	--	100	--	no	
Dry Creek #6	0.4 km above falls	1 pass	8/95	60[2]	4[2]	--	none observed	--	--	--	–	--	no	
Dry Creek #7	0.8 km above falls	1 pass	8/95	80[2]	2[2]	--	none observed	--	--	--	--	--	no	
Dry Creek #8	beaver ponds adjacent to Dry Creek 3.2 km above falls	visual	8/95	--	--	--	none observed	--	--	--	--	--	no	
Dry Creek #9	4.8 km above falls	visual	8/95	30[2]	1[2]	--	none observed	--	--	--	--	--	no	
Fallert Springs Creek (BLM)	above Fallert Springs bridge	1 pass	9/93	139	4.8	--	14 (n/a)	--	--	100	--	--	--	1 hatchery rainbow trout 353 mm
Firebox Creek	400 m above Little Lost River	2 pass	7/97	100	2.9	8	36 (41)	48 (36-72)	16.6	--	--	100	no	
Garfield Creek	200 meters above Forest boundary	1 pass	6/95	75[2]	.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Hawley Creek	immediately above Iron Creek Road	1 pass	9/95	47	.8	5	1 (1)	--	--	--	--	100	no	habitat limited

Appendix A (continued). **Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)**

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp°C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%)			Sculpin Present	Comments
										Rb	Bk	Bl		
Hilts Creek	near confluence with Wet Creek	visual	8/97	--	--	--	--	--	--	--	--	--	--	due to limited habitat a fish survey was not conducted
Horse Creek #1	at BLM/private line	2 pass	7/97	88	1	17	22 (22)	24 (22-29)	27.3	100	--	--	yes	
Horse Creek #2	0.8 km below Forest boundary	3 pass	6/95	34	1.3	10	17 (17)	17 (17-18)	38.8	100	--	--	yes	
Horse Lake Creek	300 m above Forest boundary	visual	6/97	75[2]	1.0[2]	--	none observed	--	--	--	--	--	no	
Horsethief Canyon Creek	20 m above Corral Canyon Creek	visual	7/97	30	--	21	none observed	--	--	--	--	--	no	stream appeared intermittent
Hurst Creek	confluence of left and right forks	visual	7/97	50	--	--	none observed	--	--	--	--	--	no	lower section appeared intermittent
Iron Creek	just above Iron Creek Road	1 pass	9/96	88	2.2	5	4 (8)	--	--	--	--	100	no	
		2 pass	8/95	93	2.2	9	14 (14)	20 (14-31)	10.1	--	--	100	no	
Jackson Creek	just above Iron Creek Road	1 pass	9/95	73	2.1	3	2 (2)	--	--	--	--	100	no	habitat limited
Little Lost #1 (BLM)	0.8km below Big Springs Creek	1 pass	9/93	144	6.7	--	6 (n/a)	--	--	100	--	--	--	
Little Lost #2 (BLM)	0.4 km below Buck and Bird Road	2 pass	9/93	208	4.7	--	12 (n/a)	16 (12-23)	1.6	92	--	8	--	
Little Lost #3 (BLM)	at Clyde Campground	2 pass	9/93	234	7.1	--	125 (n/a)	238 (158-318)	14.3	96	1	3	--	
Little Lost #4 (BLM Sawmill #4)	lower end of lower pasture	2 pass	7/97	108	7.2	20	14 (14)	14 (14-16)	1.8	71	14	14	no	
		2 pass	8/93	105	5.0	--	14 (n/a)	14 (14-14)	2.7	93	7	--	--	
Little Lost #5 (BLM Sawmill #3)	above Mahogany Creek Road crossing	2 pass	7/97	131	8.6	17	24 (24)	25 (24-28)	2.2	75	8	17	yes	
		2 pass	8/93	109	5.0	--	10 (n/a)	11 (10-12)	2.0	70	20	10	--	
Little Lost #6 (BLM Sawmill #2)	lower portion of upper exclosure	2 pass	7/97	131	7.2	14	27 (27)	33 (27-46)	3.5	93	--	7	yes	
		2 pass	8/93	94	7.7	--	42 (n/a)	48 (42-59)	6.6	93	2	5	--	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m^2	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Little Lost #7 (BLM Sawmill #1)	2.4 km below Sawmill Canyon Road	2 pass 2 pass	7/97 8/93	110 110	7.2 7.3	10 - -	40 (40) 43 (n/a)	45 (40-54) 56 (44-68)	5.7 7.0	90 91	8 9	3 - -	yes - -	
Little Lost #8 (FS Sawmill #1)	at Forest boundary	2 pass 4 pass	7/97 9/95	182 126	9.3 8.5	11 13	63 (63) 104 (105)	71 (63-83) 120 (104-136)	4.2 11.2	92 93	3 4	5 3	no no	1 fish appeared to be a Bk-Bl hybrid ('97)
Little Lost #9 (FS Sawmill #2)	behind Guard Station	2 pass 3 pass	7/97 9/95	158 162	9.2 7.6	11 7	75 (79) 97 (97)	93 (75-117) 99 (97-102)	6.4 8.0	87 93	11 4	3 3	- - no	2 fish appeared to be Bk-Bl hybrid ('97)
Little Lost #10 (FS Sawmill #3)	above Mill Creek	2 pass 3 pass	7/97 9/95	112 103	7.8 5.7	12 12	62 (62) 52 (52)	84 (62-117) 53 (52-55)	9.6 9.0	65 79	35 15	- - 6	yes yes	some fish appeared to be Bk-Bl hybrid ('97)
Little Lost #10a (FS Sawmill #3a)	10 m above Iron Creek Road	1 pass 1 pass	8/97 9/96	100 91	9.1 8.4	13 6	31 (34) 29 (30)	- - - -	- - - -	39 66	3 - -	58 34	yes yes	
Little Lost #11 (FS Sawmill #4)	0.4 km below Timber Creek	2 pass 2 pass	7/97 9/95	123 122	8.1 8.3	12 8	25 (28) 26 (26)	45 (25-104) 36 (26-48)	4.5 3.6	48 65	- - - -	52 35	yes yes	
Little Lost #12 (FS Sawmill #5)	0.8 km above Moonshine Creek	2 pass 3 pass	7/97 8/95	114 116	5.3 5.5	13 6	45 (46) 27 (27)	49 (45-56) 29 (27-33)	8.1 4.6	13 26	- - - -	87 74	yes no	
Little Lost #13 (FS Sawmill #6)	1.6 km above Smithie Fork	2 pass	8/95	83	3.0	- -	26 (27)	51 (26-88)	20.4	- -	- -	100	no	
Little Lost #14 (FS Sawmill #7)	400 m above Firebox Creek	1 pass	7/97	90	2.4	10	22 (26)	- -	- -	- -	- -	100	no	
Long Lost Creek #1	3.2 km above Dry Creek (below falls)	1 pass	8/95	50[2]	2[2]	- -	none observed	- -	- -	- -	- -	- -	no	
Long Lost Creek #2	0.8 km above falls	1 pass	8/95	80[2]	2[2]	- -	none observed	- -	- -	- -	- -	- -	no	
Long Lost Creek #3	at end of road (1.5 km below Hell Canyon)	1 pass	8/95	100[2]	2[2]	- -	none observed	- -	- -	- -	- -	- -	no	
Long Lost Creek #4	100 meters above #3	1 pass	8/95	100[2]	2[2]	- -	none observed	- -	- -	- -	- -	- -	no	
Magpie Springs	above canal	1 pass	6/95	5[2]	0.5[2]	- -	none observed	- -	- -	- -	- -	- -	no	habitat limited

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Mahogany Creek #1	canal 0.2 km below diversion	1 pass	6/95	20[2]	1[2]	--	none observed	--	--	--	--	--	no	
Mahogany Creek #2	3 locations above diversion	visual/ 1 pass	6/95	75[2]	1[2]	--	none observed	--	--	--	--	--	no	
Massacre Creek	40 m above Squaw Creek	1 pass	7/97	200	3.2	14	1 (1)	--	--	100	--	--	no	
Meadow Creek #1 (unnamed tributary)	at Forest boundary	2 pass	6/95	67	.75	9	17 (19)	18 (17-19)	35.5	12	88	--	no	
Meadow Creek #2 (unnamed tributary)	0.8 km above Forest boundary	visual/ 1 pass	6/95	50[2]	.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Mill Creek #1	at Mill Creek Campground	2 pass 2 pass	8/97 8/95	73 70	4.1 3.6	8 10	54 (57) 42 (44)	62 (54-74) 50 (43-57)	20.7 20.0	3 12	93 52	4 36	no no	some fish appeared to be Bk-Bl hybrid ('95 & '97)
Mill Creek #2	0.5 km above trailhead	1 pass	9/96	68	4.2	6	6 (6)	--	--	--	67	33	no	3 fish appeared to be Bk-Bl hybrid, 1 rainbow trout was observed but uncaptured
Mill Creek #3	upstream from Mill Creek Lake	visual	8/95	50[2]	1.0[2]	--	none observed	--	--	--	--	--	--	--
Mill Creek, unnamed tributary 0.5 km above trailhead	50 meters above Mill Creek	1 pass	9/96	25[2]	0.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Moffit Creek	above Little Lost/ Pahsimeroi Road	visual	5/97	10[2]	.25[2]	--	none observed	--	--	--	--	--	no	habitat limited
Moonshine Creek #1	immediately below Sawmill Road	1 pass	9/95	5[2]	--	--	none observed	--	--	--	--	--	no	
Moonshine Creek #2	immediately above Sawmill Road	1 pass	9/95	20[2]	1[2]	--	none observed	--	--	--	--	--	no	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp°C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Moonshine Creek #3	250 m above Sawmill Road	1 pass	6/97	72	1.9	7	none observed	--	--	--	--	--	no	
North Creek #1	0.4 km above Forest boundary	1 pass	8/95	2[2]	1[2]	--	1 (1)	--	--	100	--	--	no	
North Creek #2	0.8 km above Forest boundary	1 pass	8/95	40[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
Pine Creek	1.0 km above Basin Creek	visual	6/97	100[2]	0.5	--	none observed	--	--	--	--	--	no	
Quigley Creek #1	25 m above Sawmill Canyon Road	1 pass	6/97	21	0.8	10	1 (1)	--	--	--	--	100	no	
Quigley Creek #2	200 m above Sawmill Canyon Road	1 pass	6/97	87	1.2	8	none observed	--	--	--	--	--	no	
Redrock Creek #1	0.2 km above Timber Creek	1 pass	9/95	42	1.9	6	8 (8)	--	--	--	--	100	no	
Redrock Creek #2	top end of transect is culvert on road 460A	1 pass	6/97	90	3.3	9	10 (10)	--	--	--	--	100	no	
Redrock Creek, Right Fork	400 m above Left Fork	1pass	6/97	52	1.2	9	none observed	--	--	--	--	--	no	
Redrock Creek, Left Fork	200 m above Right Fork	1 pass	6/97	56	1.0	9	none observed	--	--	--	--	--	no	
Rocky Run Creek	0.5 km above pipeline diversion	1 pass	7/97	101	0.9	7	none observed	--	--	--	--	--	no	
Sands Creek #1	0.2 km above Forest boundary	visual	7/95	40[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
Sands Creek #2	2 beaver ponds 0.8 km above Forest boundary	visual	7/95	--	--	--	none observed	--	--	--	--	--	no	
Sands Creek #3	1.2 km above Forest boundary	1 pass	7/95	100[2]	1.5[2]	--	none observed	--	--	--	--	--	no	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish $\geq$70mm except for BLM sites sampled between 1992 and 1994 which are for fish $\geq$100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp°C	Total Captured $\geq$70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Slide Creek #1	100 m above Timber Creek	1 pass	6/97	107	2.7	6	8 (8)	--	--	--	--	100	no	
Slide Creek #2	0.9 km above Timber Creek	1 pass	6/97	65	1.8	6	none observed	--	--	--	--	--	no	
Smithie Fork #1	just above Sawmill Road bridge	2 pass	7/97	79	3.3	7	68 (69)	74 (68-83)	20.1	3	--	97	no	mean width does not include side channel that was included in transect
		2 pass	8/95	71	4.2	12	75 (77)	83 (77-89)	28.4	7	--	93	no	
Smithie Fork #2	3.2 km above Little Lost River	2 pass	8/95	126	3.4	9	89 (92)	130 (102-158)	30.3	--	--	100	no	
Smithie Fork Trib. (unnamed)	200 m above confluence	1 pass	9/97	45	1.5	9	1 (1)	--	--	--	--	100	no	
South Creek #1	at diversion	1 pass	6/95	30[2]	1.5[2]	--	-- (5)	--	--	100	--	--	no	
South Creek #2	200 m above diversion	1 pass	8/95	20[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
South Creek #3	2.0 km above Forest boundary	3 pass	8/95	51	1.6	7	27 (27)	27(27)	33.9	100	--	--	no	
South Creek #4	3.2 km above Forest boundary	1 pass	8/95	25[2]	1.5[2]	--	none observed	--	--	--	--	--	no	
Squaw Creek #1 (Sawmill Canyon)	0.8 km above Sawmill Canyon Road	1 pass	9/96	55	3.3	11	27 (34)	--	--	33	52	15	yes	
Squaw Creek #2 (Sawmill Canyon)	4.0 km above Sawmill Road	2 pass	7/97	56	2	9	27 (40)	27 (27-28)	24.1	41	48	11	no	some fish appeared to be Bk-Bl hybrid ('95 & '97)
		3 pass	8/95	66	3.3	10	26 (29)	27 (26-29)	12.3	23	58	19	no	
Squaw Creek #3 (Sawmill Canyon)	0.9 km above North Fork	1 pass	8/96	50	0.9	9	12 (19)	--	--	--	--	100	no	
Squaw Creek, North Fork #1 (Sawmill Can.)	0.6 km above Squaw Creek	1 pass	9/96	57	1.7	10	9 (12)	--	--	--	56	44	no	

Appendix A (continued). **Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)**

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m^2	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Squaw Creek, North Fork #2 (Sawmill Can.)	1.8 km above Squaw Creek	1 pass	6/97	114	1.8	6	8 (8)	--	--	--	13	88	no	
Squaw Creek, unnamed tributary (Sawmill Canyon)	tributary above Squaw Creek #2 on south side of road	1 pass	8/95	47	0.9	9	3 (3)	--	--	33	67	--	no	
Squaw Creek BLM #1 (Wet Creek)	just above Wet Creek Road	2 pass	8/92	107	1.0	--	40 (n/a)	47 (40-52)	43.9	100	--	--	--	
Squaw Creek BLM #2 (Wet Creek)	168 meters above #1	2 pass	8/92	99	1.2	--	37 (n/a)	43 (37-49)	36.2	100	--	--	--	
Squaw Creek #2a	2.0 km above Wet Creek	1 pass	6/96	50[2]	0.5[2]	--	none observed	--	--	--	--	--	no	habitat very degraded
Squaw Creek #3 (Wet Creek)	1.9 km below Massacre Creek	1 pass	6/96	30[2]	1.5[2]	15	5 (5)	--	--	100	--	--	yes	
Squaw Creek #4 (Wet Creek)	65 m above Massacre Creek	1 pass	7/97	100	1.5	13	4 (4)	--	--	100	--	--	yes	
Summerhouse Canyon #1	1.2 km below Forest boundary	1 pass	7/95	100[2]	.5	--	none observed	--	--	--	--	--	no	
Summerhouse Canyon #2	0.8 km above Forest boundary	visual	7/95	100[2]	--	--	none observed	--	--	--	--	--	no	
Summerhouse Canyon #3	1.6 km above Forest boundary	1 pass	7/95	50[2]	--	--	none observed	--	--	--	--	--	no	
Summerhouse Canyon #4	3.2 km above Forest boundary	1 pass	7/95	100[2]	1.0[2]	--	none observed	--	--	--	--	--	no	
Summit Creek #1 (BLM #3)	4.0 km below Sawmill Rd	2 pass	8/92	97	1.8	--	23 (n/a)	28 (23-35)	16.0	91	9	--	--	
Summit Creek #2 (BLM #2)	1.6 km below Sawmill Rd	3 pass	8/92	106	2.8	--	70 (n/a)	72 (70-76)	24.3	100	--	--	--	
Summit Creek #3 (BLM #1)	0.8 km below Sawmill Rd	3 pass	8/92	110	3.0	--	129 (n/a)	130 (129-133)	39.4	100	--	--	--	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish >100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp°C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Summit Creek #4[4]	400 m below Sawmill Canyon Road	1 pass	10/95	75[2]	3.0[2]	--	65 (65)	--	--	95	3	2	yes	
Summit Creek #5	100 m below Iron Springs	1 pass	6/97	59	7.2	12	2 (2)	--	--	100	--	--	yes	
Summit Creek #6	Iron Springs	1 pass	6/97	170	7.3	12	6 (6)	--	--	100	--	--	yes	
Timber Creek #1	0.8 km above Little Lost River	3 pass 2 pass	7/97 8/95	133 133	4.7 3.6	10 10	42 (46) 23 (23)	43 (42-45) 26 (23-30)	6.9 5.5	5 17	-- --	95 83	yes yes	
Timber Creek #2	100 m above Slide Creek	hook and line	6/97	100[2]	2.0[2]	--	1 (1)	--	--	--	--	100	no	app. 5 other bull trout between 100-200 mm were observed ('97)
Uncle Ike Creek #1	at diversion	1 pass	9/95	53	2.5	4	5 (9)	--	--	33	67	--	no	
Uncle Ike Creek #2	1.6 km above diversion	1 pass	9/95	59	2.1	6	3 (4)	--	--	67	33	--	no	
Uncle Ike Creek #3	4.8 km above diversion	visual	9/95	10[2]	.5[2]	--	none observed	--	--	--	--	--	no	habitat limited
Warm Creek #1	0.4 km above Little Lost	2 pass	6/95	47	2.6	10	8 (8)	8 (8-9)	6.7	100	--	--	no	
Warm Creek #2	0.6 km above upper Forest boundary	1 pass	6/95	34	2	7	1 (1)	--	--	--	--	100	no	2 bull trout app. 70 and 110 mm were observed but uncaptured
Warm Springs Creek (BLM)	below Little Lost Highway	2 pass	8/93	115	3.3	--	86 (n/a)	94 (88-99)	24.8	100	--	--	--	
Wet Creek (BLM #7)	just below Pancheri diversion	3 pass	8/92	118	3.7	--	27 (n/a)	28 (27-31)	6.4	85	7	7	--	
Wet Creek (BLM #6)	just below Dry Creek hydro	2 pass	8/92	94	4.4	--	4 (n/a)	5 (4-6)	1.2	75	--	25	--	
Wet Creek (BLM #5)	3.6 km below Squaw Creek	2 pass	8/92	129	4.4	--	25 (n/a)	29 (25-35)	5.1	96	--	4	--	

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m^2	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Wet Creek (BLM #4)	2.0 km below Squaw Creek	3 pass	8/92	96	3.9	--	21 (n/a)	22 (21-24)	5.9	100	--	--	--	
Wet Creek (BLM #3)	1.2 km above Squaw Creek	2 pass	8/92	113	2.8	--	17 (n/a)	21 (17-26)	6.6	94	--	6	--	
Wet Creek (BLM #2)	0.8 km below #1	2 pass	8/92	117	3.3	--	19 (n/a)	20 (19-21)	5.2	100	--	--	--	
Wet Creek (BLM #1)	2.4 km below Forest boundary	2 pass	8/92	89	4.3	--	21 (n/a)	22 (21-24)	5.7	100	--	--	--	
Wet Creek #0	top end of transect is Big Creek	1 pass	7/97	170	5.1	10	16 (16)	--	--	81	13	6	yes	
Wet Creek #1	0.6 km above Forest boundary	1 pass 3 pass	7/96 7/95	104 192	2.2 2.2	10 15	28 (28) 34 (34)	-- 35 (34-37)	-- 8.3	96 100	-- --	4 --	yes yes	
Wet Creek #1a	250 m above Coal Cr.	1 pass	7/96	87	2.3	12	15 (15)	--	--	73	--	27	yes	
Wet Creek #1 aa	beaver pond below Hilts Creek	snorkel	7/96	--	--	10	--	--	--	40[2]		60[2]	--	
Wet Creek #1b	at Hilts Creek	2 pass	8/97	102	3.6	12	65 (69)	69 (65-76)	18.8	37	--	63	yes	
Wet Creek #2	0.5 km above Hilts Creek (top end of private)	2 pass	8/95	151	3.5	--	12 (13)	13 (12-14)	2.4	75	--	25	yes	
Wet Creek #3	0.8 km above Hilts Creek (in meadow)	3 pass 2 pass	6/96 8/95	138 95	3.6 2.8	10 8	54 (54) 29 (29)	56 (54-60) 32 (29-36)	11.3 12.1	28 31	-- --	72 69	no no	
Wet Creek #3a	108 m above #3	2 pass	6/96	48	2.8	9	11 (11)	11 (11-12)	8.2	36	--	64	no	
Wet Creek #4	2.2 km above Hilts Creek	1 pass	7/95	135	2.0	7	none observed	--	--	--	--	--	no	included 3 sections on main channel and 1 on a side channel
Wet Creek, unnamed tributary (across from Coal Creek) #1	100 meters above Wet Creek	1 pass	9/95	34	1.0	12	-- (30[2])	--	--	--	--	--	no	all fish were rainbow trout 35-65 mm

Appendix A (continued). Summary of sampling efforts and results in the Little Lost River drainage between 1992 and 1997. (Calculations are for fish ≥70mm except for BLM sites sampled between 1992 and 1994 which are for fish ≥100 mm.)

Stream	Location	Sampling Method	Date	Length(m)	Width(m)	Water Temp °C	Total Captured ≥70 mm (all fish)[1]	Population Estimate (Range)	Fish/100 m²	Species (%) Rb	Bk	Bl	Sculpin Present	Comments
Wet Creek, unnamed tributary (across from Coal Creek) #2	0.6 km above Wet Creek	1 pass	7/97	91	1.2	10	20 (21)	--	--	100	--	--	no	
Williams Creek #1	1.6 km below Forest boundary	1 pass	6/95	75[2]	1[2]	--	1 (1)	--	--	--	--	100	yes	
Williams Creek #2	beaver pond at Forest boundary	hook and line	6/97	--	--	--	7 (7)	--	--	--	--	100	--	
Williams Creek #3	1.6 km above Forest boundary	3 pass	6/95	49	1.4	8	7 (12)	7 (7-8)	10.4	--	--	100	no	
Y Springs	at Forest boundary	visual	6/95	--	--	--	--	--	--	--	--	--	--	due to limited habitat a survey was not conducted
Unnamed tributary approximately 1 km south of Warm Creek	at Forest boundary	visual	6/95	20[2]	.5[2]	--	none observed	--	--	--	--	--	no	habitat limited

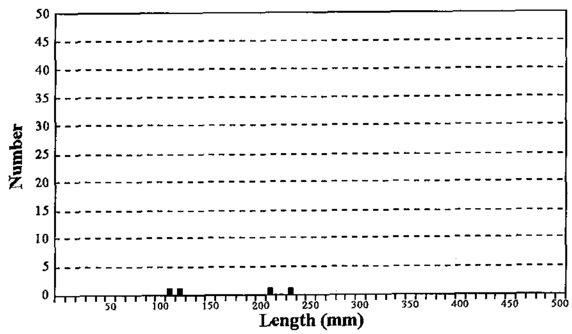
[1] For BLM sites sampled between 1992 and 1994 this column indicates number of fish ≥ 100 mm.
[2] Represents an estimate or an approximation.
[3]More fish were captured in this transect than could be held between passes. Therefore, fish were released below the transect between passes. It may be possible that some of these fish moved back into the transect, were recaptured, and recounted.

APPENDIX B

Appendix B. Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Badger Creek #1- (9/20/95)
3.2 km above Little Lost River

Rainbow Trout (n=4)

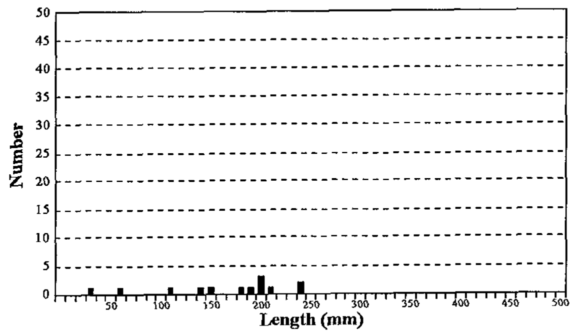


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

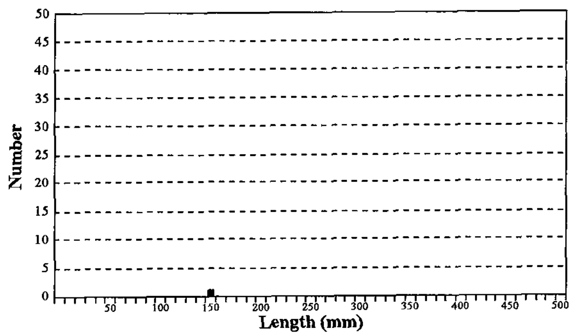
Badger Creek #2 - (9/20/95)

1.4 km above the Forest boundary

Rainbow Trout (n=13)



Bull Trout (n=1)

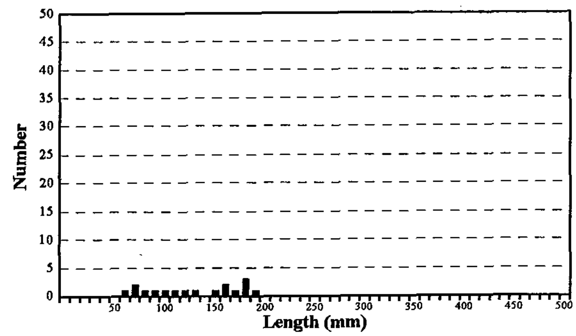


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

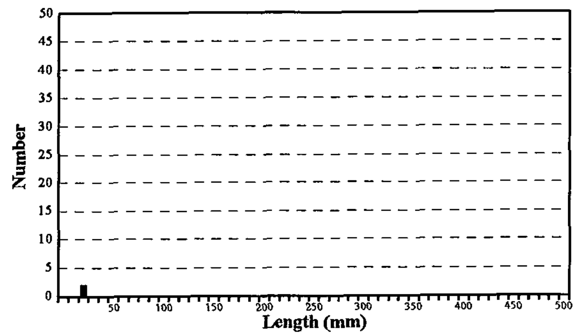
Badger Creek #3 - (7/16/97)

0.3 km above Bunting Canyon Creek

Rainbow Trout (n=17)



Bull Trout (n=2)

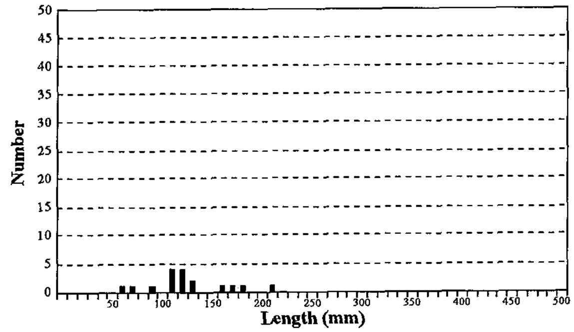


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

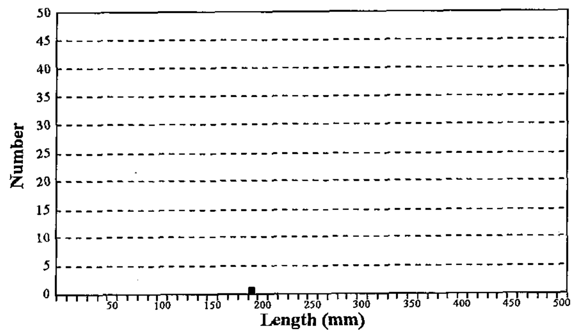
Badger Creek #3 - (6/20/95)

0.3 km above Bunting Canyon Creek

Rainbow Trout (n=17)

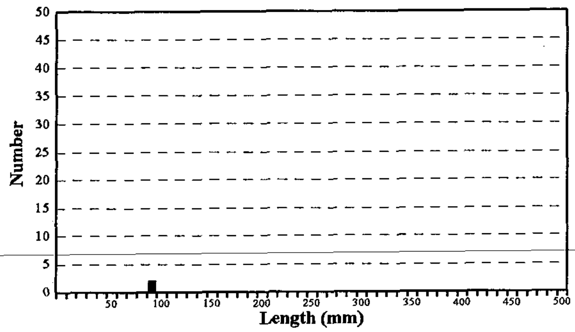


Bull Trout (n=1)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Basin Creek #2 - (7/02/97)
300 m below Pine Creek
Rainbow Trout (n=2)

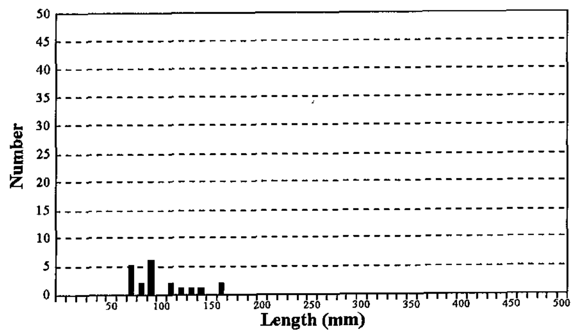


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Bear Creek #1 - (9/95)

0.6 km above Sawmill Canyon Road

Rainbow Trout (n=20)

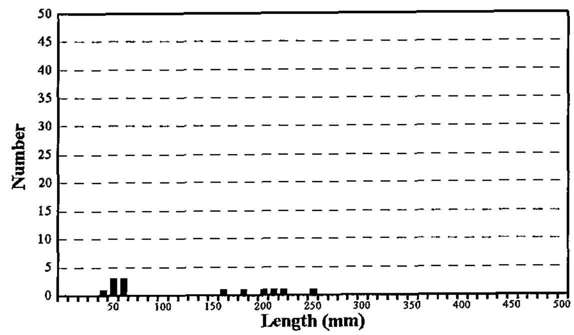


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

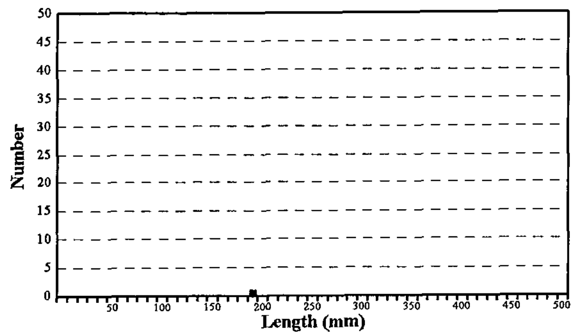
Big Creek #1 - (9/13/96)

0.8 km above Wet Creek

Rainbow Trout (n=13)



Brook Trout (n=1)

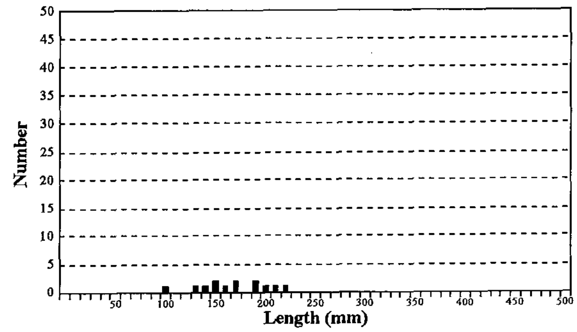


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

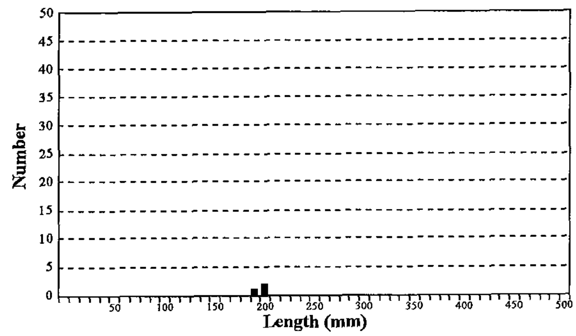
Big Creek #1 - (8/11/94)

0.8 km above Wet Creek

Rainbow Trout (n=13)



Brook Trout (n=3)

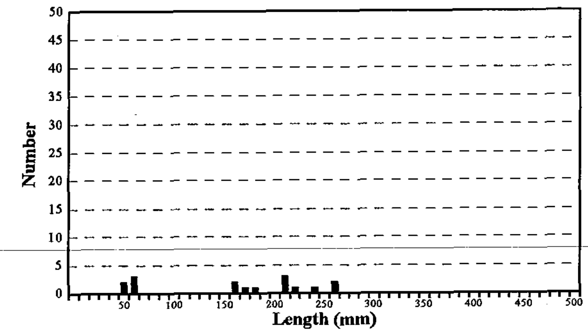


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

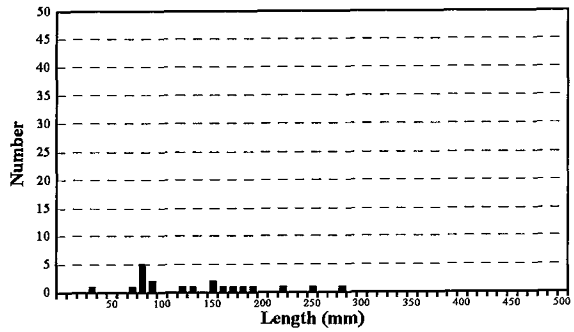
Big Creek #1a - (9/13/96)

20 meters above Forest boundary

Rainbow Trout (n=16)



Brook Trout (n=20)

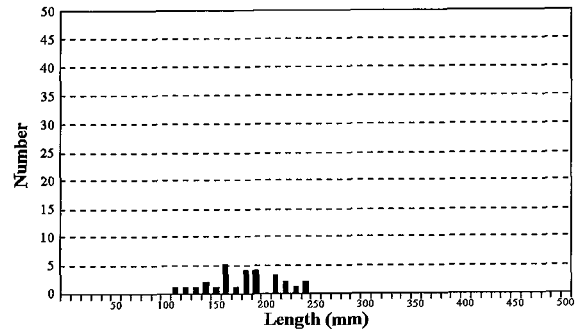


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

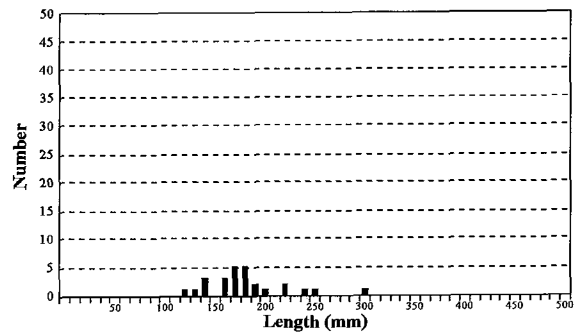
Big Creek #2 - (9/15/94)

At trailhead

Rainbow Trout (n=28)



Brook Trout (n=26)

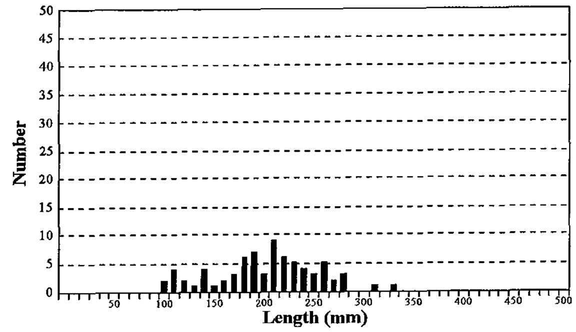


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

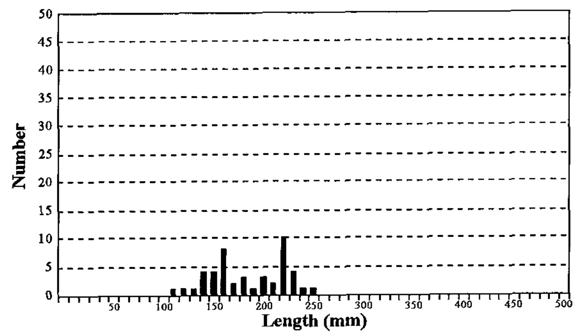
Big Creek #3 - (8/11/94)

Immediately below beaver pond

Rainbow Trout (n=74)

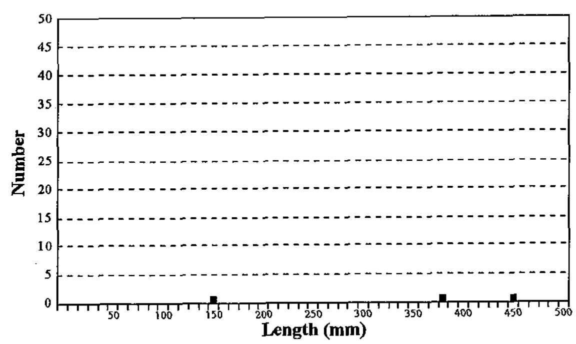


Brook Trout (n=46)



