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UNITED STATES OF AMERICA BEFORE THE FEDERAL POWER COMMISSION

In the Matter of the Application of the
City of Seattle, Washington for Amendment
of License for Skagit River
Ross Development Project No. 553 Washington

Project No. 553

VOLUME II

EXHIBITS TO ACCOMPANY TESTIMONY

of
G.W. BISHOP
G.W. SHARPE
L.D. DORAN
N.J. WILIMOVSKY

R.L. BURGNER
D.R.M. SCOTT
R.D. TABER
J.F. BENDELL

W.V. BURT
W.E. MILLS
T.J. WIRTH
A.N. HALTER
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1610 Washington Building
Seattle, Washington 98101
Special Counsel

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EXHIBIT LIST (Cont. from Volume 1)

Volume 11 of Exhibits

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
Witness: G. W. Bishop		
_____	(GWB-1)	"Visitor's Guide," Skagit Project
_____	(GWB-2)	Area-Volume Curves
_____	(GWB-3)	Letter December 20, 1972 from National Park Service
_____	(GWB-4)	Estimated Costs Recreational and Environmental Studies (with Addendum on associated estimated construction costs)
Witness: G. W. Sharpe		
_____	(GWS-1)	Collection of Photographs
_____	(GWS-2)	Western Redcedar Forest Type: Big Beaver Creek and McMillan Creek
_____	(GWS-3)	Western Redcedar Forest Type: Baker River
_____	(GWS-4)	Western Redcedar Forest Type: Thunder Creek
_____	(GWS-5)	Western Redcedar Forest Type: Little Beaver Creek
_____	(GWS-6)	Western Redcedar Forest Type: Chilliwack River
Witness: L. D. Doran		
_____	(LDD-1)	Map of Skagit River - Ross Lake System
_____	(LDD-2)	Diagram of Food Utiliza- tion by Fish in Skagit River System
_____	(LDD-3)	Diagram of Composition of Bottom Fauna in Skagit River System

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(LDD-4)	Diagram of Composition of Bottom Fauna in Skagit River, by Survey Sections
Witness: N. J. Wilimovsky		
_____	(NJW-1)	Chart: Length-Frequency Distribution; Skagit-Ross 1971
_____	(NJW-2)	Chart: Weight-Frequency Distribution; Skagit-Ross 1971
_____	(NJW-3)	Chart: Mean Calculated Length, 1971
_____	(NJW-4)	Chart: Catch Per Angler Day, 1941-70
Witness: R. L. Burgner		
_____	(RLB-1)	Gradient Profile for Lightning Creek
_____	(RLB-2)	Average Plankton Counts - 1971-72
_____	(RLB-3)	Graph: Depth Distribution of Plankton - 1972
_____	(RLB-4)	Food Utilization - Ross Lake, 1971
Witness: D. R. M. Scott		
_____	(DS-1)	Map of Ross Lake Indicating Deer Ranges and Vegetation Types
_____	(DS-2)	Plant Species List of Ross Lake Basin
_____	(DS-3)	Plant Data From Survey Plots
_____	(DS-4)	Vertical Diagrams From Survey Plots
Witness: R. D. Taber (No Exhibits)		

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
Witness: J. F. Bendell		
_____	(JFB-1)	Photo - Lower Skagit Valley in Canada
_____	(JFB-2)	Map - Vegetation and Animal Habitat Types - Two - Part Study Area
_____	(JFB-3)	List of Mammals Remaining in Study Area After Inundation
_____	(JFB-4)	Photo - Development of Waterfowl Habitat
_____	(JFB-5)	Photo - Mixed Forest Habitat
_____	(JFB-6)	List of Birds Observed in Study Area
_____	(JFB-7)	List of Birds Observed in Study Area Grouped by Habitat Type
_____	(JFB-8)	Photo - Hybridization of Deer
_____	(JFB-9)	Maps - Seasonal Deer Ranges
_____	(JFB-10)	Photo - Lowland Meadows
_____	(JFB-11)	Photo - Deer Radio Tagging Equipment
_____	(JFB-12)	Maps - Results of Radio Tagging Surveys
_____	(JFB-13)	Photo - Development of Meadow-type Range

Witness: W. V. Burt

_____	(WVB-1)	Graph - Observed and Forecast Temperature at Ross Dam
_____	(WVB-2)	Graph - Observed Temperature at Alma Creek Gauging Station

