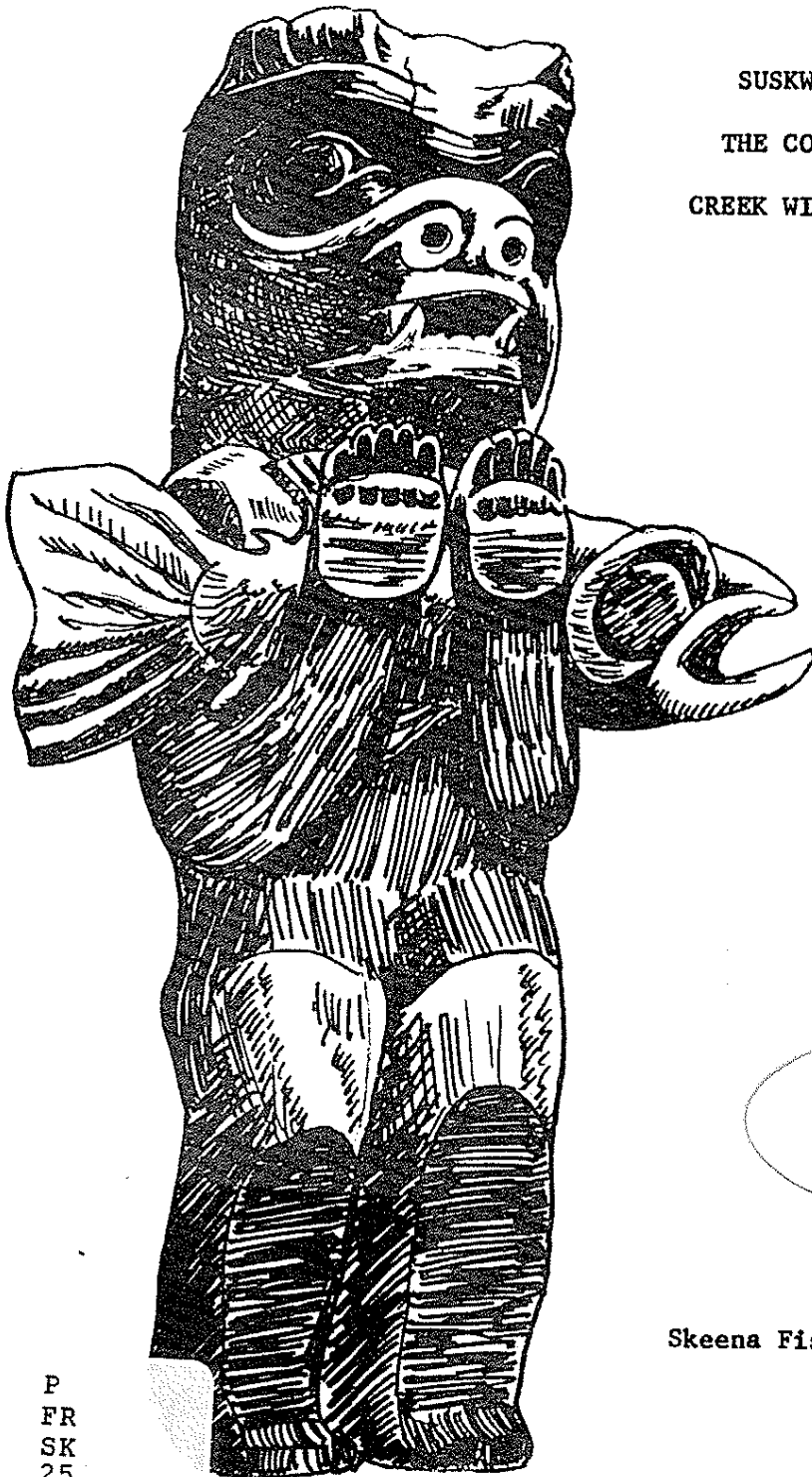


Skeena Region



British
Columbia
**Fish &
Wildlife**
Branch



SUSKWA RIVER STEELHEAD TROUT:
THE COLONIZATION OF HAROLD-PRICE
CREEK WITH HATCHERY-REARED STEELHEAD

By
W.E. CHUDYK

SK-25

Skeena Fisheries Report No. 79-1 (S.E.P.)
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INTRODUCTION

The Salmonid Enhancement Program (S.E.P.) under the joint auspices of the Federal and Provincial governments has made funds available to revitalize diminished steelhead and other salmonid stocks provincially. Through S.E.P. the B.C. Fish and Wildlife Branch (Skeena Region) implemented a Suskwa River program designed to improve steelhead populations hence improve angler success. In an earlier report, the author (Chudyk, M.S. 1978) described the study area, the steelhead fishery and outlined the steps necessary to improve steelhead populations in Suskwa River and its main tributary, Harold Price Creek. This report addresses itself to the following sequence of events in 1979:

- 1) The capture of adult steelhead in the lower Suskwa River for egg collection purposes.
- 2) Hatchery rearing of fry from Suskwa donor stock.
- 3) The introduction of hatchery produced Suskwa fry into selected sites above the Harold-Price Creek falls.
- 4) The removal of the physical barrier on Harold-Price Creek.
- 5) Assessment of steelhead fry dispersal and survival in Upper Harold-Price Creek.