Bull Trout (n=3)

One bull trout appeared a hybrid

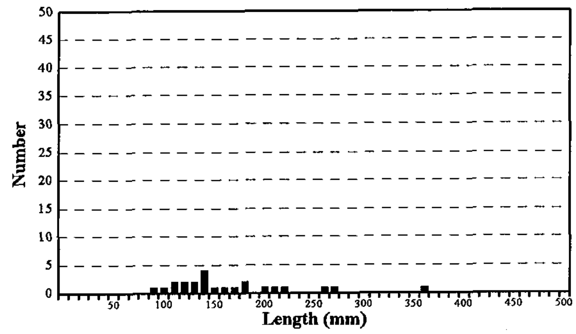


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

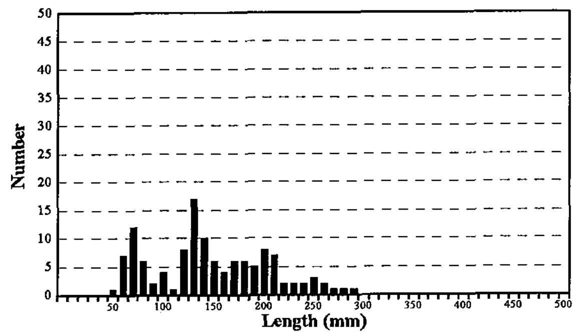
Big Creek #4 - (9/15/94)

Immediately above beaver pond

Rainbow Trout (n=23)

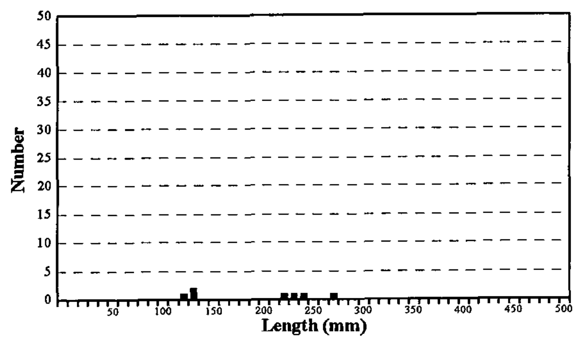


Brook Trout (n=124)



Bull Trout (n=7)

all bull trout appeared to be hybrids

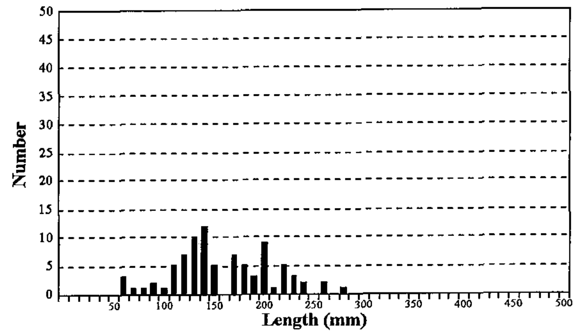


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

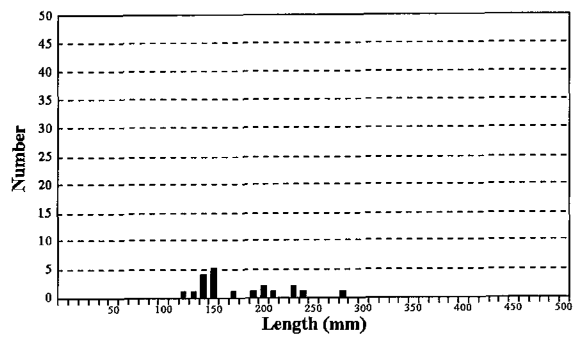
Big Springs Creek - (9/10/93)

0.8 km above Buck and Bird Road

Rainbow Trout (n=85)



Brook Trout (n=20)

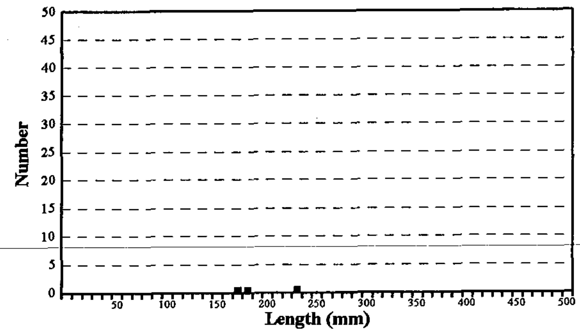


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

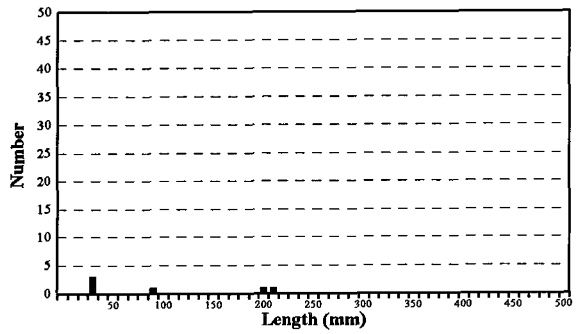
Bunting Canyon Creek #1 - (7/16/97)

175 m above Badger Creek

Rainbow Trout (n=3)



Bull Trout (n=6)

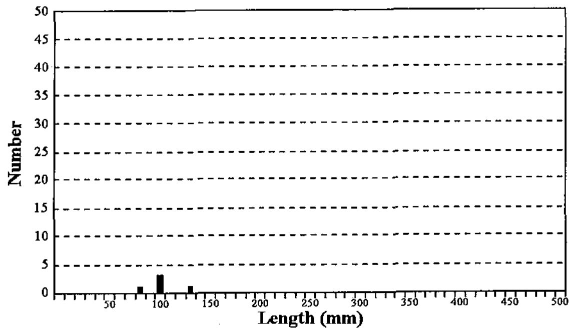


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Camp Creek #1 - (9/12/95)

100 meters above Timber Creek

Bull Trout (n=5)

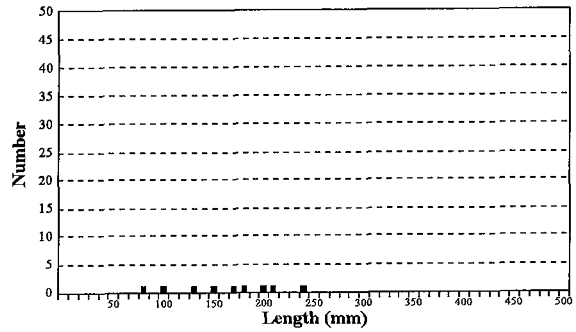


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Coal Creek - (7/6/95)

Below gate

Rainbow Trout (n=9)

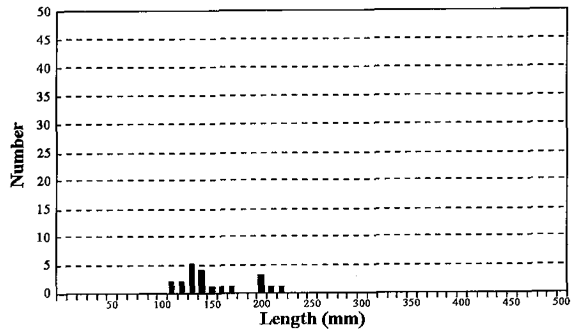


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Deer Creek (BLM) #1 - (8/4/92)

2.1 km above Little Lost River

Rainbow Trout (n=21)

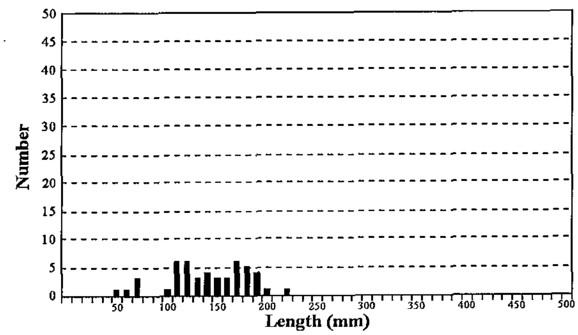


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Deer Creek (BLM) #2 - (8/4/92)

1.6 km below Forest boundary

Rainbow Trout (n=48)

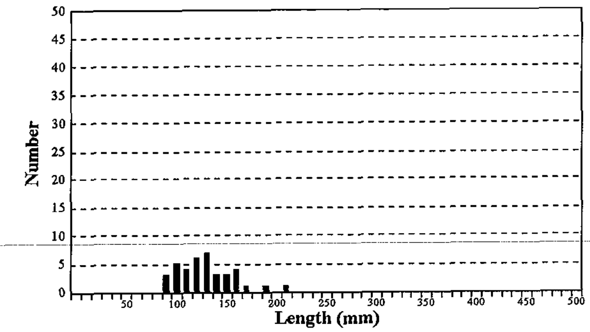


Appendix B. Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Deer Creek (Forest Service) - (6/15/95)

At Forest boundary

Rainbow Trout (n=38)

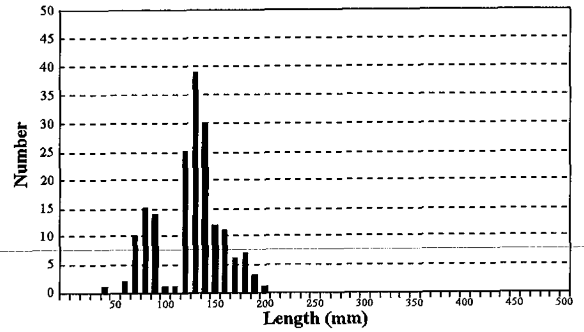


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Deer Creek, North Fork - (6/19/95)

0.2 km above confluence with South Fork

Rainbow Trout (n=178)

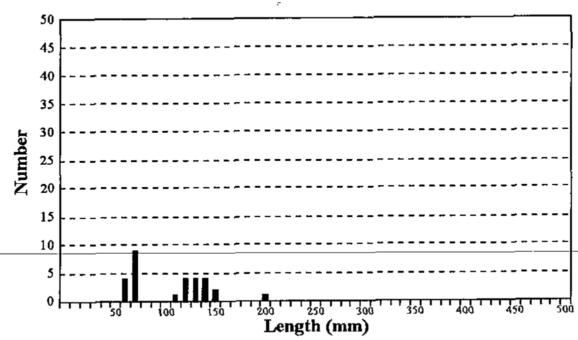


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Deer Creek, South Fork - (6/15/95)

0.5 km above confluence with North Fork

Rainbow Trout (n=29)

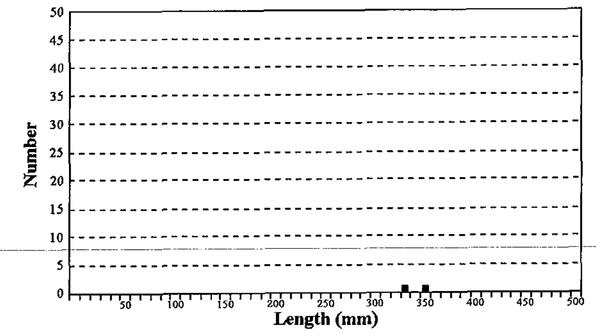


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

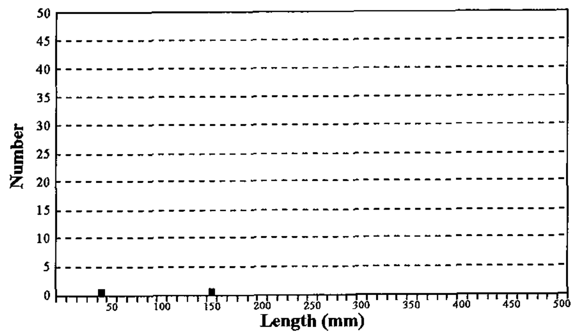
Dry Creek #1 - (8/9/95)

50 meters above diversion pool

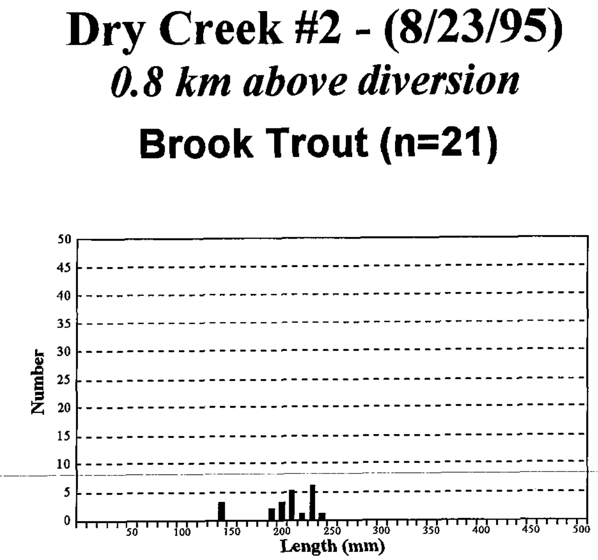
Rainbow x Cutthroat Trout (n=2)



Brook Trout (n=2)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

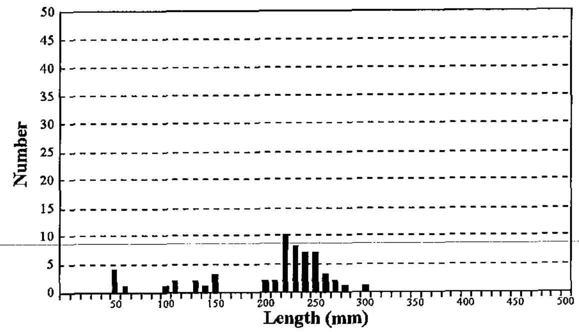


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Dry Creek #3 - (8/9/95)

150 meters above Forest boundary

Brook Trout (n=57)

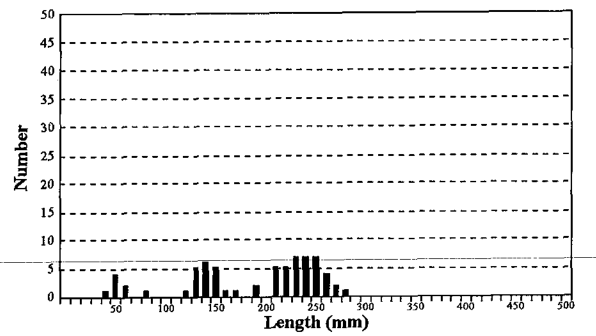


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

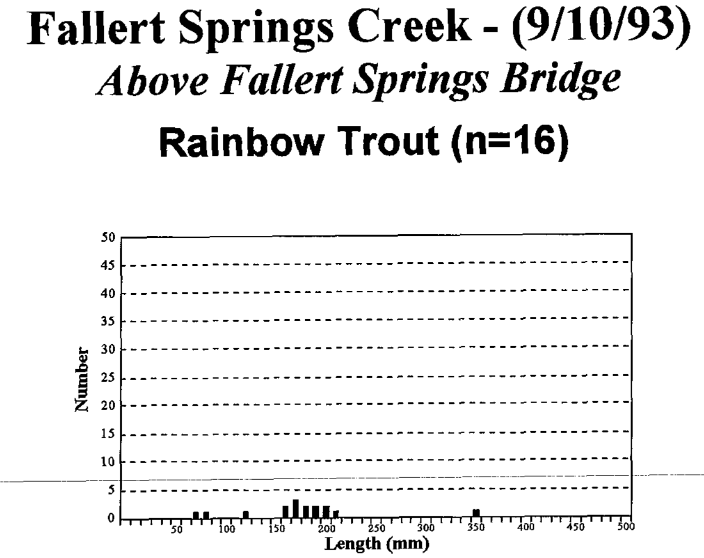
Dry Creek #4 - (8/9/95)

Pool adjacent to #3

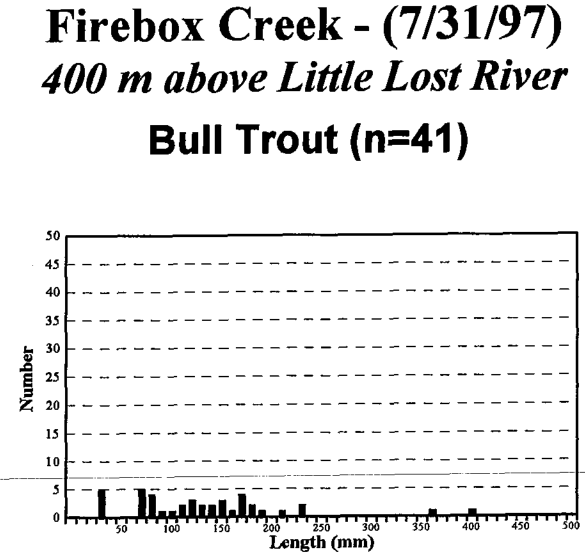
Brook Trout (n=67)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

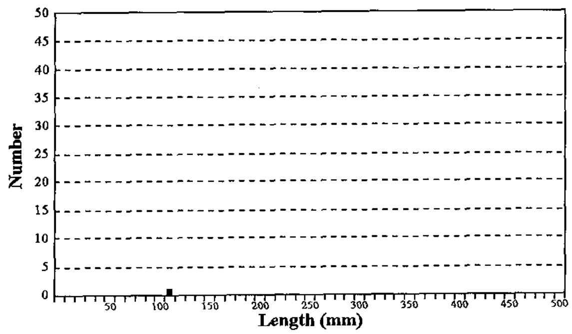


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Hawley Creek - (9/12/95)
Just above Iron Creek Road
Bull Trout (n=1)

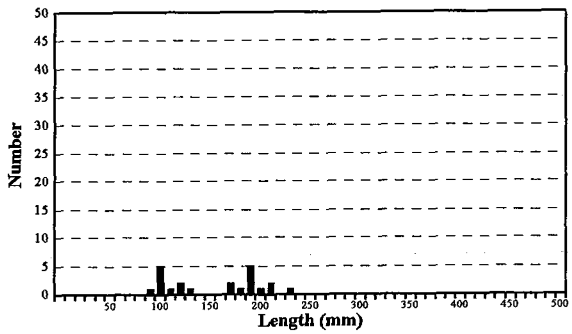


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Horse Creek #1 - (7/16/97)

Beginning at private property line

Rainbow Trout (n=22)

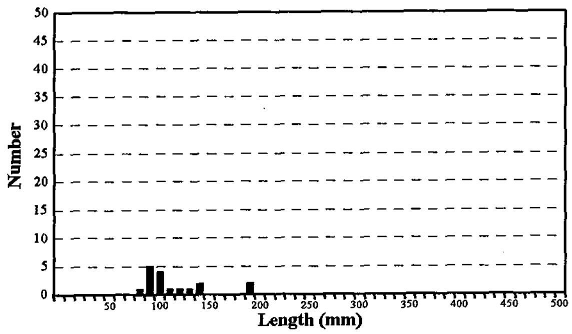


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Horse Creek #2- (6/2/95)

0.8 km below the Forest boundary

Rainbow Trout (n=17)

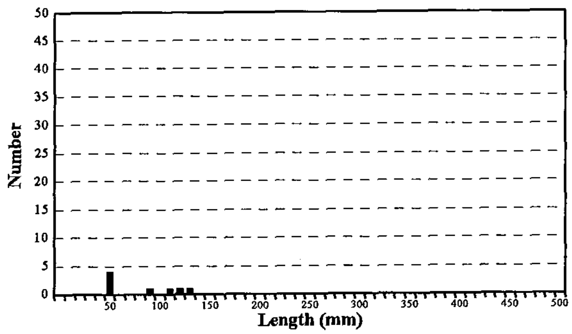


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Iron Creek - (9/16/96)

Just above Iron Creek Road

Bull Trout (n=8)

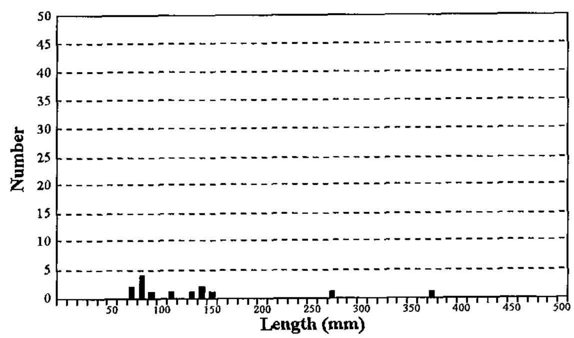


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Iron Creek - (8/23/95)

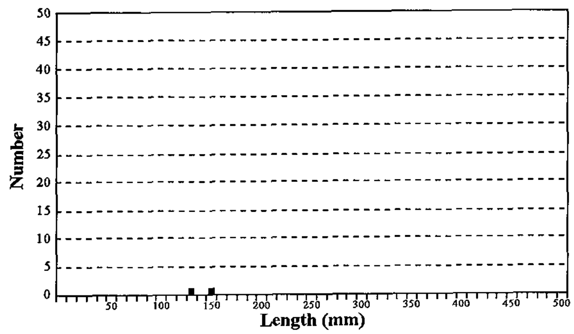
Just above Iron Creek Road

Bull Trout (n=14)

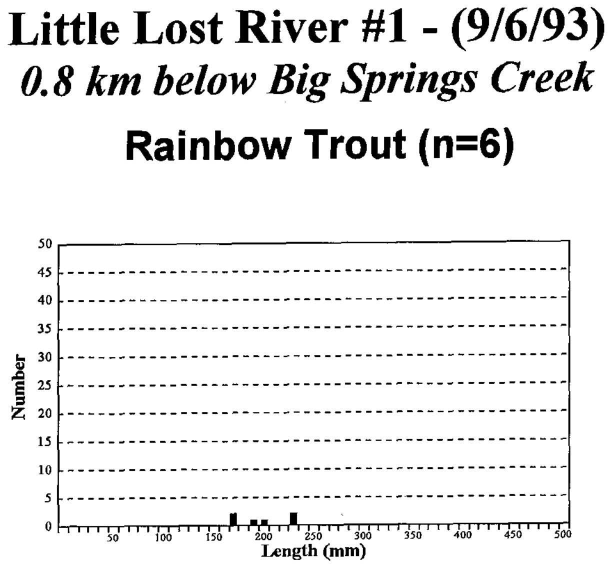


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Jackson Creek - (9/12/95)
Just above Iron Creek Road
Bull Trout (n=2)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

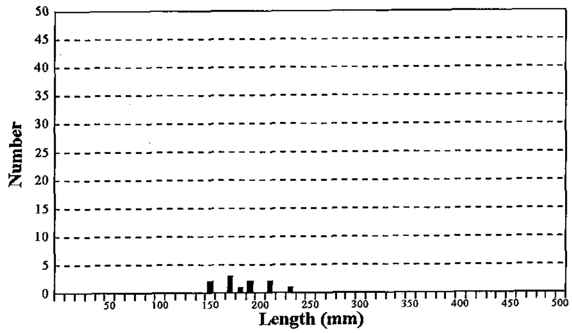


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

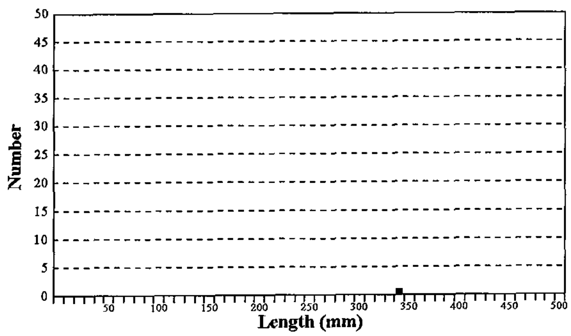
Little Lost River #2 - (9/6/93)

0.4 km below Buck and Bird Road

Rainbow Trout (n=11)



Bull Trout (n=1)

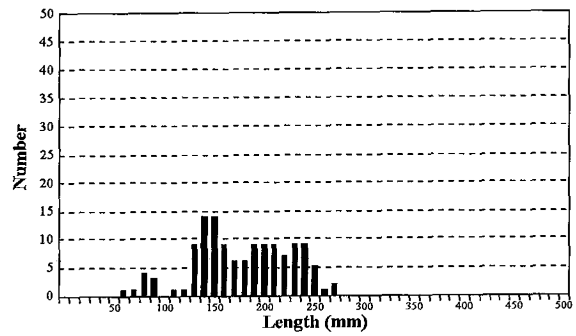


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

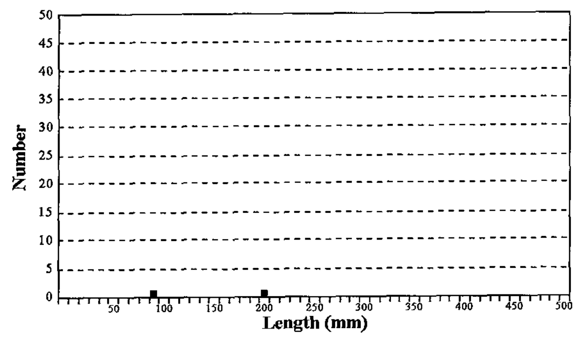
Little Lost River #3 - (9/7/93)

At Clyde Campground

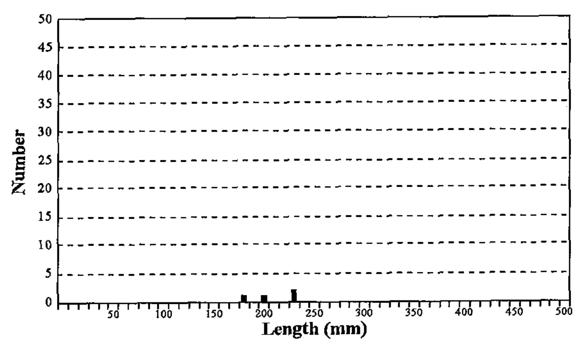
Rainbow Trout (n=129)



Brook Trout (n=2)



Bull Trout (n=4)

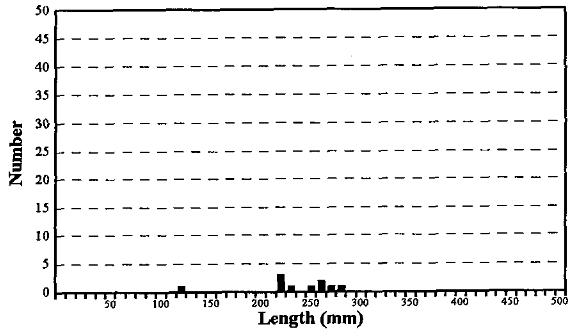


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

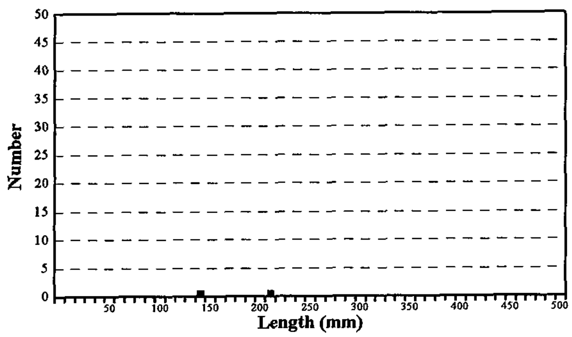
Little Lost River #4 (BLM Sawmill #4) - (7/14/97)

Lower end of lower pasture

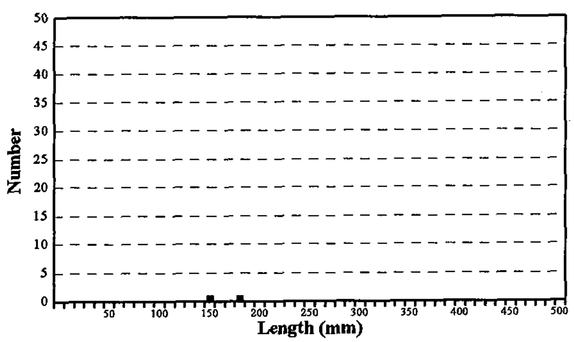
Rainbow Trout (n=10)



Brook Trout (n=2)



Bull Trout (n=2)

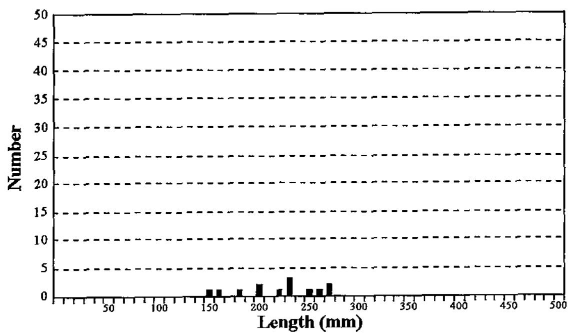


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

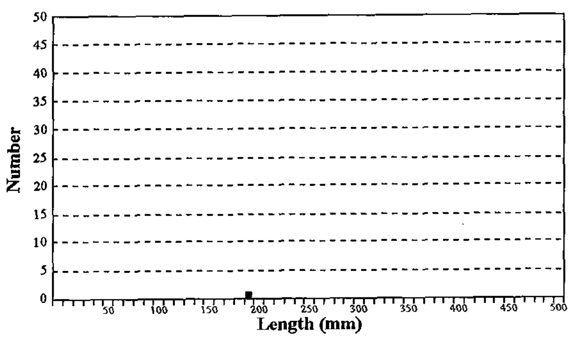
Little Lost River #4 (BLM Sawmill #4) - (8/17/93)

Lower end of lower pasture

Rainbow Trout (n=13)



Brook Trout (n=1)

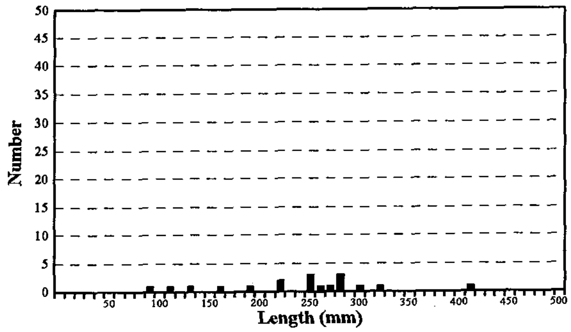


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

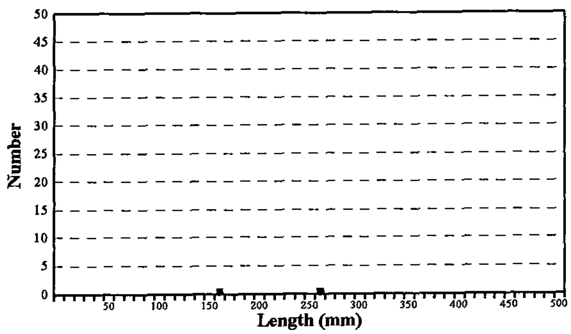
Little Lost River #5 (BLM Sawmill #3) - (7/14/97)

Above Mahogany Creek Road

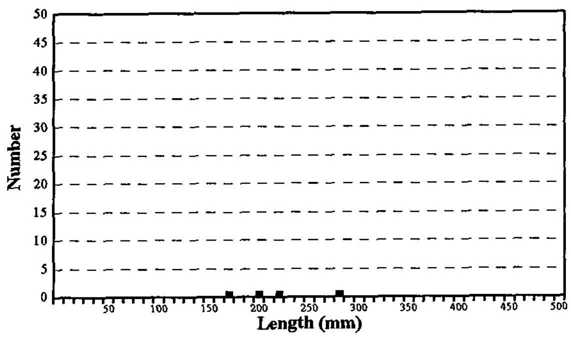
Rainbow Trout (n=18)



Brook Trout (n=2)



Bull Trout (n=4)

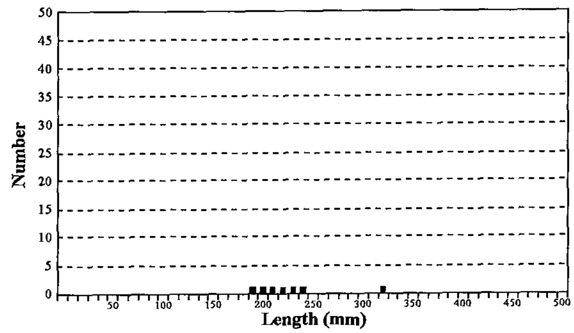


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

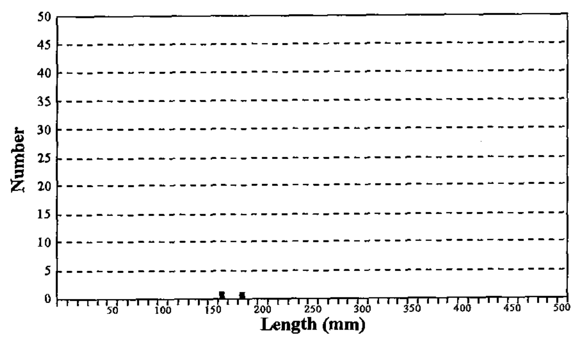
Little Lost River #5 (BLM Sawmill #3) - (8/17/93)

Above Mahogany Creek Road

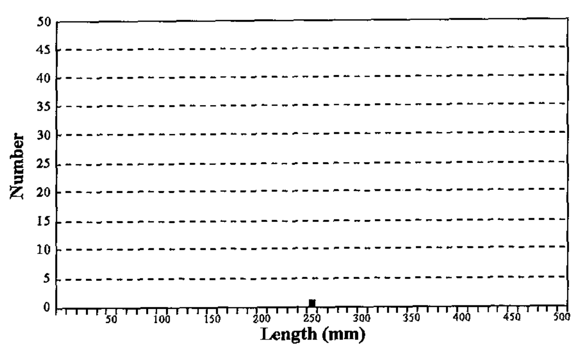
Rainbow Trout (n=7)



Brook Trout (n=2)



Bull Trout (n=1)

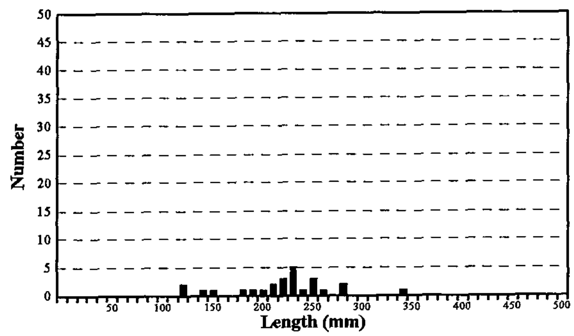


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

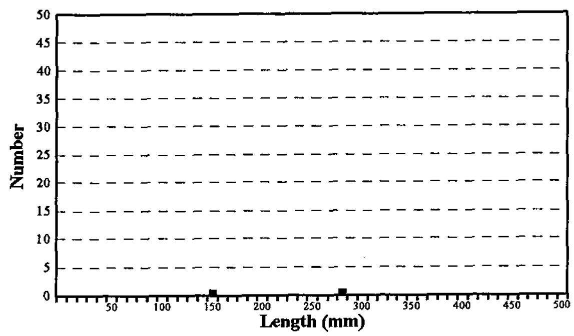
Little Lost River #6 (BLM Sawmill #2) - (7/14/97)

Lower portion of upper exclosure

Rainbow Trout (n=25)



Bull Trout (n=2)

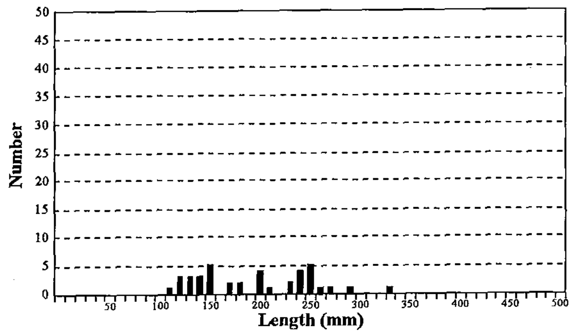


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

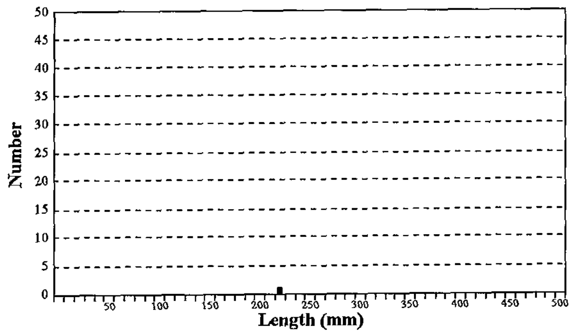
Little Lost River #6 (BLM Sawmill #2) - (8/16/93)