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(WVB-3)	Graph - Forecast Temperature at Alma Creek Gauging Station
Witness: W. E. Mills		
_____	(WEM-1)	Regional and Provincial Park Systems of the Lower Mainland Region
_____	(WEM-2)	Major Potential Recreational Valleys Within 100 Miles of Vancouver
_____	(WEM-3)	Supply of Recreational Areas Within 100 Miles of Lower Mainland Population Center
_____	(WEM-4)	Recreation Capacity Standards
_____	(WEM-5)	Potential Recreation Areas With High Ross Reservoir
_____	(WEM-6)	Potential Recreation Areas Without High Ross Reservoir
_____	(WEM-7)	Summary of Recreation Potential With and Without High Ross Reservoir
Witness: T. J. Wirth		
_____	(TJW-1)	Statistics on Use North Cascades National Park and Ross Lake NRA
_____	(TJW-2)	North Cascades Highway Use Figures
_____	(TJW-3)	Map of Ross Lake NRA U.S. Market Area
_____	(TJW-4)	Map of Whiskeytown NRA Market Area
_____	(TJW-5)	Comparison of Ross Lake NRA and Whiskeytown NRA
_____	(TJW-6)	1970 Visitor Use at Whiskeytown NRA
_____	(TJW-7)	Population, Ross Lake NRA Market Area

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(TJW-8)	Artist's Rendering on Photo from Jack Mountain, Showing Big Beaver Valley and Roland Point at El. 1725
_____	(TJW-9)	Tabulation of Usable Shoreline and Adjacent Land Areas at El. 1725
_____	(TJW-10)	Map Showing Existing and Proposed Recreation Facilities in Project 553
_____	(TJW-11)	Typical Campground Layout
_____	(TJW-12)	Estimated Cost of Campgrounds, Trails and Bridges

Witness: A. N. Halter

_____	(ANH-1)	Benefit-Cost Analysis of Projected Recreation Use of High Ross Dam
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Witness: H. F. Jones (No Exhibits)

List of Exhibits to Accompany
Testimony of G. Wayne Bishop

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(GWB-1)	"Visitor's Guide," Skagit Project
_____	(GWB-2)	Area-Volume Curves
_____	(GWB-3)	Letter December 20, 1972 from National Park Service
_____	(GWB-4)	Estimated Costs Recreational and Environmental Studies (with Addendum on associated estimated construction costs)



The best way to see the Skagit Project is by taking a guided tour from Newhalem, which includes a bus and boat ride to all points of interest and a generous family-style meal. However, because of the number of people who wish to make the trip and the limited accommodations, visitors must make advance reservations with Seattle City Light. The cost is \$4.00 per person.

If you do not have reservations, this pamphlet will help you make a self-guided tour. *May your visit be an enjoyable one.*

1. **GOODELL CREEK FOREST CAMP** — Downstream from Newhalem, the National Park Service maintains a forest camp with both camping and picnicking units.
2. **NEWHALEM POWERHOUSE** — Seattle City Light's first Skagit River power plant was completed in 1921 on Newhalem Creek to provide power during construction of the Gorge Plant. The 2000-kw plant is operated by remote control from Gorge Powerhouse. Its energy is fed into the local distribution system and any excess is sent through a connection with Gorge Plant into the Skagit generating system.
3. **NATURE TRAIL** — A unique new trail, the "Trail of the Cedars." The self-guided walking tour is a half-mile loop that begins and ends at the east side of the footbridge across the Skagit River at Newhalem. Information markers along the way describe natural phenomena and give botanical, zoological and historical information. You are invited to enjoy a walk along this trail.
4. **NEWHALEM** — A complete town of some 350 population, Newhalem is one of two communities maintained by Seattle City Light to house its employees on the Skagit Hydroelectric Project. There are no public overnight accommodations.
5. **CURRIER HALL** — Named for a former Skagit operations supervisor, this community center serves also as starting place for City Light's guided tours of the Skagit Hydroelectric Project.
6. **GORGE INN** — The employees' cookhouse in Newhalem also serves as dining hall for tourists **with advance reservations** made through the Seattle office. Meals are served family-style with seconds for everyone.
7. **PICNIC GROUNDS** — Tables, stoves, water and rest rooms are provided.
8. **COMMISSARY** — Groceries, meats and general merchandise are available here for area residents and tourists. The store is open 9:00 a.m. to 5:30 p.m., Monday through Friday.
9. **"OLD NUMBER SIX"** — All that is left of the rolling stock of the Seattle Skagit River Railway built by City Light to develop the Skagit Project is one of the steam engines, Locomotive No. 6,