METHODS

ADULT CAPTURES

Adult steelhead were angled or trapped using a "California" fyke trap (Photograph A) similar to traps used historically to capture salmonids in the

Sacramento River, California (Hallock et al 1957). Captured steelhead were sexed, scale sampled and measured, then placed in two 1 x 1 x 2 m. frame "hatchery-mesh" pens to mature sexually (Photograph B). Dennison, Mark II tagging guns were used to apply FD-67 Floy yellow-coloured spaghetti tags to both held and released steelhead. Progressive records were kept on the physical condition of each penned fish. Released steelhead were tagged against the possibility of future upriver recapture and identification. Adult scales were analysed using the techniques described in Narver and Withler (1974). Life histories for 1978 and 1979 steelhead are appended to this report as are water flow and temperature profiles.

Between May 29 and June 4, 1979 sexually ripe female steelhead were spawned into a 2l. container. These females were killed and shipped to Nanaimo for disease analysis. Male steelhead were milked of sperm and then returned to the holding pen to be used to fertilize females maturing later. Following fertilization male steelhead were released. Egg and sperm collected were thoroughly mixed, water hardened, oxygenated and placed with ice in a 2 l. plastic thermos bottle for air shipment to Vancouver where alerted Abbotsford Hatchery staff waited for them.

FRY PRODUCTION

In Abbotsford Provincial Hatchery the eggs were separated at the eyed stage, incubated, hatched then reared to 50-80 mm fry ("Super Fry"). Super fry were comparatively larger than steelhead fry produced in a natural stream environment hence should be more competitive with the indigenous cutthroat of Harold-Price Creek. Fry were marked using a pelvic fin clip to identify them as hatchery stock.

INTRODUCTION OF HATCHERY FRY

Truck-transported hatchery fry arrived in Smithers on August 28, 1979 and were flown by helicopter in plastic garbage cans to four preinventoried plant areas (Figure 1). Water temperatures of Harold-Price Creek and of the hatchery water in the buckets were within 1° of 14°C. Follow up snorkel and electroshocker surveys were conducted to determine dispersal of introduced fry.

HAROLD-PRICE FALLS

Two dynamite blasts - one 555.8 kg. explosion in the fall of 1978 and a sequel 335.3 kg. blast in the fall of 1979 - effectively reduced the lower barrier falls to allow anadromous fish passage (Photograph C and D).

ASSESSMENT

Since future assessment of angler benefits are still in the planning stages they will be presented in the "Future Works" section of this report.

RESULTS

ADULT CAPTURES

Of 30 adult steelhead angled and trapped from the Suskwa River, nine were used, four females and five males, as brood stock (Table 1.) The other 21 fish either died (15) before mature or were released (6). None of the released steelhead were observed or recaptured. About 28,500 fertilized eggs [7,125 eggs per female (four females)] arrived at Abbotsford Hatchery. Of the shipped eggs 10,580 did not eye leaving 16,440 viable eggs. From the egg stage approximately 15,000 fry (50-80 mm) survived to return to Smithers for introduction into Harold-Price Creek. Hence, survival from egg to fry was roughly 64% discounting egg loss from the first female which was almost dead before its eggs were taken.