Lower portion of upper exclosure

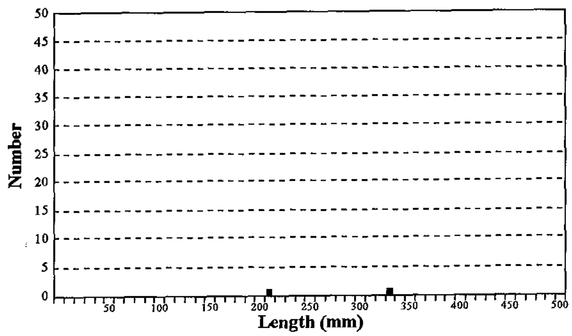
Rainbow Trout (n=39)



Brook Trout (n=1)



Bull Trout (n=2)

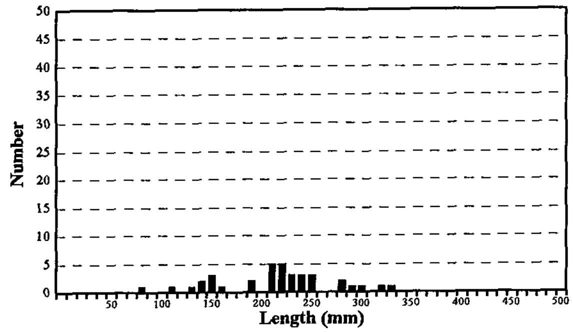


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

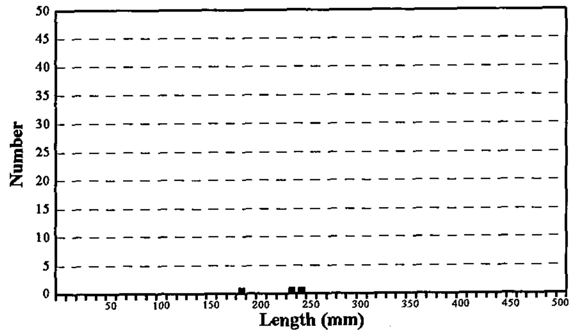
Little Lost River #7 (BLM Sawmill #1) - (7/14/97)

2.4 km below Sawmill Canyon Road

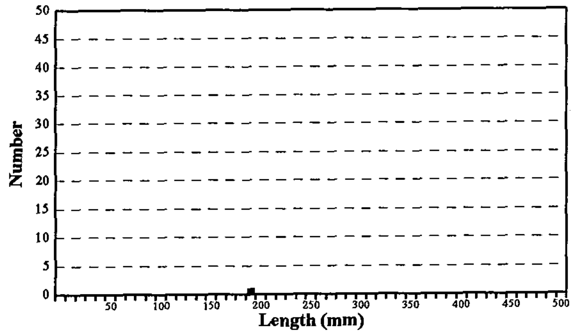
Rainbow Trout (n=36)



Brook Trout (n=3)



Bull Trout (n=1)

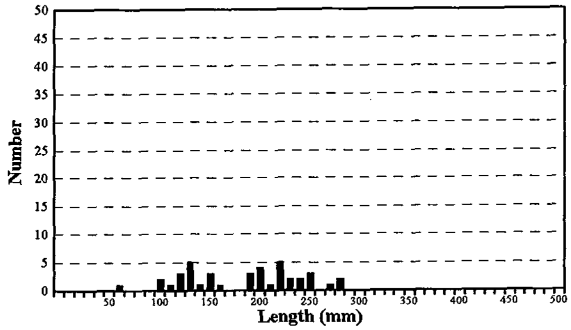


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

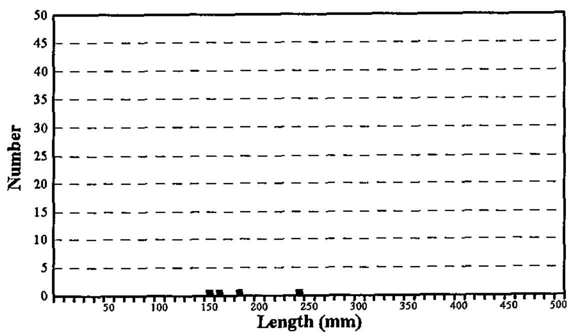
Little Lost River #7 (BLM Sawmill #1) - (8/16/93)

2.4 km below Sawmill Canyon Road

Rainbow Trout (n=39)



Brook Trout (n=4)

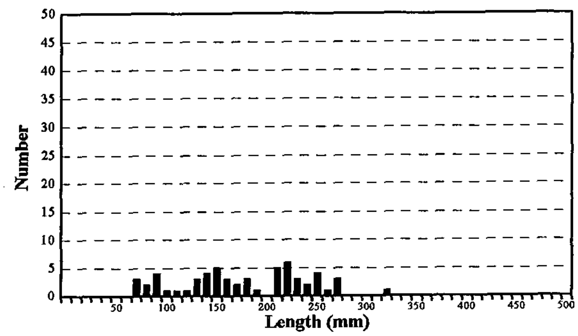


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Little Lost River #8 (FS Sawmill #1) - (7/15/97)

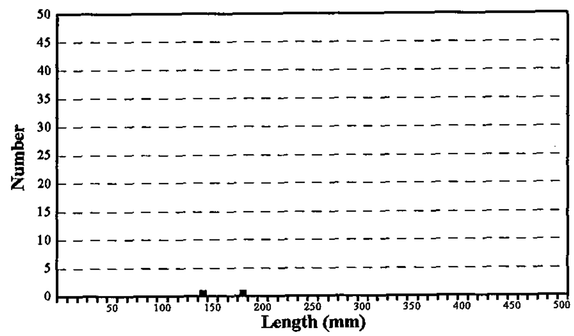
At Forest boundary

Rainbow Trout (n=58)

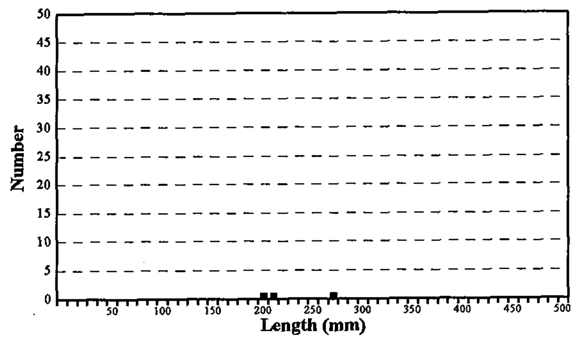


Brook Trout (n=2)

one brook trout appeared a hybrid



Bull Trout (n=3)

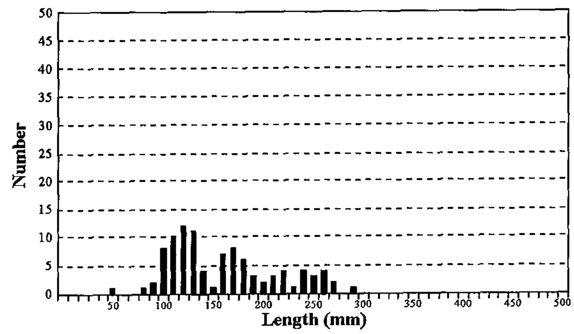


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

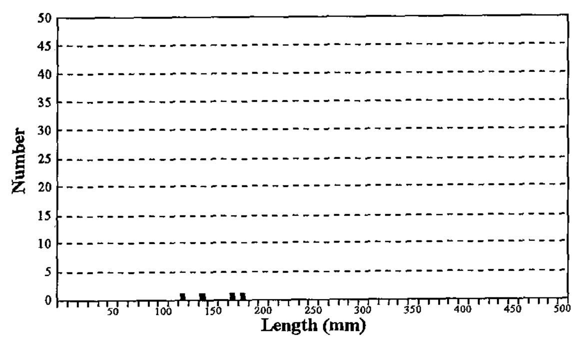
Little Lost River #8 (FS Sawmill #1) - (9/14/95)

At Forest boundary

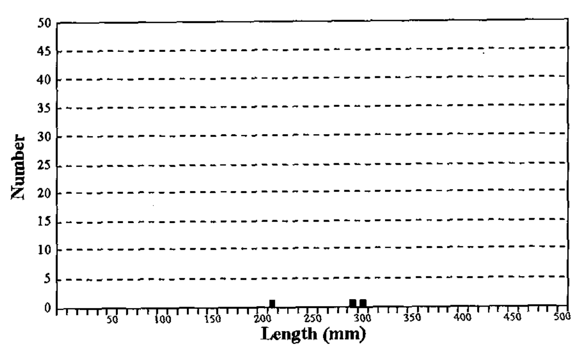
Rainbow Trout (n=98)



Brook Trout (n=4)



Bull Trout (n=3)

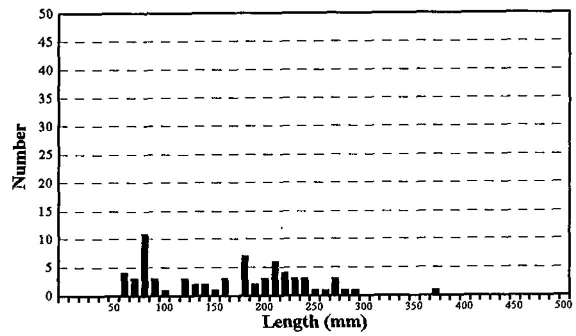


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

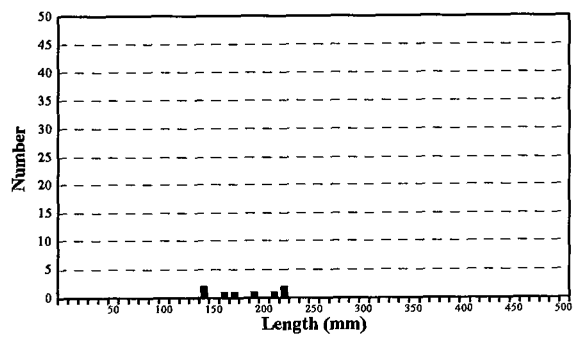
Little Lost River #9 (FS Sawmill #2) - (7/17/97)

Behind Guard Station

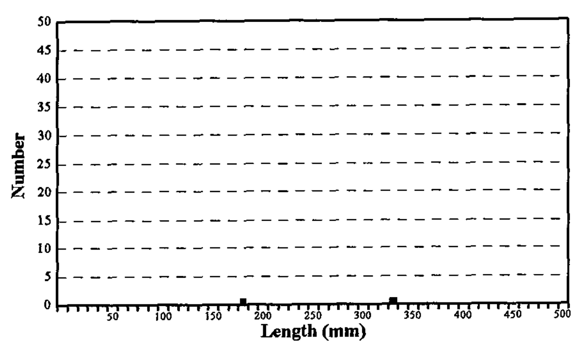
Rainbow Trout (n=69)



Brook Trout (n=8)



Bull Trout (n=2)

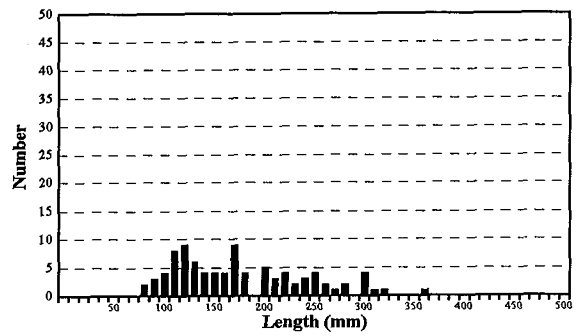


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

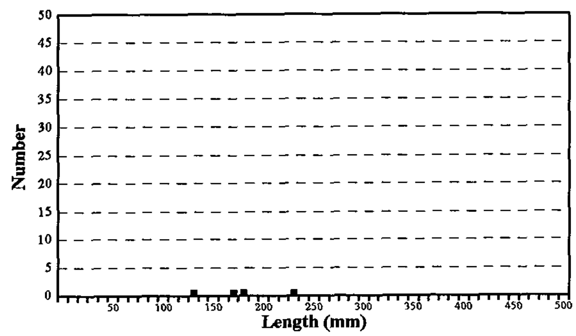
Little Lost River #9 (FS Sawmill #2) - (9/14/95)

Behind Guard Station

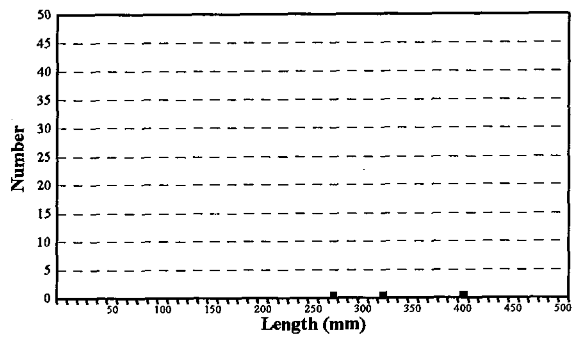
Rainbow Trout (n=90)



Brook Trout (n=4)



Bull Trout (n=3)

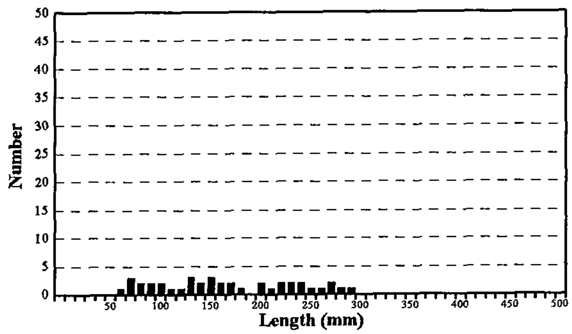


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Little Lost River #10 (FS Sawmill #3) - (7/17/97)

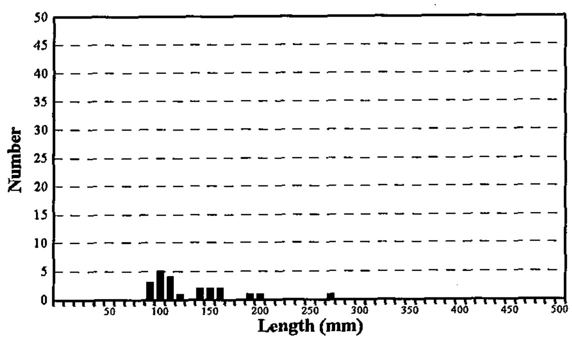
Above Mill Creek

Rainbow Trout (n=40)



Brook Trout (n=22)

some brook trout appeared hybrids

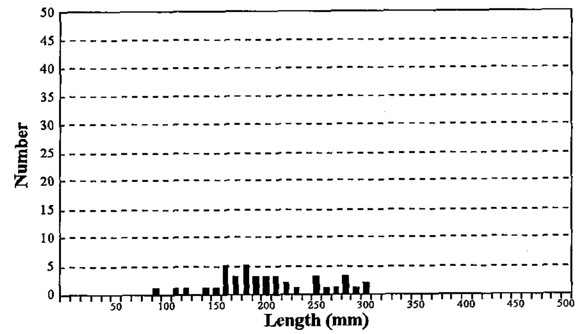


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

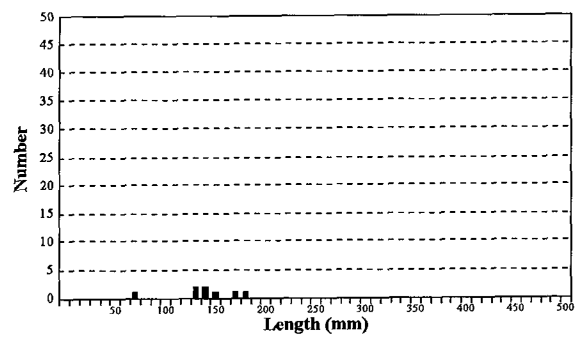
Little Lost River #10 (FS Sawmill #3) - (9/13/95)

Above Mill Creek

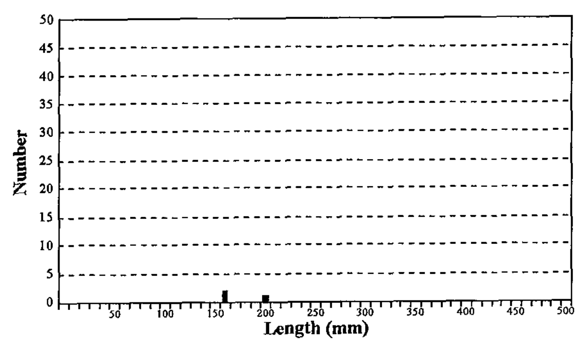
Rainbow Trout (n=41)



Brook Trout (n=8)



Bull Trout (n=3)

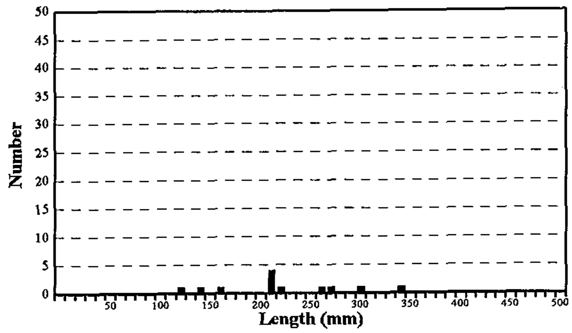


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

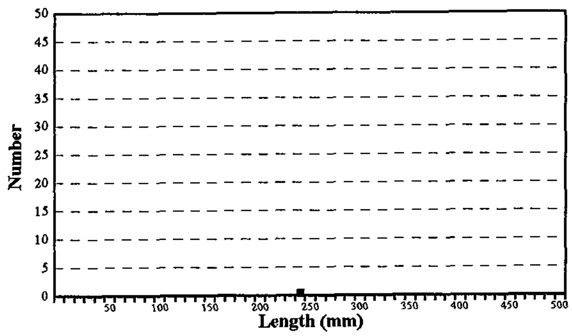
Little Lost River #10a (FS Sawmill #3) - (8/22/97)

10 m above Iron Creek Road

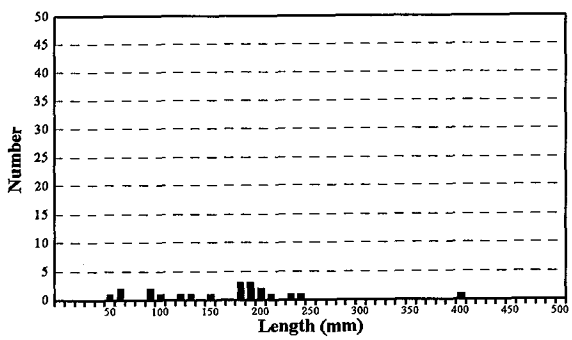
Rainbow Trout (n=12)



Brook Trout (n=1)



Bull Trout (n=21)

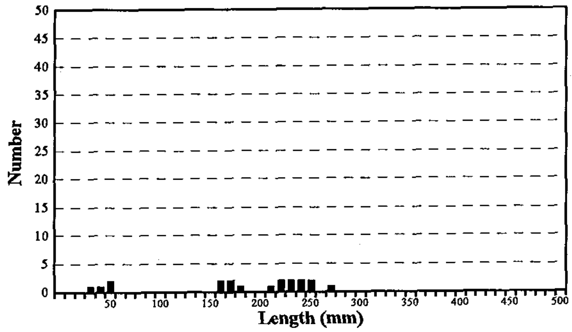


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

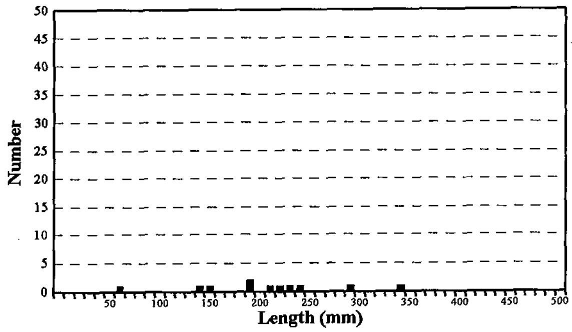
Little Lost River #10a (FS Sawmill #3a) - 9/16/96

10 m above Iron Creek Road

Rainbow Trout (n=19)



Bull Trout (n=11)

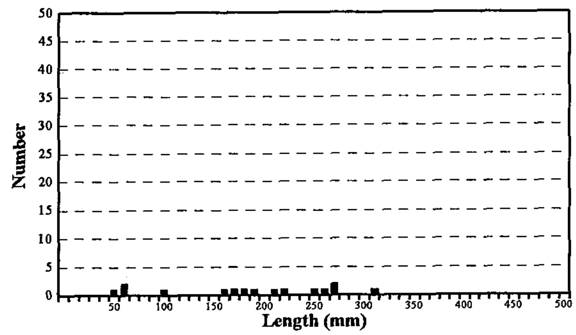


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

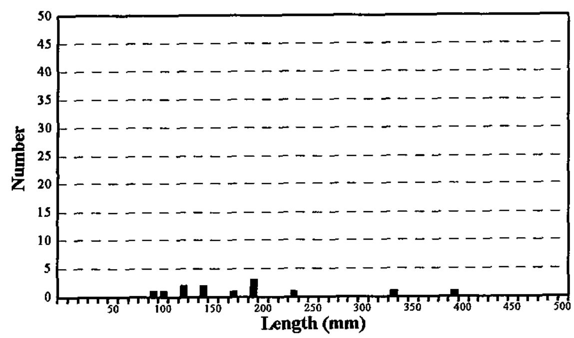
Little Lost River #11 (FS Sawmill #4) - (7/15/97)

Below Timber Creek

Rainbow Trout (n=15)



Bull Trout (n=13)

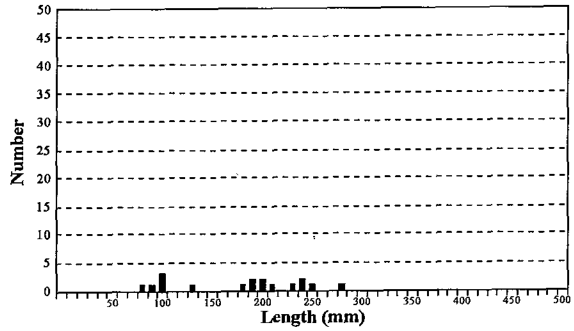


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

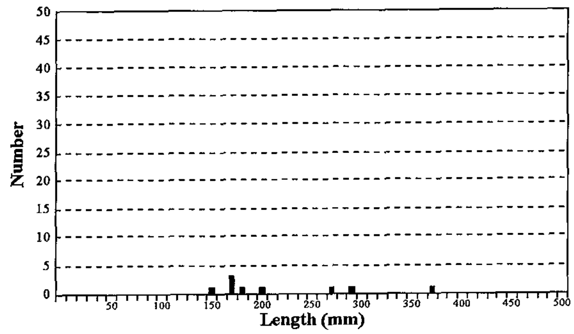
Little Lost River #11 (FS Sawmill #4) - (9/13/95)

Below Timber Creek

Rainbow Trout (n=17)



Bull Trout (n=9)

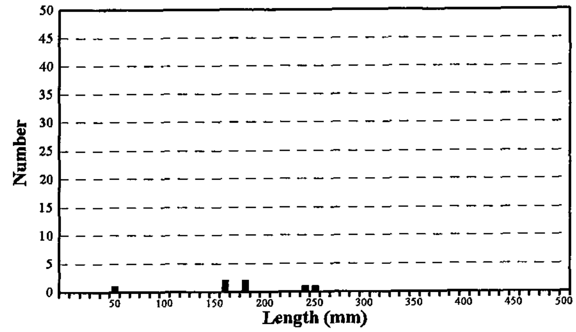


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

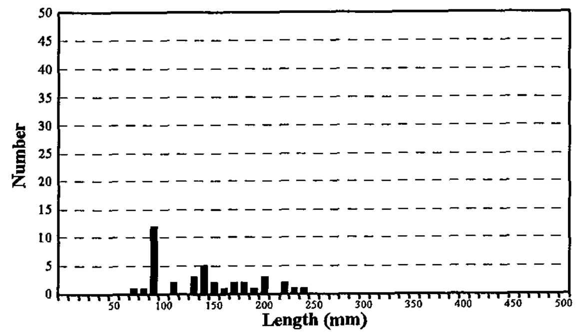
Little Lost River #12 (FS Sawmill #5) - (7/15/97)

Above Moonshine Creek

Rainbow Trout (n=7)



Bull Trout (n=39)

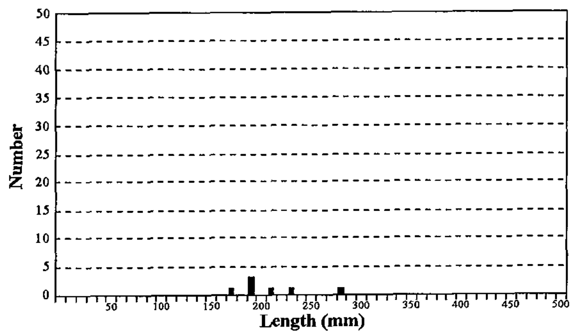


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

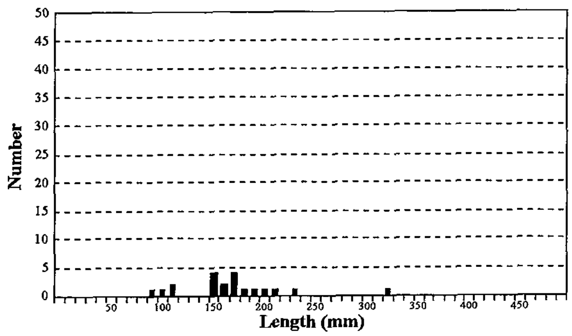
Little Lost River #12 (FS Sawmill #5) - (8/8/95)

Above Moonshine Creek

Rainbow Trout (n=7)



Bull Trout (n=20)

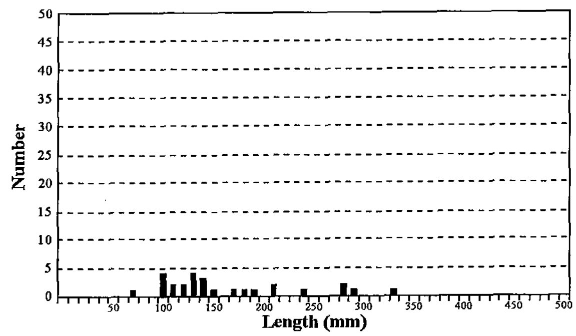


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Little Lost River #13 (FS Sawmill #6) - (8/2/95)

1.6 km above Smithie Fork

Bull Trout (n=27)

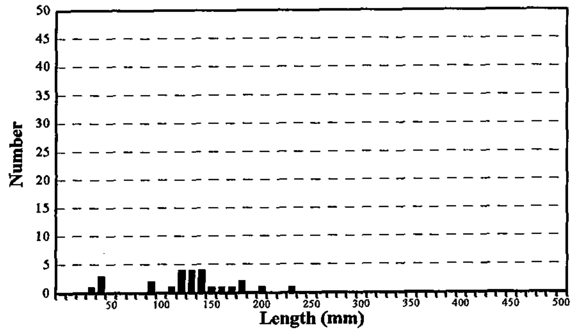


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Little Lost River #14 (FS Sawmill #7) - (7/31/97)

400 m above Firebox Creek

Bull Trout (n=26)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Massacre Creek - (7/01/97)
40 m above Squaw Creek

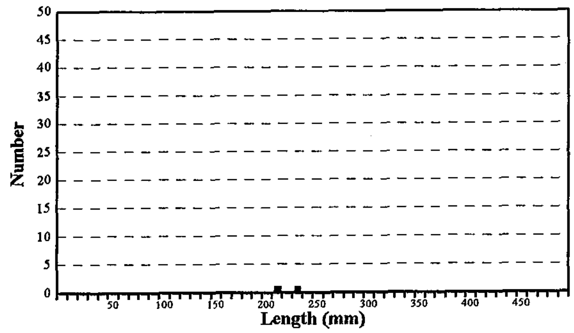
Two trout were observed in the transect but not captured. One was positively identified as a rainbow trout.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

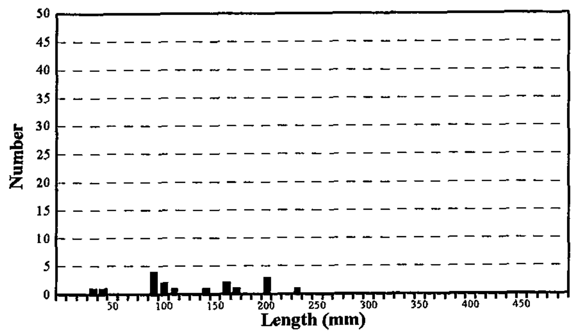
Meadow Creek, (unnamed tributary #1) - (6/28/95)

At Forest boundary

Rainbow Trout (n=2)



Brook Trout (n=17)

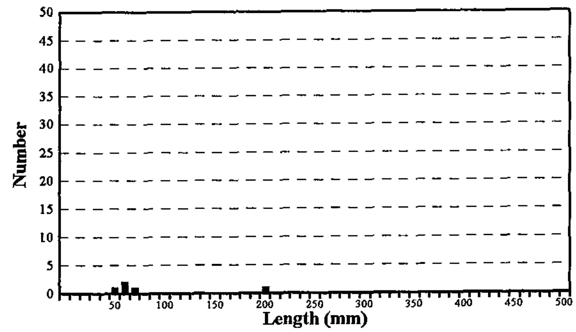


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Mill Creek #1 - (8/22/97)

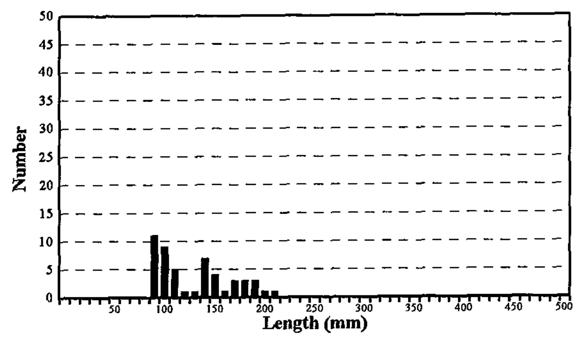
Below Mill Creek Campground

Rainbow Trout (n=5)

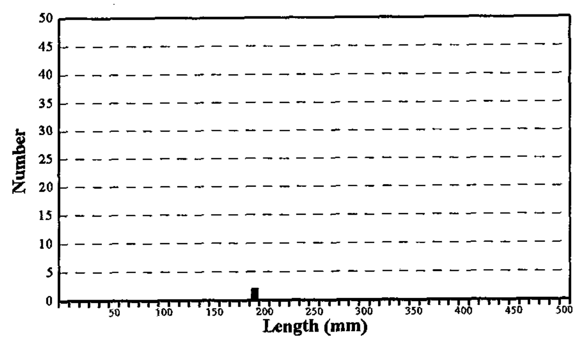


Brook Trout (n=50)

many brook trout appeared hybrids



Bull Trout (n=2)

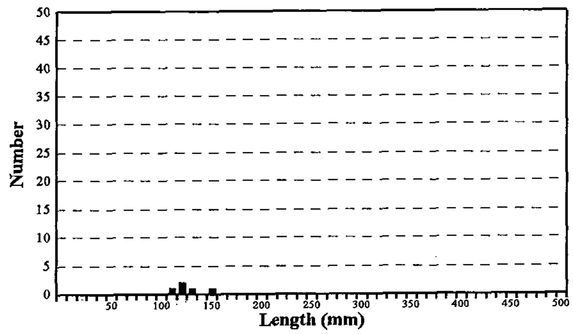


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

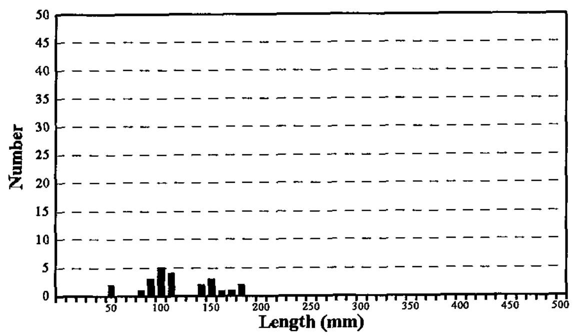
Mill Creek #1 - (8/16/95)

Below Mill Creek Campground

Rainbow Trout (n=5)

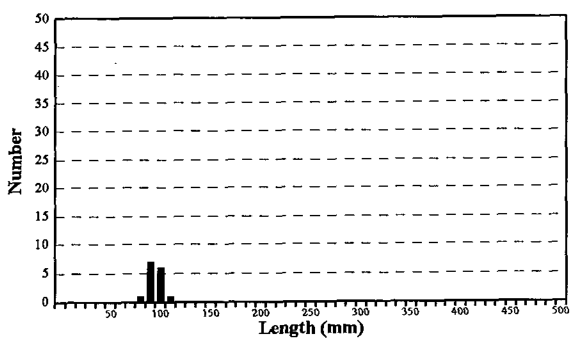


Brook Trout (n=24)



two bull trout appeared to be hybrids

Bull Trout (n=15)



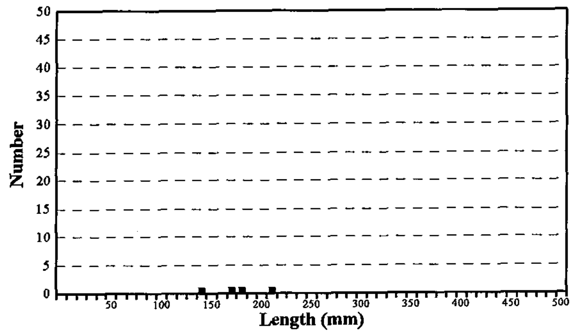
Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Mill Creek #2 - (9/16/96)

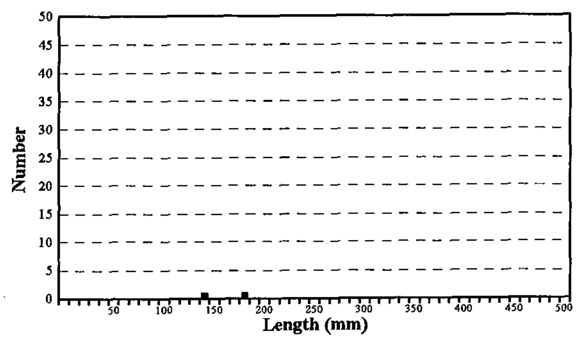
0.5 km above the trailhead

one rainbow trout was observed in the transect but not captured
most brook trout and bull trout appeared to be hybrids

Brook Trout (n=4)



Bull Trout (n=2)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

North Creek #1 - (8-17-95)
0.4 km above Forest boundary

One rainbow trout approximately 100 mm in length was captured.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Quigley Creek #1 - (6/26/97)
25 m above Sawmill Canyon Road

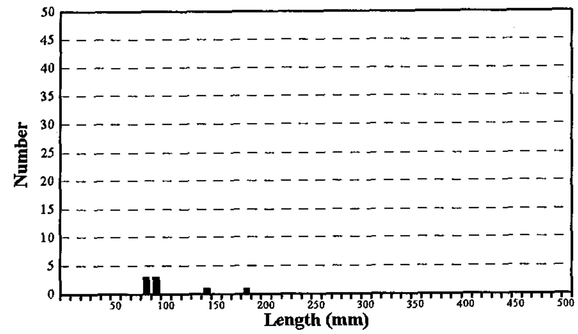
One bull trout 195 mm in length was captured.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Redrock Creek #1 - (9/12/95)

0.2 km above Timber Creek

Bull Trout (n=8)

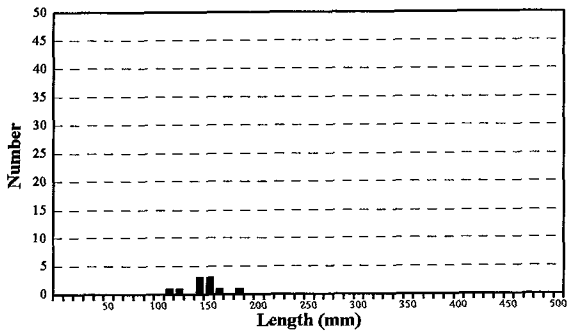


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Redrock Creek #2 - (6/26/97)

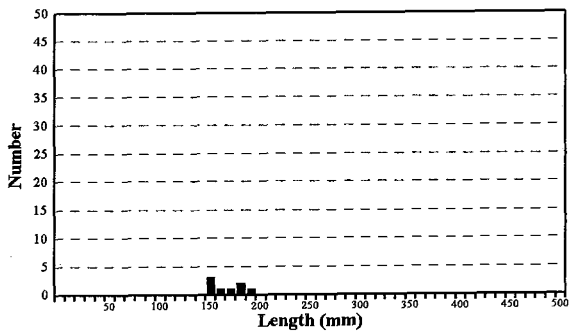
Top end of transect is culvert on road 460A

Bull Trout (n=10)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Slide Creek #1 - (6/27/97)
100 m above Timber Creek
Bull Trout (n=8)