preserved as a tourist attraction in Newhalem. The 31-mile line, part electric and part steam, which ran from Rockport to Diablo, was built in 1919 and carried men, materials, supplies and equipment until 1954. From 1928 on, it served also to carry tourists to Newhalem and Diablo. In 1954 construction of the new Gorge Dam made it necessary to relocate the Newhalem-Diablo portion of the railroad. Because a new highway to Newhalem had reduced rail traffic below that town, it was decided to extend the highway instead of relocating the railway roadbed—so the Skagit Railroad passed into history.

10. **ROSS CRYPT** — James D. Ross, "father of City Light", and his wife Alice are interred in a crypt at the base of Ross Mountain. It was Ross who first recognized in the Skagit River a perpetual source of power for Seattle and won national recognition for its hydroelectric development. He died March 14, 1939; Mrs. Ross died April 6, 1956.
11. **GORGE POWERHOUSE** — The farthest downstream of City Light's three plants on the Skagit River, Gorge Powerhouse uses water that has already been used twice, to spin the turbines and produce electric energy at Ross and Diablo plants upstream. The four generators at Gorge Powerhouse, capable of producing a total of 175,000 kilowatts, use water drawn from behind Gorge Dam through a 20½-foot-diameter, two-mile-long tunnel.
12. **ROCK GARDENS AND LADDER CREEK FALLS** — The gardens were established by J. D. Ross, City Light's first superintendent, as a tourist attraction. Flowing through the gardens is Ladder Creek in a series of spectacular cascades. Both the gardens and the falls are illuminated at night.
13. **GORGE DAM** — The original dam built in 1919 was a wood crib dam. This was replaced in 1950 by a concrete diversion dam and by the present high dam in 1961. It is 300 feet high and 670 feet long. The reservoir behind it is 4½ miles long and has a total storage of 8,500 acre feet.
14. **NORTH CASCADES HIGHWAY** — When completed, this highway across the North Cascades will connect the northern sections of the state,

running 77 miles from Marblemount on the Skagit River, to Mazama in Okanogan County. It is now open to Thunder Arm of Diablo Lake and will soon reach Ross Lake. Parts of City Light's Skagit River Railway roadbed were deeded over for highway construction. Completion is expected in 1972, at an estimated cost of \$20 million.

15. **DAVIS POWERHOUSE** — Close by the modern Diablo Powerhouse is a replica of the first Skagit powerhouse, which was built on the Davis ranch in 1908 by Glee Davis. The waterwheel is the original one. In its day it turned a generator which produced $3\frac{3}{4}$ kilowatts for the Davis roadhouse.
16. **DIABLO POWERHOUSE** — Water from Diablo Lake is delivered to the turbines here through a tunnel 1990 feet long and $20\frac{1}{2}$ feet in diameter. Construction of the Diablo plant began in 1927 and the first unit went into regular service in 1936. The plant has a peak capability of 159,000 kilowatts. Its two main generators were the largest in the world when ordered.
17. **INCLINE RAILWAY** — The only remaining operating part of the old Seattle Skagit River Railway is the Diablo incline railway. A 400-horsepower electric motor pulls a lift 600 feet up the mountainside on a 68% grade to the level of Diablo Lake. All the materials and equipment for the Ross Plant and Diablo Dam were taken up this incline which has a capacity of 158,000 pounds. Now, besides performing City Light maintenance work, it carries thousands of tourists and fishermen each summer.
18. **DIABLO** — Employees who operate the Diablo and Ross plants live in the City Light town of Diablo. Population—employees and their families—is about 200.
19. **DIABLO DAM** — When it was completed in 1930, this was the highest arch-type dam in the world. It is 389 feet high and 1,180 feet long at the crest. Diablo Lake has 50,000 acre-feet of usable storage and is used to regulate the discharged water from the Ross Plant upstream for the use of Diablo and Gorge plants. The lake, stretching $4\frac{1}{2}$ miles to Ross Dam, provides scenic cruising for Skagit visitors as well as excellent trout fishing.
20. **COLONIAL CREEK FOREST CAMP AND BOAT**

