

HATCHERY CREEK STREAM
SURVEY AND RECON

BY

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HATCHERY CREEK STREAM SURVEY AND RECON

Between August 11 - 18, 1971, the recreation crew and myself were doing some improvement work on the Honker Divide Canoe Area. During this trip, I estimated the fisheries potential of 12½ miles of stream and 648 acres of salmon supportable lake area. Some of the sockeye in lower Hatchery Creek also use a share of the 1920 acre Sweetwater Lake for rearing; this was taken into account during the survey. At the time of this trip, pinks, coho, and sockeye were observed in the streams. Although this system appears to have excellent potential, there are two partial barrier falls between Sweetwater and Hatchery Lakes and the feasibility of their improvement was the main purpose of the study.

The first problem encountered in this feasibility study is the fact that estimates and surveys of actual numbers of fish returning to spawn in this system are very poor. Many reasons exist for poor historical data and questionable survey methods used in the past. Priorities for information have been elsewhere and only the sketchiest of estimates have been used. The early records show upwards of 200,000 in the 1930's, but more recent counts in the 1950's vary (emphasizing sockeye counts) from 10,000 to 60,000 sockeye and average 6000 for pinks. The low priority of the stream, the difficulty in both access to and travel along the stream, and the extreme darkness of the water contribute to admittedly inaccurate counts over the years. Fly over surveys were a flop. However, in a 1964 fly over, sockeye were seen spawning above all the lakes in the system. This information is summarized in the attached letter from Norman Johnston, Alaska Department of Fish and Game Area Management Biologist.

During our recent survey, the total estimated production was quite high. The potential is over 289,260 harvestable surplus in pinks, coho, and sockeye. 66% of this production must come from above the falls. Over the years, the two falls on Hatchery Creek have been variously labeled as partial barriers to total blocks, depending on the level of the water at the time.

The sum of these observations indicate that during average water conditions, the falls are only a partial barrier and only at extreme highs or lows can they be called complete barriers. No true picture can be guessed at what per cent of the migration is halted by these falls. C. Gass, during June 7-29, 1967, observed sockeye going over the upper falls; later in August 7-11, numerous coho were making the falls. Several references before and after are made to the falls. W. Sheridan stated during the same year, during high normal water no fish were able to get over either of the two although many tried. An earlier report by O. L. Scott in 1961 estimated 5% success.

During the 1969 survey, I must fall back on the old description of "numerous" fish, both coho and sockeye. M. R. Cruise claimed to have seen pinks above this barrier. On the portion of lower Hatchery between Hatchery Lake and the barrier falls, we sighted several hundred migrating and spawning fish.

Fish after fish swam by the barrier, although we did not count them. Some were jumping at other areas of the falls and failing. The lower falls did not seem to be any barrier at all at this time. The conclusion is that the partial barrier is a complete one at only high normal water flow.

Pictures and studies of the falls indicate that either a blasted or an aluminum steep-pass fishway is feasible for several reasons. Within the next few years, both a permanent system road and spur logging roads will develop the area for logging and access to these two falls. The area will be very easy to get to from Coffman Cove, and an intensive study of migration and water flow over the falls can be made. Also the nature of these falls lend themselves to blasting. The first fall is 10-14' high with a 30' run on the south side. In its present form, the falls has one fish channel with about three steps. This channel is about 2 feet wide at the top and 5 feet wide at the bottom. By blasting an additional channel or improving the one presently useable, the run could be significantly increased.

The lower falls did not appear to be more than a large rapids and not to be a barrier. However, Sheridan claimed it was a total barrier at high normal water levels. This one needs further study. If determined to be a serious barrier, it could easily be improved since it is less than seven feet tall.

The nature of the upper falls and the results of various observers, indicate that at least the upper falls is a significant partial fish barrier. Several alternative benefit/cost analysis are attached to determine possible investment returns.

Short description of streams follow.

X { I have observed steel falls for 4 successive years (1967-68-69-70) and I have noted that the falls is a complete barrier under low water flow conditions. I have never seen steel fall under high flow conditions but under normal average flow conditions as well as trout come up the falls - about one successful ascent per 2-10 fish (I would estimate). I have never seen grills above the falls. The best steel observation spot I've seen on Pacific is probably the same area.

Q. B. S. 7-22-72

MAIN HATCHERY CREEK
(3 Sections)

- Sec. I. Lake Galea - Butterfly Lake
- Sec. II. Butterfly Lake - Hatchery Lake
- Sec. III. Hatchery Lake - Sweetwater Lake

Section I

Relatively slow moving creek with the majority of bottom in fine gravel. Windfalls were in the creek but none had caused any damage to the creek. Two old log jams had been by-passed by the stream and also were not causing damage. The first 1500' of this section is lake slough-like with very slow current. Almost no sections of large rocks, cobbles or rubble appear here. Elevation difference in between these two lakes is small; less than 50'. Most of the 1.2 mile stream is excellent spawning and resting area. Stream bank cover is grass for the first 1500' and last 1000', the remainder is old growth hemlock, spruce, cedar timber type. Very little brush actually shades the stream itself. No improvement work needed on this stretch.