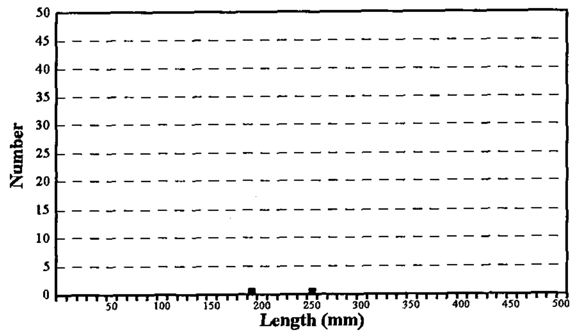


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

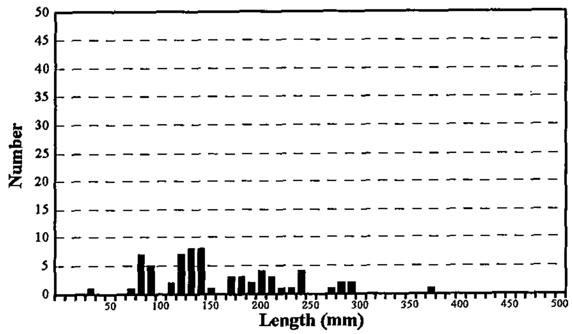
Smithie Fork #1 - (7/11/97)

Above Sawmill Canyon Road bridge

Rainbow Trout (n=2)



Bull Trout (n=67)

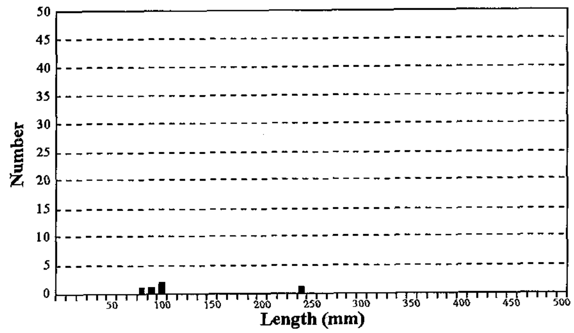


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

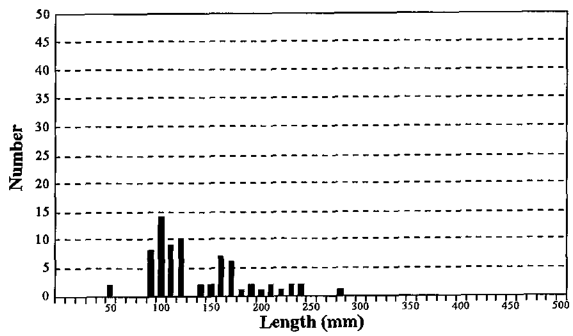
Smithie Fork #1 - (8/23/95)

Above Sawmill Canyon Road bridge

Rainbow Trout (n=5)



Bull Trout (n=72)

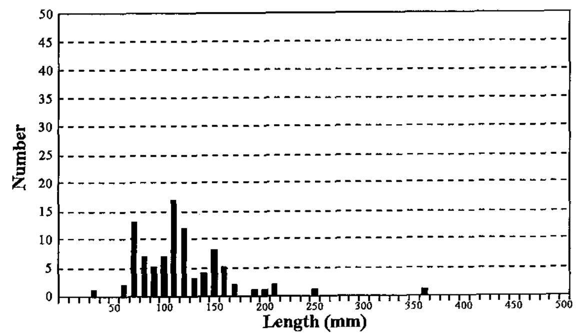


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Smithie Fork #2 - (8/2/95)

3.2 km above Little Lost River

Bull Trout (n=92)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

South Creek #1 - (6/95)

At diversion

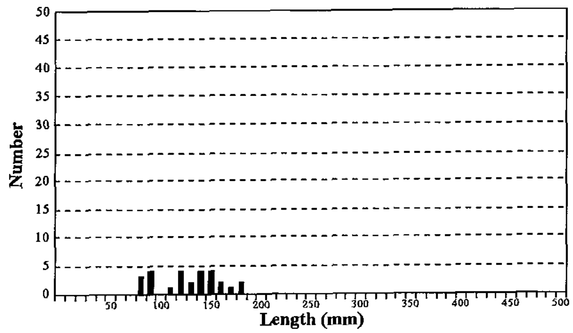
Rainbow trout ranging from approximately 75 mm to 200 mm in length

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

South Creek #3 - (8/17/95)

2.0 km above Forest boundary

Rainbow Trout (n=27)

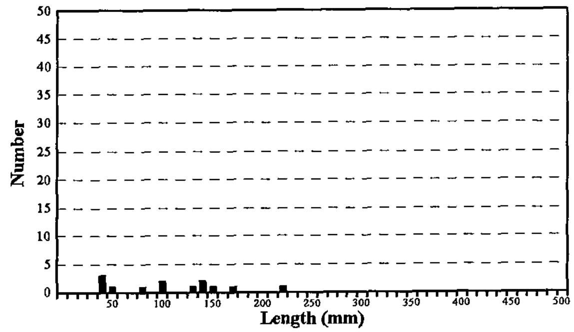


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

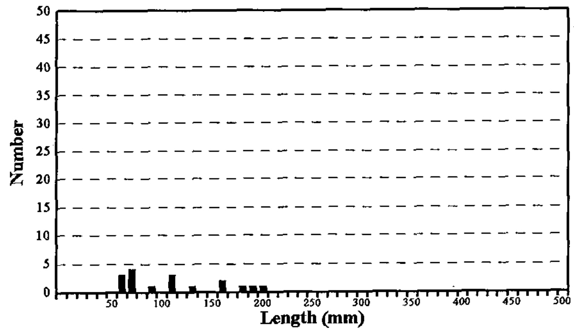
Squaw Creek #1 (Sawmill Canyon) - (9/13/96)

0.8 km above Sawmill Canyon Road

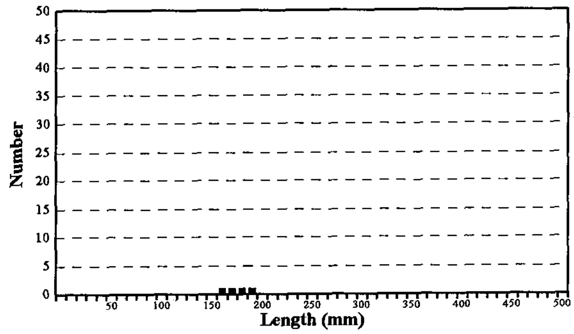
Rainbow Trout (n=13)



Brook Trout (n=17)



Bull Trout (n=4)

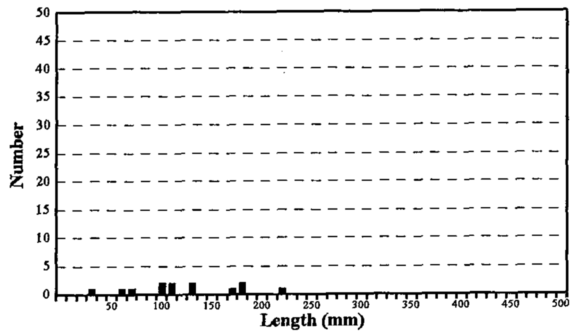


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

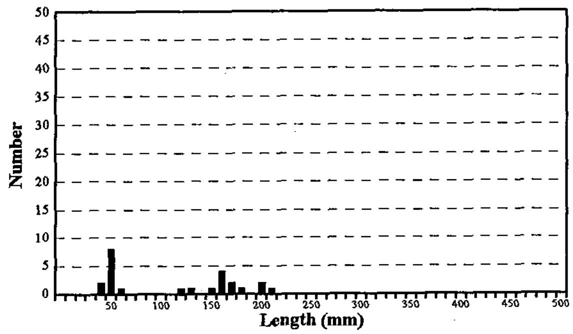
Squaw Creek #2 (Sawmill Canyon) - (7/16/97)

Above North Fork

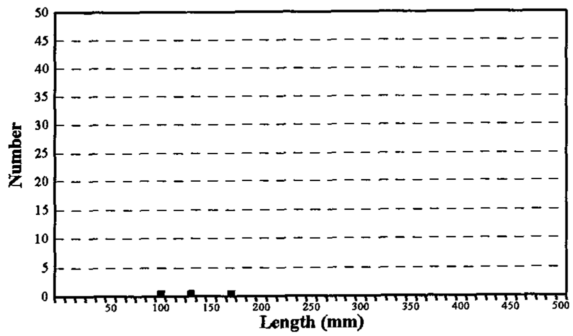
Rainbow Trout (n=13)



Brook Trout (n=24)



Bull Trout (n=3)

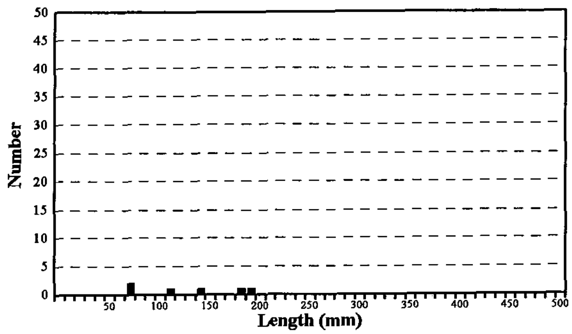


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

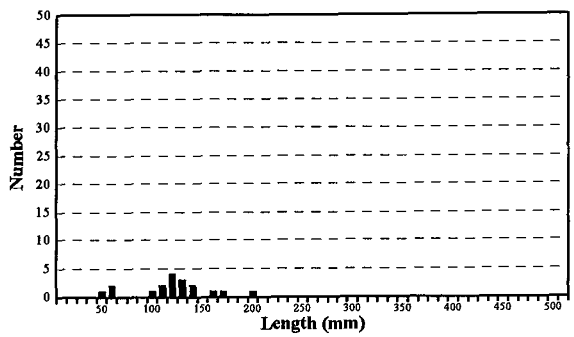
Squaw Creek #2 (Sawmill Canyon) - (8/15/95)

Above North Fork

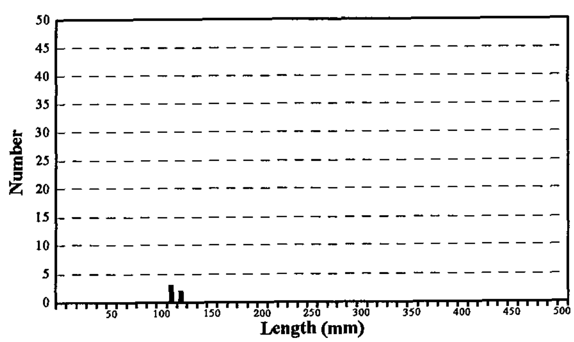
Rainbow Trout (n=6)



Brook Trout (n=18)



Bull Trout (n=5)

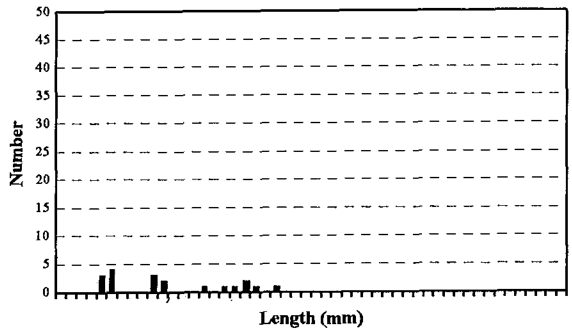


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Squaw Creek #3 (Sawmill Canyon) - (8/23/96)

0.9 km above North Fork Squaw Creek

Bull Trout (n=19)

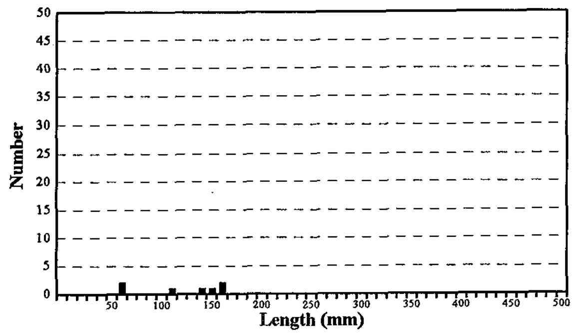


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

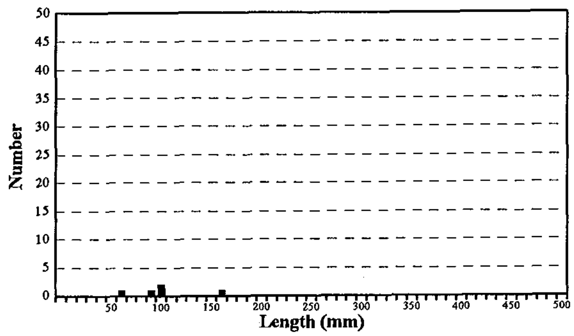
Squaw Creek, North Fork #1 (Sawmill Canyon) - (9/14/96)

0.6 km above Squaw Creek

Brook Trout (n=7)



Bull Trout (n=5)

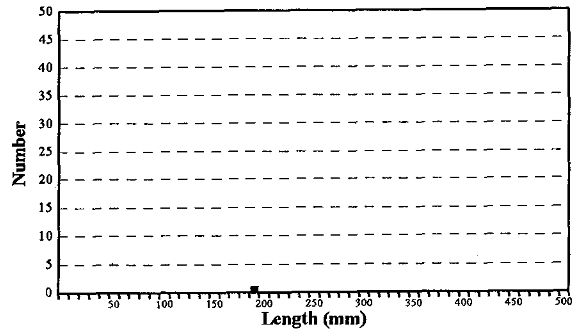


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

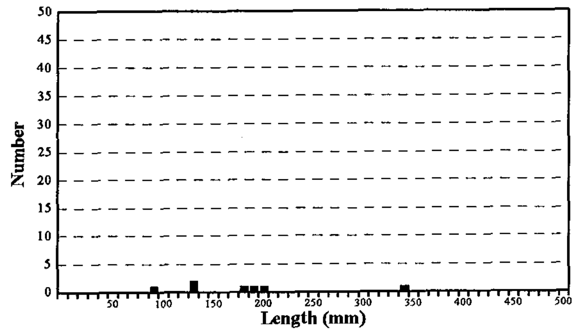
Squaw Creek, North Fork #2 (Sawmill Canyon) - (6/27/97)

1.8 km above Squaw Creek

Brook Trout (n=1)



Bull Trout (n=7)

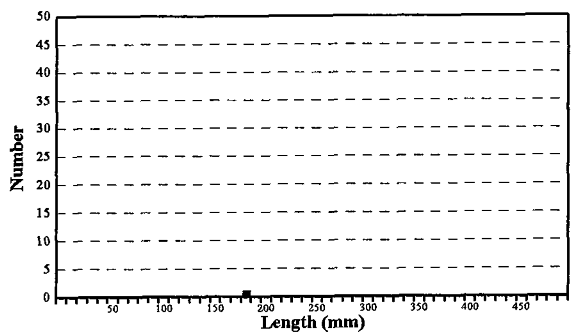


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

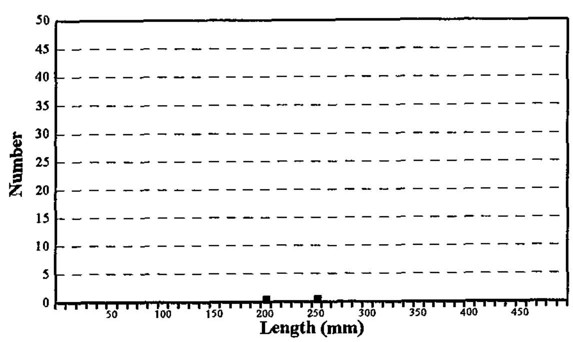
Squaw Creek (Sawmill) (unnamed tributary[1]) - (8/15/95)

above Squaw Creek #2 on south side of road

Rainbow Trout (n=1)



Brook Trout (n=2)



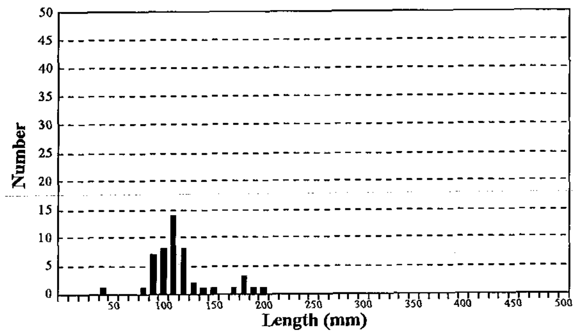
[1] This tributary enters Squaw Creek on the south side of the stream a short distance above the confluence of Squaw Creek and North Fork Squaw.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Squaw Creek #1 (Wet Creek) - (8/10/92)

Just above Wet Creek Road

Rainbow Trout (n=49)

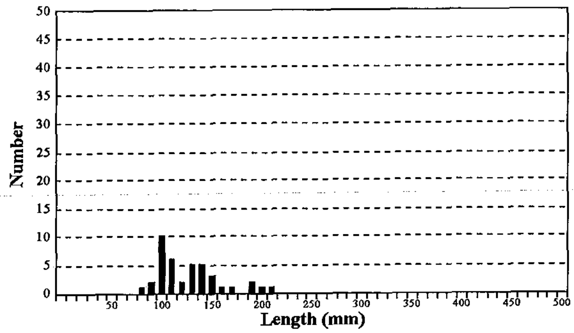


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Squaw Creek #2 (Wet Creek) - (8/10/92)

168 meters above #1

Rainbow Trout (n=40)

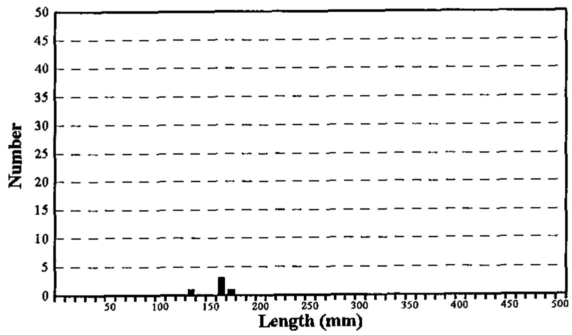


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Squaw Creek #3 (Wet Creek) - (6/17/96)

1.9 km below Massacre Creek

Rainbow Trout (n=5)

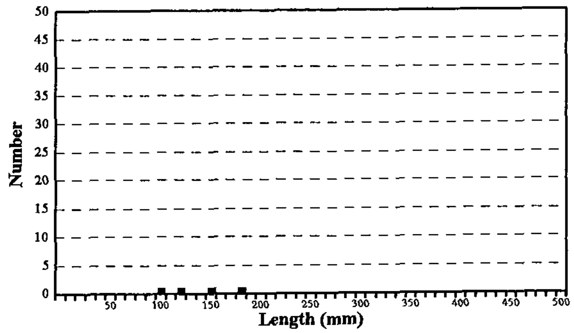


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Squaw Creek #4 (Wet Creek) - (7/01/97)

65 m above Massacre Creek

Rainbow Trout (n=4)

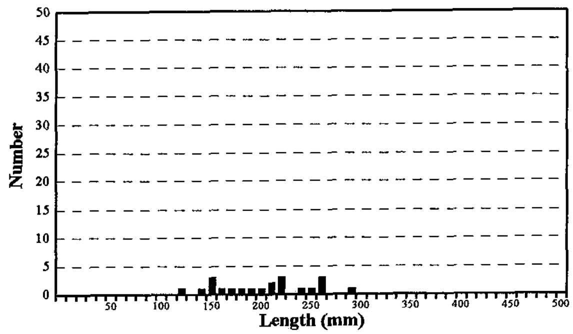


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

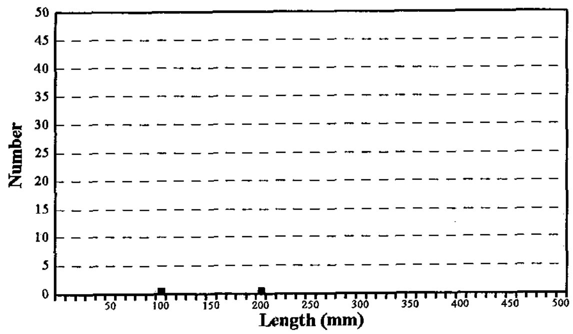
Summit Creek #1 (BLM #3) - (8/6/92)

4.0 km below Sawmill Canyon Road

Rainbow Trout (n=21)



Brook Trout (n=2)

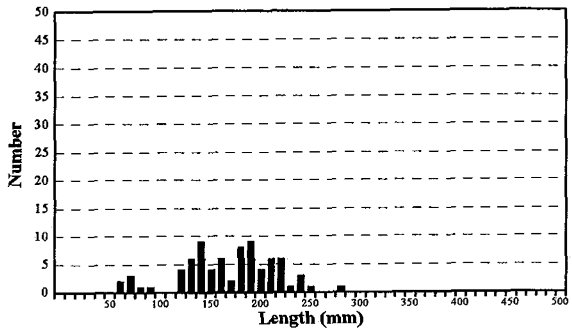


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Summit Creek #2 (BLM #2) - (8/6/92)

1.6 km below Sawmill Canyon Road

Rainbow Trout (n=77)

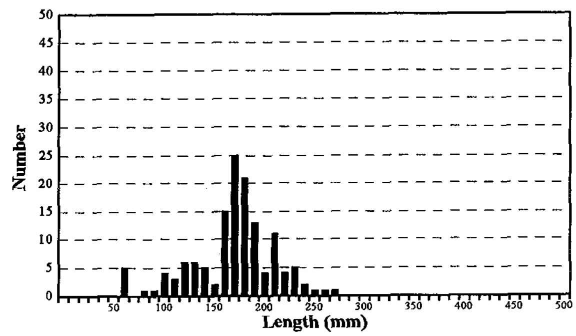


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Summit Creek #3 (BLM #1) - (8/6/92)

0.8 km below Sawmill Canyon Road

Rainbow Trout (n=136)

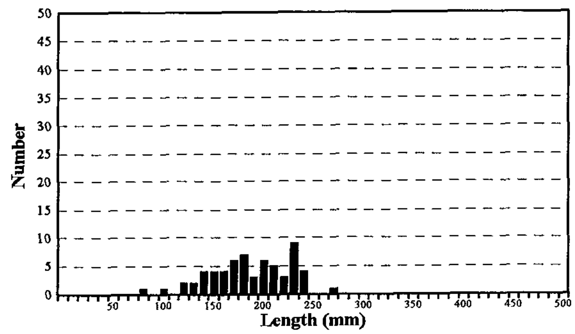


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

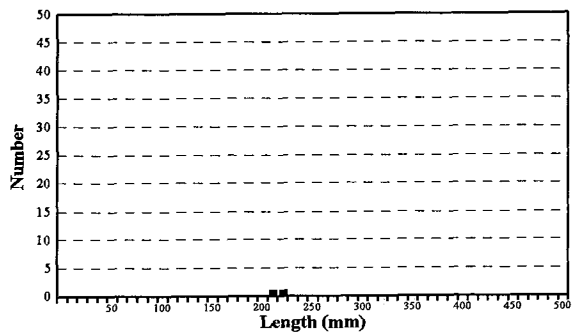
Summit Creek #4 - (10/12/95)

400 m below Sawmill Canyon Road

Rainbow Trout (n=62)



Brook Trout (n=2)

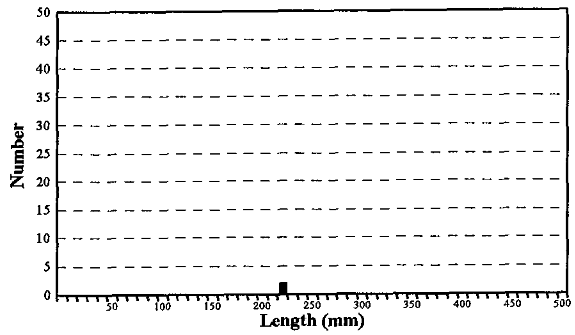


One bull trout approximately 200 mm long was also captured.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Summit Creek #5 - (6/27/97)
100 m below Iron Springs inflow

Rainbow Trout (n=2)

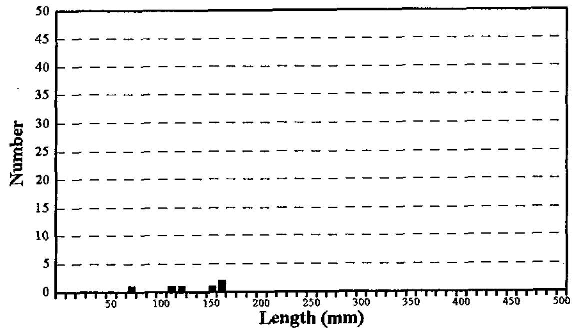


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Summit Creek #6 - (6/27/97)

Iron Springs

Rainbow Trout (n=6)

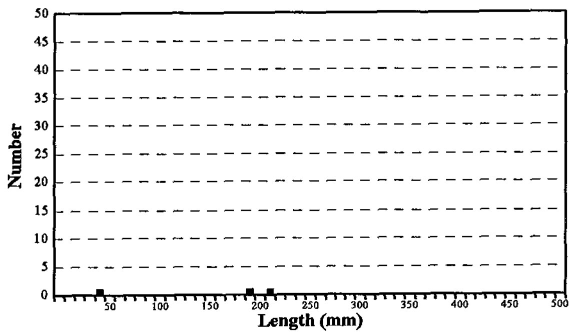


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

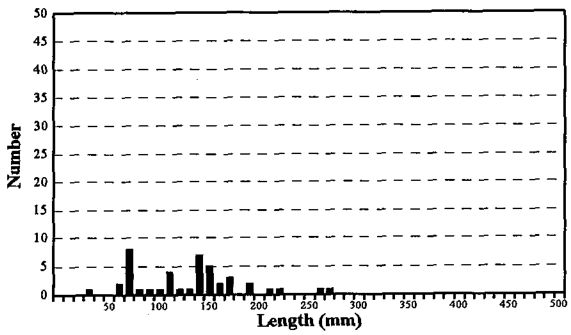
Timber Creek #1 - (7/11/97)

0.8 km above Little Lost River (Sawmill Creek)

Rainbow Trout (n=3)



Bull Trout (n=43)

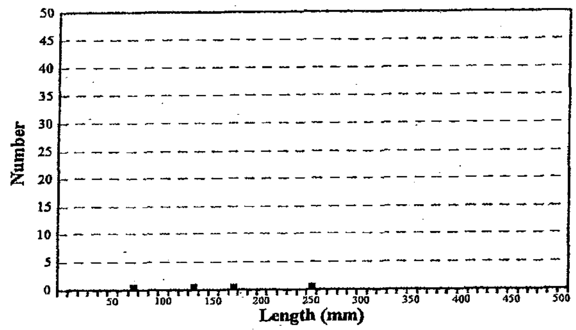


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

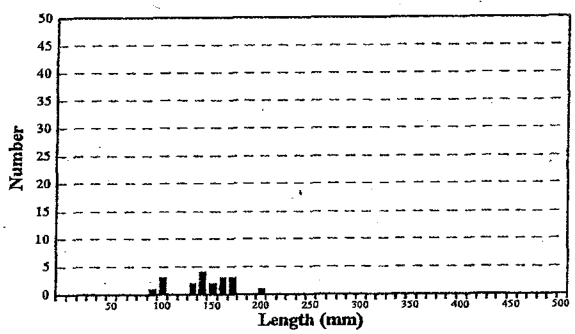
Timber Creek #1 - (8/8/95)

0.8 km above Little Lost River (Sawmill Creek)

Rainbow Trout (n=4)



Bull Trout (n=19)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Timber Creek #2 - (6/26/97)
100 m above Slide Creek

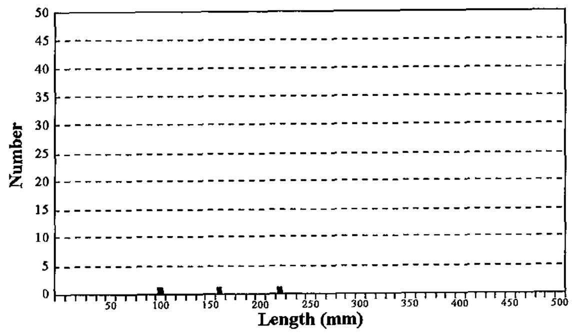
One bull trout approximately 165 mm in length was captured during approximately 1 hour of hook and line sampling. Approximately 5 other bull trout 100 to 200 mm in length were observed.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

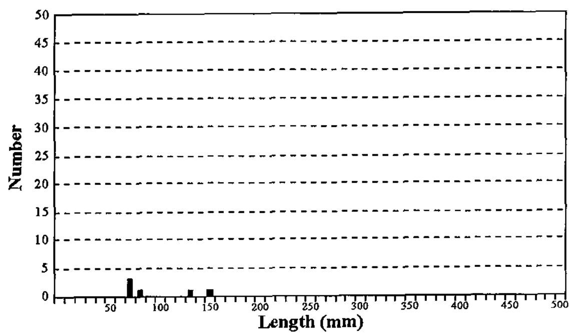
Uncle Ike Creek - (9/21/95)

At diversion

Rainbow Trout (n=3)



Brook Trout (n=6)

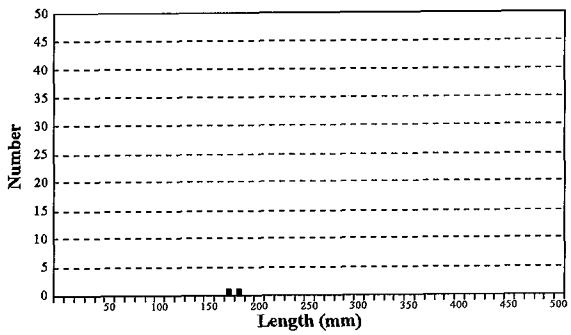


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

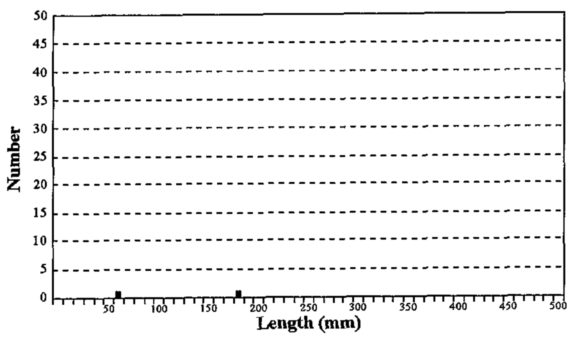
Uncle Ike Creek - (9/21/95)

1.6 km above diversion

Rainbow Trout (n=2)



Brook Trout (n=2)

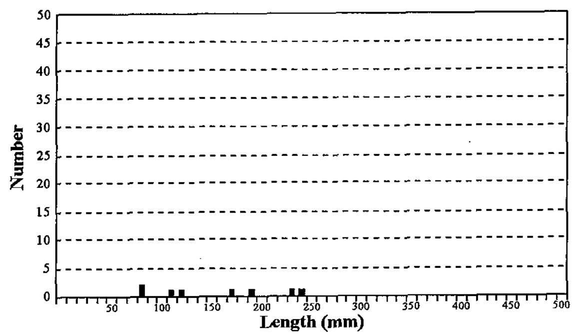


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

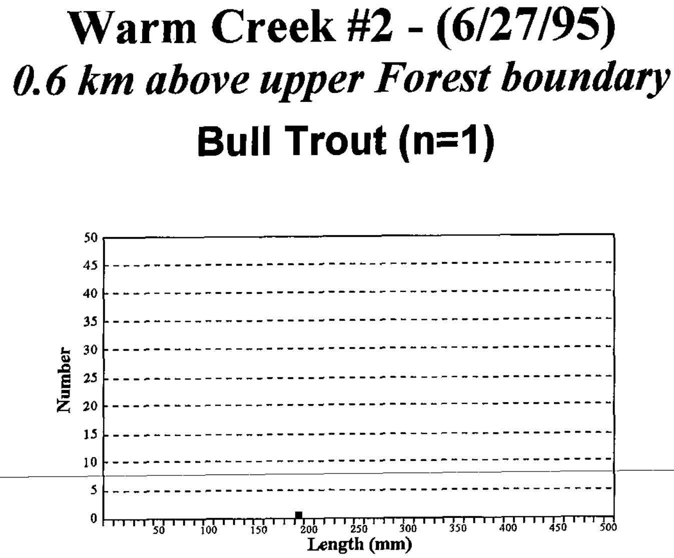
Warm Creek #1 - (6/27/95)

0.4 km above Little Lost River (Sawmill Creek)

Rainbow Trout (n=8)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.