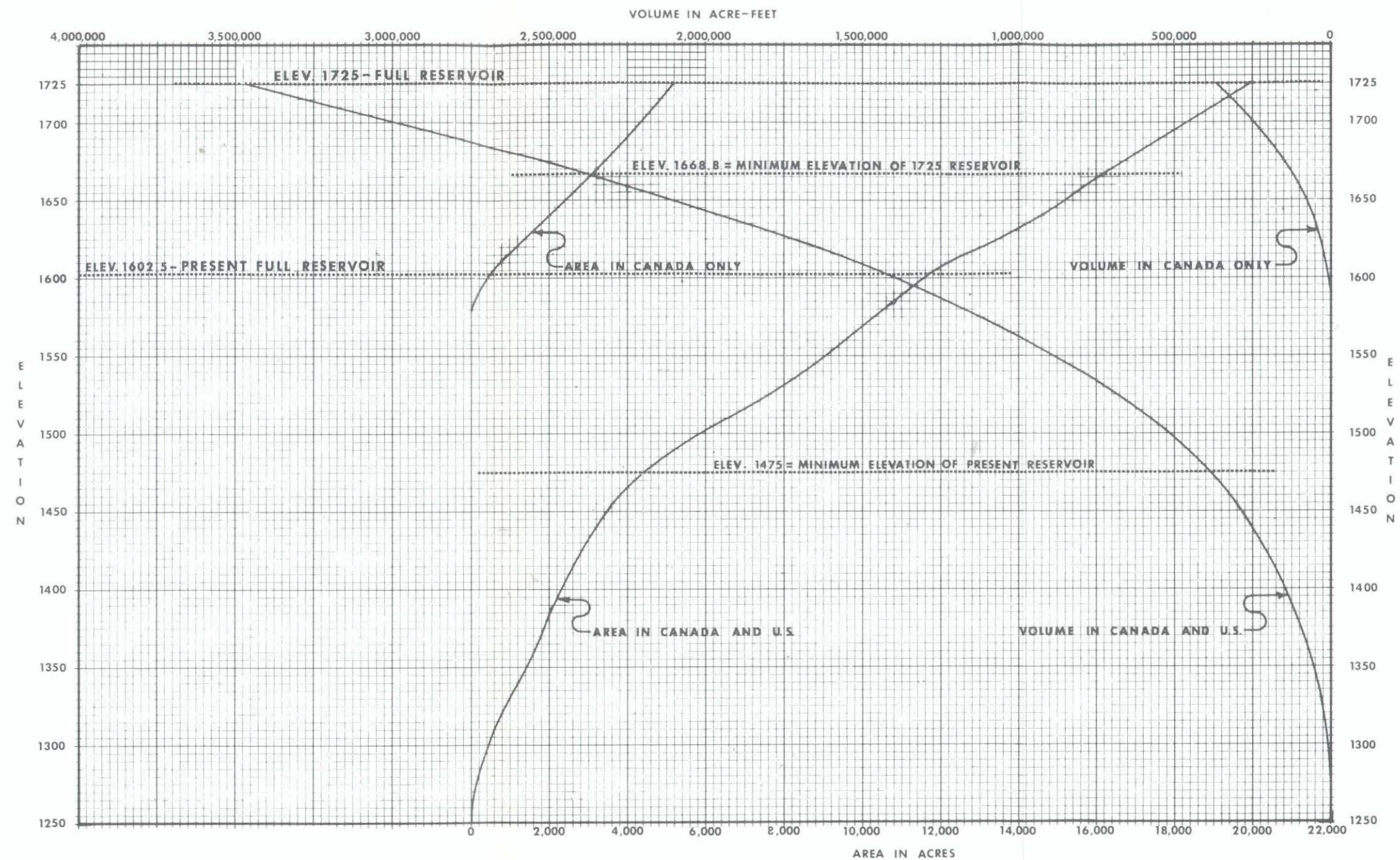
LANDING — This National Park Service camp, located on Thunder Arm of Diablo Lake, has both camping and picnicking units, and a double ramp for boats.

