

SILVER CREEK FISHERY INVESTIGATIONS

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Introduction

Silver Creek, in southern Idaho, has had a reputation through the years as an excellent trout stream and has always generated much interest among fishermen. With a decline in fishing success, particularly between 1959-1962, fishermen have expressed their concern and have made various proposals regarding management of the fishery. The following report is a compilation of data gathered by fishery biologists and conservation officers since 1952. Although some of the data is of a limited nature, it is felt that the information is sufficient to support the conclusions and recommendations made herein.

Stream Ecology

Vegetation

Water levels in Silver Creek are controlled in part by the build-up of aquatic vegetation. Heavy beds of vegetation, i.e. chara, pondweed, clodea, watercress, and filamentous algae, act as barriers which tend to raise the water level. Stream flow restricted between vegetative beds is increased in velocity, cutting deep pools in the soft, silt bottom. Growth of aquatic vegetation generally reaches its peak in August.

Seasonal abundance of vegetation may vary drastically from year to year. This is affected by low stream flows which expose plants to drying or freezing, or as the vegetation becomes dense, water pressure will uproot large masses and roll them downstream. This often results in a "snowball" effect, washing out large sections of the stream.

Because of the predominant silt-sand bottom in Silver Creek, the aquatic vegetation provides the principal habitat for fish food organisms. As a result, fish growth and production is probably closely correlated with the condition of the aquatic vegetation in the stream.

Stream Flow

Stream flows on Silver Creek are summarized in Table I. As shown in the table, flows since 1959 have been below average during the months when fish growth and fish distribution are the most critical.

TABLE I  
MEAN FLOWS (C.F.S.) OF SILVER CREEK AT PICABO, IDAHO

Year	May	June	July	Aug.	Sept.
1951-58*	134	139	166	162	174
1959	102	98	112	105	122
1960	104	91	99	90	92
1961	82	86	83	80	95
1962	120	133	143	147	145

\*Average flow during these years.

### Water Temperature

Stream temperatures were recorded at Station No. 7 (see map) during June 22 through September 21, 1962. Temperatures above Station No. 4 would average 3 to 5 degrees cooler. Average temperatures and maximums during July at times were above the considered optimum for trout (Table II). During the low stream flows in 1959-1961, temperatures may have been even higher. The influence of warm stream temperatures is reflected in the prevalence of non-game fish species in the lower portions of Silver Creek. Stream temperatures may also influence the distribution of some of the more desirable aquatic plants, particularly chara and watercress.

TABLE II  
STREAM TEMPERATURES ON SILVER CREEK AT  
POINT OF ROCKS (STATION 7), 1962

Period	Daily Mean (°F)	Daily Mean Range (°F)	Max. for Period (°F)
6/22 - 6/30	64.5	7.1	70
7/1 - 7/7	63.0	8.0	69
7/8 - 7/14	67.4	7.0	72
7/15 - 7/21	63.3	8.0	69
7/22 - 7/31	65.5	7.5	72
8/1 - 8/7	61.7	7.3	69
8/8 - 8/14	64.7	9.1	70
8/15 - 8/21	63.1	7.6	70
8/22 - 8/31	59.3	7.4	65
9/1 - 9/7	59.1	8.0	64
9/8 - 9/14	56.1	5.8	61
9/15 - 9/21	56.8	6.8	61

### Fish Species Composition

Data on species composition was gathered by use of electrical shocker equipment and underwater diving gear. The shocker unit (2500 W, DC) was floated in a boat, allowing the entire length of the section to be sampled. The number of fish collected does not constitute the total population present, but does show relative abundance of the various species (Table III). Collections of fish made with the shocker at Station B were far from complete, due to the stream width and motor trouble on the unit. Underwater observations were made using wet suit, mask, and snorkel tube. Effective visibility was fair, and fish could be observed and identified to species up to 10 feet away. Likewise, the number of fish recorded (Table IV) would represent only a small sample of the actual number of fish present.

Changes in species composition, sharply demonstrated in Table IV between Stations 1 through 4 and 5 through 8, correspond to a marked change in the stream ecology. The upper portion of the creek above the Kilpatrick Bridge (Station 4) on September 11 contained an abundance of aquatic vegetation which provided pool area, cover, and food organisms, such as freshwater shrimp and damselfly nymphs. Below this point, the dominant aquatic plant was a longleaf pondweed (Potamogeton) which tends to lie flat in the current. Therefore, it does not provide a barrier to the water flow to form pool areas and affords little cover for fish and food organisms.