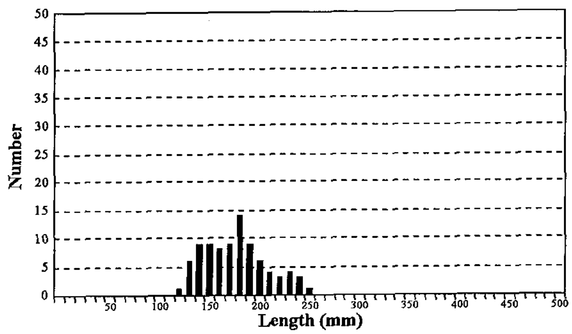
Two additional bull trout approximately 70 mm and 110 mm in length were seen in the transect.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Warm Springs Creek - (8/17/93)

Below Little Lost River Highway

Rainbow Trout (n=86)

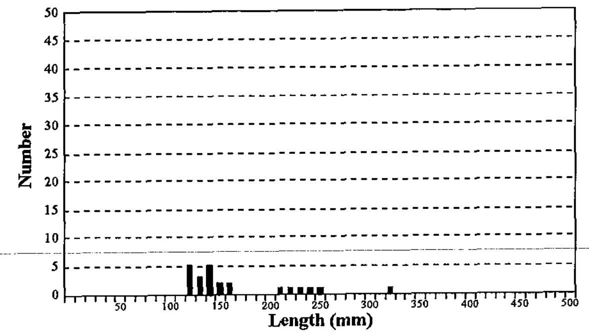


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

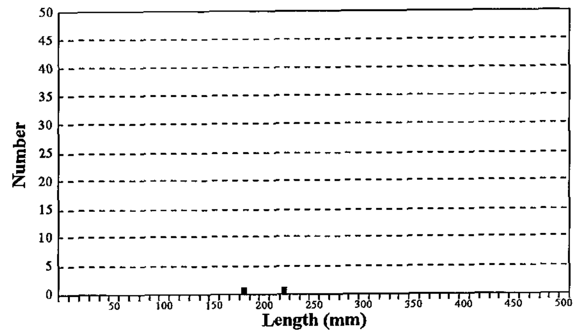
Wet Creek (BLM #7) - (8/13/92)

Just below Pancheri diversion

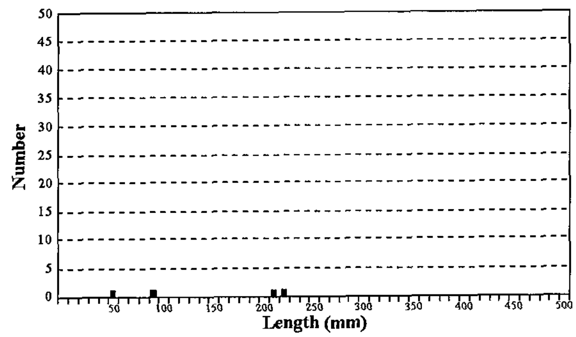
Rainbow Trout (n=23)



Brook Trout (n=2)



Bull Trout (n=4)

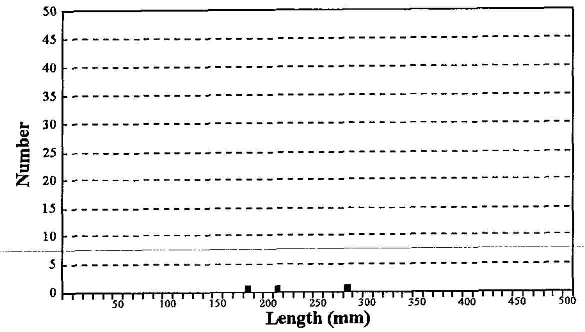


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

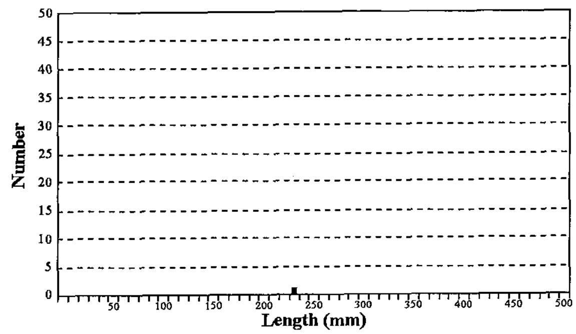
Wet Creek (BLM #6) - (8/13/92)

Just below Dry Creek hydroelectric plant

Rainbow Trout (n=3)



Bull Trout (n=1)

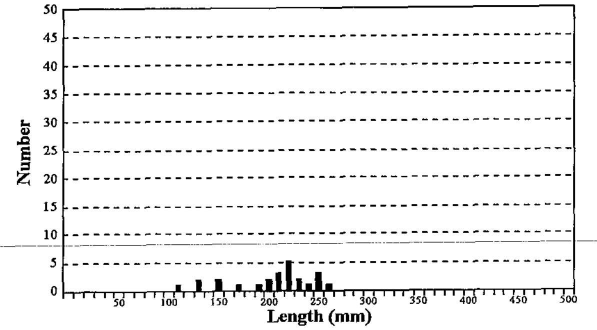


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

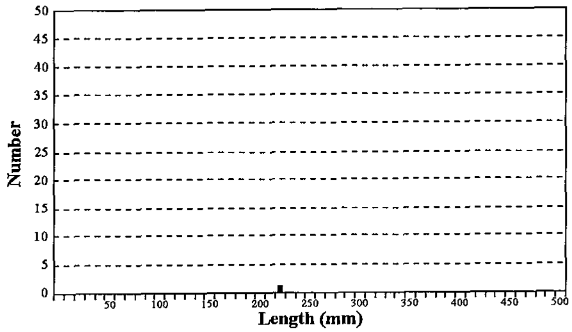
Wet Creek (BLM #5) - (8/13/92)

3.6 km below Squaw Creek

Rainbow Trout (n=24)



Bull Trout (n=1)

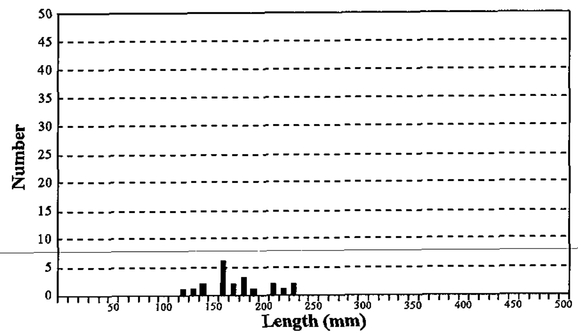


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (BLM #4) - (8/12/92)

2.0 km below Squaw Creek

Rainbow Trout (n=21)

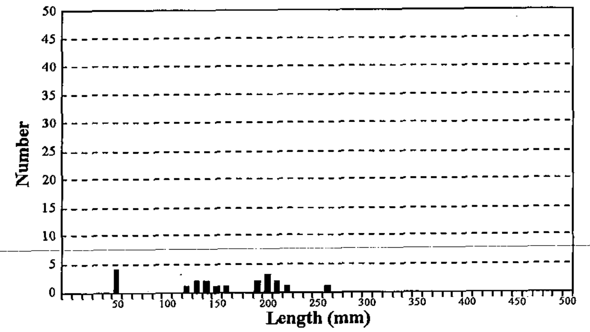


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

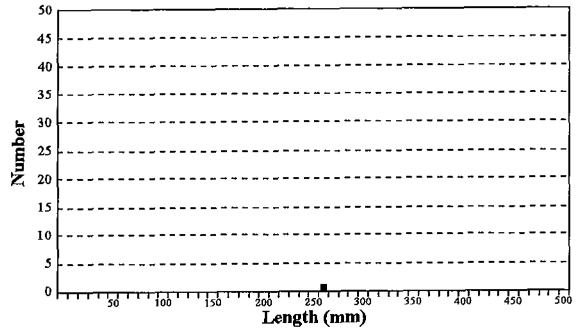
Wet Creek (BLM #3) - (8/11/92)

1.2 km above Squaw Creek

Rainbow Trout (n=20)



Bull Trout (n=1)

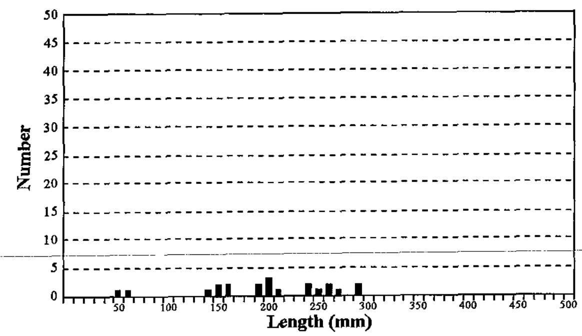


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (BLM #2) - (8/11/92)

0.8 km below BLM #1

Rainbow Trout (n=21)

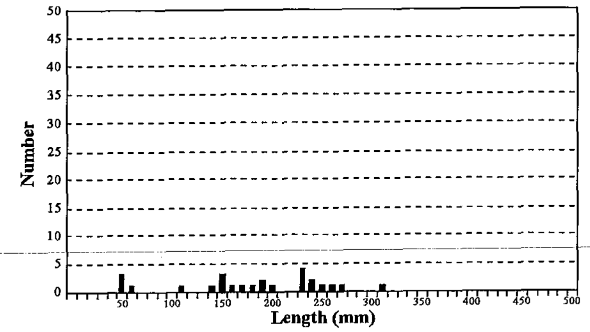


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (BLM #1) - (8/11/92)

2.4 km below the Forest boundary

Rainbow Trout (n=25)

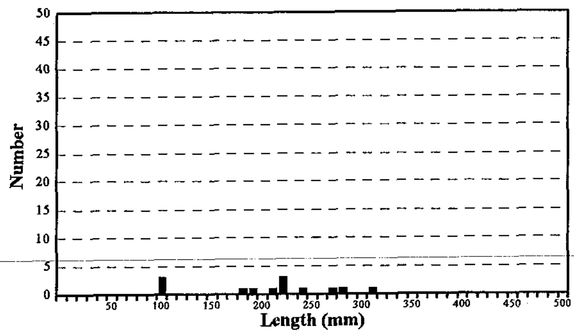


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

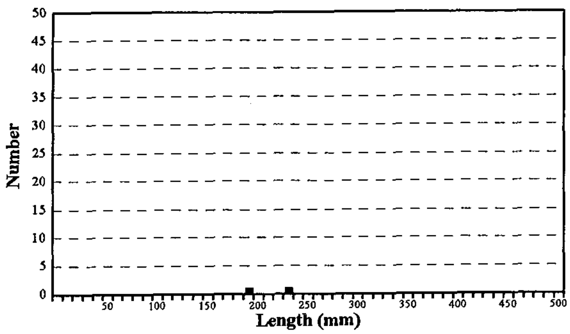
Wet Creek 0 - (7/02/97)

Top end of transect is Big Creek

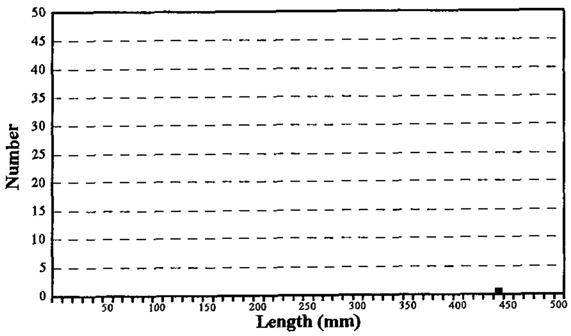
Rainbow Trout (n=13)



Brook Trout (n=2)



Bull Trout (n=1)

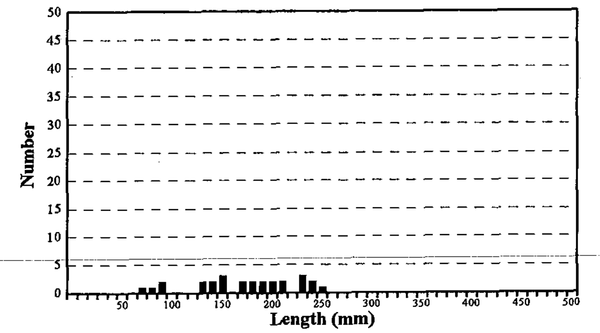


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

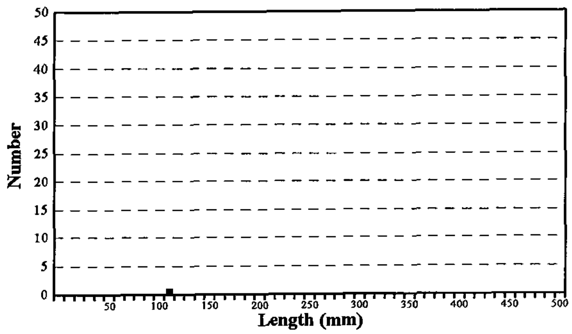
Wet Creek (FS #1) - (7/03/96)

0.6 km above the Forest boundary

Rainbow Trout (n=27)



Bull Trout (n=1)

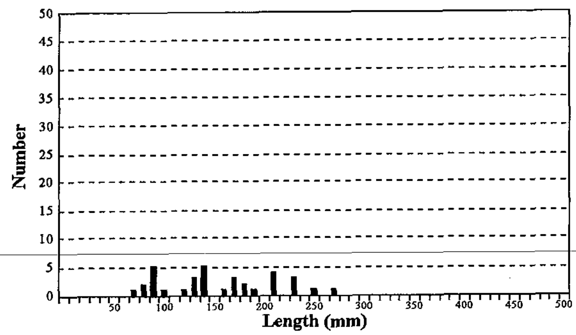


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (FS #1) - (7/25/95)

0.6 km above the Forest boundary

Rainbow Trout (n=34)

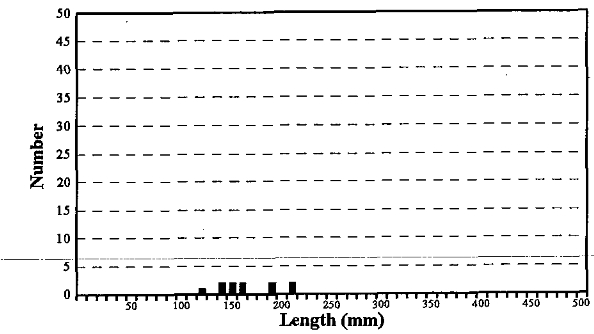


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

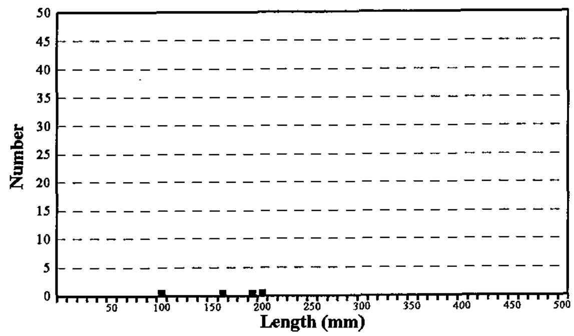
Wet Creek (FS #1a) - (7/03/96)

250 meters above Coal Creek

Rainbow Trout (n=11)



Bull Trout (n=4)

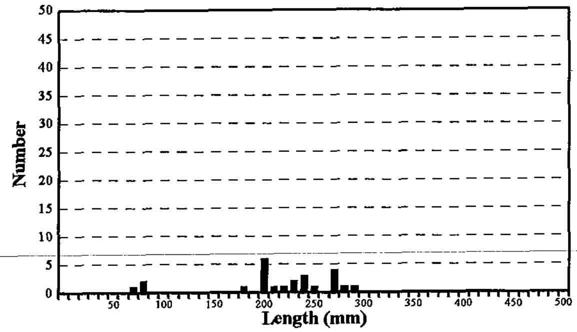


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

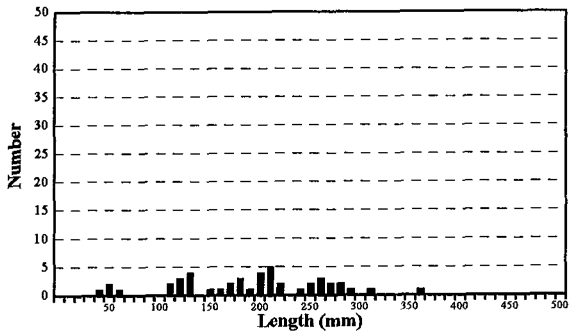
Wet Creek (FS #1b) - (8/18/97)

115 m below private road near Hilts Creek

Rainbow Trout (n=24)



Bull Trout (n=45)

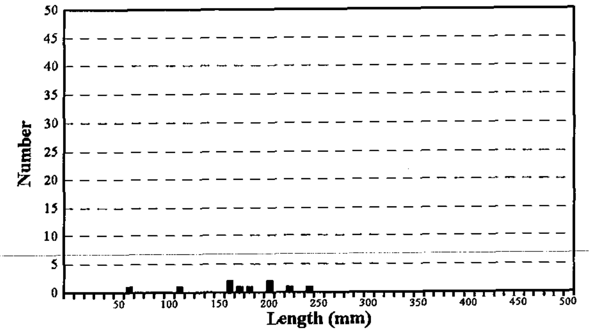


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

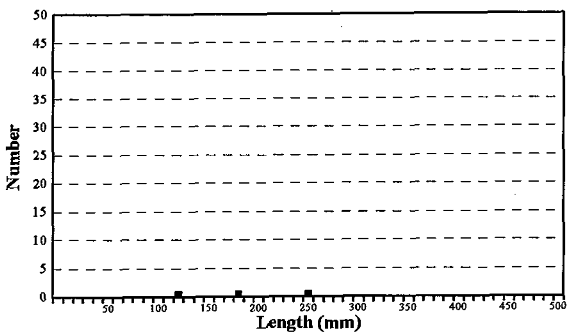
Wet Creek (FS #2) - (8/7/95)

0.5 km above Hilts Creek (top end of private property)

Rainbow Trout (n=10)



Bull Trout (n=3)

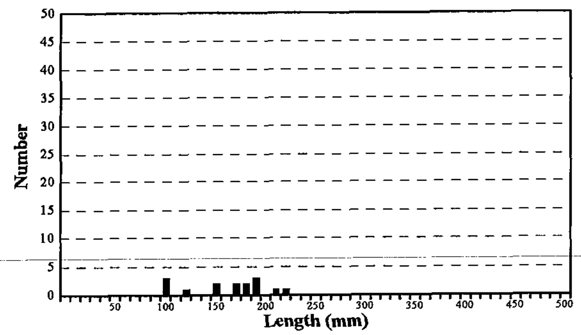


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

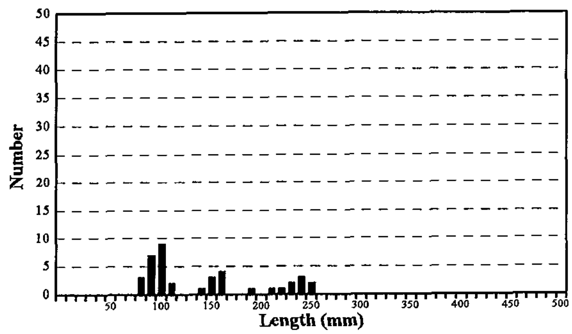
Wet Creek (FS #3) - (6/26/96)

0.8 km above Hilts Creek (in meadow)

Rainbow Trout (n=15)



Bull Trout (n=39)

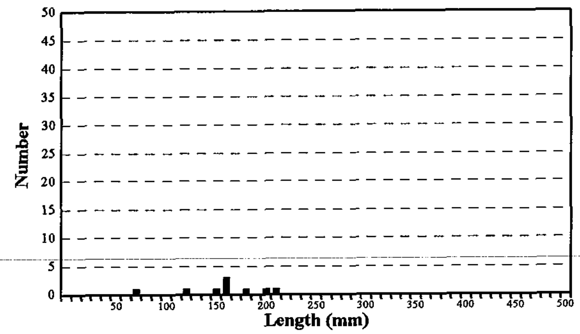


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

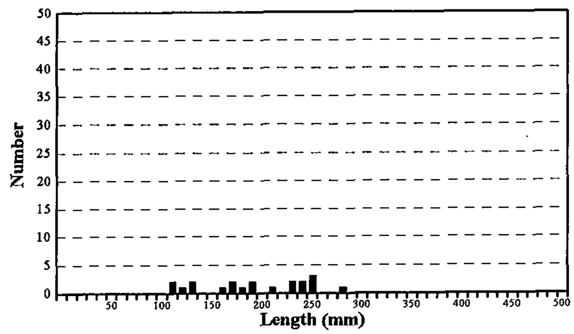
Wet Creek (FS #3) - (8/7/95)

0.8 km above Hilts Creek (in meadow)

Rainbow Trout (n=9)



Bull Trout (n=20)

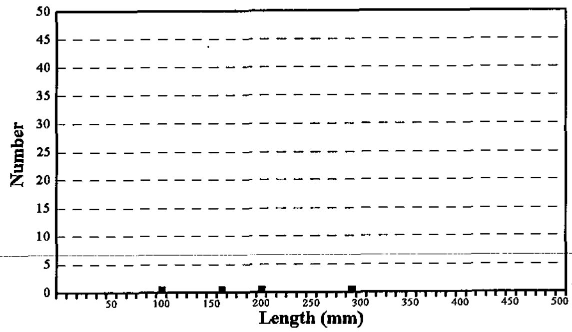


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

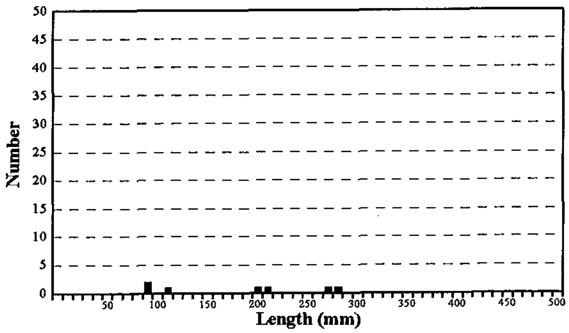
Wet Creek (FS #3a) - (6/26/96)

108 meters above #3 (top end of meadow)

Rainbow Trout (n=4)



Bull Trout (n=7)



Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (unnamed tributary[1] #1) - (9/19/95)
100 m above Wet Creek

all fish captured were between 35 and 60 mm in length

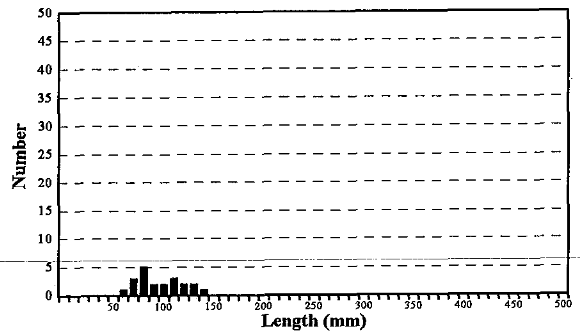
[1] This tributary enters Wet Creek from the opposite side of Coal Creek 0.4 km below the confluence of Wet Creek and Coal Creek.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Wet Creek (unnamed tributary[1] #2) - (7/02/97)

0.6 km above Wet Creek

Rainbow Trout (n=21)



[1] This tributary enters Wet Creek from the opposite side of Coal Creek 0.4 km below the confluence of Wet Creek and Coal Creek.

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Williams Creek #1 - (6/21/95)
1.6 km below Forest boundary

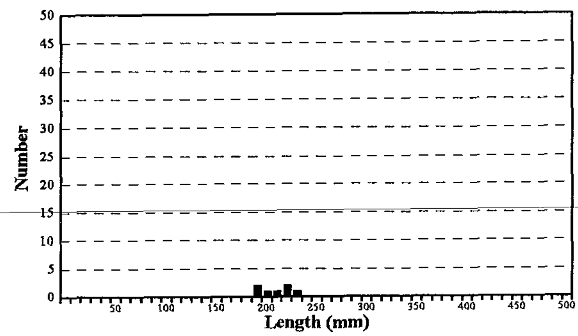
one bull trout captured approximately 200 mm in length

Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Williams Creek #2 - (6/7/97)

beaver pond at Forest boundary
(hook and line sampling)

Bull Trout (n=7)

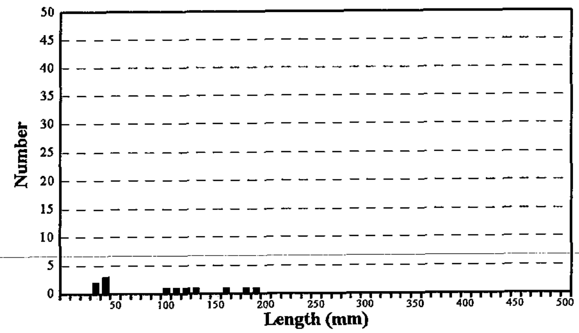


Appendix B (continued). Length frequency distribution of salmonids captured in sampling sites in the Little Lost River drainage.

Williams Creek #3 - (6/21/95)

1.6 km above Forest boundary

Bull Trout (n=12)



APPENDIX C

Appendix C. Summary of creel census data from the Little Lost River drainage(Adapted from USRR file data[1]; Corsi and Elle 1989; Gamett 1990a, 1990b).

Water	Year	# Angler Interviewed	Hours Fished	Fish/Hour	Species Composition (%) Wrb	Hrb	Bk	Bl	Ct	Source
Streams										
Badger Creek	1977	6	16	1.1	72			28		USRR file data
	1976	12	9	0.9	100					USRR file data
	1968-70	2	5	3.6	56		44			USRR file data
Big Creek	1979	23	60	1.3	58	42				USRR file data
	1977	33	70	1.1	77		7	16		USRR file data
	1974	10	50	.9	37			63		USRR file data
	1972	2	7	1.3	100					USRR file data
	1971	32	117	1.1	100					USRR file data
	1969	3	3	4.0	100					USRR file data
Big Springs Creek	1987	N/A	4.5	2.0	89		11			Corsi (1989)
	1979	30	102	1.0	8	65	27			USRR file data
	1978	85	140	1.3	55	42	3			USRR file data
	1977	97	190	1.0	87		12	1		USRR file data
	1976	24	38	1.2	74	6	20			USRR file data
	1974	68	169	.9	89	3	7	1		USRR file data
	1972	95	215	1.9	99			1		USRR file data
	1971	76	267	1.6	99		<1	<1		USRR file data
	1967-70	191	645	1.7	97		2			USRR file data
Deer Creek	1976	16	79	0.6	100					USRR file data
	1974	3	10	2.6	100					USRR file data
Dry Creek	1979	18	60	1.3			100			USRR file data
	1978	11	27	1.8	10		84		6	USRR file data
	1977	19	35	1.9	12		72		16	USRR file data
	1969	2	1	9.0			89		11	USRR file data
Little Lost River	1987	N/A	35	1.6	95		2	3		Corsi (1989)
	1977	44	80	2.3	95		2	3		USRR file data
	1976	21	84	0.5	89	5		5		USRR file data
	1974	15	31.5	0.9	93	7				USRR file data
	1971	23	84	1.3	97		1	2		USRR file data
	1967-70	125	422	1.2	92		7	1		USRR file data
Sawmill Creek	1987	N/A	27.5	1.2	41		6	53		Corsi (1989)
	1979	28	85	0.8	3	79	7	11		USRR file data
	1978	14	32	1.3	75	5	5	15		USRR file data
	1977	21	50	0.8	83		12	5		USRR file data
	1970	4	18	0.9	75			25		USRR file data
Squaw Creek (Sawmill Canyon)	1976	6	11	1.4	86		7	7		USRR file data
Summit Creek	1987	N/A	6.5	2.8	83		17			Corsi (1989)
	1979	4	17	1.3	23		77			USRR file data
	1978	47	110	1.3	81	7	12			USRR file data
	1977	58	104	1.8	91		7	2		USRR file data
	1974	27	43	3.6	78	3	19			USRR file data
	1972	47	115	1.8	22	76	2			USRR file data

<u>Appendix C (continued)</u>. Summary of creel census data from the Little Lost River drainage(Adapted from USRR file data[1]; Corsi and Elle 1989; Gamett 1990a, 1990b).

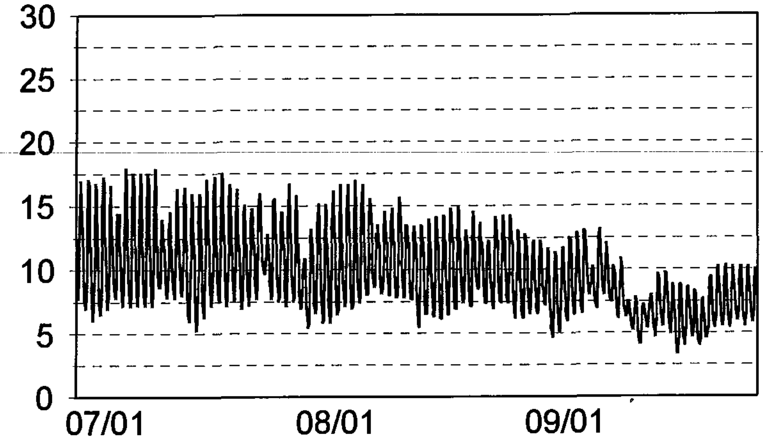
Water	Year	# Angler Interviewed	Hours Fished	Fish/Hour	Species Composition (%) Wrb	Hrb	Bk	Bl	Ct	Source
Summit Creek(cont.)	1967-70	75	313	1.4	91		9	<1		USRR file data
<u>Lakes</u>										
Big Creek Lake #1 (beaver pond)	1990	21	80	1.94	5		95			Gamett 1990a
Shadow Lake #2 (upper)	1994	2	1	0.0						LRRD file data
Swauger Lake #1 (upper)	1994	39	140	0.16					100	LRRD file data
Mill Creek	1994	25	53.5	.75	25					LRRD file data

APPENDIX D

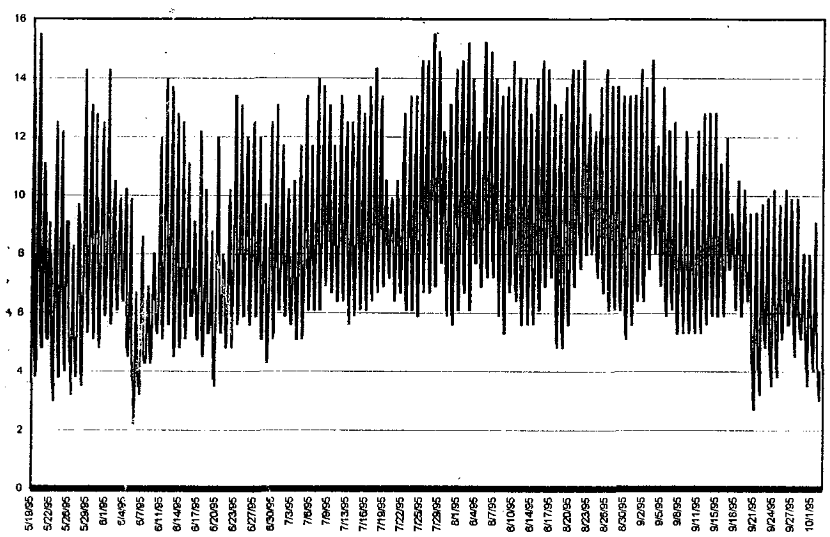
Appendix D. Stream temperature data collected from various locations in the Little Lost River drainage.

Big Creek
Immediately above Wet Creek

1996



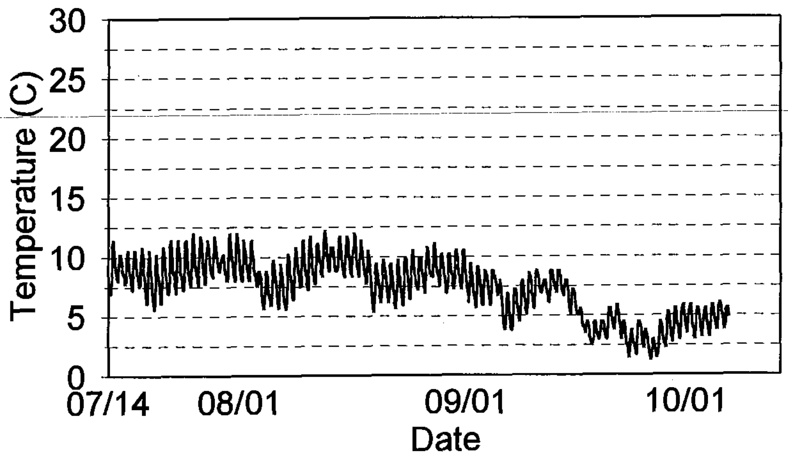
1995



Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Iron Creek
10 meters above Iron Creek Road

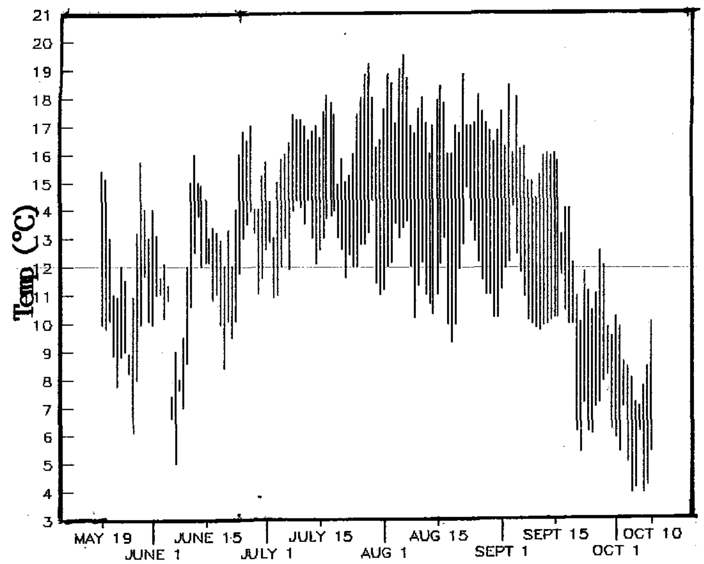
<u>1996</u>



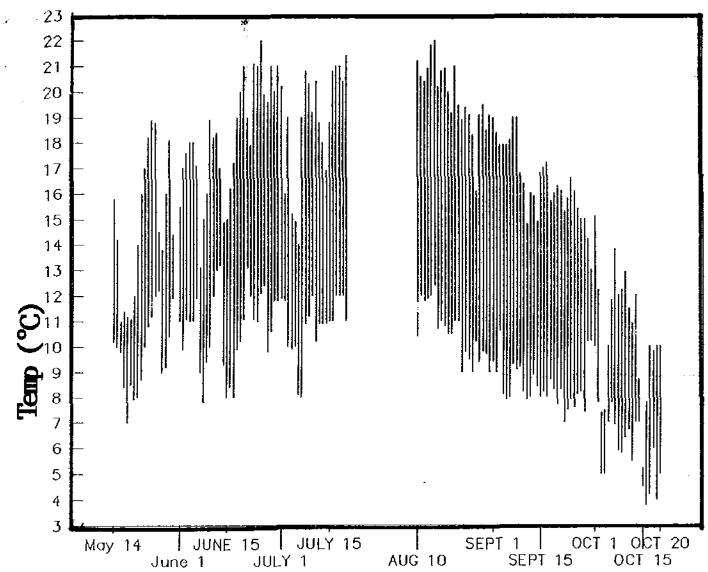
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Little Lost River
Below Big Springs Creek

1995



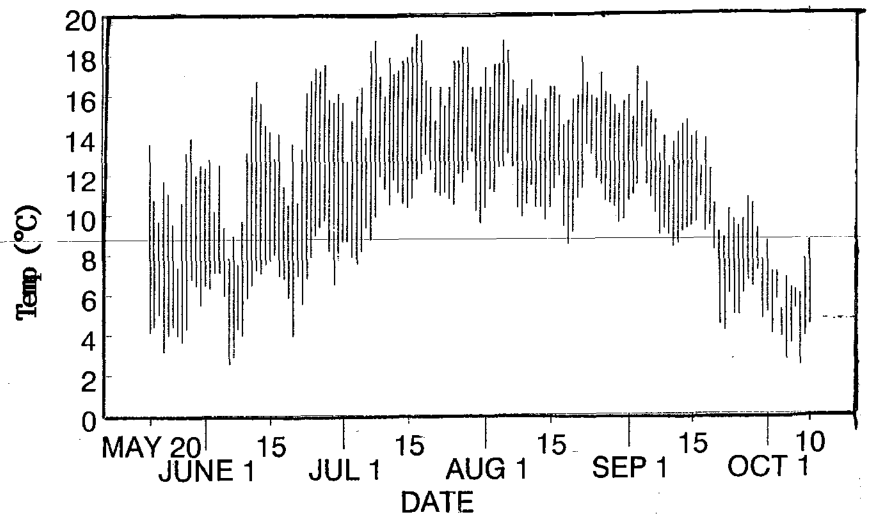
1994



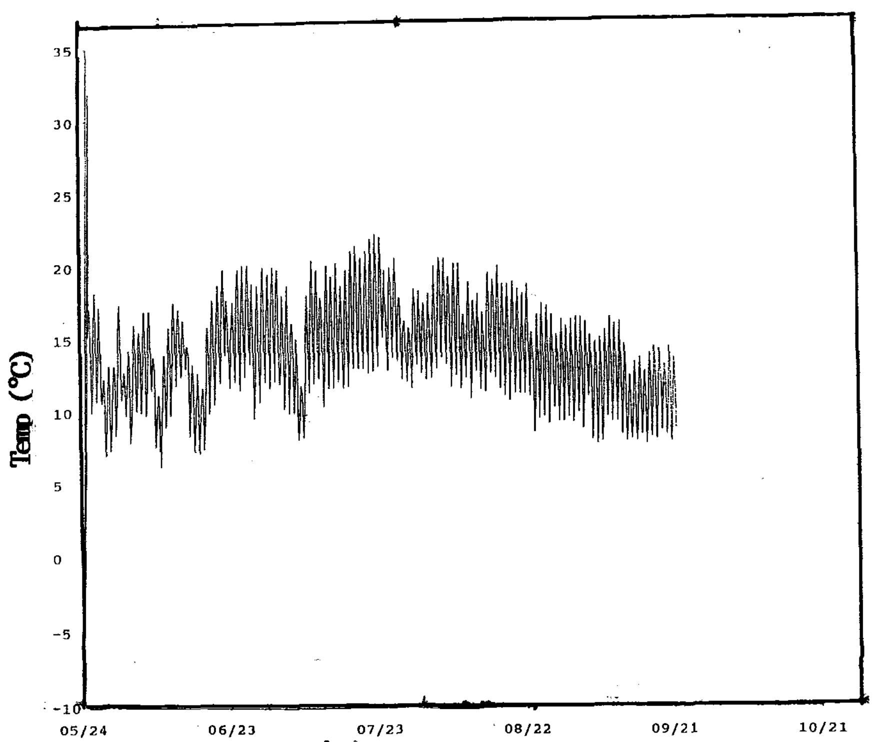
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Little Lost River
At Clyde

1995



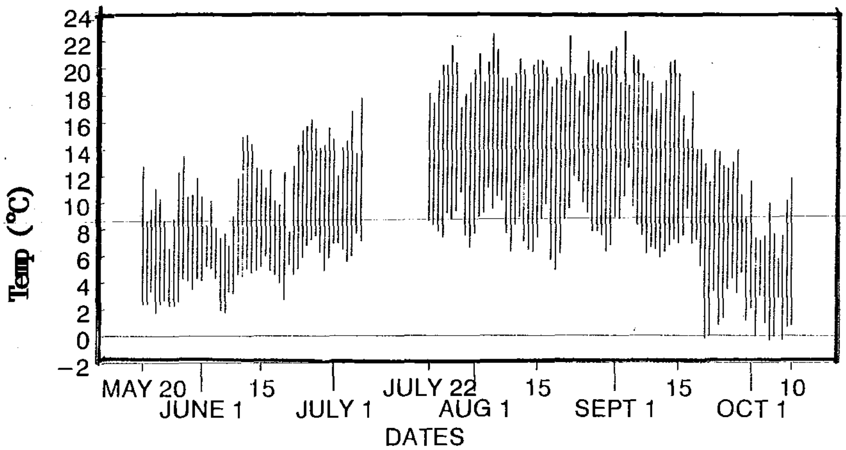
1994



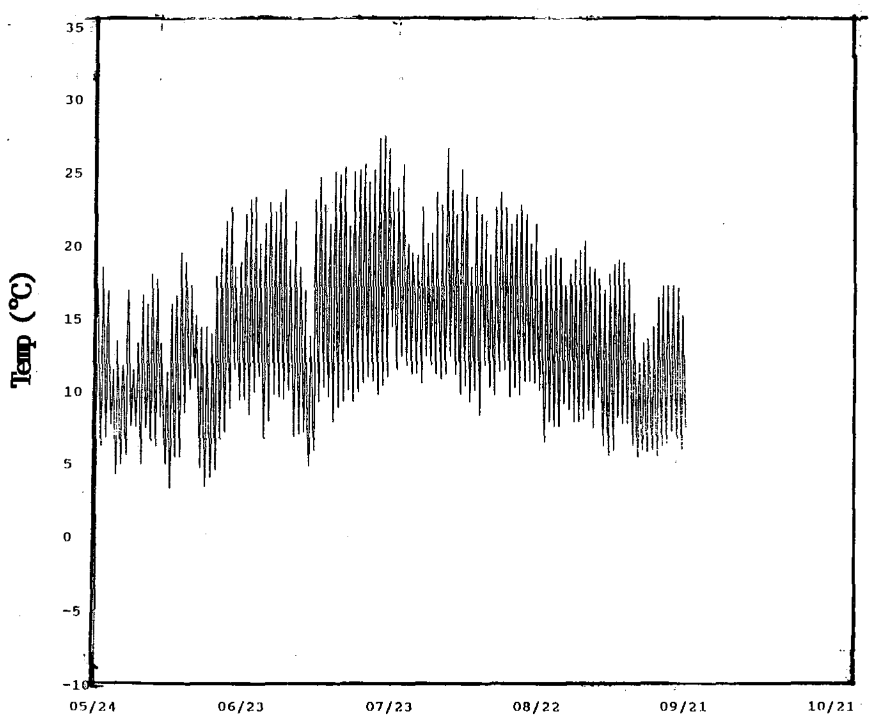
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Little Lost River (Sawmill Creek)
At old gauging site near Summit Creek