21. **THUNDER CREEK**
22. **DIABLO BOAT LANDING** — City Light's 102-passenger tour boat "Alice Ross II" and various City Light work boats are berthed here. Visitors not on the regular tour and who wish to take the boat ride to Ross Dam, may do so at a nominal charge of \$1 per round trip.
23. **DIABLO LAKE RESORT** — Furnished cabins, food, boats, motors and gas are available at the resort. For reservations, write Diablo Lake Resort, P. O. Box 194, Rockport, Washington. Fishermen with reservations may drive directly to the resort by way of the North Cascades Highway and crossing at Diablo Dam.
24. **ROSS POWERHOUSE** — Started in 1950 after completion of Ross Dam, the plant has four generators—the last one installed in 1956. Two tunnels supply water to the immense turbines. Each generator can produce 112,500 kilowatts, giving the plant a peak capability of 450,000 kilowatts when the reservoir is full to the 1,600-foot level.
25. **ROSS DAM** — The key structure of the Skagit Hydroelectric Project is one of the highest dams in the nation. It is an arch-type concrete dam, 540 feet high from bedrock to surface of the roadway along the crest. It was designed for possible enlarging. The reservoir behind the dam holds 1,435,000 acre-feet. Construction of the dam created a lake 22 miles long, extending $1\frac{1}{2}$ miles into Canada. Collecting water from a 1,200-square-mile watershed, Ross Lake plays an important part in flood control for the entire Skagit Valley.
26. **ROSS LAKE RESORT** — Cabins, bedding, boats, motors and gas are available, but fishermen must bring their own food for there is no store. Reservations may be made by writing Ross Lake Resort, Rockport, Washington. It is reached by taking a boat across Diablo Lake to the foot of Ross Dam, then hiking up a "jeep" road to Ross Lake. For those who want it, the resort operator provides transportation at a nominal cost from the foot of Ross Dam to the fishing resort.



**YOU ARE IN THE ROSS LAKE NATIONAL RECREATION AREA —
PLEASE BE CAREFUL WITH MATCHES AND FIRE.**

**Remember—only YOU can
PREVENT FOREST FIRES**



NOTE: CURVES DERIVED FROM THE
CITY OF SEATTLE'S "S" SERIES
TOPOGRAPHY OF ROSS RESERVOIR
WITH ADJUSTMENTS PER 1970 SURVEYS.

EXHIBIT NO. _____
(GWB-2)

6-19-71

REVISIONS		DATE	MF
REV	DATE	MF	APP
1	6/6/71	ME	
2	5/24/71	ME	

REDRAWN WITH
ADJUSTMENTS
PER 1970 SURVEYS

CITY OF SEATTLE DEPARTMENT OF LIGHTING			
JOHN M. NELSON, SUPERINTENDENT			
DR	M ²	2/17/71	DATE 2-18-71
CK	W ²		APP R.R. S. J.
EJD		DATE	
C.R.H. =		APP	

ROSS DAM		CLASS.
ROSS RESERVOIR AREA, VOLUME CURVES		DRAWING NO. C-6048
SCALE AS SHOWN	REV. NO. 1	



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

L7427
(PNR)CA

December 20, 1972

Mr. Gordon Vickery
Superintendent
Seattle City Light
1015 Third Avenue
Seattle, Washington 98104

Dear Mr. Vickery:

We have reviewed the plans your office submitted relative to a boat launching area and associated parking for Ross Lake. While a few minor changes will be required before the project is undertaken, the proposed project will meet our requirements for access to Ross Lake.

Accordingly, if you will amend your Exhibit R to your application for Amendment of License, Federal Power Commission Project No. 553, to incorporate the plans for access, a boat launching area, and associated parking for Ross Lake, your Exhibit R will meet the terms of the condition requested by the Secretary of the Interior for such access and facilities.

By copy of this letter, we are advising the Director of the National Park Service and Regional Director of the Bureau of Outdoor Recreation of this matter.