TABLE III  
ELECTRICAL SHOCKER COLLECTION ON SILVER CREEK  
NOVEMBER 13, 1962 (2500 W, DC)

Station	WRB*	wrb*	HRB*	WF	wf*	Sucker	Dace
A (1/2 mile)	59	23	5	18	2	7	6
B (3/4 mile)	21	11	3	6	2	200	13

\*WRB - wild rainbow over 10 inches in length

wrb - immature wild rainbow

HRB - hatchery rainbow, catchable size

WF - adult whitefish

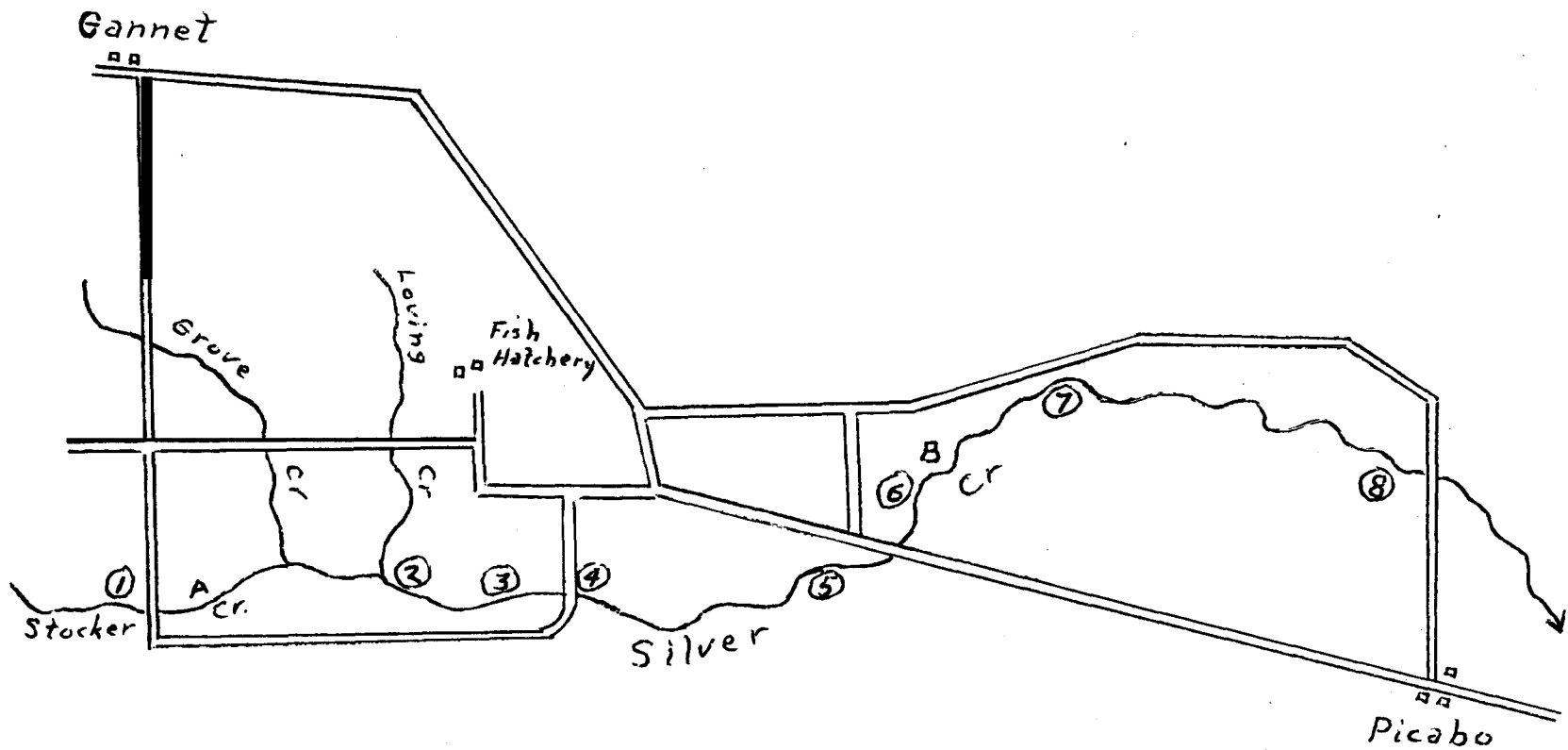
wf - immature whitefish

TABLE IV  
 UNDERWATER OBSERVATIONS ON SILVER CREEK WITH DIVING GEAR  
 SEPTEMBER 11, 1963

Station*	Rainbow	Brook	Whitefish	Sucker	Shiner
1	40	10	5	5	0
2	50	0	30	0	0
3	67**	0	20	150	0
4	15	0	2	100	0
5	3	0	10	1	0
6	1	0	0	30	300
7	1	0	0	75	0
8	2	0	0	9	0

\*Only adult fish were recorded. Each station was approximately 500 feet in length, except Station 4, which was in the immediate area of the bridge.

\*\*Five fish seen ranging 4 to 5 pounds in weight.



Stream survey stations on Silver Creek. Scale 1 inch to the mile.

## Fishermen Success

Creel census information on Silver Creek has been taken since 1952, with the bulk of the data being collected on opening day (Table V). In some instances, fishermen success appears correlated with the number of hatchery fish stocked for that year. However, planting times and procedures would greatly influence these returns. Data is presently being gathered on the type of fishermen checked (Table VI), The steady increase in the percent of fly fishermen is due to the increased effectiveness of this type of gear, as the vegetation builds up in the stream.