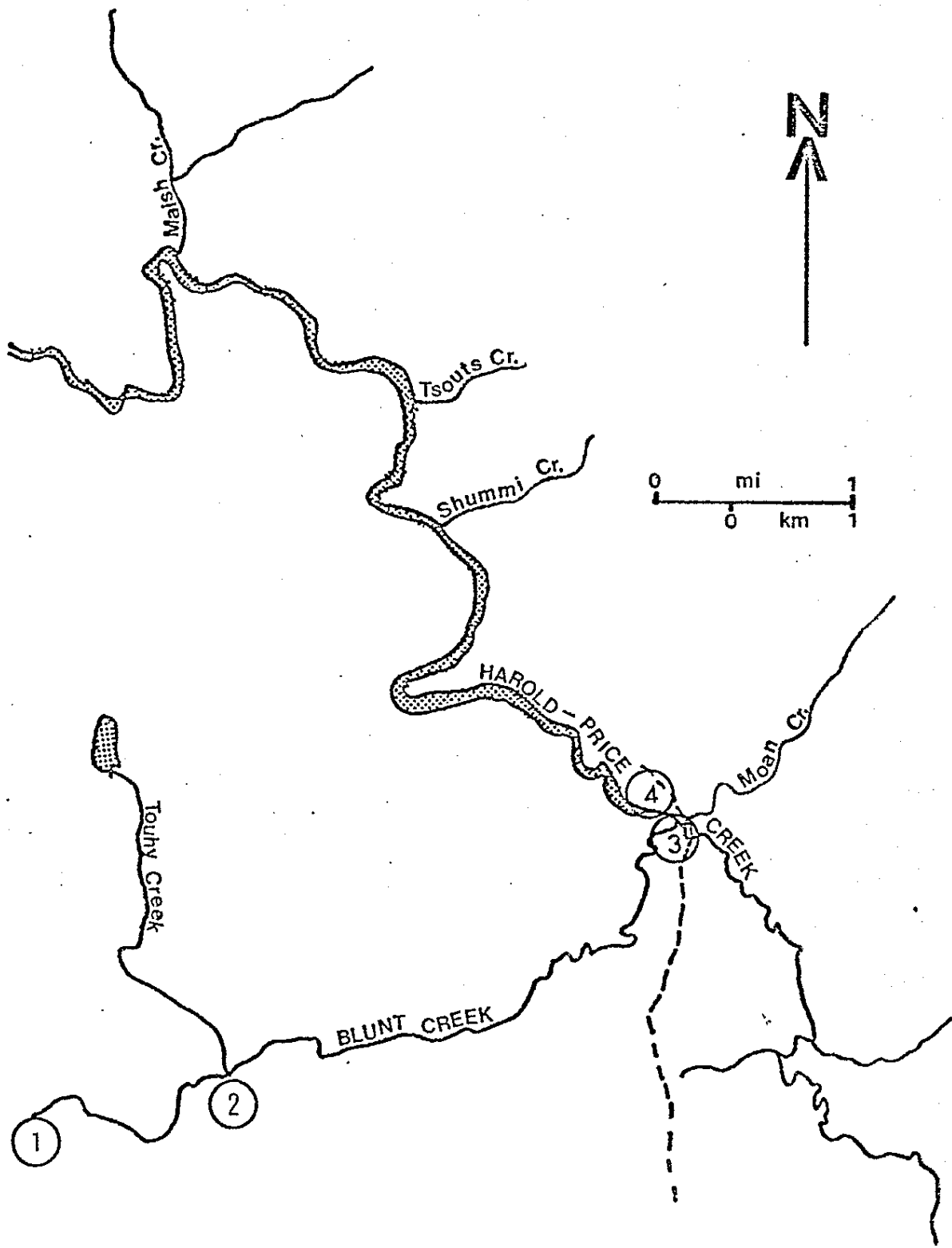


Figure 1. Upper Harold-Price Creek with steelhead colonization sites circled.

Table 1. Number, sex, length and history of angled and trapped steelhead trout from Suskwa River, 1979.

Cummulative Steelhead	Sex	Tag Number	Length	Date Captured	History
1	F	No Tag	787	April 2	Killed for disease, analysis Apr 2
2	F	No Tag	-	April 2	Died in pen - May 1
3	M	10	776	April 3	Died in pen - June 2
4	F	11	-	April 3	Died in pen - May 27
5	M	12	607	April 3	Died in pen - May 25
6	F	13	800	April 3	Eggs taken - June 4
7	M	14	-	April 3	Died in pen - June 4
8	F	No Tag	775	April 3	Hooking mortality - April 3
9	F	15	762	April 4	Died in pen - May 30
10	M	16	-	April 4	Sperm taken - released June 5
11	M	17	-	April 4	Sperm taken - released June 5
12	M	18	-	April 4	Sperm taken - released June 5
13	F	19	777	April 5	Died in pen - June 4
14	F	51	770	April 5	Died in pen - April 16
15	M	52	882	April 6	Sperm taken - released June 5
16	F	No Tag	792	April 11	Eggs taken - June 4
17	F	53	720	April 12	Died in pen - June 4
18	F	54	843	April 12	Eggs taken - May 29
19	F	55	775	April 17	Died in pen - May 17
20	M	No Tag	772	April 17	Died in pen - May 25
21	F	56	780	April 18	Died in pen - May 25
22	F	57	595	April 18	Died in pen - May 19
23	M	58	845	April 18	Sperm taken - June 5
24	F	No Tag	762	April 18	Eggs taken - May 30
25	F	61	-	April 18	Released - April 18
26	F	62	-	April 18	Released - April 18
27	M	64	-	April 18	Released - April 18
28	M	59	-	April 23	Released - April 23
29	F	60	-	April 23	Released - April 23
30	F	65	-	April 24	Released - April 24

FRY INTRODUCTION

15,000 (3 g) steelhead fry were divided into four groups of about 2000, 5500, 3700 and 3700 and deposited in the following four locations:

Site 1: 2000 steelhead - to the confluence of Wan Creek with Blunt Creek.

Site 2: 5500 steelhead - to the confluence Touhy and Blunt Creeks.

Site 3: 3700 - to the confluence of Blunt and Harold-Price Creeks

Site 4: 3700 steelhead - downstream 4.5 km on Harold-Price Creek from the Blunt Creek Harold-Price Creek junction.

About 100 fry died due to the rigors of handling from hatchery to introduction site.

HAROLD-PRICE FALLS

After the final blast in October 1979 the lower step of the three step falls was 3 m. lower and had apparently passed coho into upper Harold-Price Creek.

Four coho were subsequently angled from the junction pool of Blunt and Harold-Price Creeks. Snorkel and electrofishing surveys in plant areas revealed only seven marked fry.

