MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-5-R-14 Name Central Montana Fisheries Study

Job No. I Title Inventory of Waters of the Project Area

Period Covered July 1, 1964 - June 30, 1965

Abstract:

Extensive flooding occurred in the watersheds of the Sun and Teton Rivers in June 1964. In cooperation with the U. S. Forest Service certain areas were inspected, and gabion structures were proposed for streambank protection and improvement of habitat for trout. A 300-foot section on the North Fork of the Dearborn River was shocked in August 1964 to determine if any trout had survived the June flood. Ten rainbow and 12 brook trout were collected. A 300-foot section on Logging Creek was shocked in August 1964 to determine the abundance and sizes of trout. The catch consisted of 19 rainbow and 74 brook trout. The seven largest rainbow and brook trout averaged 7.4 inches in total length. Public show-me trips were conducted on Otter and Sheep Creeks in August 1964. On each stream two 300-foot sections were shocked. One section had been altered by highway construction and the other section was unaltered. Altered sections contained fewer trout and other species of fish than did unaltered sections.

Recommendations:

Only through a continual study of an area's resources, whether physical or biological, can man attain a sound management program, therefore, it is recommended this inventory of waters be continued.

Objectives:

The purpose of this investigation is to determine the physical, chemical and biological characteristics of the waters of highest importance to the recreational fisheries of the project area.

Techniques Used:

Samples of fish were collected by using a 110-220 volt electric shocker or 125-foot experimental gill nets. Figures were copied from a U. S. Forest Service map printed in 1938. Areas inspected and where gabions were proposed were then added to the map. All fish were measured in total length.

Findings:

In June 1964 extensive flood damage occurred in the watersheds of the Sun and Teton Rivers, located in the Lewis and Clark National Forest (Figures 1 and 2). The maps indicate areas inspected in co-operation with the U. S. Forest Service. Advice was given where new roadways would possibly influence tributaries, and in the establishment of gabions for streambank protection and improvement of trout habitat (i.e., the use of gabions to direct water flows so that pools might be formed).

On August 14, 1964 a 300-foot section on the North Fork of the Dearborn River was shocked to determine if any trout survived the June flood. The section was located approximately $\frac{1}{4}$-road miles west of the Wallace Bean Ranch in Lewis and Clark County. The section contained a badly scoured riffle-pool-run complex, with little overhead cover. Ten rainbow trout were collected, and were 3.7 to 11.8 inches in length. Four of the largest rainbow trout had eroded dorsal fins and were thought to have been representatives of a plant made on July 21, 1964. Twelve brook trout were collected and were 3.8 to 8.1 inches in length.

One 300-foot section of Logging Creek, Cascade County, was shocked on August 18, 1964 to determine the abundance and sizes of trout. Nineteen rainbow and 74 brook trout were collected. The rainbow were 3.4 to 8.1 inches in length and the brook trout were 2.5 to 8.3 inches in length. The seven largest rainbow and brook trout averaged 7.4 inches in length. The same area was shocked on August 15, 1962 (Swedberg, 1963). At that time, the catch from two 300-foot sections consisted of 19 catchable-size rainbow and brook trout that averaged 9.9 inches in length. Forty-one smaller rainbow and brook trout were also taken.

During August 1964 the District Information and Education Officer and fisheries personnel conducted two public show-me trips. Each show-me trip consisted of electrofishing a 300-foot section of stream that had been altered by highway construction and one 300-foot section that was unaltered by highway construction. The sections were on Otter Creek, Cascade County, near the town of Raynesford, and on Sheep Creek, located approximately 20 miles northeast of White Sulphur Springs, near the Cook Ranch in Meagher County. Table 1 shows the results of electrofishing the two streams. Altered sections contained fewer trout and other species of fish that did unaltered sections.