Section II Hatchery Creek (2.5 mi.)

Stream gradient is very slight for the first .5 miles, so much so that this was considered a part of Butterfly Lake during the upstream survey. As the stream progresses beyond, it goes into steeper gradient with cobble bottom and moderate rapids giving way in another 3/4 mile to water similar to those described in Section I. From here on the streams are almost identical. At one island point, a large log jam has built up that could be removed by logging equipment and prevent any blockage. Presently it is not a barrier. As the stream approaches Hatchery Lake, it again becomes a lake slough for the last .25 miles. Aside from the possible log jam removal, no real problems exist here. Spawning (67,050 ft.²) and rearing (128,500 ft.²) are extensive.

Section III Hatchery Creek Hatchery Lake - Sweetwater

The fastest section of Hatchery Creek results from its 200' drop from Hatchery Lake to Sweetwater in about 4 miles. The presence of large boulders, cobbles and big rocks overshadow the huge area of spawning gravel and resting pool available (spawn 446,850 ft.² - resting 1,649,000 ft.²). Old growth hemlock, spruce is the predominant bank cover. This is the section with the two falls. The first and most major of the two is one and a half miles downstream from the outlet of Hatchery Lake. The second a short distance, 1/8 mile downstream.

Smaller Tributaries (Keyed to Map)

H1 - Stream H1 is the primary feeder stream to Lake Galea. Its present useable length of about one mile includes 1500' of lake slough that was not surveyed with the stream. The survey of the remaining useable length measured 28,145 ft.² of spawning beds and 28,205 ft.² resting pools.

In the first 3/4 mile surveyed, the bottom type was predominately fine gravel (90%) giving way in the upper reaches rubble and bedrock. Gravel bars persisted right up to the first falls however, and very little bottom vegetation was noted.

The lake slough is silt-gravel bottom with grasses and sedges working their way in.

Bank cover all along the stream was huckleberry bush, sitka spruce-hemlock except for the 1500' lake slough which is grass.

At the lower reaches, the creek is slow with various windfall over the creek. Average width is 15' and creek is relatively slow in velocity. Water is very clear. Coho were observed here in August, 1971, and sockeye earlier during Alaska Department of Fish and Game fly overs. Fingerlings were seen the whole way.

H1c - Small tributary to H1. Useable length is approximately 4000'. Fry exist further upstream, but the bottom gets steep and goes from fine gravel to shifting cobbles and bedrock. At low water, the stream runs very small. Near where it flows into H1, the bed is wide of fine gravel and seems to be good spawning area. However, at low water, the gravel bars at mouth restrict entry. Water is very clear with little vegetation. Stream banks are mainly high grass with alder at the lower end.

H2, H3 and H4 - Small feeder streams into Lake Galea. Both streams are insignificant in size, neither running much more than a large trickle, however coho were rearing for 950' in H1 and 200' in H2. Spawning area is nil.

H4 has 100' rearing length.

H5 - Short stream running a fairly large quantity of water with good spawning beds at the lower end. Useable length is approximately 1500' before falls restrict migration.

In this stream are 5,750 ft.² spawning gravel and 9,200 ft.² resting pools. Bottom types vary in lower reaches from fine gravel and sand to large gravel and rubble at the 1500' mark. From 500' upstream, the creek appears very unstable; shifting channels, etc.

H6 - Insignificant - steep, unstable, small.

H6a and H6b - not surveyed - small.

H7 - This major small stream flows into Hatchery Creek approximately 1 mile downstream from the outflow of Butterfly Lake. Its useable length is in excess of 14,000' with a falls 14,440' from the outlet. Fry were observed the entire length over the large areas of spawning gravel (101,350 ft.²) and resting pools (114,700 ft.²). 5400' from the outlet is a large log jam backing water up 300' which must be at least a partial barrier.

Clearance of this jam could be accomplished during logging of the norther side of the creek although due to possible deflection problems, it may be difficult (steep banks).

Remaining Streams H8 - 13

These short streams were not looked at during this trip although some fish area exists in most of them. One major stream tributary to Hatchery Creek is H13 which comes in 3/4 mile upstream from Sweetwater Lake. This creek was reconned in 1971 by Forest Service Engineer J. McGrath who determined its entire length of 1½ miles was useable by most fish but due to timing or low water, coho were the only ones seen then. The significant size (15' x 1.5 mi.) makes this a major fish stream. Windfalls were across the creek, but no blockage problems were noted. This stream should receive full protection during road construction and logging.

Potential Problems

1. Possible error in blasting making falls totally unpassable. Aluminum ladder necessary to preserve what run.
2. Blasting may cause no actual improvement and a ladder still will be needed; huge investment wasted.
3. Competition by trout may nullify much of the projected benefit.
4. Further work may be needed on lower rapids.