DISCUSSION

Fourteen adult steelhead died in holding pens before ripe enough to use as brood stock. Heavy mortalities were attributable to excessive handling and moving of holding pens made necessary by turbulence, current shifts and sediment load associated with sudden and heavy stream runoff. An improved offsite holding pond has been constructed on Skilokis Creek, a Suskwa

tributary, for a sequel 1980 operation.

Parkinson (M.S. 1978) maintained that dispersal of introduced fry is poor and recommended (pers. comm.) that fry be split into smaller groups and introduced over more sites. In 1979 attempts for increased sites were cut short by the emergency of a local forest fire. However, later electroshocking of selected fry plant areas indicated good dispersal of marked fry under boulders or in rootwads.

If we assume that four per cent of 15,000 fry survive to smolt stage and of ocean migrants four percent survive to return as adult steelhead then about 24 steelhead of the 1979 brood will be available in the angler fishery between 1982 and 1986. Hopefully improved techniques in 1980 will boost eggs collected to roughly 110,000 or (using 1979 assumptions) about 176 adult steelhead returning between 1983 and 1987.

Of two fish capture techniques, angling proved superior, sampling both holdin and actively migrating fish, whereas the California fyke produced results for only a few days before peak flows destroyed the Trap. Trap results show that steelhead did not begin upstreaming until April 18, 1979 when stream flows were beginning to rise (Appendix 1).

SUMMARY

1. Thirty adult steelhead were angled and trapped from the Suskwa River, of which nine, four females and five males, were used as brood stock.
2. From the nine brood adults about 15,000 fed fry were produced in Abbotsford

hatchery. Fry were marked using a pelvic fin clip and introduced to Harold-Price Creek in four preselected plant areas.

3. The lower barrier step of Harold-Price falls was reduced by 3 m. and had passed four coho into upper Harold-Price Creek.
4. Snorkel and electrofishing surveys for marked fry in Upper Harold-Price Creek have shown only seven fish, well dispersed under boulders and in Rootwads.

FUTURE WORK

1. Continued monitoring of selected juvenile habitat for marked introduced steelhead to determine survival and dispersal.
2. A sequel collection with introduction of hatchery reared fry above the falls on Harold-Price Creek will begin in early 1980.
3. An intensive creel survey will be conducted to determine whether or not improved creel returns are in evidence as a result of the Suskwa program.

REFERENCES AND LITURATURE CITED

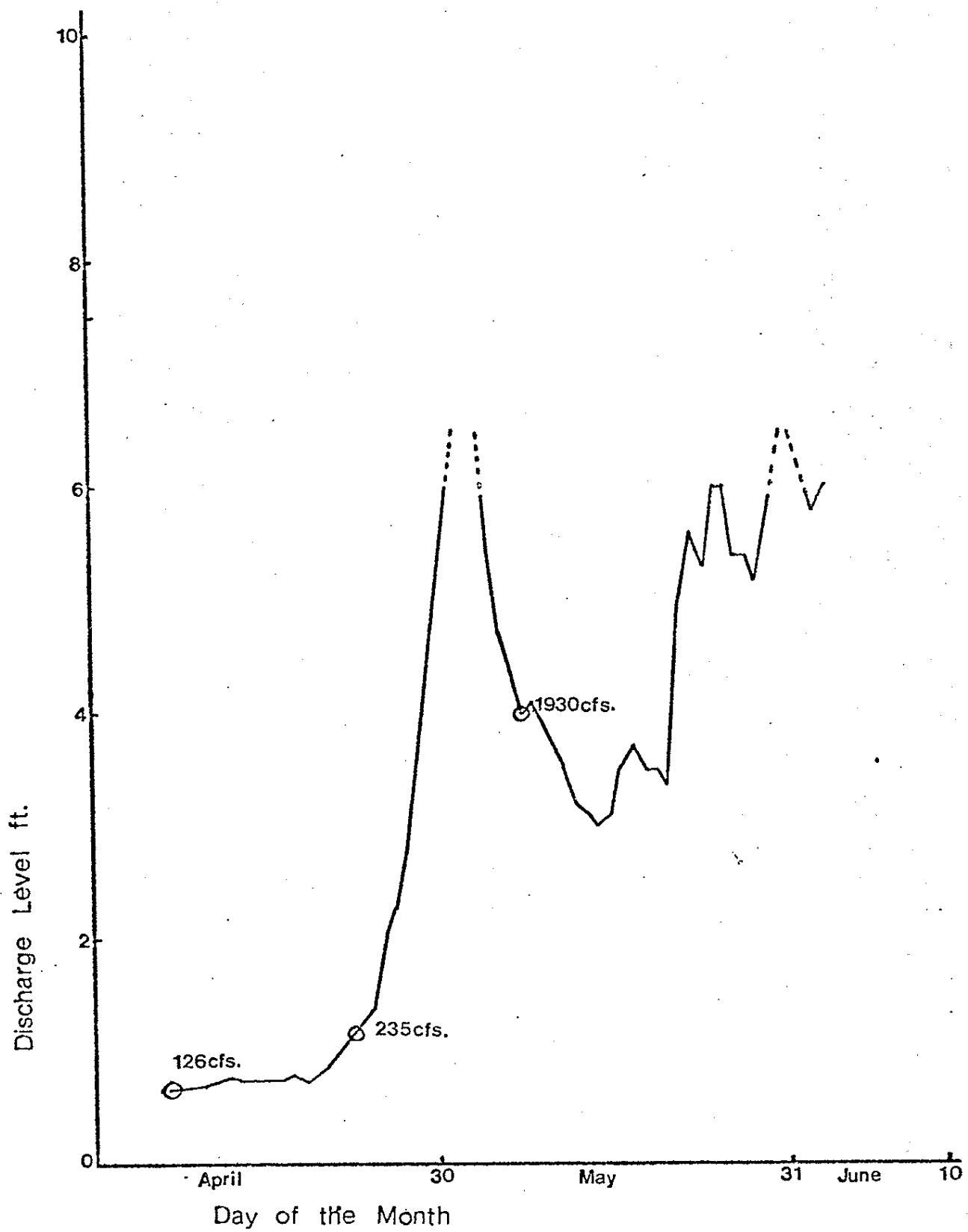
- Chudyk, W.E. M.S. 1978. Suskwa River steelhead trout: the 1977 inventory, creel survey and life history characteristics study leading to the removal of a barrier on Harold-Price Creek. Unpubl. M.S. Fish and Wildlife Branch, Smithers, B.C. 21 pp.
- Hallock, R.J., D.H. Fry Jr. and D.A. LaFaunce. 1957. The use of wire fyke traps to estimate the runs of adult salmon and steelhead in the Sacramento River. Cal. Fish and Game. Vol. 43 No. 4:271-298.
- Narver, D.W. and F.C. Withler. 1974. Steelhead of the Nanaimo River. Aspects of their biology and the fishery from three years of anglers catches. Fisheries and Marine Service, Nanaimo, B.C. Circ. No. 99, 25 pp.
- Parkinson E.. M.S. 1978. Evaluation of Headwater stocking of steelhead fry in coastal British Columbia. Unpubl. S.E.P. progress report, Fish and Wildlife Branch, U.B.C. Vancouver, B.C. 14 pp.