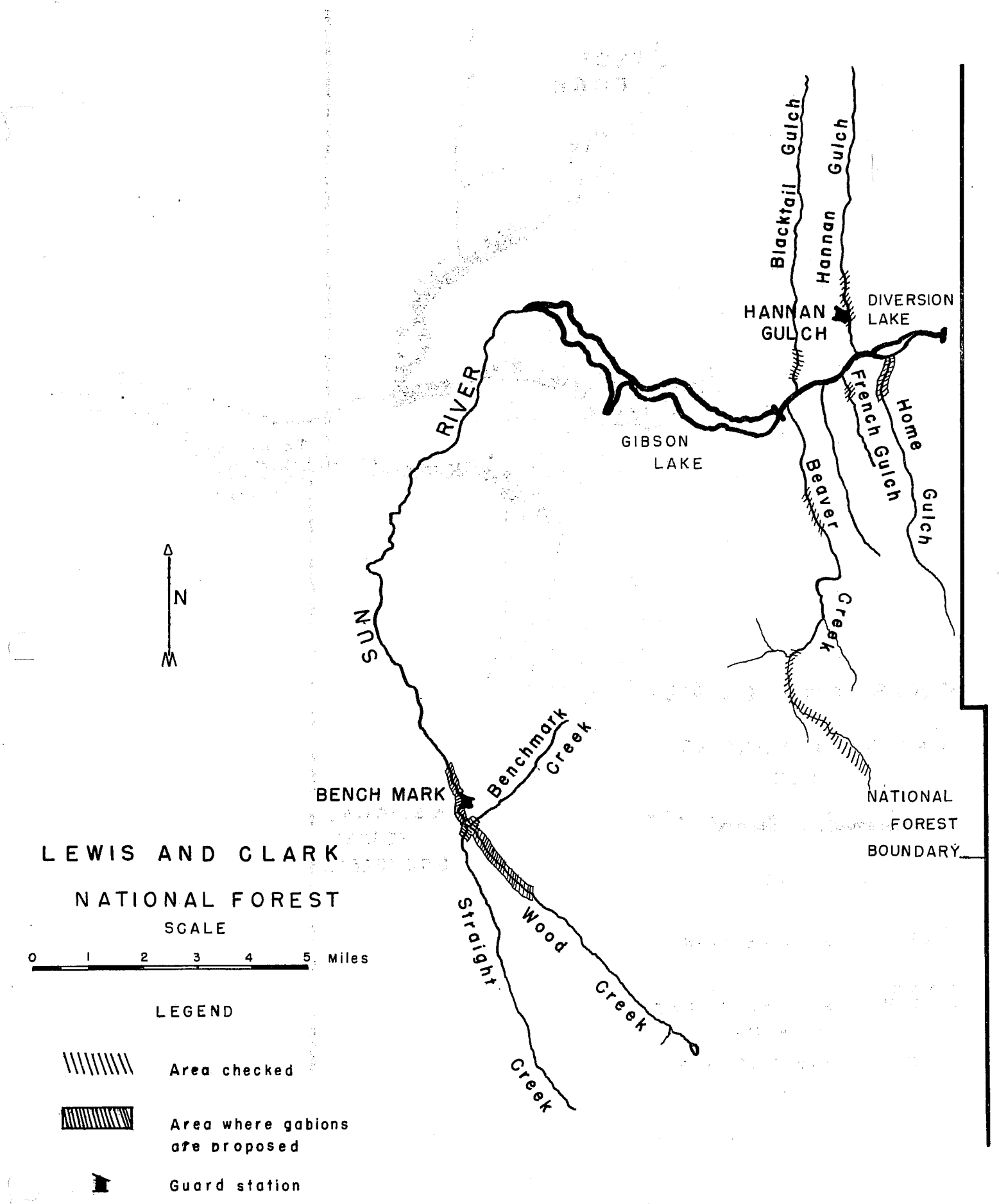
Blacktail Gulch
Hannan Gulch
HANNAN GULCH
DIVERSION LAKE
SUN RIVER
GIBSON LAKE
French Gulch
Home Gulch
Beaver Creek
N
Benchmark Creek
BENCH MARK
NATIONAL FOREST BOUNDARY
LEWIS AND CLARK
NATIONAL FOREST
SCALE
0 1 2 3 4 5 Miles
LEGEND
Area checked
Area where gabions are proposed
Guard station
Straight Creek
Wood Creek

Figure 1.

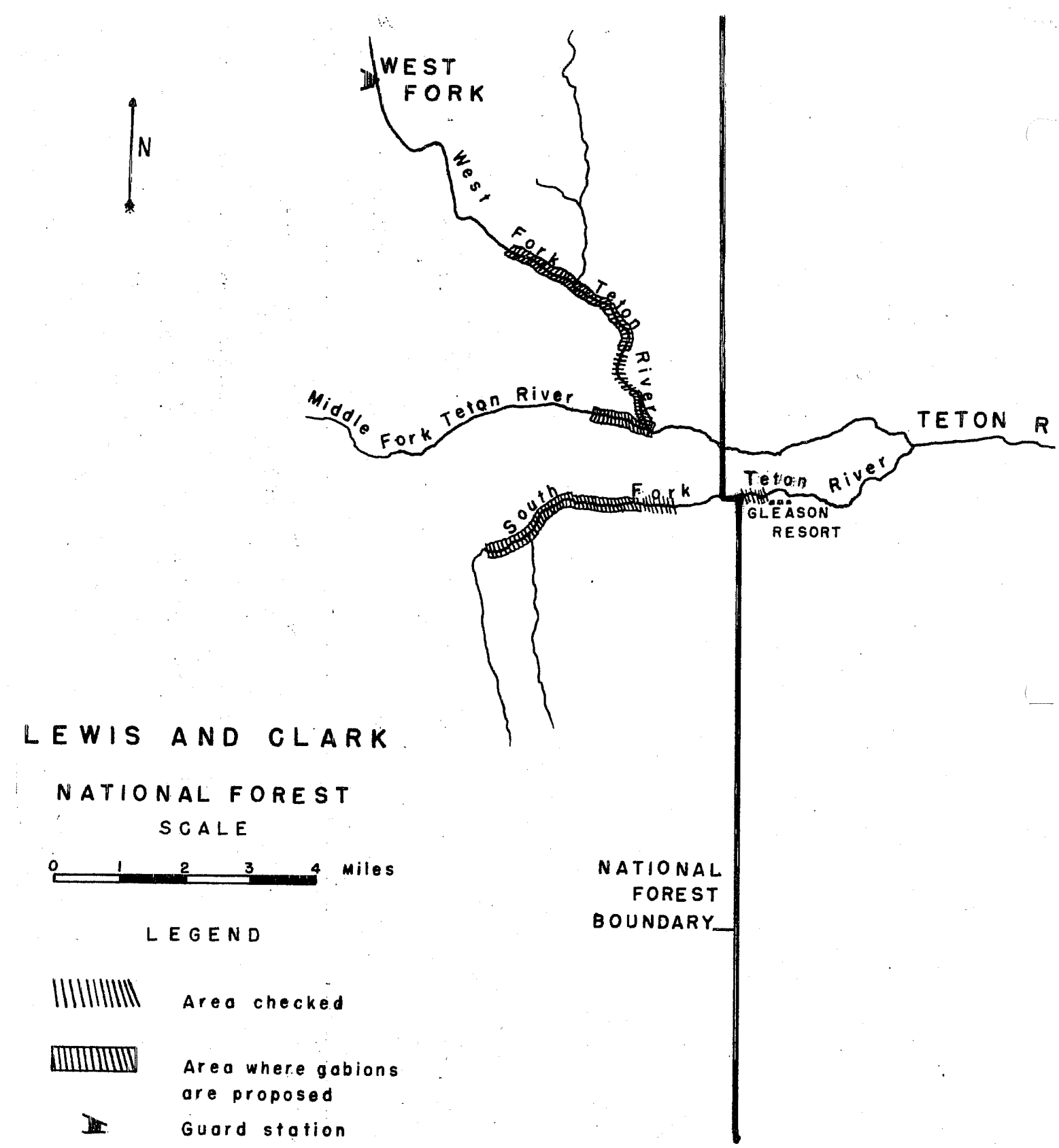
N
WEST FORK
West Fork Teton River
Middle Fork Teton River
TETON R
Teton River
South Fork
GLEASON RESORT
LEWIS AND CLARK
NATIONAL FOREST
SCALE
0 1 2 3 4 Miles
LEGEND
Area checked
Area where gabions are proposed
Guard station
NATIONAL FOREST BOUNDARY