Sincerely yours,

Wayne R. Howe
Acting Director

DEC 27 2 21 PM '72

RECEIVED
DEC 27 1972



National Parks Centennial 1872-1972

EXHIBIT NO. _____
(GWB-3)

ESTIMATED COSTS ASSOCIATED WITH
RECREATIONAL AND ENVIRONMENTAL STUDIES
U.S. AND CANADA*

A. Recreational Studies

Prelicensing studies through 1972	\$ 187,000
Anticipated studies	<u>80,000</u>
Total	<u>\$ 267,000</u>

B. Environmental Studies

Prelicensing studies through 1972	\$ 815,000
Anticipated studies 1973	205,000
Post-Licensing investigations	<u>347,000</u>
Total	<u>\$1,367,000</u>

Grand Total	<u><u>\$1,634,000</u></u>
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* Does not include interest during construction

ADDENDUM TO EX. _____ (GWB-4)

ESTIMATED COSTS ASSOCIATED WITH
RECREATION AND ENVIRONMENTAL CONSTRUCTION*

A. Recreation Work

1. Campsites, bridges, trails	\$ 821,275
2. Recreation facilities at dam	825,200
3. Clearing in Canada attrib. to recreation	<u>260,000</u>
Total	<u>\$1,906,475</u>

B. Environmental Work

1. Lightning Creek Fish passage	\$ 5,000
2. Incubation boxes	40,000
3. Shrimp feed	30,000
4. Inhibit plant succession	<u>10,000</u>
Total	<u>\$ 85,000</u>

Grand Total \$1,991,475

Summary:

From Ex. _____ (GWB-4)	\$1,634,000
From Addendum	<u>1,991,475</u>
Total	\$3,625,475

*Does not include contingencies and engineering and administration costs.

List of Exhibits to Accompany
Testimony of Dr. Grant W. Sharpe

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(GWS-1)	Collection of Photographs
_____	(GWS-2)	Western Redcedar Forest Type: Big Beaver Creek and McMillan Creek
_____	(GWS-3)	Western Redcedar Forest Type: Baker River
_____	(GWS-4)	Western Redcedar Forest Type: Thunder Creek
_____	(GWS-5)	Western Redcedar Forest Type: Little Beaver Creek
_____	(GWS-6)	Western Redcedar Forest Type: Chilliwack River

INDEX TO EXHIBIT _____ (GWS-1)

<u>Photo No.</u>	<u>Description</u>	<u>Date</u>
(1)	Ross Lake NRA Entrance Sign	9- 5-69
(2)	Map of North Cascades	
(3)	Map of North Cascades	
(4)	Map of North Cascades	
(5)	Map of North Cascades	
(6)	Map of North Cascades	
(7)	Map of North Cascades	
(8)	Gorge Dam	7-26-71
(9)	Diablo Dam	5-24-72
(10)	Ross Dam	7-30-70
(11)	Ross Dam	9- 8-70
(12)	Ross Dam	7-30-70
(13)	Newhalem	9-12-69
(14)	Diablo	9- 9-69
(15)	Diablo	7-27-70
(16)	Campground Entrance Sign	8-18-72
(17)	Colonial Creek Campground	8-18-72
(18)	Colonial Creek Amphitheater	8-18-72
(19)	Colonial Creek Boat Launch Ramp	8-18-72
(20)	Cat Island Campsite	6-15-72
(21)	Little Beaver Campsite	8-14-72
(22)	Diablo Lake	8-18-72
(23)	Diablo Lake Resort	8-18-72
(24)	Ross Lake Resort	6-15-72
(25)	Ross Lake Resort	8-17-72
(26)	Ross Lake Resort Boats	8-17-72
(27)	Ross Lake View	9-13-69
(28)	Fawn	6-14-72
(29)	Western White Pine	9-13-69
(30)	Fisherman on Bank	7-26-71
(31)	Fisherman in Boat	9- 6-69
(32)	Hunters' Vehicles at Hozomeen	9- 6-69
(33)	Float Plane on Ross Lake	8-25-72
(34)	Boat on Ross Lake	8-25-72
(35)	Canoe Party	8-25-72
(36)	Canoe Party	8-16-72
(37)	Ruby Arm	6-18-70
(38)	City Light Tour in Newhalem	6-18-70
(39)	City Light Tour Boat	8-16-72
(40)	City Light Tour Guides	7-30-69
(41)	Visitors on Tour Boat	7-30-69
(42)	Diablo Gorge	9- 5-69
(43)	Sign - "Trail of the Cedars"	8-18-72
(44)	Trail Label	4-28-72
(45)	Cedar Colonnade	7-25-71