1995



1994

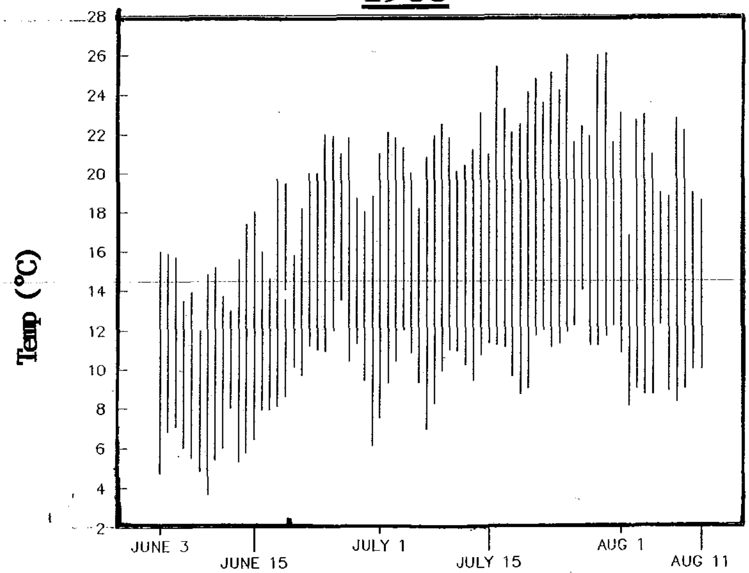


Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

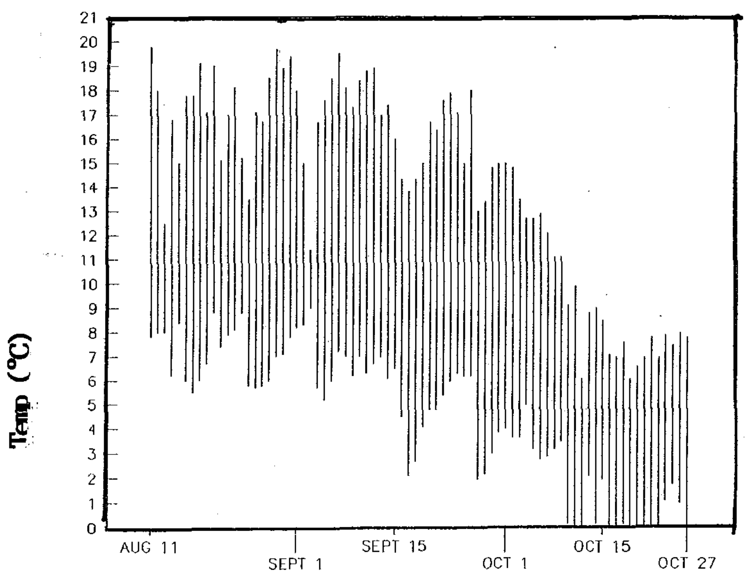
Little Lost River (Sawmill Creek)

At old gauging site near Summit Creek (continued)

1988



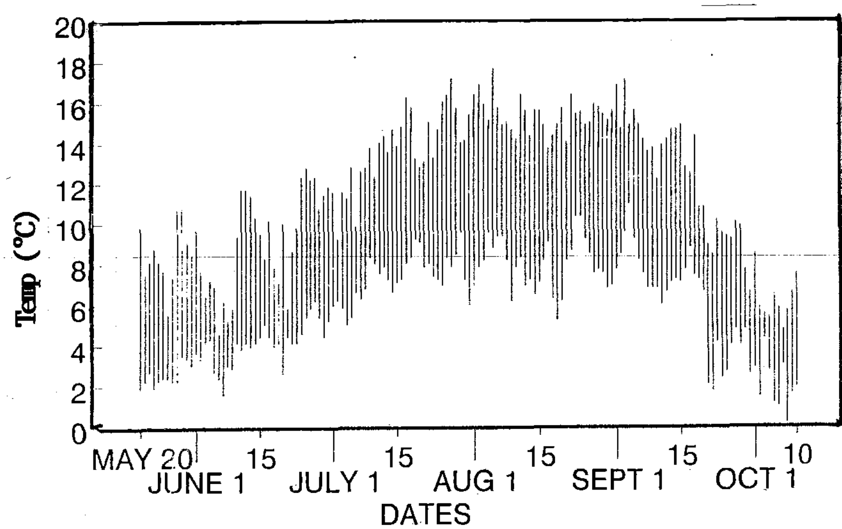
1987



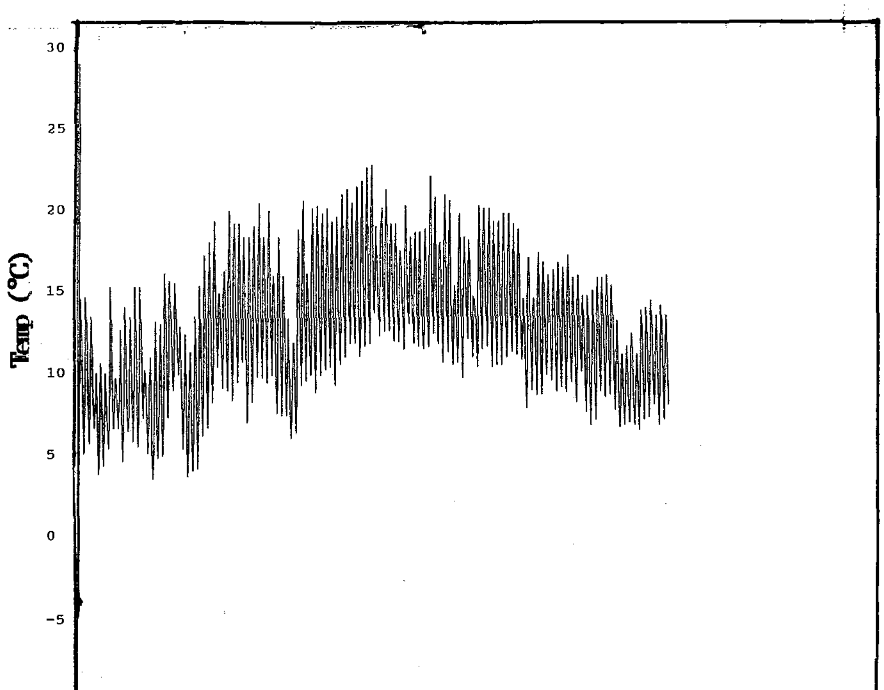
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Little Lost River (Sawmill Creek)
At Forest Boundary

1995



1994

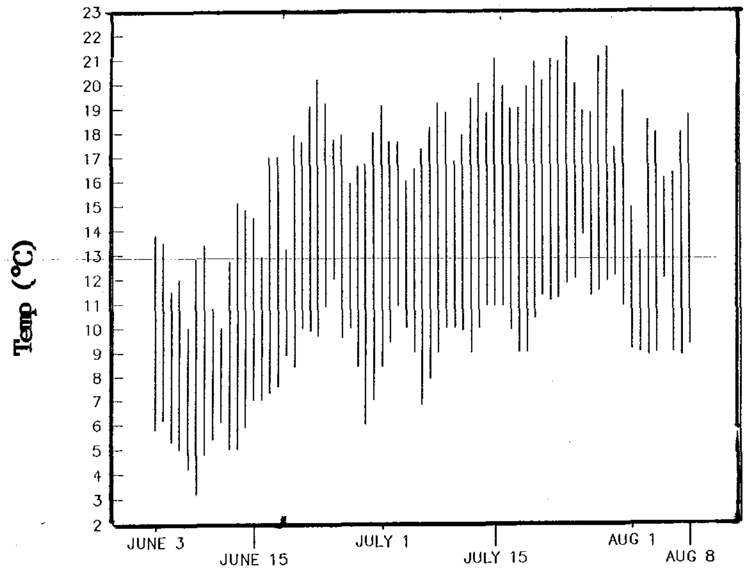


Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

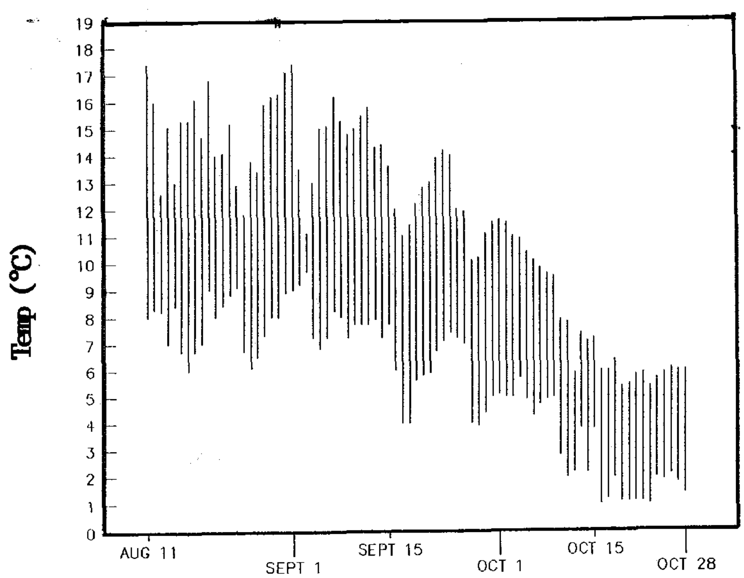
Little Lost River (Sawmill Creek)

At Forest Boundary (continued)

1988



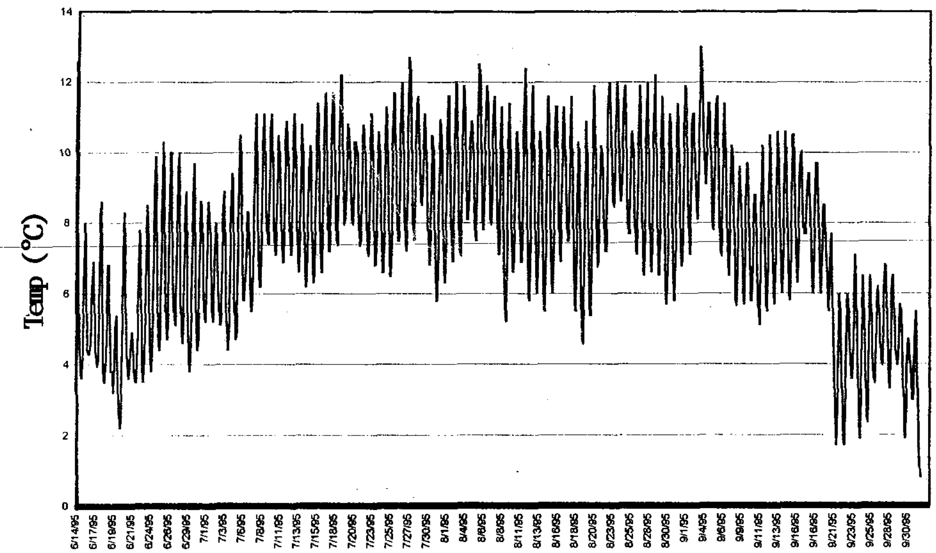
1987



Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

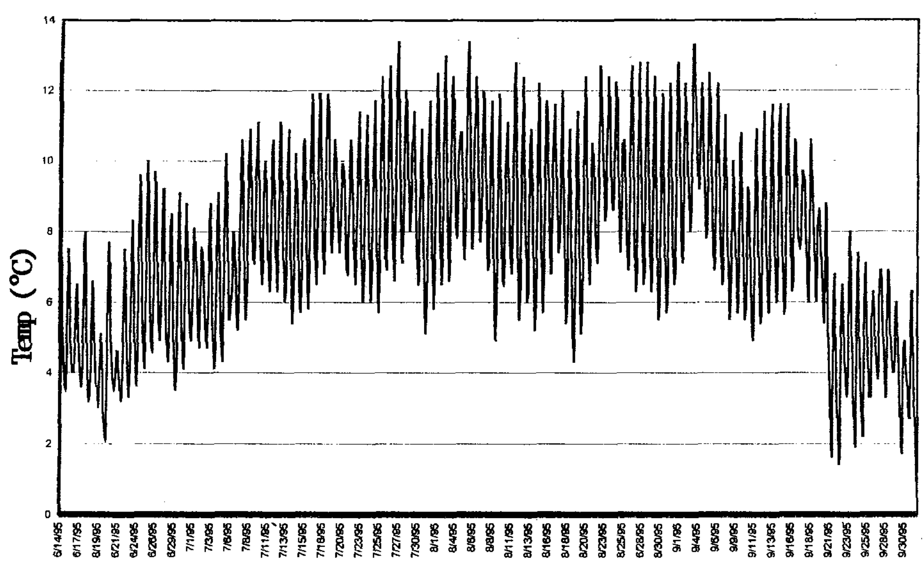
Little Lost River (Sawmill Creek)
Below Timber Creek

1995



Little Lost River (Sawmill Creek)
Below Iron Creek

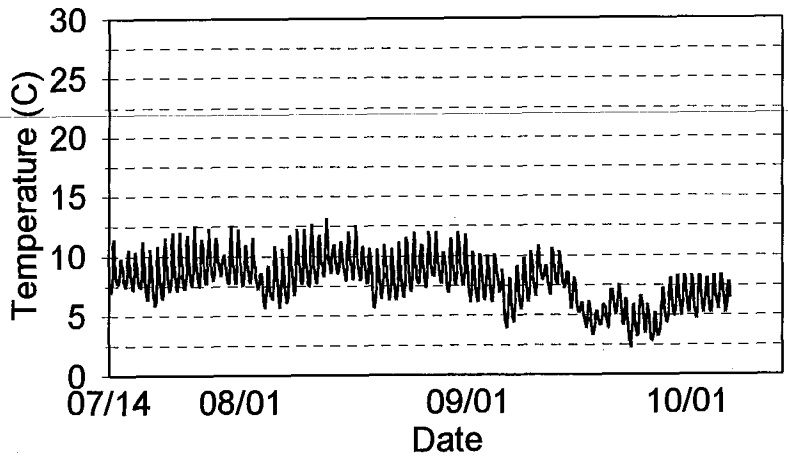
1995



Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Mill Creek
At trailhead

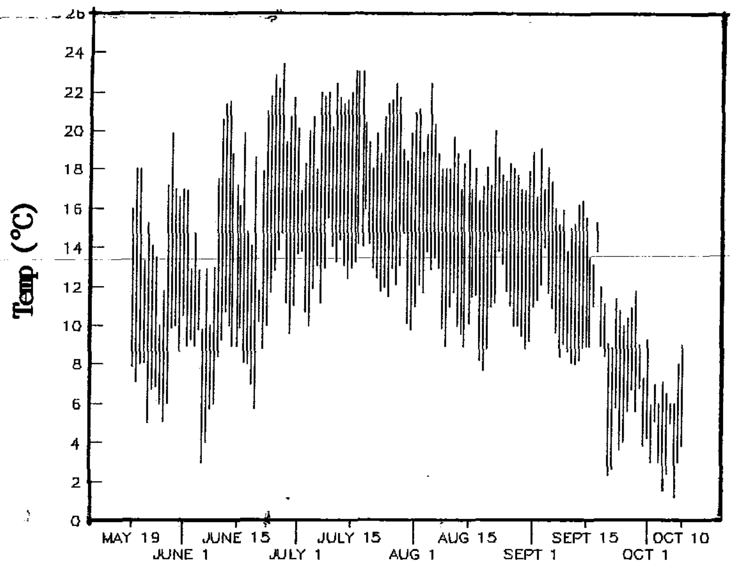
<u>1996</u>



Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

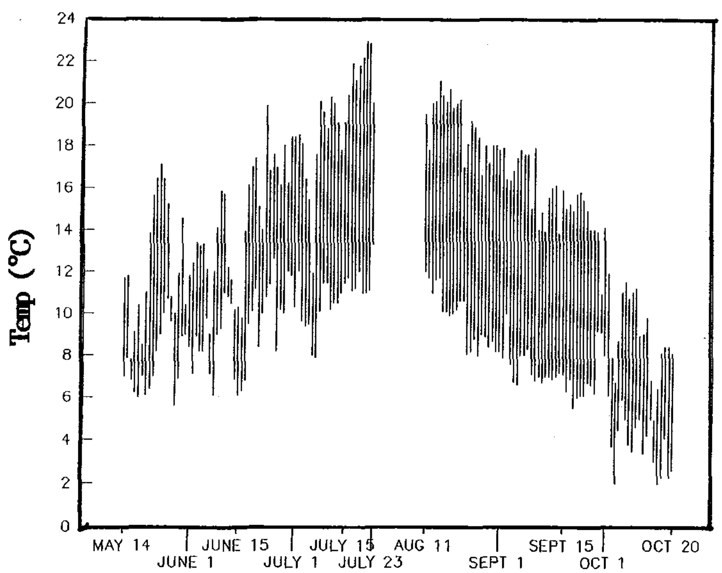
Summit Creek
At county line

1995



Wet Creek
At Clyde

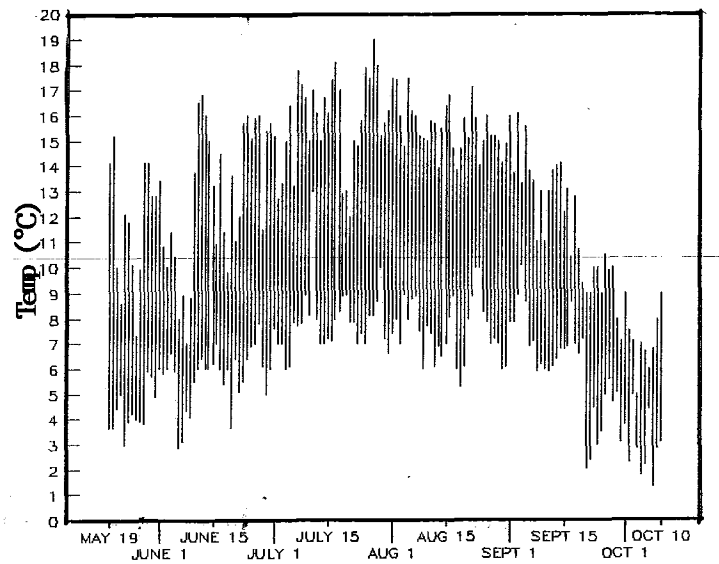
1994



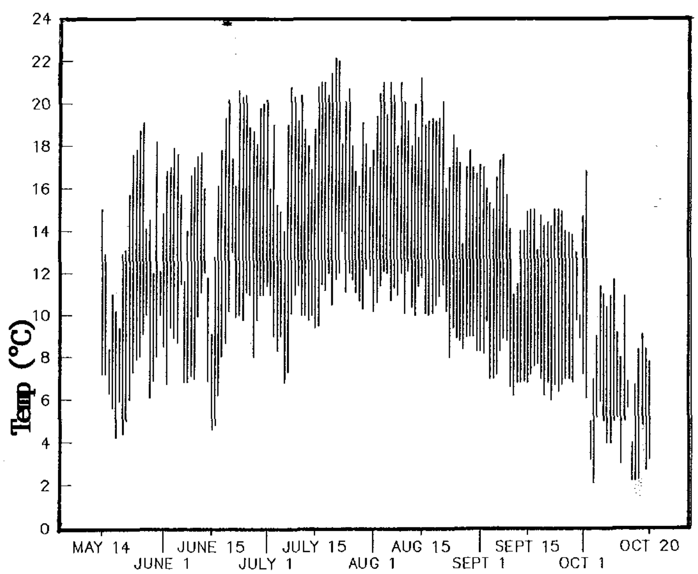
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Wet Creek
At Deer Creek Road crossing

1995



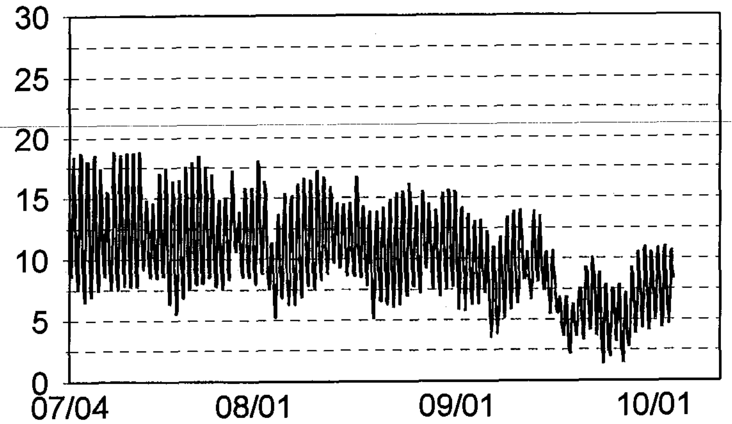
1994



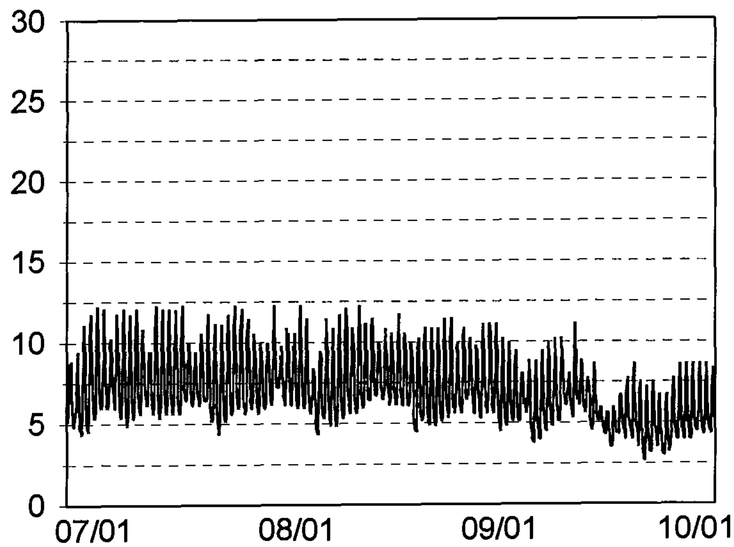
Appendix D (continued). Stream temperature data collected from various locations in the Little Lost River drainage.

Wet Creek
At Forest Boundary

1996



Wet Creek
0.8 km above Hilts Creek
1996

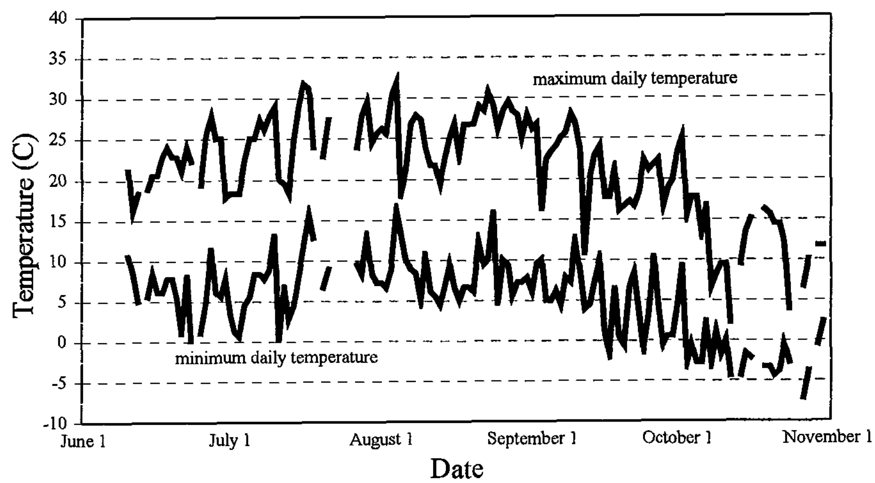


APPENDIX E

Appendix E. Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

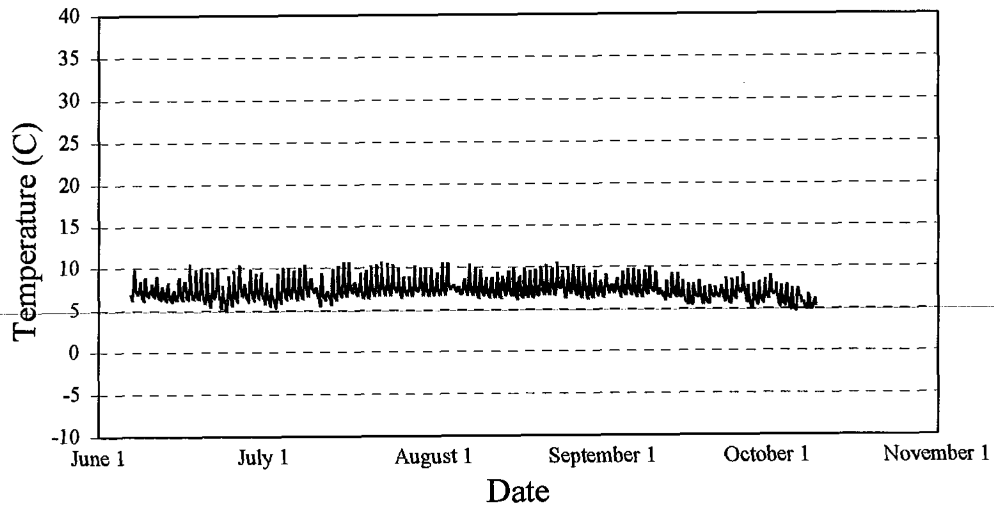
Mulkey Bar (air temperature)

Near confluence of Squaw and Wet creeks

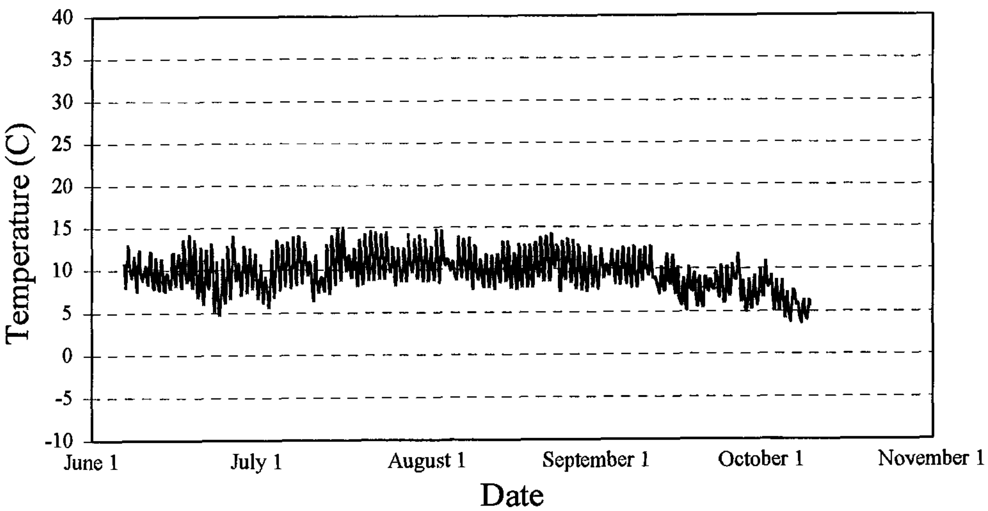


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Badger Creek
At the Forest boundary

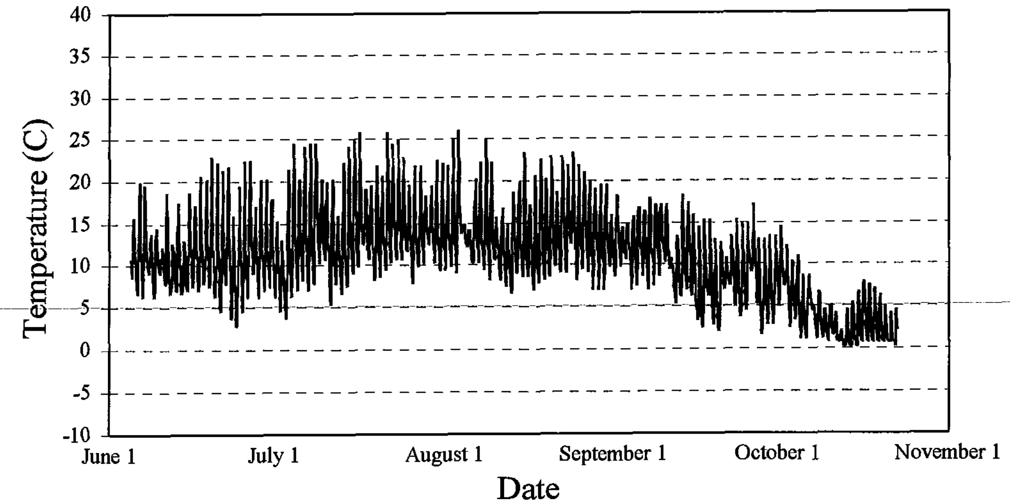


Badger Creek
At the Little Lost/Pahsimeroi Road

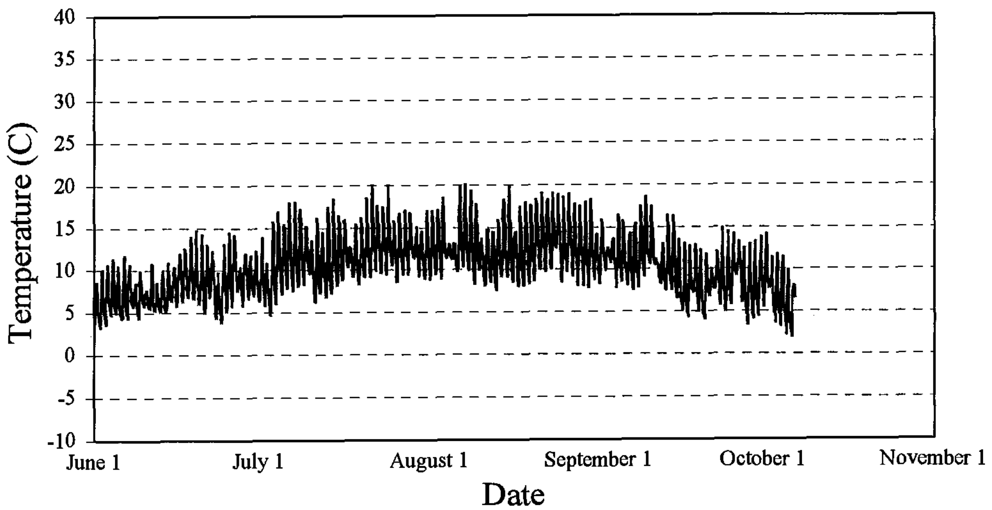


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Basin Creek
13.7 m above Wet Creek

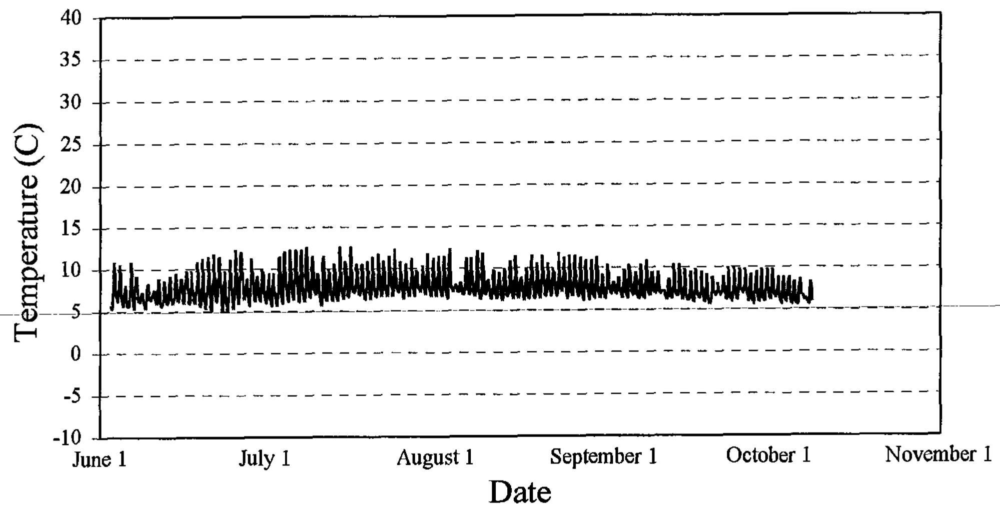


Bear Creek
23.5 m above Little Lost River

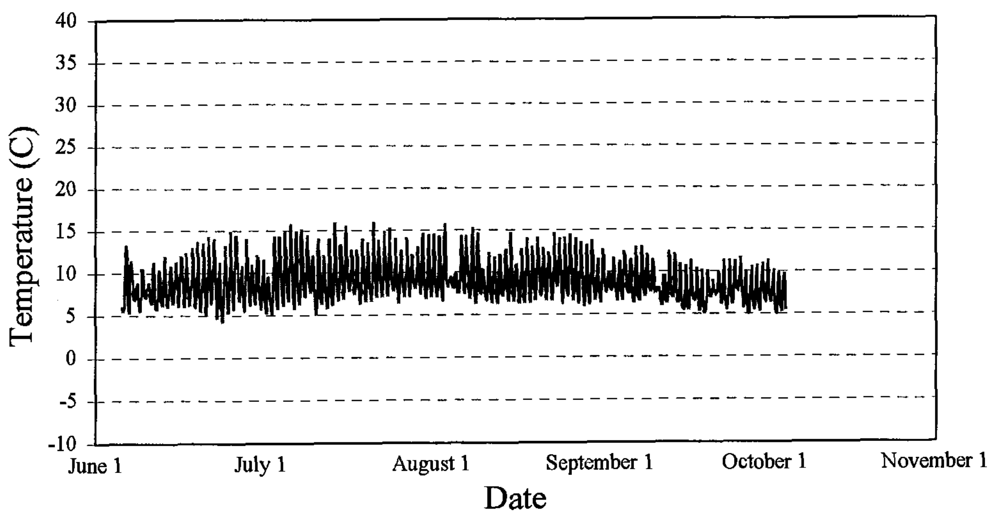


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Big Creek
91 m below Big Creek Pond (4 km above Forest boundary)