Figure 2.

Fish populations in several other waters were also sampled with electric shockers and gill nets during the report period. The data obtained have been recorded in the District stream and lake survey file.

Table 1. Results of electrofishing 300-foot sections of stream.

Location	Date	Habitat	Number				
			Rainbow trout	Brown trout	Brook trout	Whitefish	Suckers
Otter Cr.	8-23-64	Altered	--	--	--	--	1
		Unaltered	--	15	--	--	31
Sheep Cr.	8-30-64	Altered	8	--	4	--	--
		Unaltered	152	--	6	22	11

References Cited:

Swedberg, Steve E.
1963. Inventory of waters of the project area. Central Montana Fisheries Study. Montana Fish and Game Department, Completion Report for Dingell-Johnson Project F-5-R-12, Job I, 3 p. (mimeo).

Prepared by Steve E. Swedberg

Approved by George D Holton

Date May 4, 1965

MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-5-R-14 Name Central Montana Fisheries Study

Job No. II Title Evaluation of Fish Habitat Destruction in Little Prickly Pear Creek due to Construction of Interstate Highway 15

Period Covered: July 1, 1964 to June 30, 1965

Abstract:

Temperature, water quality and quantity, bottom fauna and fish were sampled at several stations on Little Prickly Pear Creek. The data has been analyzed and presented in tables and graphs. The U. S. Geological Survey collected and analyzed the water flow and suspended sediment information, other data were collected and presented by fisheries personnel. Similar analysis will be performed in 1965.

Recommendations:

It is recommended this study be continued. Highway construction is not completed in the study area.

Objectives:

The purpose of this investigation is to determine the extent of trout habitat destruction caused by construction of Interstate Highway 15 along Little Prickly Pear Creek and obtain information on the effect of highway construction on fish and aquatic insect populations.

Techniques Used:

Temperatures were recorded with two recording thermometers.* One recorder was installed above construction activities at Sieben Ranch, and the other just below the mouth of Wolf Creek (Figure 1). Water flow and suspended sediment data were collected at Sieben Ranch and Wolf Creek and analyzed by personnel from the U. S. Geological Survey-Water Resources Division.

Bottom fauna were collected with a Surber sampler utilizing a 1-square foot frame. Three 4-square foot samples were taken at each of 5 stations (A, B, C, D, E, Figure 1). Organisms were identified

to order. Fish were collected at 5 stations (numbers 2, 3, 4, 5, and 6, Figure 1) with a 110-220-volt alternating-current generator. Each station was 600 feet in length, but was shocked in two 300-foot lengths. Blocknets were put in at each end of a section just prior to electrofishing. Numbers, weights, lengths, and scale samples were taken from fish that had been anesthetized with MS-222 (Cottus sp. were not accounted for).

Data is presented in tabular and graphic forms. Highway construction continues in the study area. A similar survey is planned for 1965.

Findings:

Temperature

Two recording thermometers* were installed in Little Prickly Pear Creek in 1964; one was located at Sieben Ranch and the other at Wolf Creek. The recorders plotted temperatures for 7 to 12 day periods. When recorder sheets were changed, both air and water temperatures were taken with a thermometer. Any necessary adjustments in the operation of the instruments were made at this time. Daily temperatures are presented in Figures 2 and 3, with means for each monthly series included.

