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LAKE SURVEYS:

NANAIMO RIVER WATERSHED

JULY 1980

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Nanaimo River

Salmonid Enhancement Project

INTRODUCTION

The purpose of the lake survey program in the Nanaimo River watershed was to gather baseline data on:

1. biophysical features of the lakes
2. water quality
3. fish utilization and species and diseases present
4. to find a suitable lake pen rearing site

MATERIALS AND METHODS

Lake surveys were carried out on nineteen lakes within the Nanaimo River watershed (Fig. 1). These lakes included:

1. Barsby Lake
2. Beck Lake
3. Blackjack Lake
4. Blind Lake
5. Cassidy Gravel Pit
6. Crystal Lake
7. First Lake
8. Fourth Lake
9. Green Mountain (or Heart) Lake
10. Healy (or Panther) Lake
11. Holden Lake
12. McKay Lake
13. Myles Lake
14. Quennel Lake
15. Second Lake
16. Shelton Lake
17. Third Lake
18. Timberlands Lake
19. Williams Lake

In most cases, the write up for each lake contains a physical description

a contour map with vegetation noted, water quality data and gill net data.

PHYSICAL DESCRIPTION

The physical description of the lake contains the following information and the method by which it was determined.

NAME: Name of the lake.

DATE: Date of the survey.

LOCATION: NTS map number, latitude and longitude and the UTM number.

ACCESS: Recorded by the S.E.P. field technicians. All directions start from Nanaimo.

PHYSICAL DATA: Surface Area - Calculated from the survey map using a polar planimeter.

Perimeter - Calculated in metres using a map measurer.

Volume - Calculated in cubic metres using the following formula:

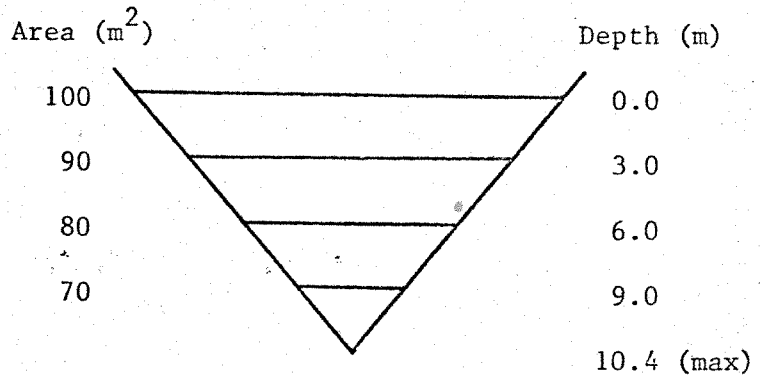
$$\text{Volume} = \left[\sum_{i=1}^k A_{i+1} (D_{i+1} - D_i) + \frac{1}{2} (A_i - A_{i+1}) (D_{i+1} - D_i) \right] + \frac{1}{2} A_k (D_{\text{max}} - D_k)$$

Where A = the area of the contour line

D = the depth at the contour interval

k = the number of contour lines

For example:



$$\text{Volume} = 90(3 - 0) + \frac{1}{2}(100 - 90) (3 - 0) + 80(6 - 3) + \frac{1}{2}(90 - 80) (6 - 3) + 70(9 - 6) + \frac{1}{2}(80 - 70) (9 - 6) + \frac{1}{2} \times 70(10.4 - 9)$$

Elevation - In metres, determined from the NTS map.

Maximum Depth - In metres, determined by the field technicians using a hand line.

Mean Depth - Calculated in metres using the formula;

$$\text{Mean Depth} = \frac{\text{Volume (m}^3\text{)}}{\text{Surface Area (m}^2\text{)}}$$

DRAINAGE: Taken from the Fish and Wildlife Branch maps or from the NTS maps.

PHYSICAL CHARACTERISTICS: Noted by the S.E.P. field technicians.

VEGETATION: Noted by the S.E.P. field technicians.

BENCHMARK: Noted and placed by the S.E.P. field technicians.

PUBLIC UTILIZATION: Noted by the S.E.P. field technicians.

COMMENTS: Noted by the S.E.P. field technicians.

CONTOUR MAP

The contour maps of the lakes were either taken from the Nanaimo Fish and Wildlife Branch or were drawn from data gathered using a hand line. The vegetation marked on the contour maps was identified and noted by the S.E.P. field technicians.

WATER QUALITY DATA

The water quality was determined by the S.E.P. field technicians. The tests and equipment included:

SECCHI DEPTH: The depth of light penetretion in metres using a secchi disc.

WATER TEMPERATURE: Taken at one metre depth intervals using a max/min thermometer or a Yellow Springs Instrument - model 33 S.C.T. metre.

DISSOLVED OXYGEN (mg/l), ALKALINITY (gr/gal) and pH: Standard Hach tests were carried out at a minimum of 2 depths. Carbon dioxide (mg/l) and hardness tests were also carried out on occasion.

CONDUCTIVITY (umhos) - Tests were carried out at each of the test depths using the Yellow Springs Instrument - model 33 S.C.T. meter. If the instrument was unavailable, a ½ litre water sample from each depth was taken back to the office for testing.