Appendix 1. Steelhead trout age groups, Suskwa River 1977¹ and 1979.

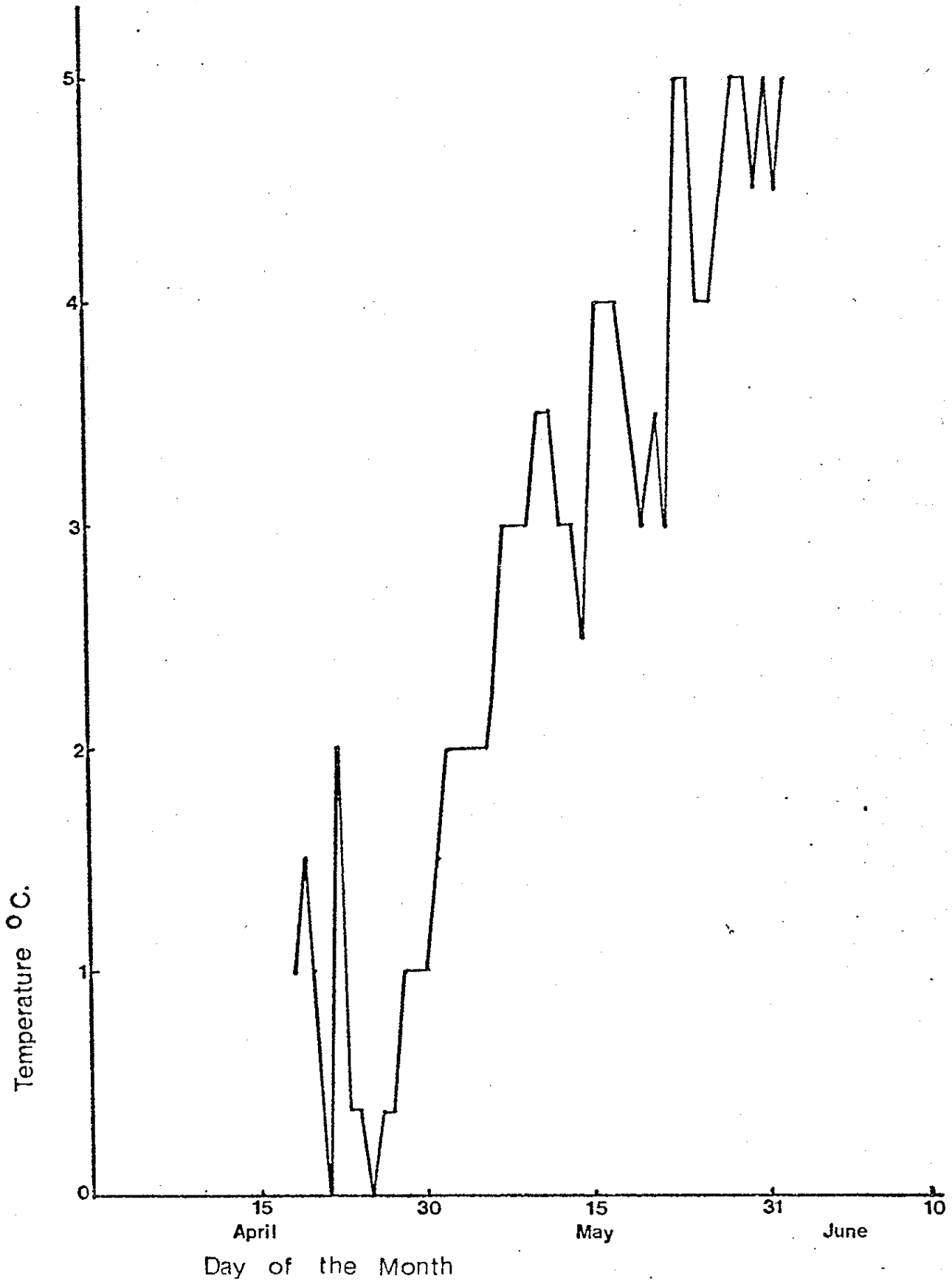
Age Group	Number Steelhead	Male	Female	Percent Total
3.2+	2	1	1	5
4.1+	2	1	1	5
4.2+	25	9	16	60
4.3+	8	4	4	19
4.1S1+	1	1	-	2
4.3S1+	1	1	-	2
5.2+	2	1	1	5
5.3+	1	1	-	2
8	42	19	23	100