Water Analysis

Water flow and suspended sediment information was collected by U. S. Geological Survey personnel at Sieben Ranch and at the town of Wolf Creek. Total mean dischange (cfs) and suspended sediment data (tons per month) are presented in Table 1, and suspended sediment (mean concentration - ppm) is described graphically in Figure 4.

Bottom Fauna

Bottom fauna were collected with a Surber sampler having a 1-square foot frame. Three 4-square foot samples were taken at each of 5 stations. Table 2 summarizes this data by order and numbers of organisms.

Fish

Five stations were sampled in 1964. Table 3 illustrates the results of electrofishing these 5 stations. The species composition (by number and weight) of fish caught is presented in Figure 5. Age and growth of fish collected in 1964 are depicted in Table 4.

*Minicorders, manufactured by the Dixon Company, Chicago, Ill.

Prepared by: Steve E. Swedberg and Ed Nevala Approved by: George D. Horan

Date: June 14, 1965

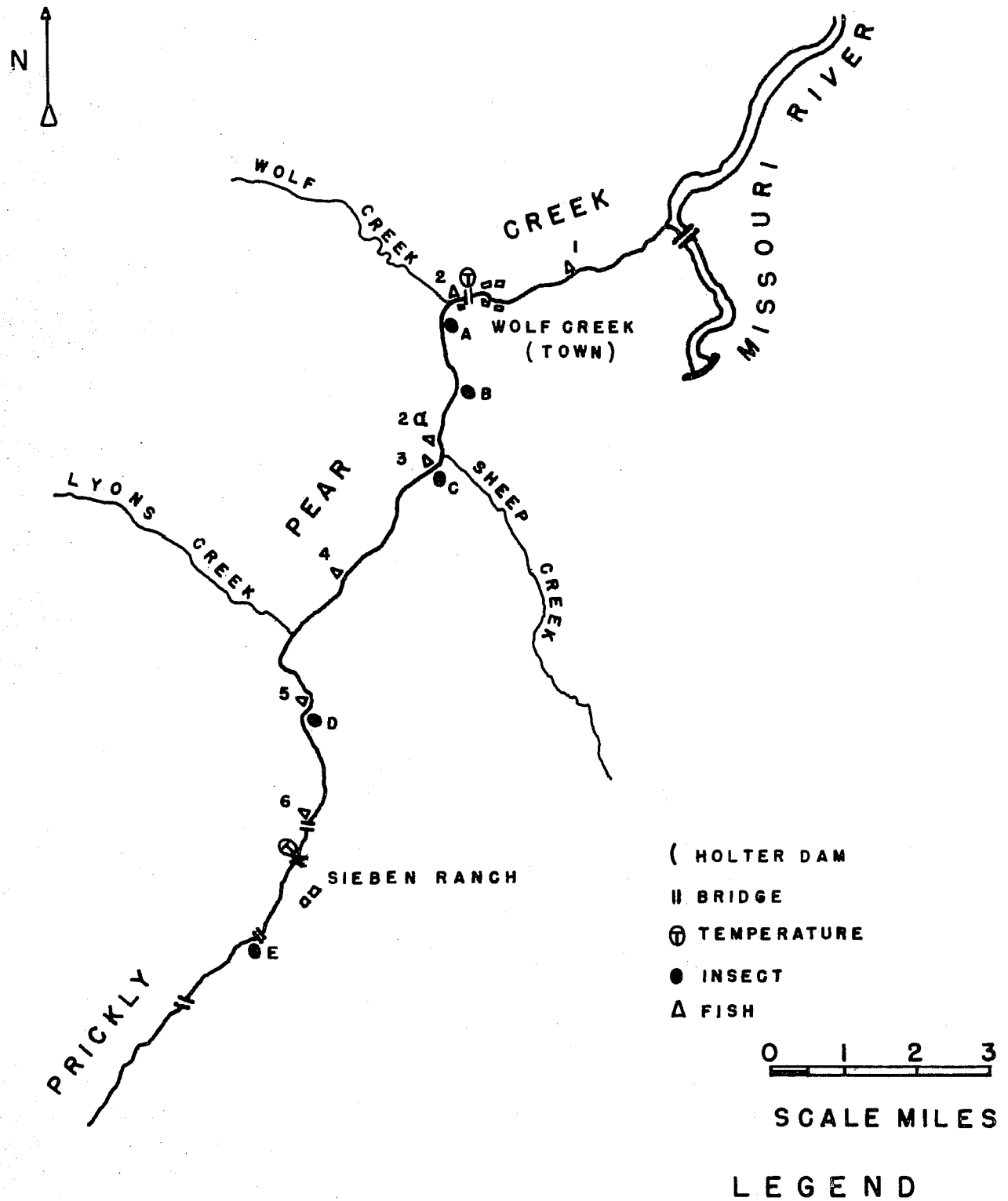
N
WOLF CREEK
CREEK
MISSOURI RIVER
WOLF CREEK (TOWN)
LYONS CREEK
PEAR
SHEEP CREEK
SIEBEN RANCH
PRICKLY
HOLTER DAM
BRIDGE
TEMPERATURE
INSECT
FISH
0 1 2 3
SCALE MILES
LEGEND