Recommendations

1. Using drilling and blasting techniques, modify the large falls on Hatchery Creek.
2. Timing on the actual planning for this job should be co-ordinated closely with the logging road construction expected in the area within the next 10 years to utilize drilling and blasting equipment more cheaply.
3. Survey carefully the restriction on migration attributed to the lower falls to determine if further work is needed.

Benefit/Cost Analysis

1. Based on total spawning area and lake area, the maximum potential annual value of the Hatchery Creek drainage above the large falls on Hatchery Creek is \$112,949 in pink, coho, and sockeye salmon.
 - a. pinks - 68% spawning area is above falls
 $882,155 \text{ ft.}^2 \text{ total spawning area} \times .68 \times .275 = 164,962 \text{ pinks}$
 $.50 \times 164,962 = \$82,481 \text{ ex-vessel value}$
 - b. sockeye - above Hatchery Lake maximum production
 $648 \text{ Acres lakes} \times 22 \text{ sockeye/A.} = 14,256$

- above Hatchery Creek Falls to Hatchery Lake
(1900 Acres Sweetwater Lake) 1000 acres -
Hatchery Creek share of Sweetwater. 36% spawning area
of Hatchery Creek (approximately) for this section
is above the falls.
 $360 \text{ A.} \times 22 = 7920$
Total Value $7920 + 14256 = \$22,176$
 - c. coho - 65% resting pools above falls
 $.65 \times 2,238,232 \text{ ft.}^2 \times .0019 = 2764 \text{ harvestable surplus coho}$
 $\$3 \times 2764 = \$8292 \text{ ex-vessel value}$
2. Maximum estimated cost of project is \$14,000 for blasting falls into a ladder. \$100/year maintenance (cleaning, etc.)
3. An extremely favorable Benefit/Cost ratio results from this analysis. Several variances from this analysis make it more favorable than the actual straight line Benefit/Cost used here shows.

The various alternative blockage percentages are shown. I estimate that the falls is at least a 20% barrier and is probably as much as 60-80%. No differentiation between species was made (i.e. when stating a 50% blockage, this was evenly applied to coho, sockeye, and pinks.) The blockage could be 50% for sockeye + coho, but actually it would be much higher for pinks. Thus, the estimated benefits are conservative.

HATCHERY CREEK BENEFIT/COST ANALYSIS
 (Assuming Total Blockage)
 FOR AREA ABOVE LARGE FALLS

- 5 year allowed for buildup of population
1. Initial investment in blasting falls - \$14000
 2. Annual Maintenance - \$100
 3. (Max. Annual Benefits - \$112949)

YEAR	RATE	DISCOUNT		DISCOUNT	
		COST	COST	BENEFITS	BENEFITS
0	1.000	14,000	14,000	0	0
1	.952	0	0	0	0
2	.907	100	91	25% 28,237	25,611
3	.867	100	87	50% 56,474	48,963
4	.823	100	82	75% 84,711	69,717
5	.784	100	78	100% 112,949	88,552
6	.746	100	75	100% 112,949	84,260
7	.711	100	71	100% 112,949	80,307
8	.678	100	68	100% 112,949	76,579
9	.645	100	64	100% 112,949	72,852
10	.614	100	61	100% 112,949	69,351
11	.585	100	58	100% 112,949	66,075
12	.557	100	56	100% 112,949	62,913
13	.530	100	53	100% 112,949	59,863
14	.505	100	50	100% 112,949	57,039
15	.481	100	48	100% 112,949	54,328
16	.458	100	46	100% 112,949	51,731
17	.436	100	44	100% 112,949	49,246
18	.416	100	42	100% 112,949	46,987
19	.396	100	40	100% 112,949	44,728
20	.377	100	38	100% 112,949	42,582
		\$15,152		1,151,684	

ALTERNATIVE BENEFIT/COST RATIOS BASED ON VARIOUS % BLOCKAGE

If Fall Blocks X% of Run

B/C Ratio is

100%

76:1

70%

53:1

60%

50%

38:1

30%

23:1

20%

15:1

2%

1.52:1 Break Even

1%

.76

0%

SUMMARY OF SPAWNING/RESTING AREA

<u>Creek</u>	<u>Spawning Area Ft.²</u>	<u>Resting Area Ft.²</u>
Hatchery Creek		
Sweetwater Hatchery Lake (below falls)	283,800	825,865
Sweetwater Hatchery Lake (above falls)	163,050	823,135
Hatchery Lake Butterfly Lake	67,050	128,500
Butterfly Lake Lake Galea	218,260	299,482
Miscellaneous Small Tributaries		
H1	28,145	31,450
H1c	14,750	2,400
H2		1,000
H3		1,500
H5	5,750	9,200
H7	<u>101,350</u>	<u>114,700</u>
TOTAL	882,155	2,238,232

Acreages

Hatchery Lake	288 acres
Butterfly Lake	48 acres
Lake Galea	312 acres
Sweetwater Lake	1920 acres