1. Chudyk (M.S. 1978)

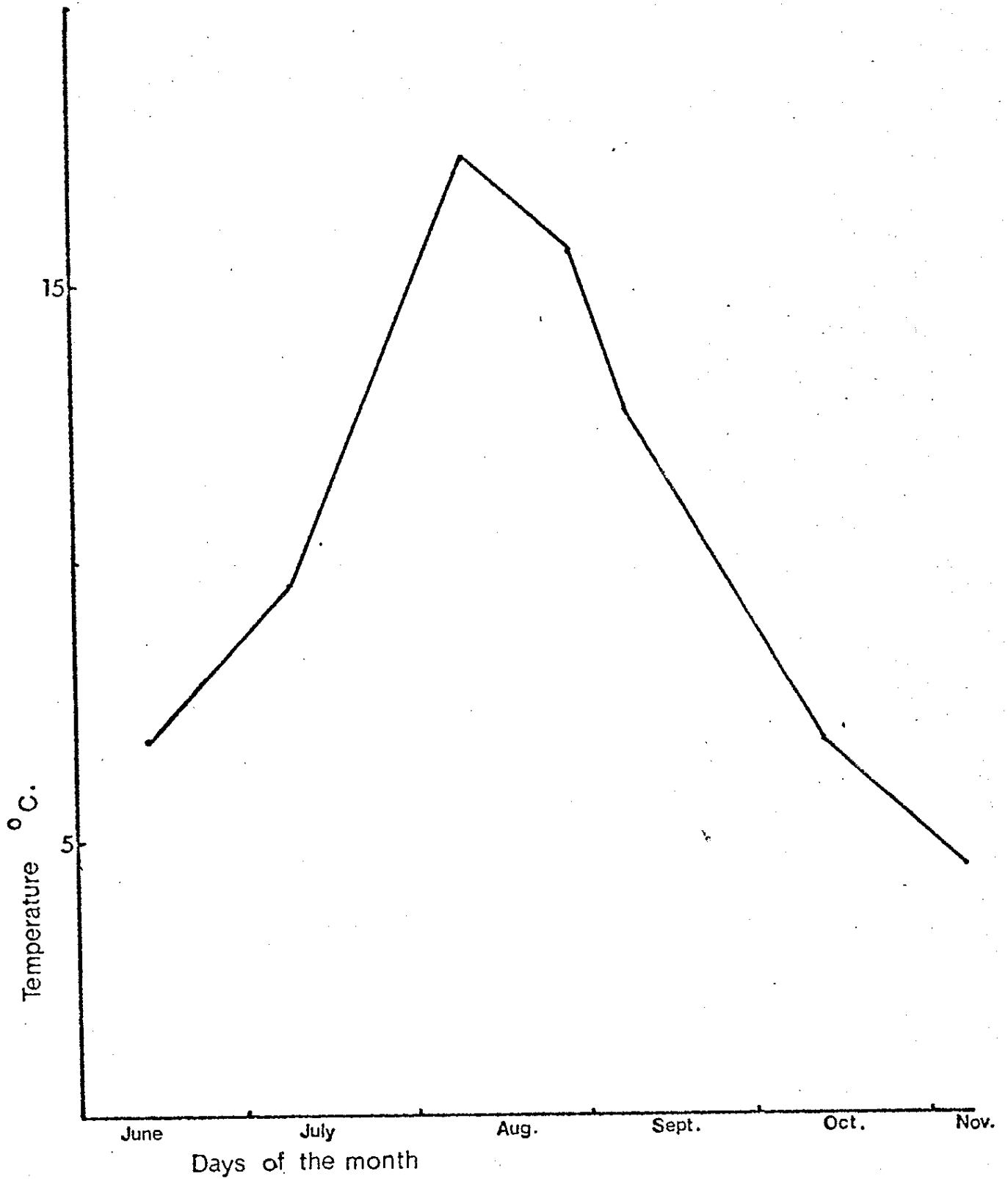




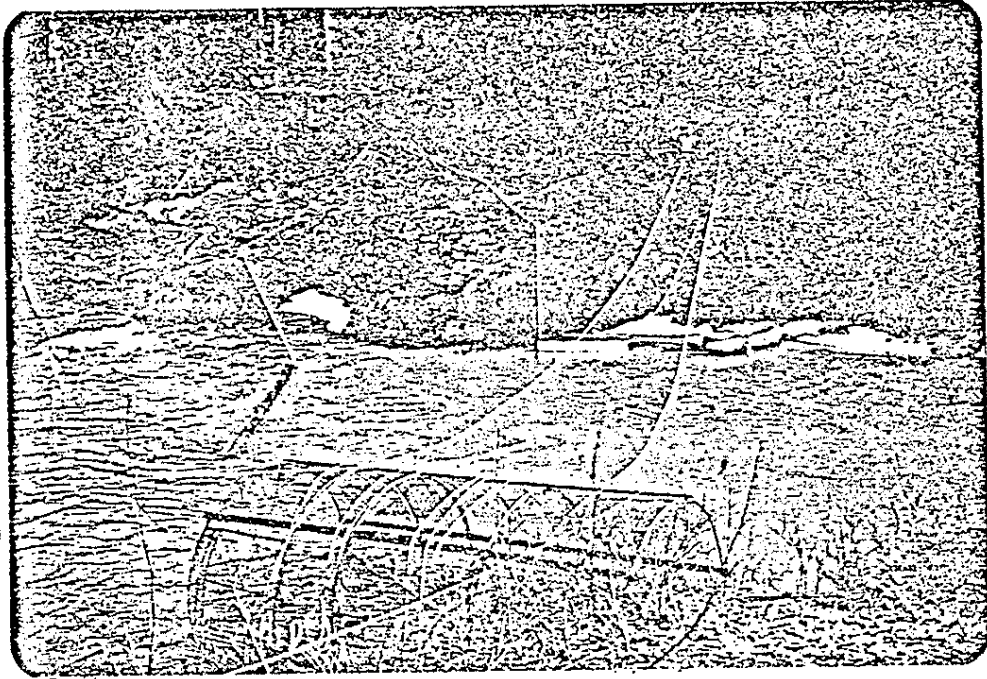
Appendix 2. Lower Suskwa River daily discharge