Figure 1. Map

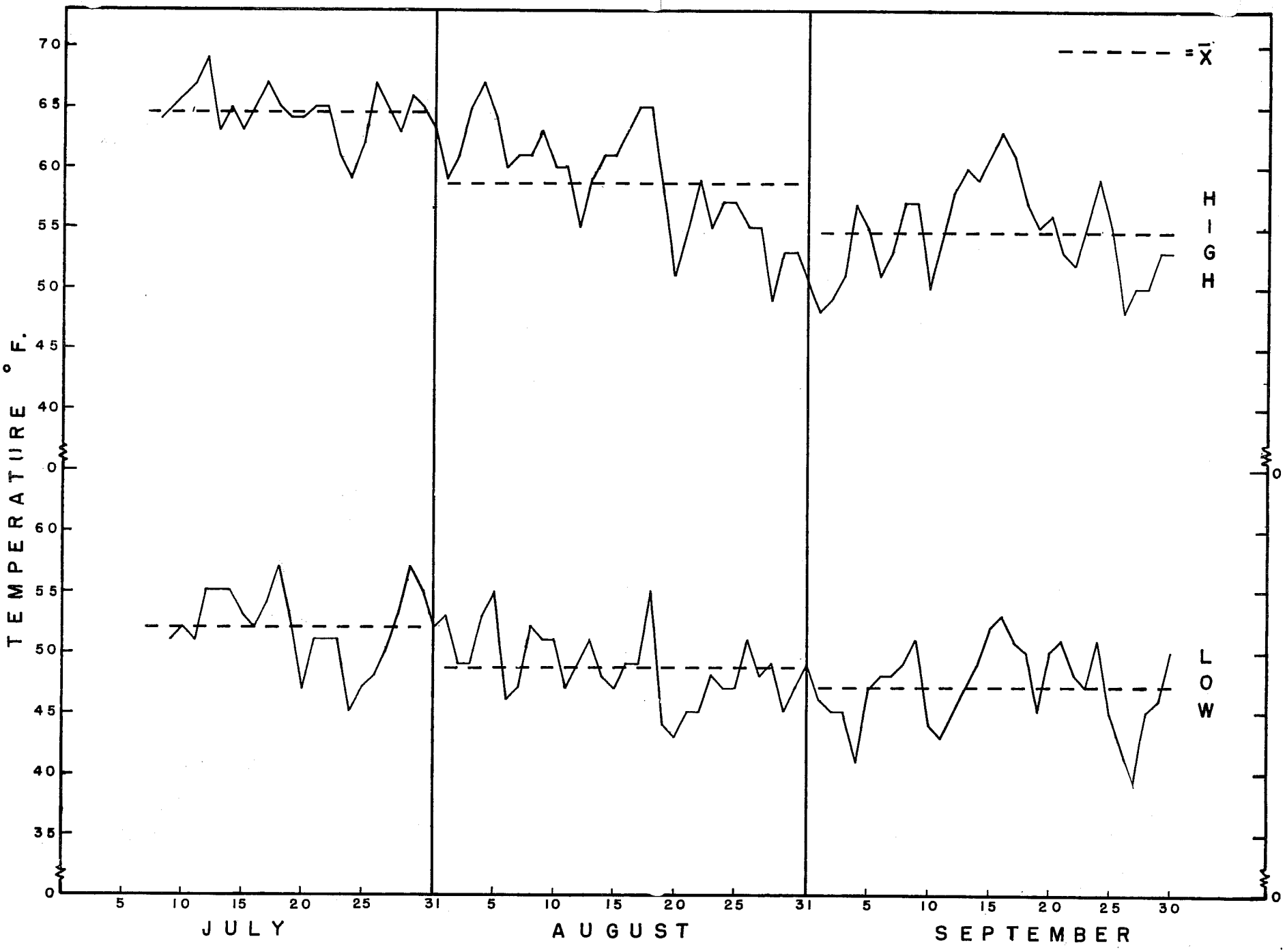

Figure 2 - Prickly Pear Creek Water Temperatures at Sieben Ranch, 1964

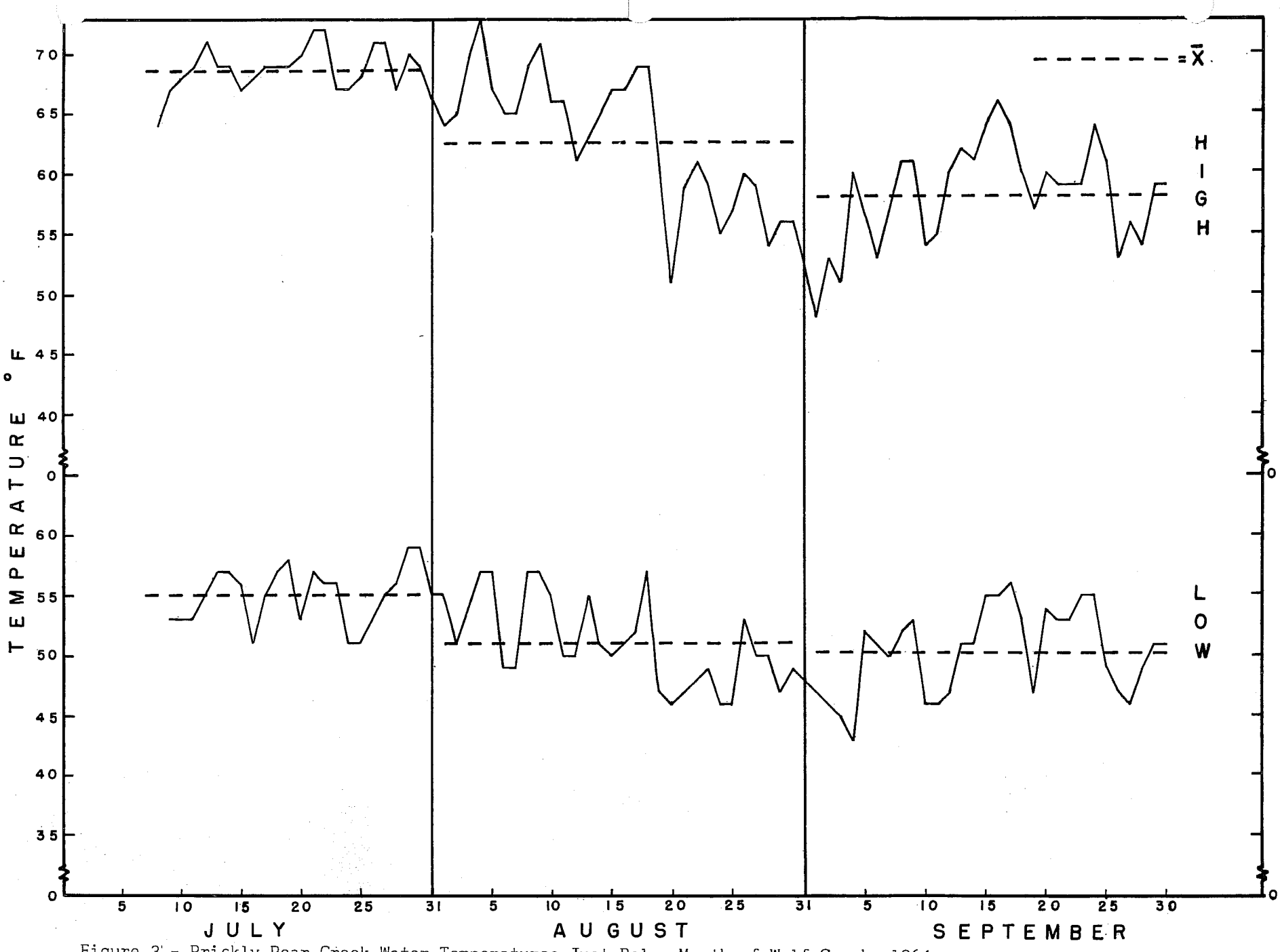

Figure 3 - Prickly Pear Creek Water Temperatures Just Below Mouth of Wolf Creek, 1964