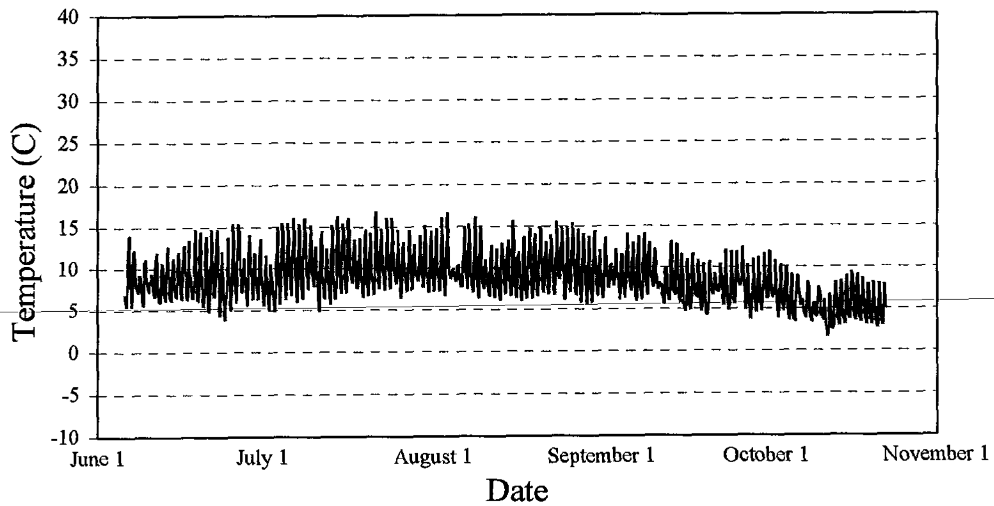


Big Creek
At the Forest/private boundary

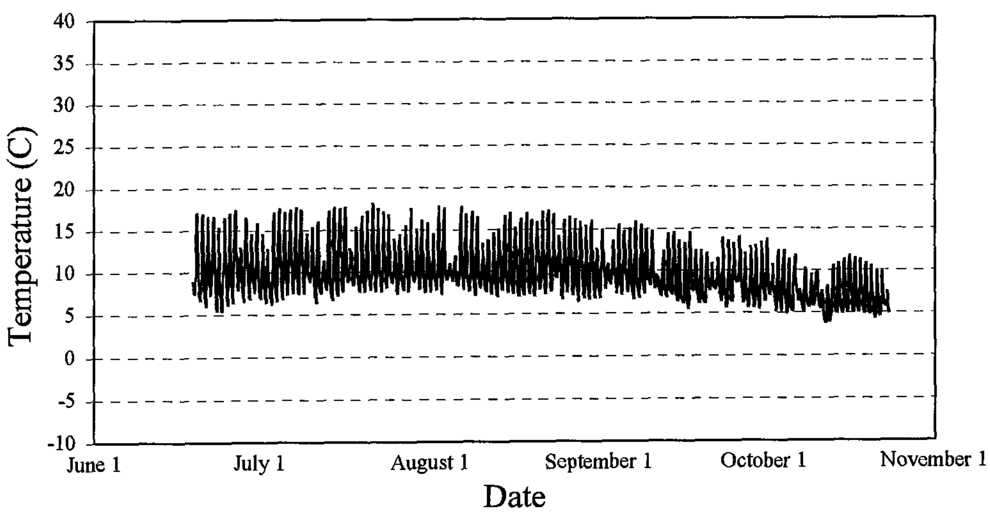


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Big Creek
At Wet Creek Road

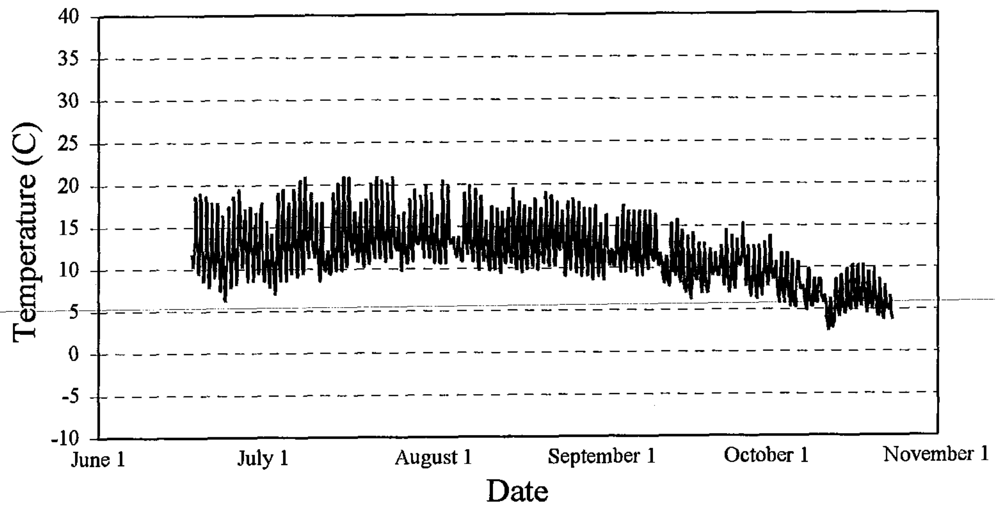


Big Springs Creek
At BLM/private boundary near source

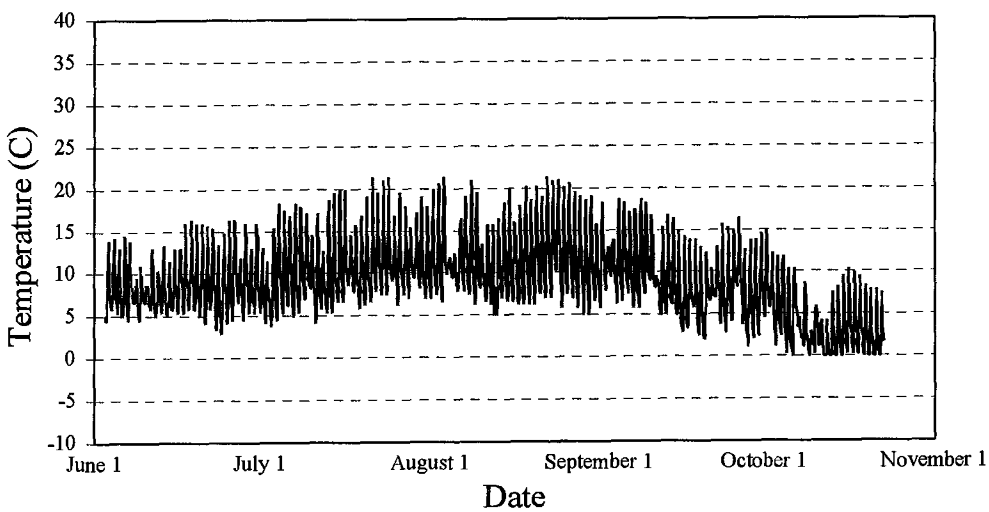


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Big Springs Creek
300 m above Little Lost River

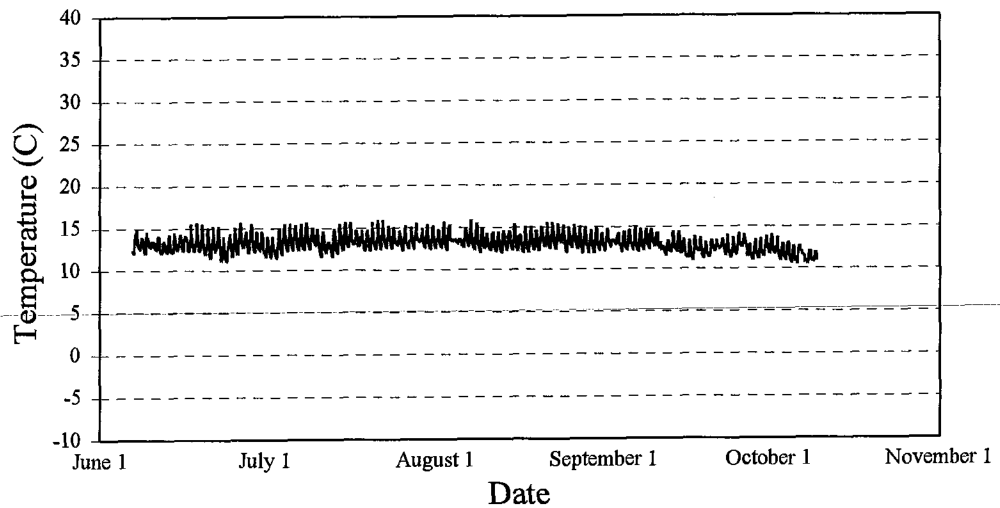


Coal Creek
5 m above Wet Creek

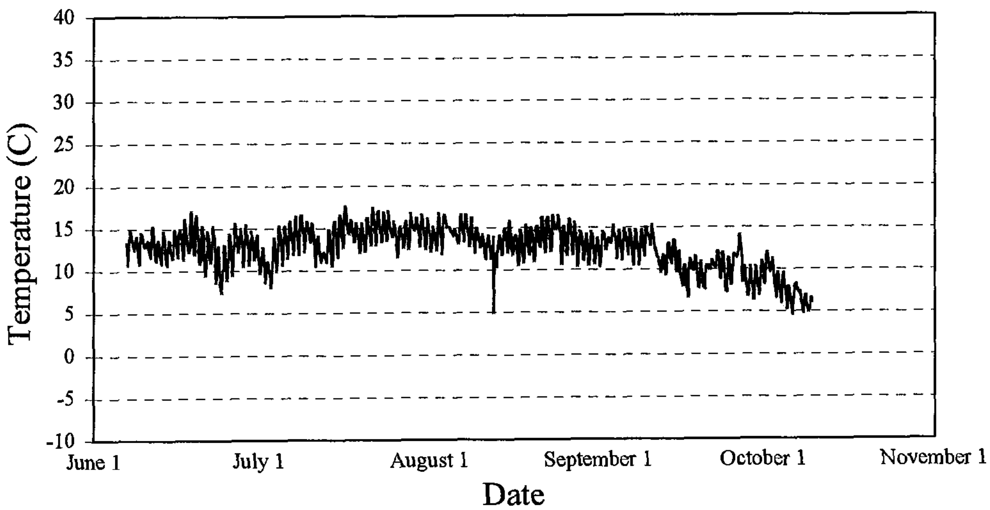


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Deer Creek
300 m below confluence of South and North forks

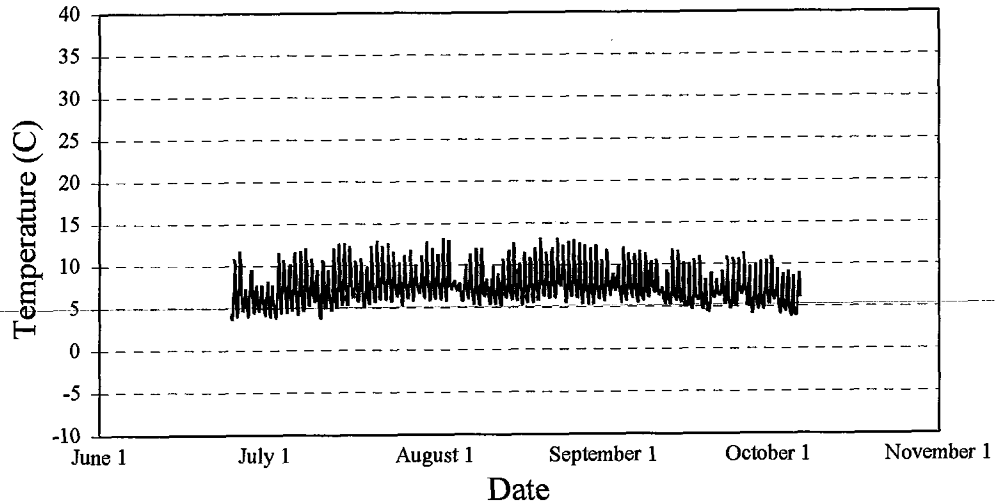


Deer Creek
At BLM/private boundary

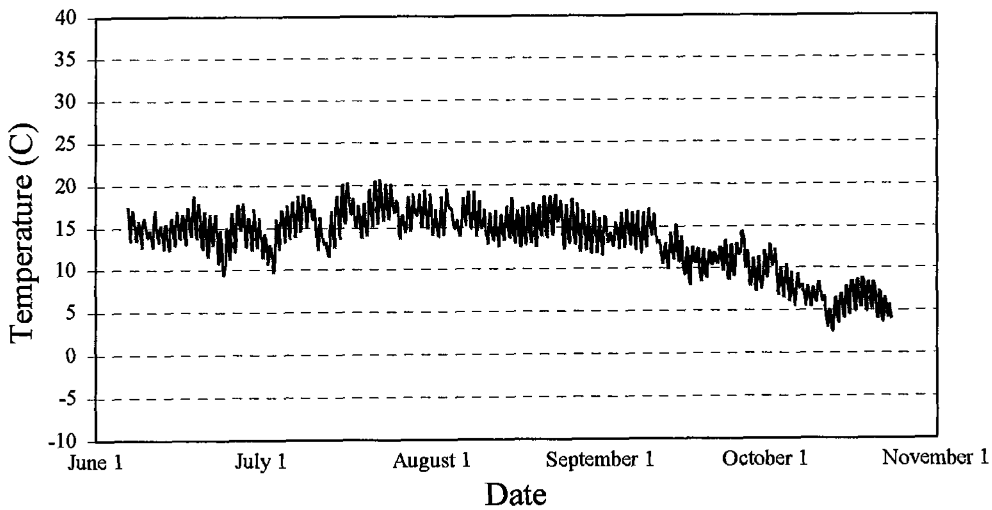


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Dry Creek
At Forest boundary

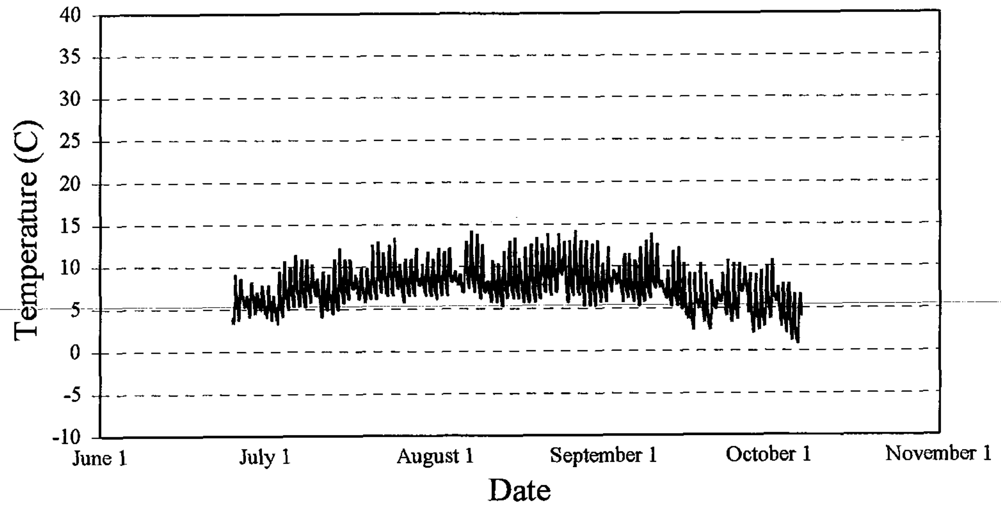


Fallert Springs Creek
200 m above Little Lost River

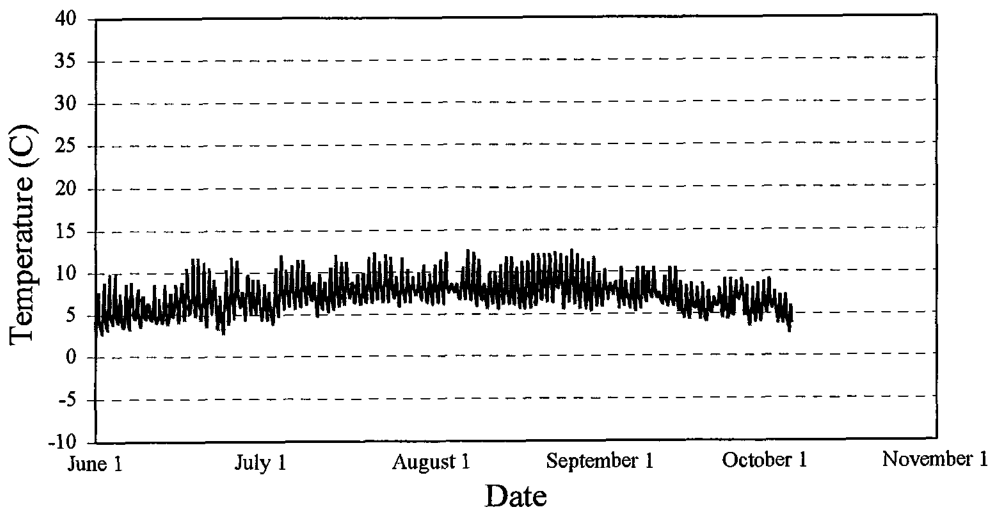


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Iron Creek
18 m above Little Lost River

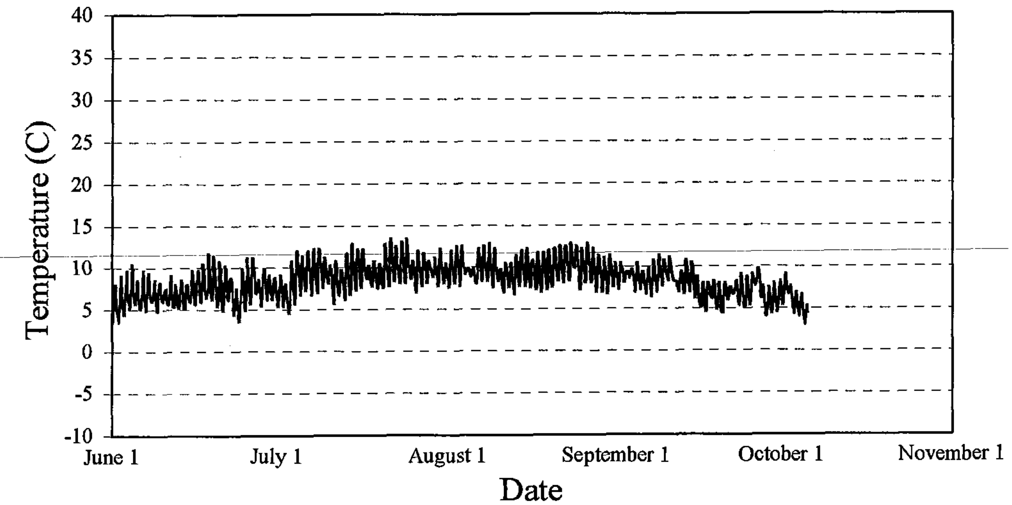


Little Lost River
Approximately 2 km above Smithie Fork

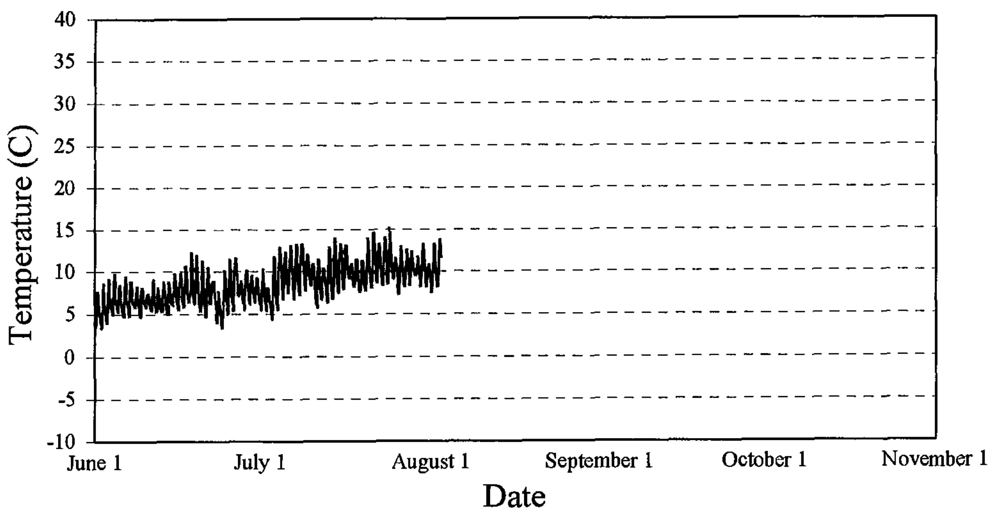


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Little Lost River
Approximately 1 km above Timber Creek (at Timber Creek Road)

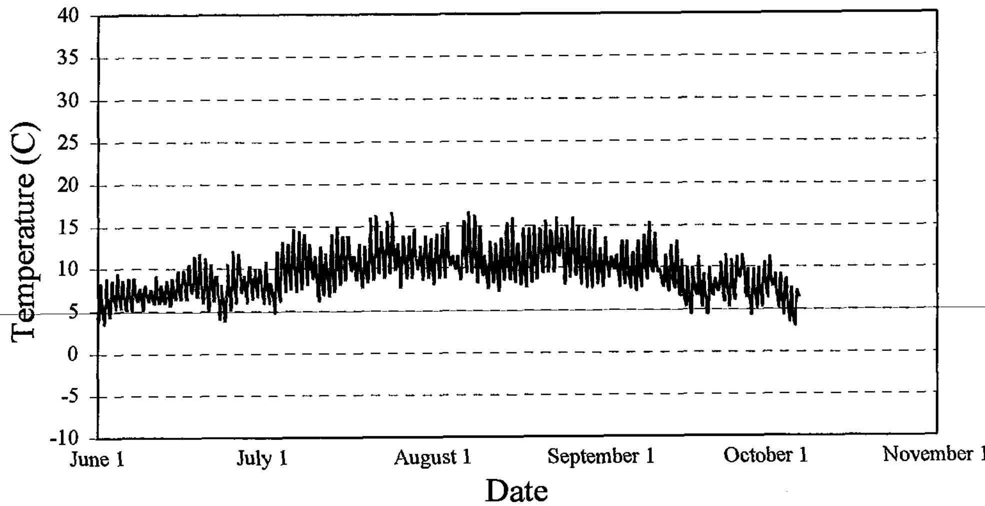


Little Lost River
Approximately 500 m below Timber Creek

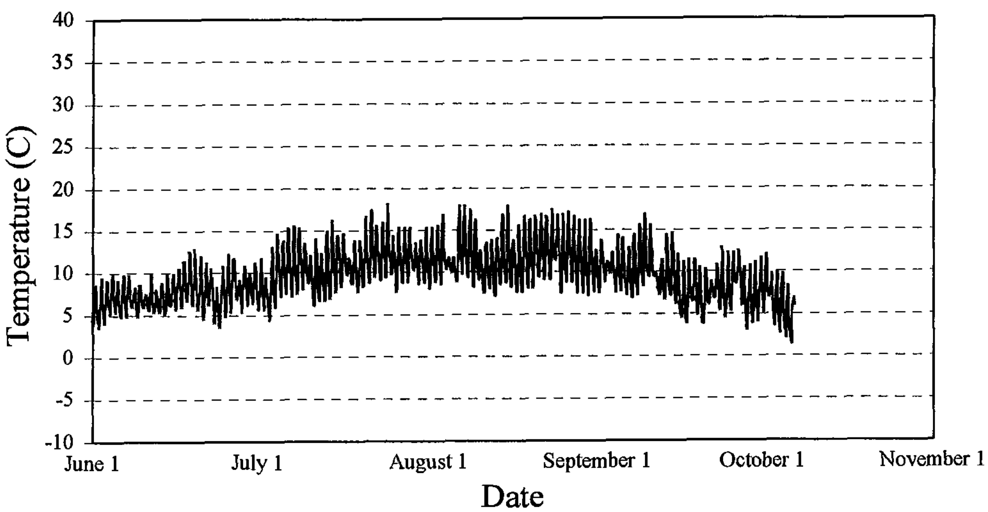


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Little Lost River
At Bull Creek Road bridge

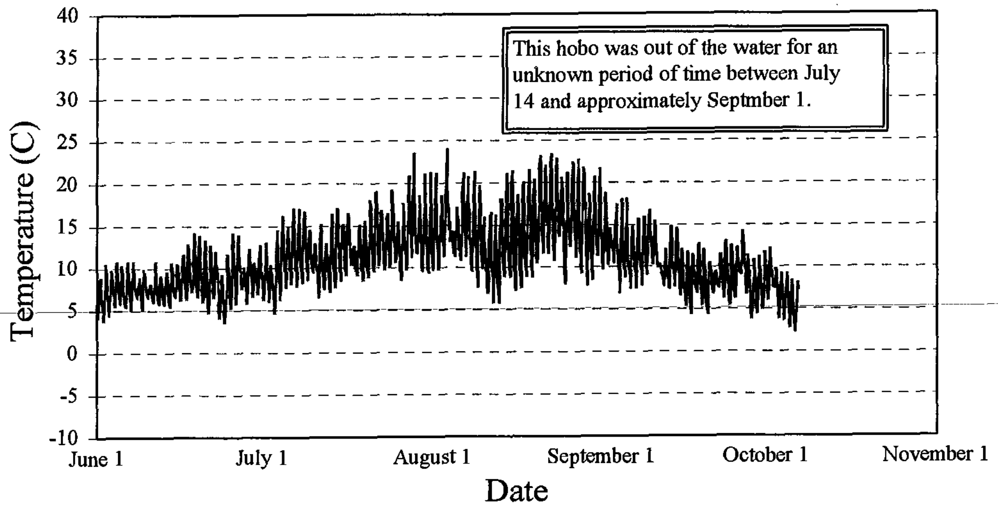


Little Lost River
Between Mill and Squaw creeks

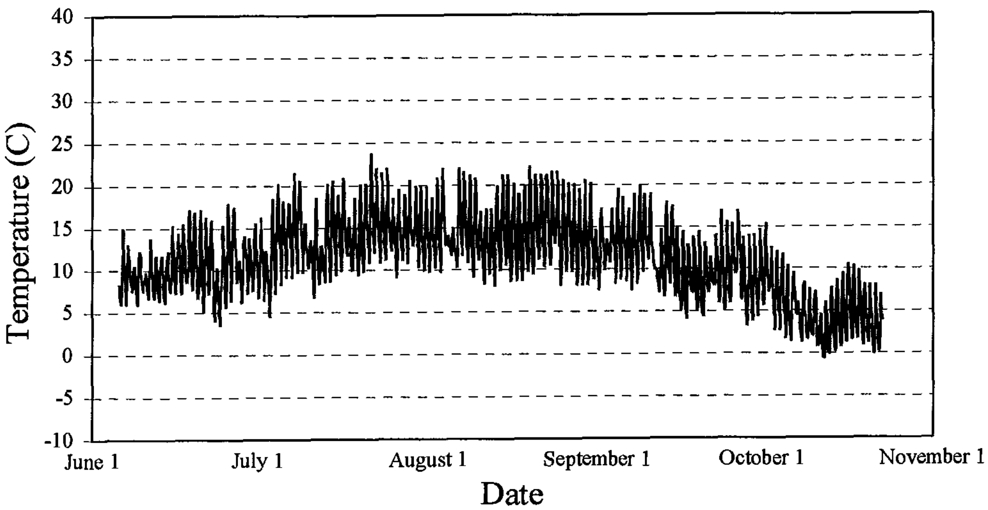


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Little Lost River
At the Sawmill Road bridge (Forest boundary)

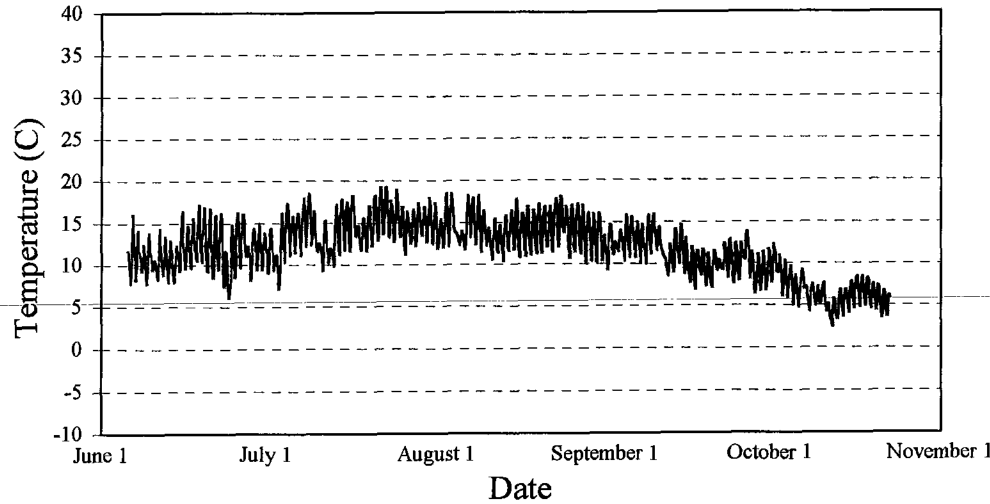


Little Lost River
Approximately 1 km above Summit Creek

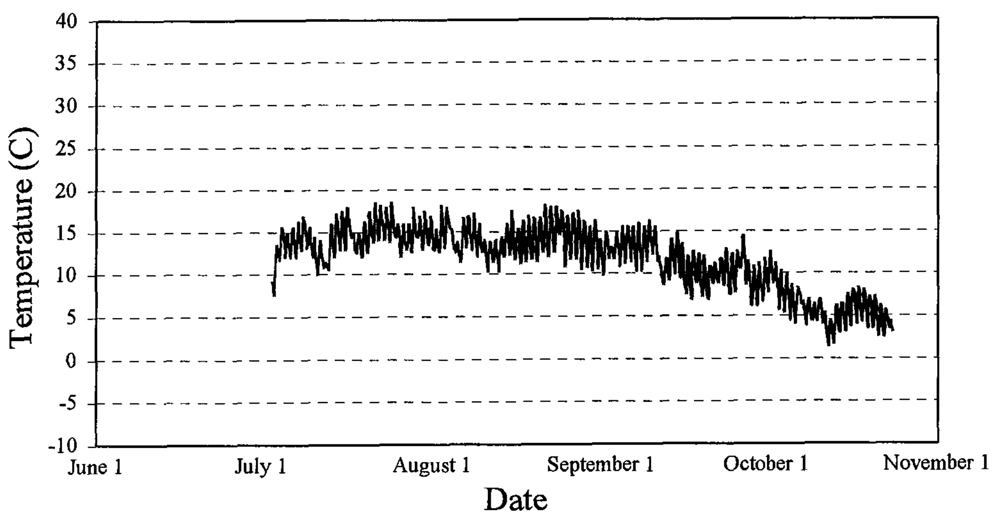


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Little Lost River
Approximately 1 km above Wet Creek

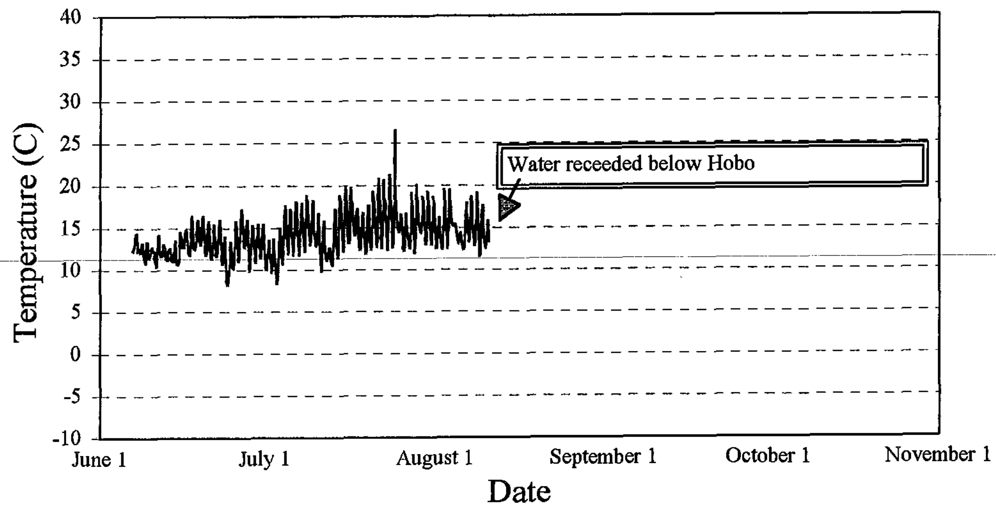


Little Lost River
Approximately 5 km below Badger Creek (at Buck and Bird Road bridge)

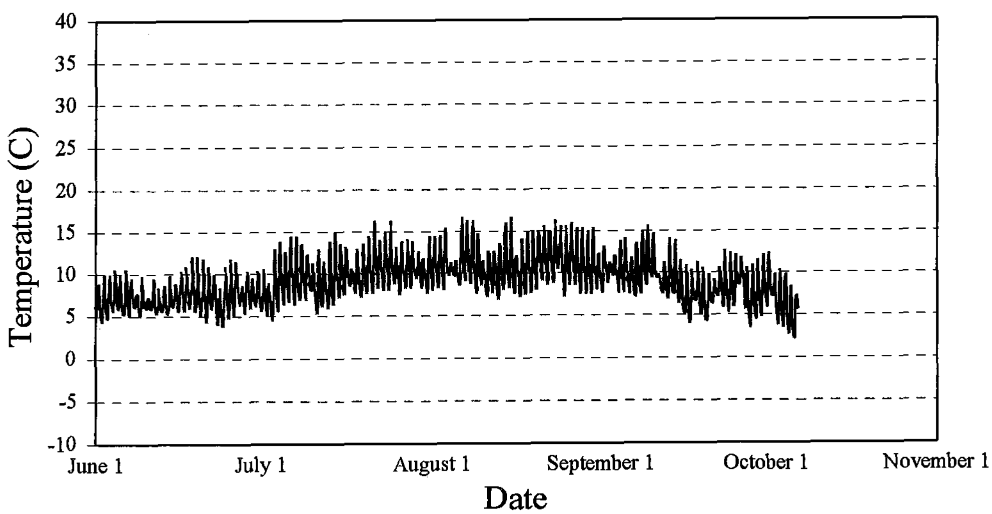


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Little Lost River
Approximately 2 km below Big Springs Creek (at Cedarville Canyon Road bridge)

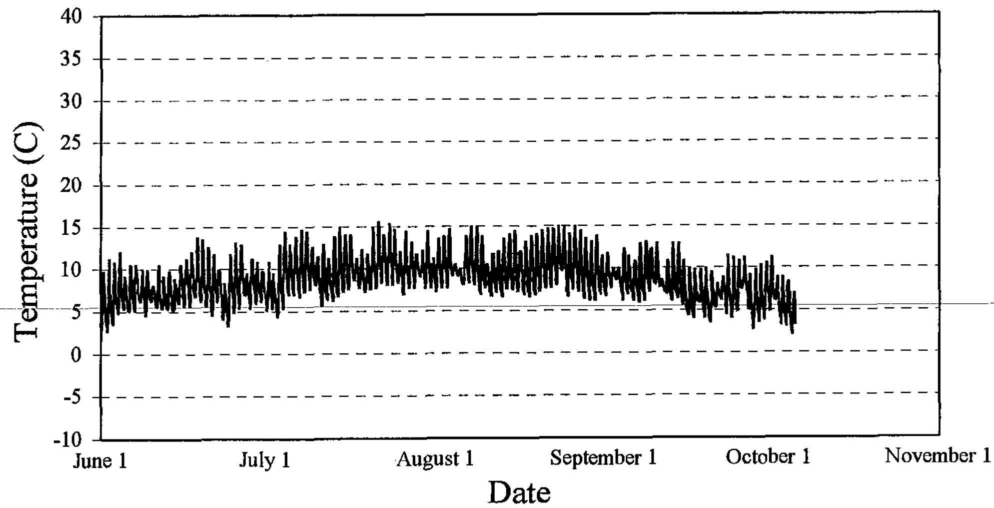


Mill Creek
100 m above Little Lost River

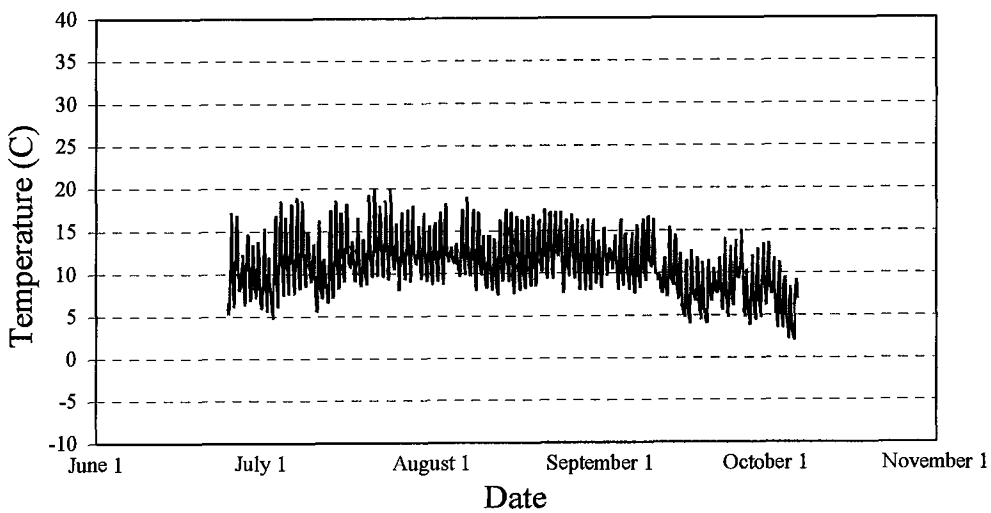


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Smithie Fork
Approximately 100 m above Little Lost River