levels from April to June, 1979.



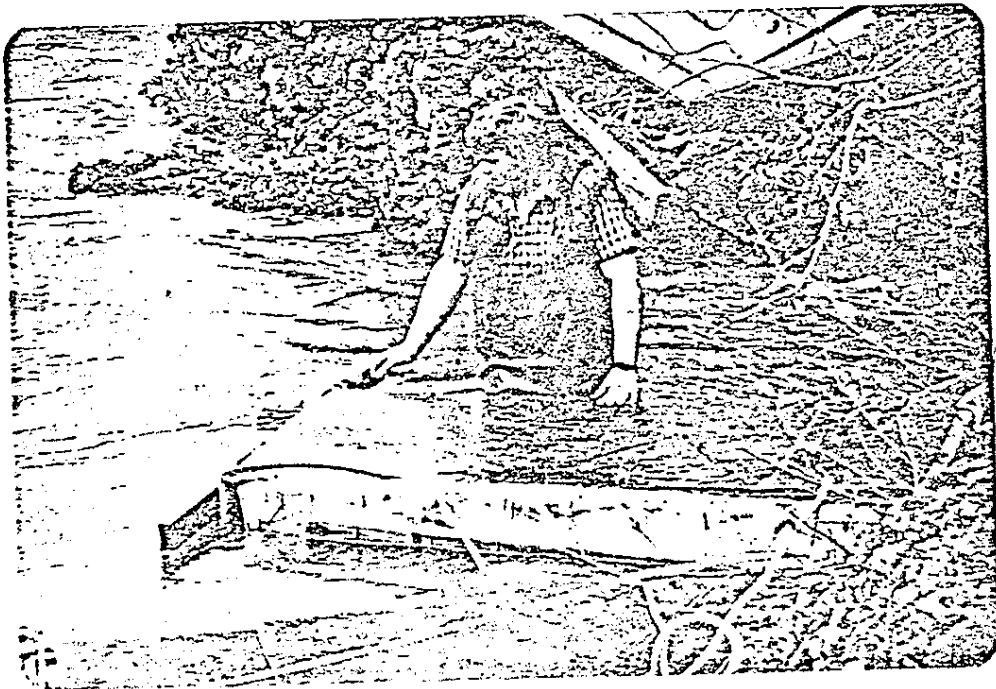
Appendix 3. Lower Suskwa River daily temperature changes from April to June, 1979.