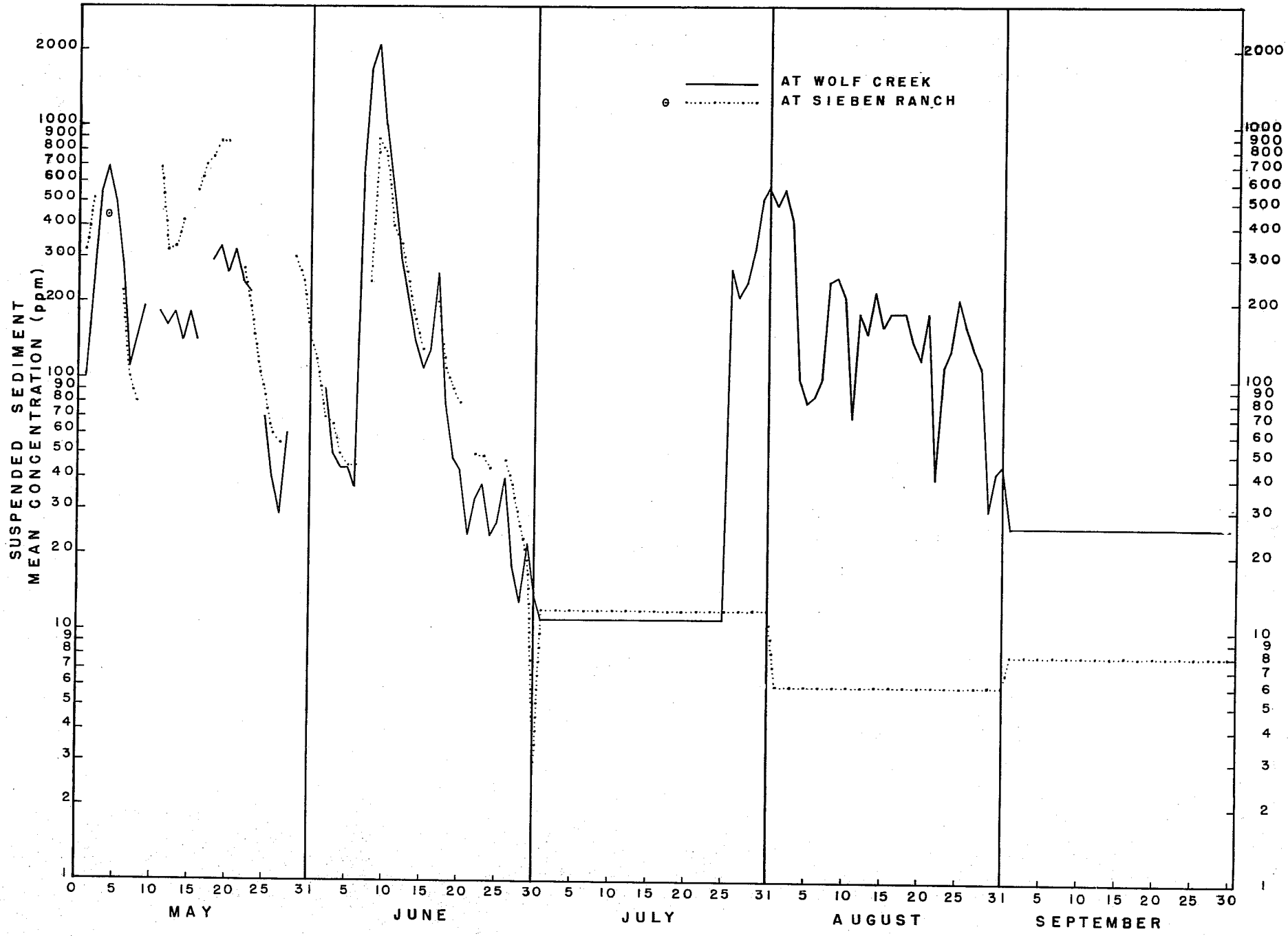
AT WOLF CREEK
AT SIEBEN RANCH
SUSPENDED SEDIMENT
MEAN CONCENTRATION (ppm)
2000
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
0 5 10 15 20 25 31 5 10 15 20 25 30 5 10 15 20 25 31 5 10 15 20 25 31 5 10 15 20 25 30
MAY
JUNE
JULY
AUGUST
SEPTEMBER