Length frequencies on wild rainbow taken during the following years of low stream flow (1959-1962 in Table VII) disclosed that only 25 percent of the fish entering the creel during these years on opening day were over 12 inches in length. Following improved water and vegetation conditions in 1962, opening day in 1963 found over 60 percent of the rainbow exceeding 12 inches in length. Brook trout generally comprise less than 2 percent of the catch over the season.

TABLE V  
FISHING SUCCESS ON SILVER CREEK  
1952-1963

Year	Trout/pole	Trout/hour	% Hatchery RB	No, Hatchery RB Planted
1963	6.0	1.64	73.8	6,000
1962	3.5	0.87	88.6	5,300
1961	5.6	1.59	81.5	8,000
1960	3.2	0.86	72.5	5,000
1959	6.3			8,900
1958	5.5			11,000
1957	6.0			5,300
1956	4.4	1.40		10,500
1955	6.4			10,500
1954	2.7			8,600
1953	3.3	0.87		9,800
1952	4.6	1.10		15,700

TABLE VI  
 TYPES OF FISHING GEAR USED ON SILVER CREEK  
 1963

Month	%Bait	%Lure	%Fly
June	88.0	1.1	10. 9
July	72.2	5.6	22. 7
August	59.9	0.1	40.

TABLE VII  
 LENGTH FREQUENCIES (TOTAL LENGTH) OF WILD RAINBOW TROUT IN  
 THE CREEL ON SILVER CREEK  
 ON OPENING DAY

Year	Inches							
	6-8	8-10	10-	12-14	14-16	16-18	18-	20-
1959	3.1*	13.4	59.0	19.2	3.8	1.5		
1960	8.0	21.4	45.4	12.2	11.4	1.5		
1962	25.0	30.6	19.4	9.7	1.4	9.7	2.8	1.4
1963	9.4	13.2	17.0	18.9	18.9	13.2	9.4	

\*Percent

#### Fishing Regulations

Up until 1958, attempts were made to control fish harvest by emergency closures when vegetation was sparse and limiting fishing to July 1 through September 30. In 1959, the season was extended to include October and, in 1960, the stream was placed on the general season, June 4-October 31. fishing success in Table V appears to be independent of the type or length of season that was imposed upon the stream.

#### Discussion

Observations and analysis of data collected on Silver Creek since 1952 leads to the one conclusion that the distribution and production of trout in Silver Creek is directly related to stream flows and abundance of aquatic vegetation. Underwater study in 1963 clearly demonstrated the association of aquatic vegetation and fish distribution (Table IV). In 1953, the average weights of trout in the creel were 13 percent less than 1952 and was attributed to the extensive removal of vegetation in the stream in 1953. The increase in water flow and vegetation in 1962 was followed by improved fishing success in 1963, with larger fish being caught by fishermen (Tables IV, V, and VII).

Attempts to improve or sustain fishing on Silver Creek by various regulations and stream improvement structures have been relatively ineffective. During the past four years, 72 to 88 percent of the creel has been made up of hatchery rainbow, and planting catchable-size fish has been the only effective means to date of artificially sustaining fishing on Silver Creek.

Fishing pressure on the creek drops sharply by July and remains light for the remainder of the season. As stream conditions improve in August through October, interest picks up somewhat, particularly for fly fishermen. In areas where vegetation is heavy, fishermen are almost limited to the use of flyrods by the nature of the stream itself.

Competition for food and space by whitefish and other non-game species affects trout production to an unknown extent. Although these undesirable species are common and widespread throughout the drainage, their presence and numbers do not as yet appear to be great enough to warrant a control program. In Table IV, it should be noted that the greatest number of adult whitefish and suckers were observed in areas where trout numbers and quality were considered excellent,

#### Future Management

- 1, It is recommended that any special fishing regulations on Silver Creek be discouraged, especially the reservation of any section for fly fishing only. Fishing pressure and harvest throughout the season is such that restrictions on fishermen would not improve the quality of the fishing. Quality of the fishery is basically governed by the ecological conditions of the stream and not by fishermen harvest,
2.           Balanced plantings and good distribution of hatchery fish is the best immediate answer to improved fishing on Silver Creek,  
Hatchery  
fish will provide a "buffer°" for wild fish on opening days and during years when vegetative conditions are poor. This should preclude the necessity for reduced bag limits or shortened seasons on the stream,
3.           Further experimentation is suggested on a floating structure with grappling devices that would snare and hold drifting vegetation and would provide overhead and lateral cover for fish. Expensive stream improvement structures of the design built on Silver Creek in 1955-56 were effective only in creating a deep pool in the stream bed. This alone does not necessarily provide attraction or cover for fish, nor does it replace the vegetative habitat essential for food organisms. It is conceivable that an extensive program of installation of these pool-digging structures could actually reduce the carrying capacity of the stream,

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September 19, 1963