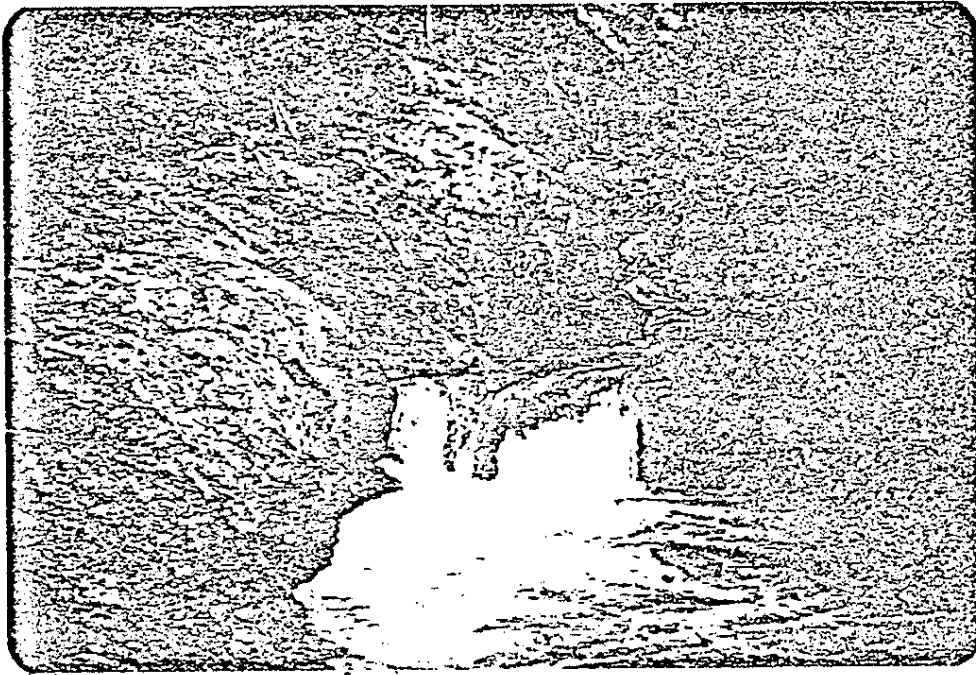
Appendix 4. Upper Harold-Price Creek daily temperature changes from June to November, 1979.



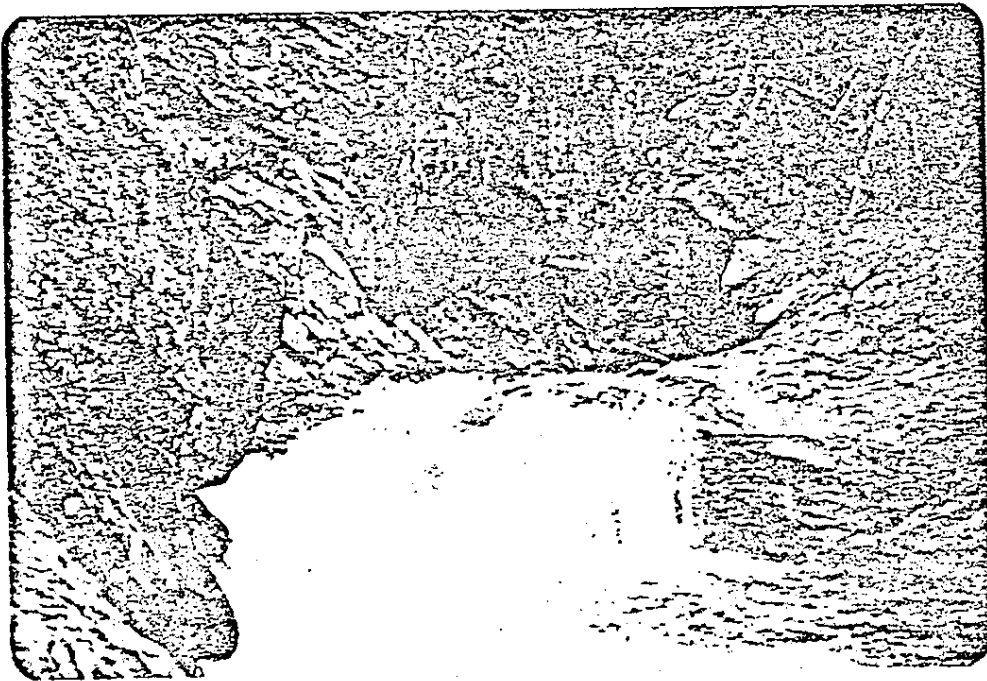
Photograph A. California Fyke Trap.



Photograph B. Frame "hatchery-mesh" pens.



Photograph C. Harold-Price Creek falls before the dynamite blast.



Photograph D. Harold-Price Creek falls after the final dynamite blast.