Table 1. Little Prickly Pear Creek at Sieben Ranch and Wolf Creek, Montana. Suspended sediment, October 1963 to September 1964. 1/

Station	Month	Total mean discharge (cfs)	Suspended sediment (tons per month)
Sieben Ranch	October	650	57
	November	789	89
	December	1,032	121
	January	896	117
	February	800	128
	March	728	158
	April	1,231	160
	May	7,989	8,463
	June	9,238	6,757
	July	1,584	50
	August	922	20
	September	1,470	30
Total for period		27,329	16,150
Wolf Creek	October	1,023	767
	November	1,265	621
	December	1,526	959
	January	1,424	204
	February	1,291	245
	March	1,360	364
	April	3,322	560
	May	17,458	11,837
	June	18,030	28,342
	July	3,586	520
	August	2,024	962
	September	2,398	167
Total for period		54,698	45,548

1/ Source: United States Department of Interior Geological Survey-Water Resources Division.

Table 2. Summarization of bottom fauna samples collected in 1964 in Prickly Pear Creek.

Station	Date	Average number of organisms per square foot							
		Ephemeroptera	Plecoptera	Trichoptera	Coleoptera	Diptera	Oligochaeta	Gastropoda	Total Numbers
I	6-28-64	1.1	5.7	1.8	1.1	1.9	.2	.1	11.9
I	9-24-64	4.0	107.0	38.6	25.3	139.7	.1	.1	314.8
II	6-28-64	1.7	16.4	2.8	1.0	1.5	.1	-.-	23.5
II	9-24-64	-.-	91.4	3.8	.3	12.0	-.-	-.-	107.5
III	6-28-64	1.6	17.7	2.4	2.0	.7	-.-	-.-	24.5
III	9-24-64	1.5	63.4	8.6	2.4	44.3	-.-	.3	120.2
IV	6-28-64	2.2	23.1	14.2	2.7	3.2	.6	-.-	45.9
IV	9-24-64	3.9	32.2	49.1	17.0	4.8	-.-	.3	107.3
V	6-27-64	2.0	46.4	42.7	65.7	2.4	.3	-.-	159.7
V	9-24-64	20.3	55.3	544.8	147.0	74.2	2.3	.6	844.4

Table 3. Electrofishing data collected at five stations in Little Prickly Pear Creek on August 11-12 and December 8, 1964.

	Species			
	Rainbow Trout		Brown Trout	
Figure	Total length	Weight	Total length	Weight
Total	1,465.0	34.09	1,075.1	52.89
Number	208	208	112 a/	112
Average	7.0	0.16	9.6	0.47
	Brook Trout		Mountain Whitefish	
Total	39.7	1.21	345.4	21.61
Number	5	5	25	25
Average	7.9	0.24	13.8	0.86
	Longnose Sucker		White Sucker	
Total	362.2	13.70	12.5	0.30
Number	49	49	2	2
Average	7.4	0.28	6.2	0.15

a/ Plus three that were aged 0+ but were not measured or weighed.