<u>Photo No.</u>	<u>Description</u>	<u>Date</u>
(46)	NPS Information Sign	7-26-71
(47)	NPS Information Building	7-26-71
(48)	Diablo Lake	7-30-69
(49)	View of Ross Lake	9-13-69
(50)	View of Ross Lake	9- 9-69
(51)	Ross Lake Shoreline	9- 7-69
(52)	Ross Lake Fishermen	9- 6-69
(53)	Ruby Arm	9-16-72
(54)	Devils Creek Gorge	9- 6-69
(55)	Arctic Creek Falls	9- 7-69
(56)	Ruby Arm	6-18-70
(57)	NPS Information Sign	8-18-72
(58)	Roland Point	7-27-70
(59)	Ross Dam and N.C. Highway	5-24-72
(60)	Ross Dam and N.C. Highway	9-14-72
(61)	Jasper Sky Tram	8-24-69
(62)	Ruby Mountain Tram Site	7-31-70
(63)	Newhalem	7-27-70
(64)	Jack Mountain and Ross Lake	9- 6-69
(65)	Hozomeen Mtn. and Ross Lake	8-16-69
(66)	Pumpkin Mtn. and Ross Lake	8-16-72
(67)	Sourdough Mtn. and Ross Lake	8-16-72
(68)	Skymo Ridge and Ross Lake	8-16-72
(69)	Desolation Peak and Ross Lake	8-25-72
(70)	North End Ross Lake	8-25-72
(71)	North End Ross Lake	8-25-72
(72)	Jackass and Hozomeen Mountains	8-25-72
(73)	Jackass and Hozomeen Mountains	8-25-72
(74)	Stumps at Hozomeen	5-31-70
(75)	Stumps at Hozomeen	5-31-70
(76)	Ross Lake 55' Drawdown	5-30-70
(77)	Title "Arms"	
(78)	Ruby Arm	8-18-72
(79)	Big Beaver Creek Valley	7-27-70
(80)	Big Beaver Creek Cascades	7-10-69
(81)	Large Cedar B.B. Creek Valley	9-10-69
(82)	Large Cedar B.B. Creek Valley	9-10-69
(83)	Beaver Pond B.B. Creek Valley	9- 9-69
(84)	Beaver Pond B.B. Creek Valley	9- 9-69
(85)	Beaver Pond B.B. Creek Valley	9-10-69
(86)	Luna Peak	9-10-69
(87)	Title "Gorges"	
(88)	Lightning Creek Gorge	9- 9-69
(89)	Devil's Creek Gorge	9- 9-69
(90)	Little Beaver Creek Gorge	9- 9-69
(91)	Pierce Creek Gorge	6-16-72
(92)	Title "Waterfalls"	
(93)	Arctic Creek Falls	9- 7-69
(94)	Arctic Creek Falls	9- 9-69