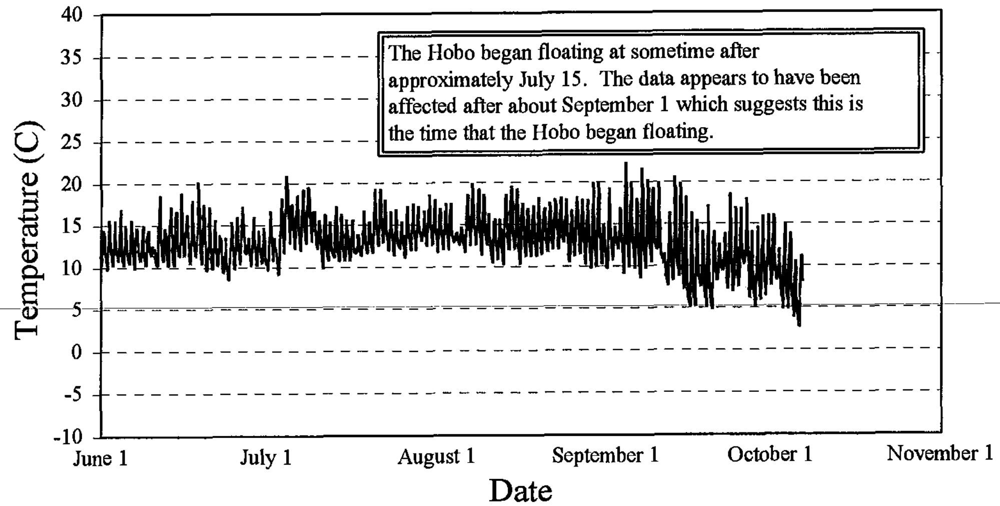


Summerhouse Creek
At Forest boundary

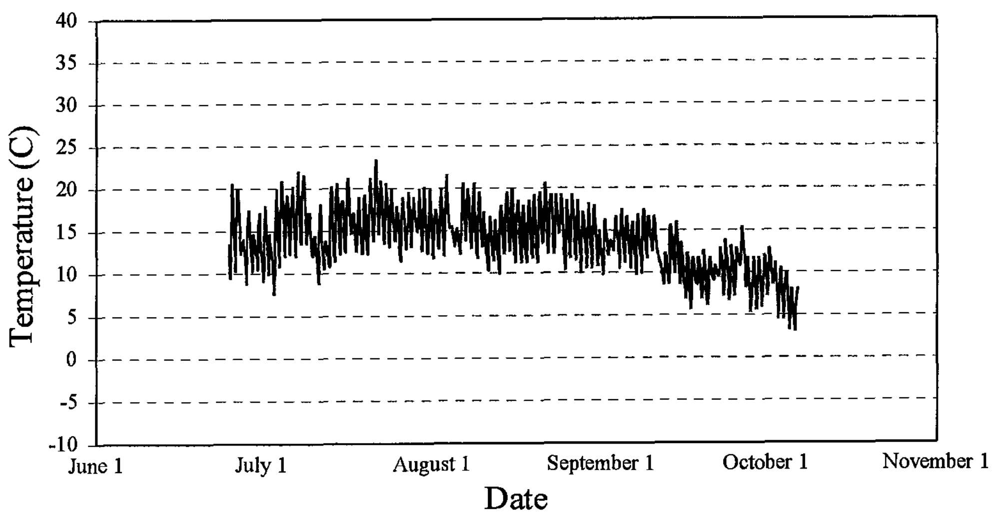


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Summit Creek
200 m below confluence of Iron Springs

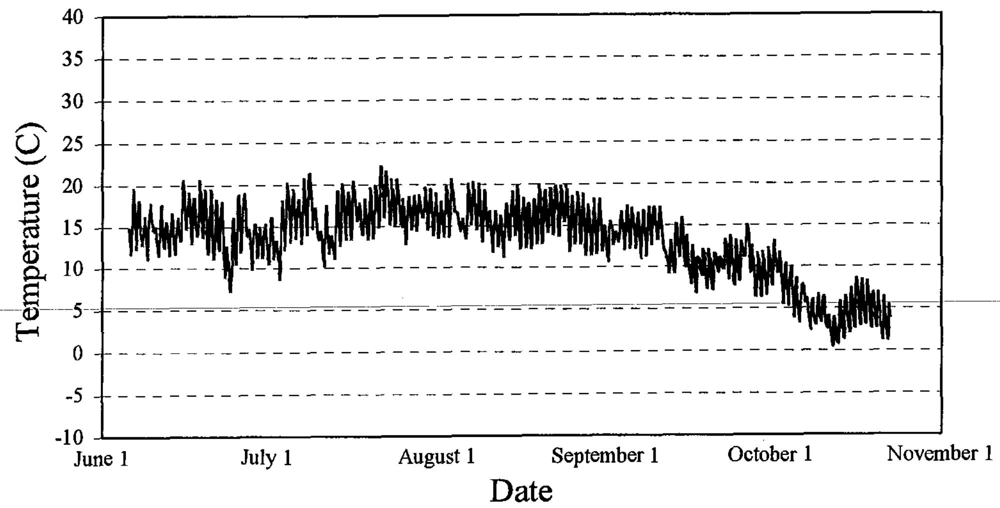


Summit Creek
At BLM/private boundary approximately 1 km below Sawmill Canyon Road

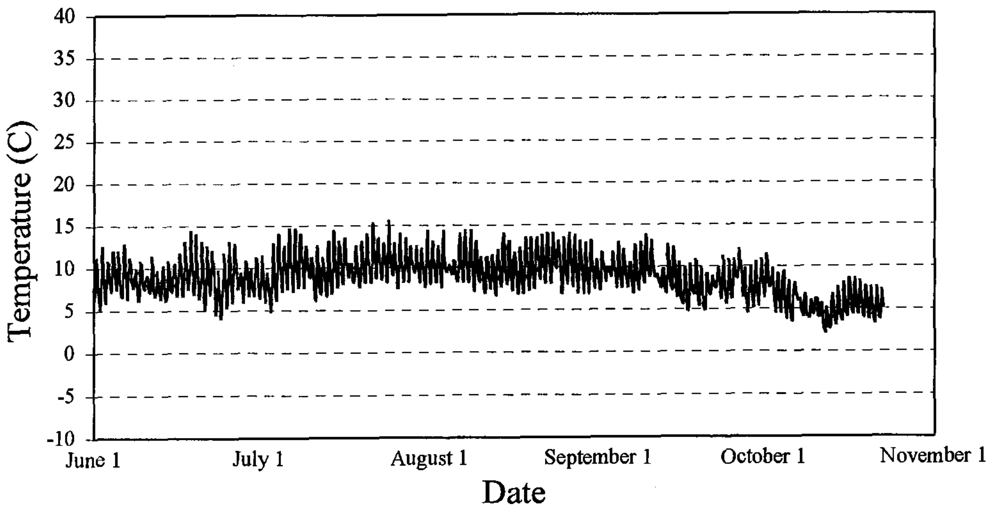


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Summit Creek
Approximately 1 km above Little Lost River



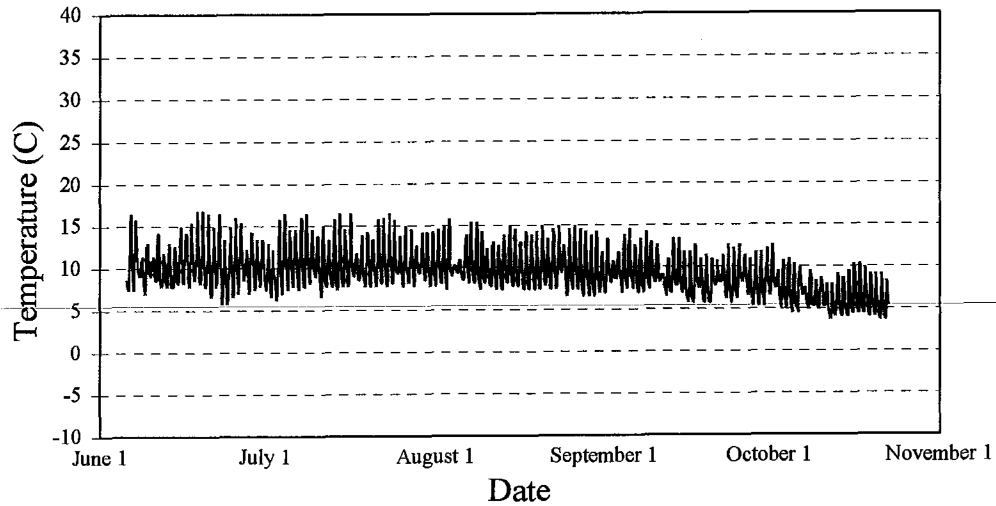
Squaw Creek (Sawmill Creek)
10 m above Little Lost River



Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

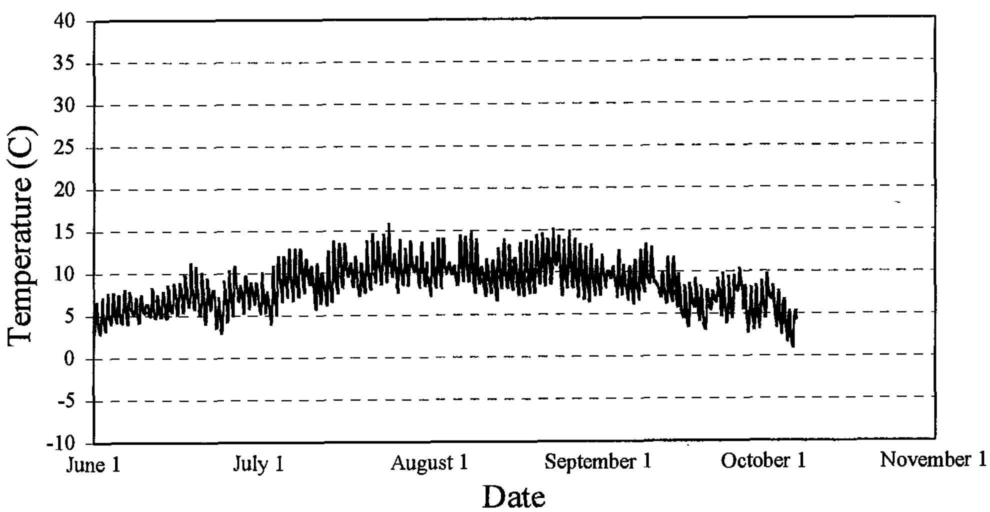
Squaw Creek (Wet Creek)

17 m above Wet Creek



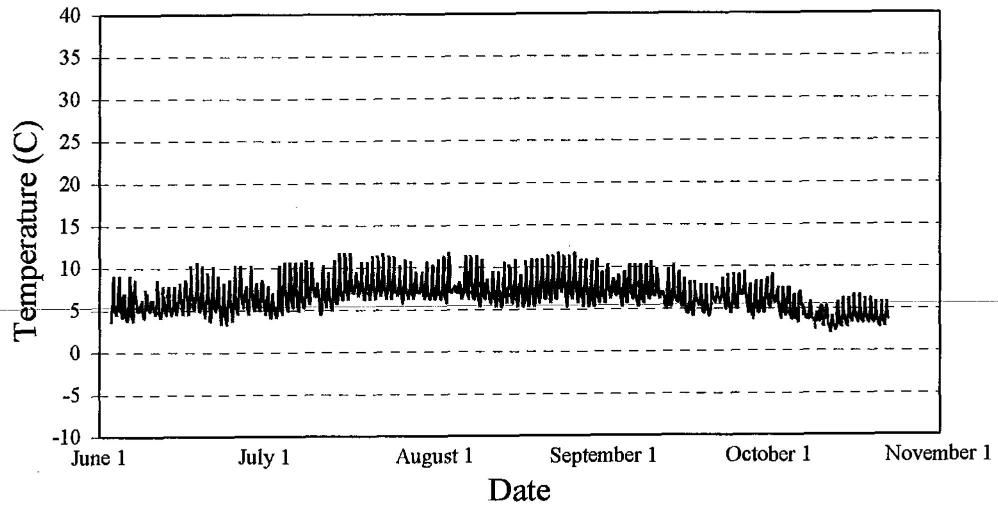
Timber Creek

Approximately 200 m above Little Lost River

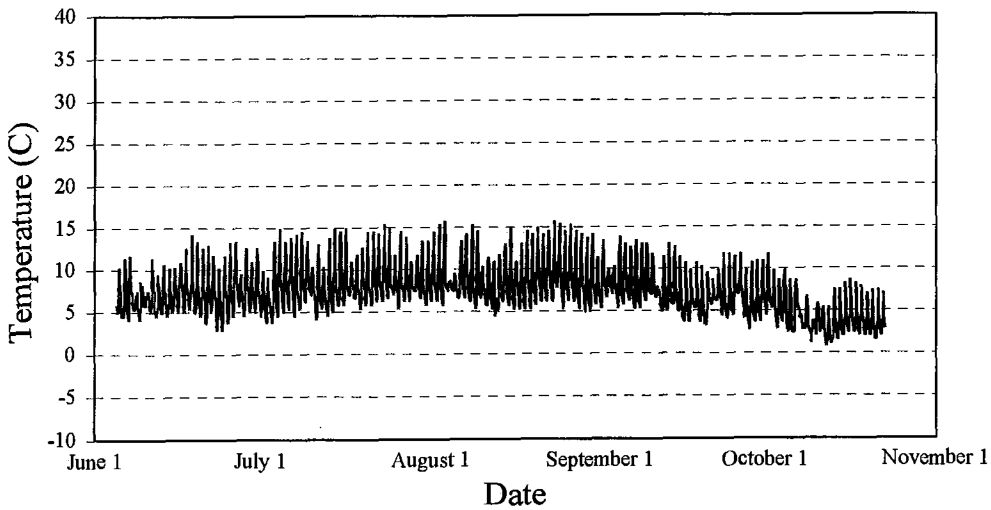


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Wet Creek
Approximately 0.8 km above Hilts Creek (at old diversion)

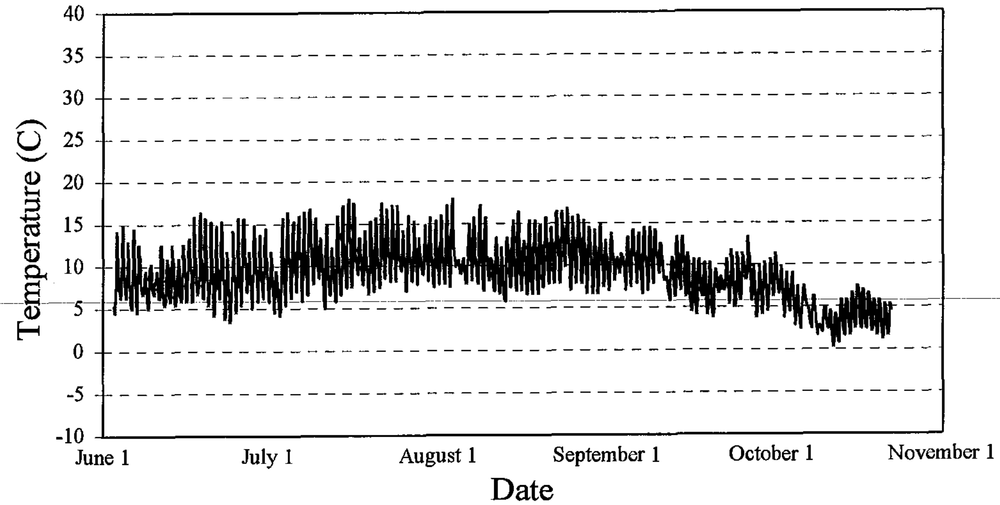


Wet Creek
Approximately 500 m above Coal Creek (at Forest/private boundary)

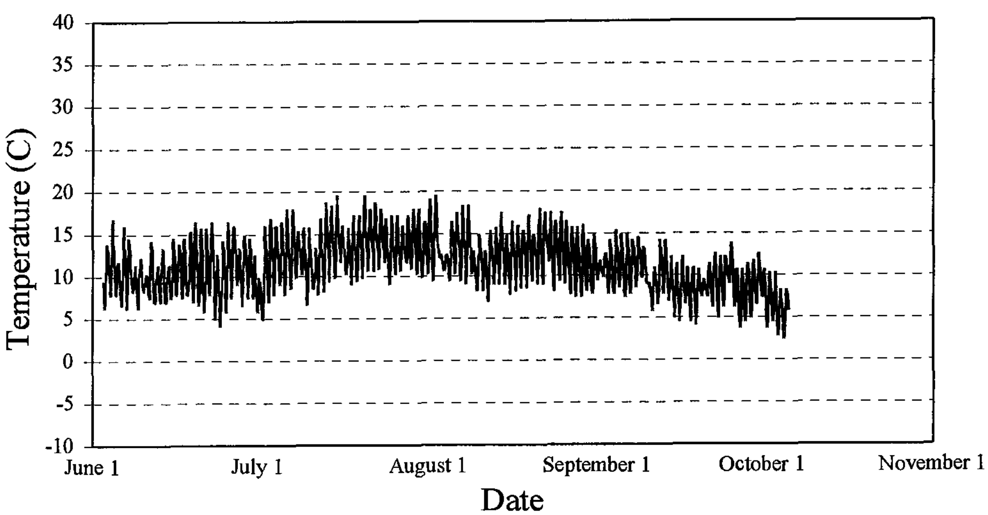


Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Wet Creek
At the Forest boundary (approximately 300 m above Big Creek)



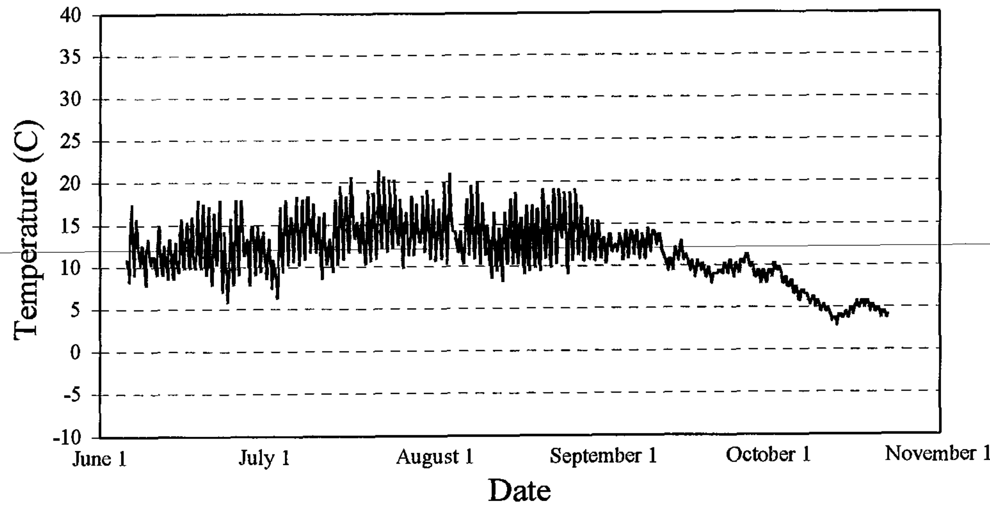
Wet Creek
At Deer Creek Road crossing



Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

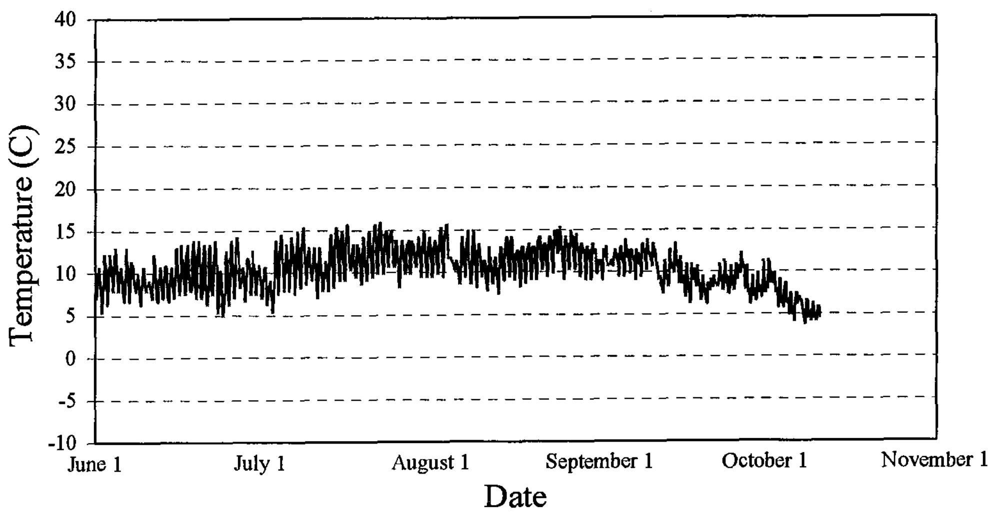
Wet Creek

Approximately 50 m above Dry Creek hydroelectric inflow (approximately 6 km above Wet Creek)



Wet Creek

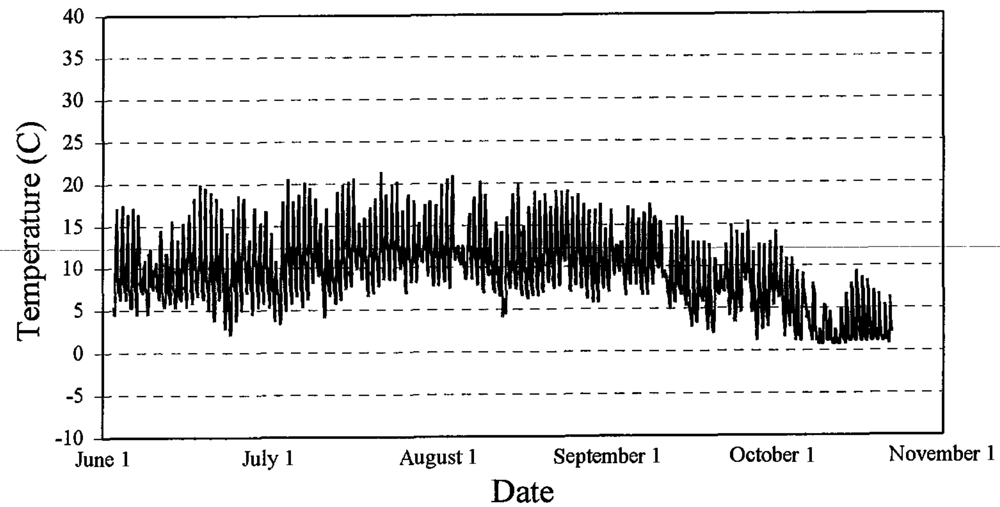
At Little Lost/Pahsimeroi Road



Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

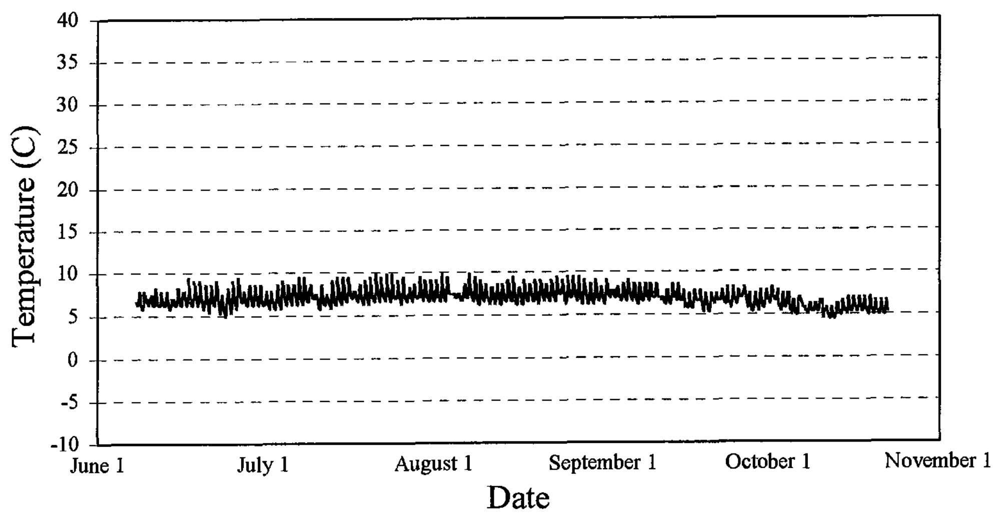
Wet Creek, unnamed tributary approximately 500 m below Coal Creek

13.5 m above Wet Creek



Williams Creek

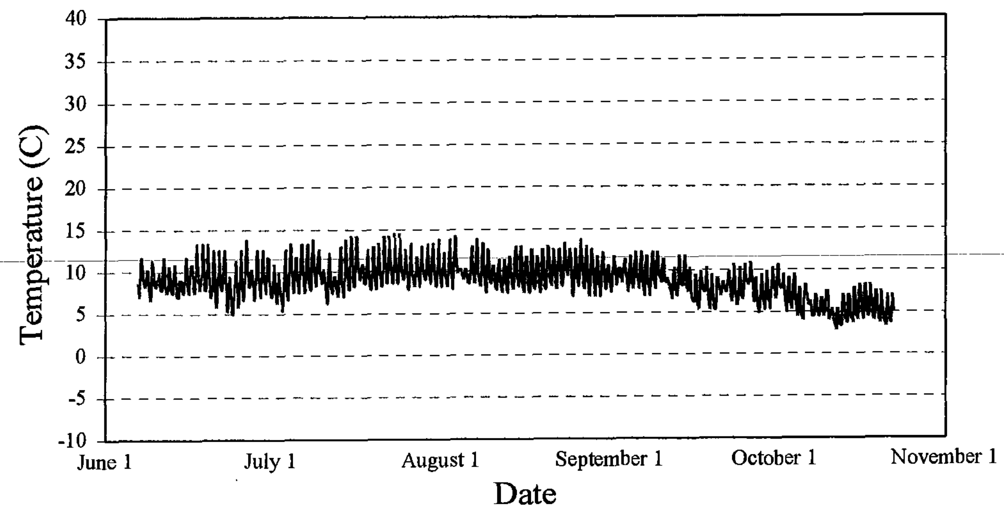
Approximately 1.6 km above the Forest boundary



Appendix E (continued). Stream and air temperature data collected from various locations in the Little Lost River drainage in 1997.

Williams Creek

Approximately 3 km below Forest boundary (at uppermost diversion)



APPENDIX F

Appendix F. Selected stream habitat parameters determined by the Forest Service R1/R4 Fish and Fish Habitat Standard Inventory Procedures (Overton et al. 1997).

Stream/Reach	Date	Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Max. Depth (m)	Width/ Depth	LWD/ 100 m	Bank Stability (%)	Undercut Bank (%)	Surface Fines (%)	Pools (%)	Comments
Badger Creek												
Private boundary near Little Lost Road to Forest boundary (BLM section)	97	8837	4.5	2.1	0.5	15.7	0.8	71	69	12	2	
F.S. boundary to Bunting Creek	97	2569	4.2	2.5	0.6	15.7	0.6	65	64	13	1	
Bunting Creek to source spring	97	1637	5.9	1.6	0.4	9.0	2.3	86	72	37	6	
Basin Creek - Wet Creek to Pine Creek	97	2473	4.4	0.9	0.5	24.3	0.0	73	25	68	1	
Bear Creek - Little L.R. upstream 1,593 m	94	1593	5.5	3.8	0.5	19.5	1.1	97	5	44	44	
Big Creek												
Wet Cr. upstream 7,459 m (Beaver Pond)	94	7459	3.6	2.0	0.5	11.2	1.0	100	32	12	4	
Beaver Pond to source springs	94	453	4.0	23.6	1.3	12.9	0.2	98	8	9	62	reach included beaver pond
Bunting Cr. - Badger Cr. upstream 912 m	97	912	0.1	2.4	0.7	15.3	1.5	81	8	13	<1	
Camp Cr. - Timber Cr. upstream 2,299 m	97	2299	8.1	1.7	0.4	25.0	5.2	71	14	17	1	
Coal Creek - Wet Creek upstream 1,047 m	97	1047	2.5	0.4	0.2	13.2	0.0	60	6	52	<1	
Deer Creek												
Private boundary to Forest boundary (BLM section)	97	7403	2.7	1.3	0.4	9.0	0.4	87	58	68	1	
Forest boundary to confluence of forks	97	1801	4.1	1.5	0.4	16.3	2.1	90	51	65	3	
Deer Creek, North Fork - entire reach	97	812	5.9	1.3	0.4	11.4	5.4	99	48	43	<1	
Deer Creek, South Fork - entire reach	97	937	5.5	1.2	0.2	17.0	2.1	90	29	58	3	
Dry Creek												
Hydroelectric diversion to Long Lost Cr.	97	3763	1.6	5.9	1.2	30.0	0.7	63	26	13	8	
Long Lost Creek to Forest boundary	97	1570	1.6	5.4	1.0	29.7	0.0	70	50	19	3	
Forest boundary upstream 2,623 m (to the falls)	97	2623	2.4	4.0	1.0	16.5	0.2	75	45	13	1	

Appendix F. Continued.

Stream/Reach	Date	Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Max. Depth (m)	Width/ Depth	LWD/ 100 m	Bank Stability (%)	Undercut Bank (%)	Surface Fines (%)	Pools (%)	Comments
Dry Creek, unnamed tributary above Forest boundary												
Dry Creek to source spring	97	1028	3.4	2.1	0.5	18.8	0.0	85	37	12	3	
Firebox Cr. - Little L.R. upstream 2,406 m	94	2406	7.4	1.7	0.4	11.4	11.3	100	38	7	5	burned in 1988
Hawley Creek - Iron Cr. upstream 2,446 m	97	2446	9.3	1.6	0.3	16.6	7.4	89	57	31	7	
Iron Creek												
Little Lost River to Jackson Creek	94	1151	3.0	2.3	0.4	17.5	1.7	63	7	7	14	
Jackson Creek to "Right Fork" Iron Creek	94	2340	4.5	1.7	0.4	16.1	6.3	88	13	9	21	
Iron Creek, "Left Fork"												
Iron Creek upstream 2,439 m	97	2439	11.6	2.4	0.5	20.6	5.5	80	76	10	2	
Iron Creek, "Right Fork"												
Iron Creek upstream 1,044 m	97	1044	9.6	1.7	0.4	26.0	5.9	78	70	14	4	
Jackson Creek												
Iron Creek upstream 3,806 m	97	3806	14.9	1.7	0.5	15.2	6.2	88	64	9	2	
Little Lost River												
Bride on Sawmill Canyon Road below Forest boundary upstream to private boundary	94	2250	2.6	6.1	0.9	16.2	0.4	91	22	11	58	
Private boundary near Squaw Creek to private boundary near Bull Creek	94	5261	1.4	6.1	0.8	21.3	0.8	90	15	9	39	
Private boundary near Iron Creek to Timber Creek	94	2267	1.9	5.9	0.6	25.4	2.4	89	18	10	25	
Timber Creek to Smithie Fork	94	4678	2.4	4.1	0.6	17.5	7.0	95	32	10	18	upper portion burned in 1988
Smithie Fork to Firebox Creek	94	2002	3.6	2.2	0.4	12.3	13.1	99	51	10	19	burned in 1988
Firebox Creek to unnamed tributary	97	317	12.0	1.9	0.8	12.4	11.7	76	53	17	17	burned in 1988

Appendix F. Continued.

Stream/Reach	Date	Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Max. Depth (m)	Width/ Depth	LWD/ 100 m	Bank Stability (%)	Undercut Bank (%)	Surface Fines (%)	Pools (%)	Comments
Little Lost River (continued)												
Unnambed tributary to headwaters	97	713	11.5	1.6	0.4	16.9	7.4	92	32	23	2	burned in 1988
Little Lost River, "Right Fork"												
Little Lost River to headwaters	97	1614	11.0	1.5	0.4	19.3	3.0	87	41	6	2	burned in 1988
North Creek – diversion to headwaters	97	3052	9.6	1.3	0.6	14.4	0.9	81	29	48	1	
Meadow Creek – Little L. R. to headwaters	97	4937	10.0	0.7	0.3	10.2	1.0	66	56	50	1	lower portion appears intermittent
Mill Creek												
Little Lost River upstream 3824 m	94	3824	7.0	3.2	0.4	18.5	4.9	94	3	16	10	
Quigley Cr. - Little L. R. upstream 411 m	97	411	2.0	1.3	0.4	24.4	7.0	76	16	32	8	
Redrock Creek - Timber Creek to forks	97	677	2.5	2.1	0.5	26.4	10.1	73	13	65	5	
Slide Creek - Timber Cr. upstream 965 m	97	965	9.6	2.2	0.4	23.1	8.3	94	15	21	6	
Smithie Fork												
Little Lost River upstream 1,203 m	94	1203	3.5	3.0	0.5	15.3	7.9	94	25	14	48	burned in 1988
End of prior section upstream 3,238 m	94	3238	3.6	2.4	0.5	12.7	4.9	99	43	11	50	burned in 1988
End of prior section to Right Fork	94	2149	4.0	1.5	0.4	12.6	2.9	98	37	12	23	burned in 1988
Smithie Fork, "Right Fork"												
Smithie Fork upstream 488 m	97	488	9.0	1.1	0.3	11.5	4.8	79	42	17	5	burned in 1988
Smithie Fork, "West Fork"												
Smithie Fork upstream 959 m	97	959	11.2	1.6	0.4	18.4	5.2	85	59	24	3	burned in 1988
South Creek - diversion upstream 4,230 m	97	4230	7.6	1.1	0.3	10.8	0.2	90	31	38	<1	

Appendix F. Continued.

Stream/Reach	Date	Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Max. Depth (m)	Width/ Depth	LWD/ 100 m	Bank Stability (%)	Undercut Bank (%)	Surface Fines (%)	Pools (%)	Comments
Squaw Creek - Sawmill Canyon												
Little Lost River to Road #101	94	609	1.4	2.0	0.5	9.2	0.5	82	25	35	22	
Road #101 upstream 2,446 m	94	2446	2.1	1.8	0.4	9.1	4.4	99	13	10	5	
End of prior section upstream 1,292 m	94	1292	3.8	1.7	0.4	8.2	4.5	99	7	14	7	
South Fork Squaw Cr. upstream 2,143 m	97	2143	9.2	1.4	0.4	13.2	4.4	86	57	22	4	
Squaw, North Fork												
Squaw Creek upstream 2,013 m	97	2013	10.4	2.9	0.4	34.2	4.0	94	15	48	2	
Squaw Creek, "South Fork"												
Squaw Creek upstream 500 m	97	500	2.8	1.3	0.4	9.8	5.6	100	14	55	5	
Summit Creek												
Pahsimeroi Road upstream 2,195 m	95	2195	0.6	5.3	0.5	47.7	0.6	87	53	32	37	
Timber Creek												
Little Lost River to Redrock Creek	94	2949	2.5	2.6	0.5	15.9	4.3	85	4	10	33	
Redrock Creek to Slide Creek	94	3279	2.0	2.1	0.4	15.8	12.2	82	6	12	26	
Slide Creek to source springs	97	1228	7.4	2.0	0.4	20.2	7.4	92	13	17	2	
Uncle Ike Creek												
Diversion dam to "Left Fork"	97	3454	10.0	2.2	0.6	16.3	0.6	83	46	40	1	
"Left Fork" to headwaters	97	3241	7.7	0.9	0.4	13.0	0.7	82	30	33	<1	
Warm Creek - Little L. R. to source spring	97	3452	6.3	2.0	0.4	15.2	4.0	64	36	18	1	
Wet Creek												
Basin Creek to Big Creek	97	2123	2.8	4.2	1.0	17.2	0.0	82	67	28	22	
Big Creek to private boundary above Coal Creek	97	3575	2.5	8.5	0.7	14.8	1.2	45	15	47	32	reach includes beaver ponds

Appendix F. Continued.

Stream/Reach	Date	Reach Length (m)	Map Gradient (%)	Mean Width (m)	Mean Max. Depth (m)	Width/ Depth	LWD/ 100 m	Bank Stability (%)	Undercut Bank (%)	Surface Fines (%)	Pools (%)	Comments
Wet Creek (continued)												
Private section above Coal Creek	97	2332	3.0	2.8	0.7	19.5	2.5	83	28	28	16	reach is not grazed and includes beaver ponds
Private boundary to old diversion	97	185	4.2	2.7	0.7	12.9	5.0	70	11	23	2	
Old diversion upstream 673 m (to the falls)	96	673	2.7	2.3	0.5	15.6	9.5	60	25	52	39	
Wet Creek, unnamed tributary near Coal Creek												
Wet Creek upstream 1,550 m	97	1550	1.0	0.9	0.3	33.8	0.4	65	34	66	1	
Williams Creek												
Lower diversion to upper diversion	97	1235	12.0	0.8	0.4	6.3	0.0	86	66	21	4	
Upper diversion to Forest boundary	97	1869	12.0	1.4	0.4	12.5	1.7	69	57	26	4	
Forest boundary to source springs	97	2497	12.0	2.0	0.4	32.8	2.4	69	55	18	2	