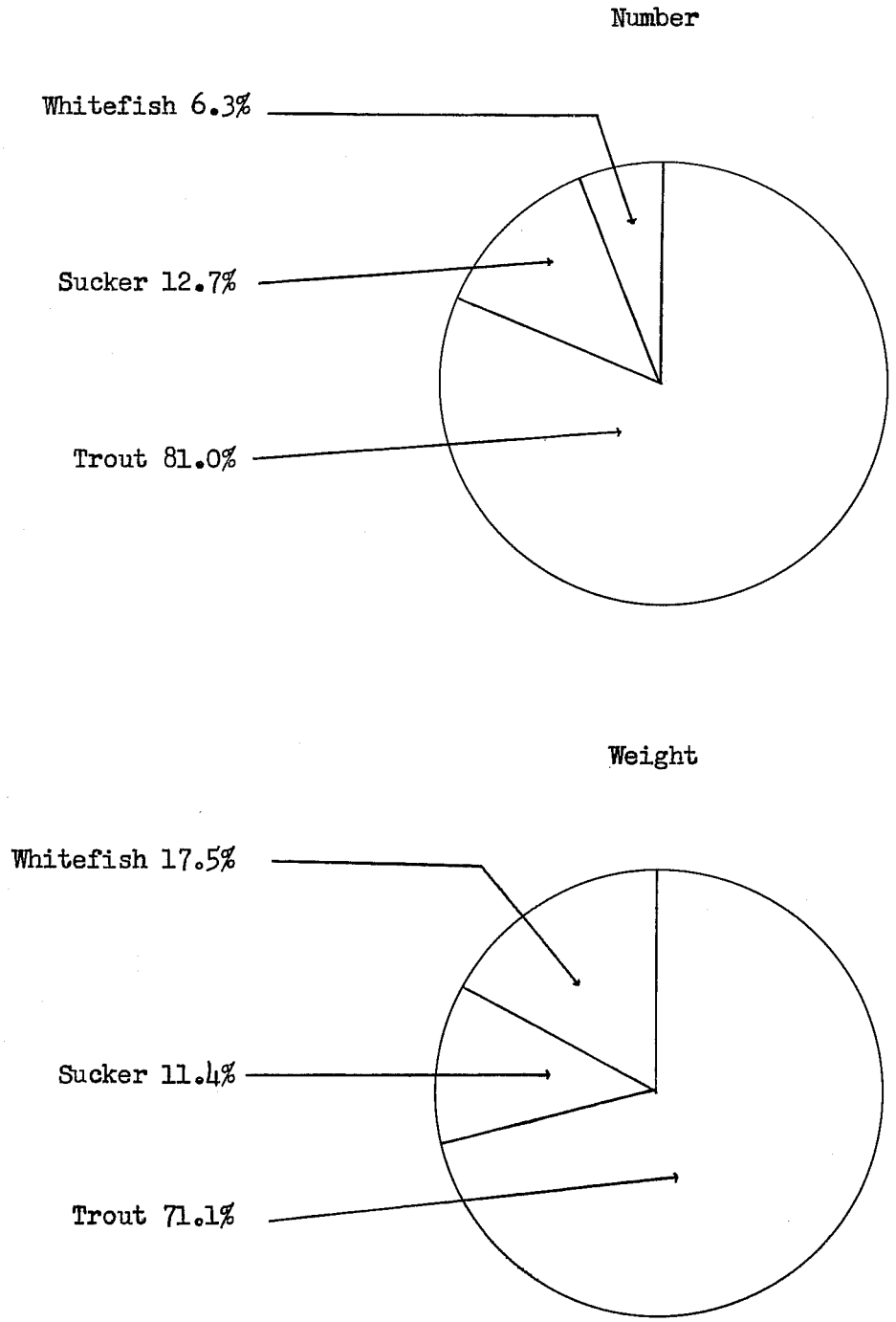

Figure 5. Percentage composition by number and weight of trout (rainbow, brown and brook), suckers (white and longnose), and mountain whitefish collected by electrofishing sections 2-6 of Little Prickly Pear Creek in August and December 1964.

Table 4. Summary of age and growth studies. Fish were collected in Little Prickly Pear Creek, Montana on August 11-12 and December 8, 1964.

Species	I 1/	II	III	IV	V	VI	VII
Rainbow trout	2.8	6.7	10.1	13.2			
Salmo gairdneri	(199)	(49)	(10)	(2)			
Increment (Inches):	-	3.9	3.4	3.1			
Brown trout 2/	3.5	7.9	11.8	13.9	13.6	14.7	16.0
Salmo trutta	(87)	(51)	(26)	(10)	(2)	(2)	(2)
Increment (Inches):	-	4.4	3.9	2.1	-0.3	1.1	1.3
Brook trout 3/							
Salvelinus fontinalis							
Mountain whitefish	4.3	8.6	11.4	13.2	14.5	16.0	
Prosopium williamsoni	(23)	(23)	(22)	(18)	(4)	(1)	
Increment (Inches):	-	4.3	2.8	1.8	1.3	1.5	
Longnose sucker	1.4	3.9	6.1	9.8	12.7	14.8	16.0
Catostomus catostomus	(44)	(32)	(16)	(4)	(1)	(1)	(1)
Increment (Inches):	-	2.5	2.2	3.7	2.9	2.1	1.2
White sucker	1.4	3.6	5.7				
Catostomus commersoni	(2)	(1)	(1)				
Increment (Inches):		2.2	2.1				

1/ Average total length in inches. The number of fish collected is given in parenthesis.

2/ Ten additional fish were aged 0+ and averaged 3.5 inches in total length.

3/ Five brook trout were taken, but their scales were regenerate, or scale lengths at the magnification used would not fit nomograph.