GILL NET DATA: Gill netting was carried out in only 9 of the 19 lakes. The nets used were sinking monofilament, 50 x 6 ft., 1/2, 3/4, 1, 1 1/2, 2, 2 1/2 and 3 inch mesh. All fish caught were taken to the Pacific Biological Station to be tested for diseases and parasites.

RESULTS

Disease and parasite analysis on gill net caught fish were completed at the Pacific Biological Station in Nanaimo. The results were:

Parasites:

Digenea: Crepidostomum farionis
Tetracotyle sp.

Cestoda: Diphyllobothrium sp.
Proteocephalus sp.

Acanthocephala: Neoechinorhynchus sp.

Nematoda: Rhabdochona sp.
Sterliadochona tenuissima

Trematoda: Neascus sp.

Protozoa: Myxobotus neurobius

Parasites were found in normal numbers for wild stocks - specific cases were not given.

Diseases:

The only disease found in the gill netted fish was furunculosis. There were 2 cases of the disease, one chinook smolt and one spawned out adult chinook.

NANAIMO RIVER WATERSHED

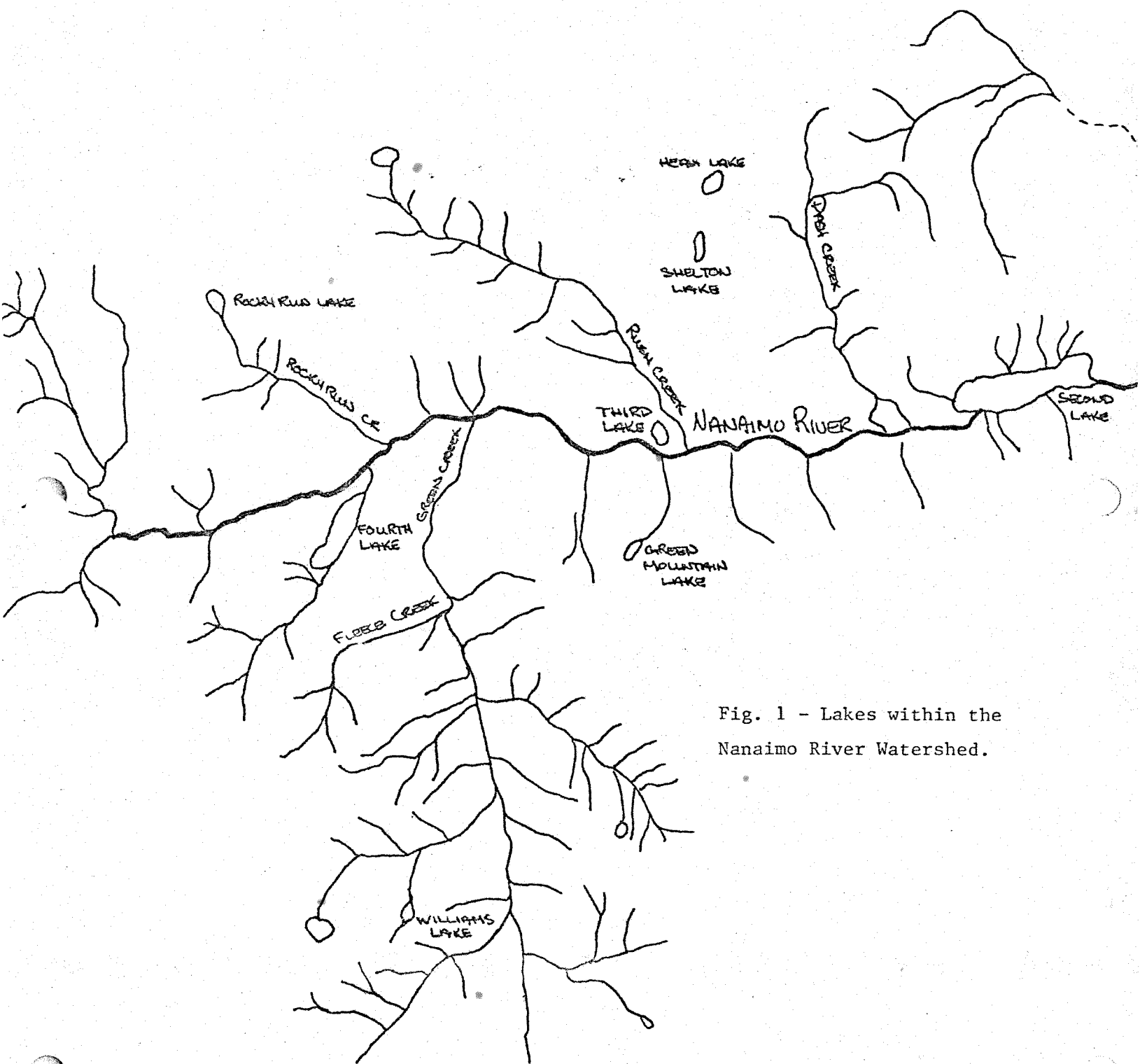
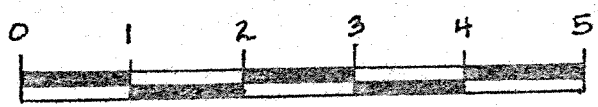
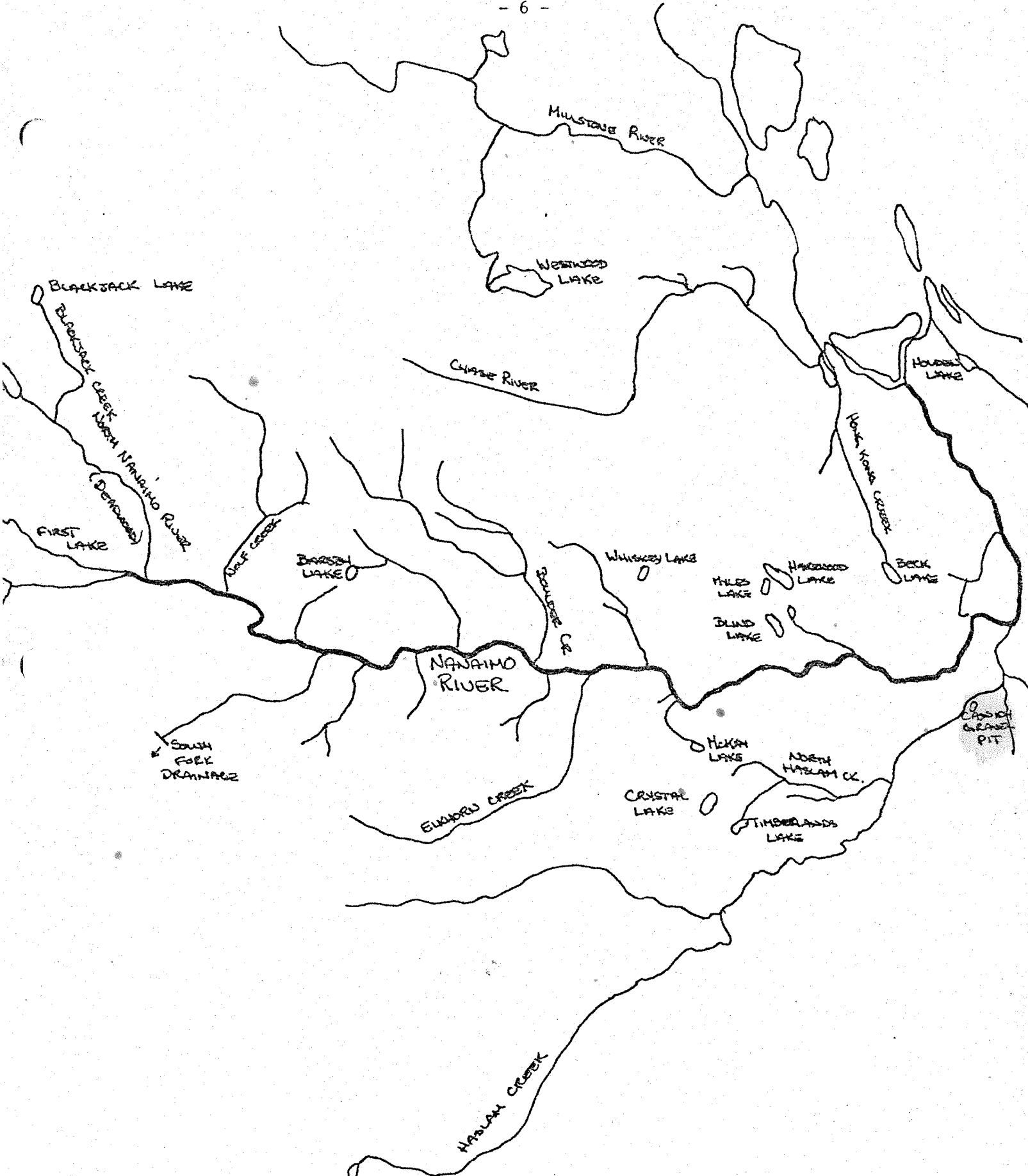
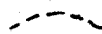
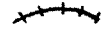
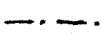
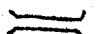
















Fig. 1 - Lakes within the Nanaimo River Watershed.




LAKE SURVEY MAP LEGEND

SYMBOLS

-  Road
-  Railway
-  Power Transmission Line
-  Bridge
-  Building
-  Stream Flow Direction
-  Contour Line
-  Water Chemistry Station
-  Benchmark
-  Gill Net
-  Flat Shoreline
-  Moderate Shoreline
-  Steep Shoreline - 30°+
-  Very Steep Shoreline - 45°+
-  Beaver House
-  Beaver Dam
-  Picnic Site
-  Campsite

VEGETATION

- D Alder
- C Cedar
- F Douglas Fir
- H Hemlock
- P Pine
- S Sitka Spruce
- W Willow
-  Swamp
- CT Cattails
- LL Leather Leaf
- LP Lily Pads
- ~~DET~~ Detritus