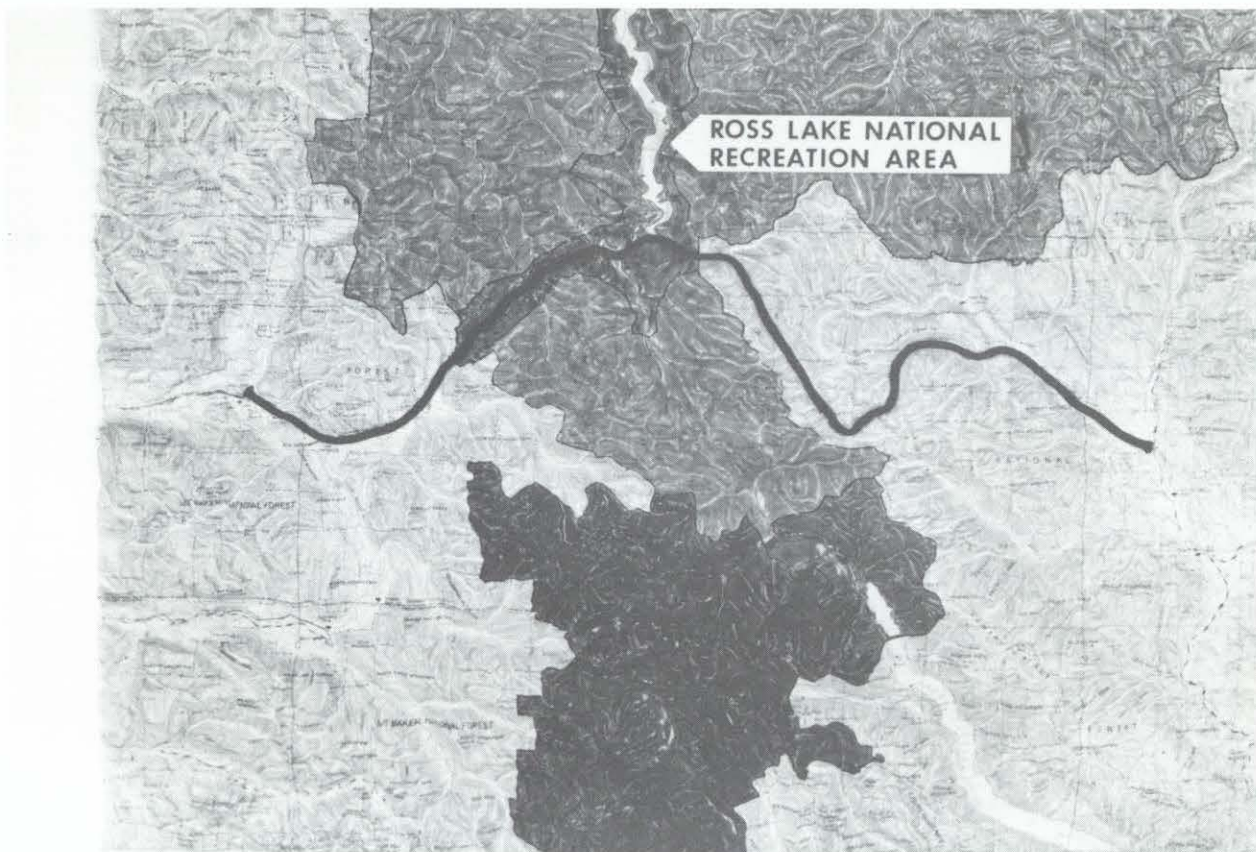
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REFERENCE LIBRARY

<u>Photo No.</u>	<u>Description</u>	<u>Date</u>
(95)	Skymo Creek Falls	9- 7-69
(96)	Skymo Creek Falls	9- 9-69
(97)	May Creek Falls	9- 8-70
(98)	May Creek Falls	6-16-72
(99)	Pierce Creek Rapids	6-16-72
(100)	Pierce Creek Falls	6-16-72
(101)	Title "Islands"	
(102)	Cat Island	9- 6-69
(103)	Rainbow Point	9- 6-69
(104)	Roland Point	7-27-70
(105)	Foot Trail on Ross Lake	8-14-72
(106)	Foot Trail on Ruby Creek	8-16-72
(107)	Foot Trail in Big Beaver Cr. Valley	8- 8-72
(108)	Suspension Bridge at Lightning Cr.	9-16-69
(109)	Log Stringer Bridge at May Cr.	6-16-72
(110)	Hozomeen Road	5- 4-69
(111)	Pit Toilet	8-14-72
(112)	Box Toilet with Screen	8-14-72
(113)	Box Toilet	8-14-72
(114)	Fiberglass Toilet	8-15-72
(115)	Wood metal table	8-14-72
(116)	Wooden Table	8-14-72
(117)	Fireplace	8-14-72
(118)	Shelter	8-14-72
(119)	Boat Dock	8-14-72
(120)	Boat Ramp and Dock	8-15-72
(121)	Entrance Sign at Hozomeen	8-15-72
(122)	Hozomeen Picnic Area	6-16-72
(123)	Hozomeen Picnic Area	6-16-72
(124)	Hozomeen Campsite	8-15-72
(125)	Hozomeen Automobile Campground	8-15-72
(126)	Hozomeen Overflow Campsite	8-15-72
(127)	Lightning Creek Campground	9- 6-69
(128)	Rainbow Point Campground	8-14-72
(129)	Rainbow Point Campsite	8-14-72
(130)	Big Beaver Campsite	8-16-72
(131)	Dry Creek Campsite	8-14-72
(132)	Cat Island Campsite	8-14-72
(133)	Title "Potential Campsite Areas"	
(134)	Ruby Point	9- 5-69
(135)	Ruby Point Campsite	8-16-72
(136)	Ruby Point Campsite	8-16-72
(137)	Viewpoint	5-24-72
(138)	Viewpoint Campsite	5-24-72
(139)	Viewpoint Campsite	5-24-72
(140)	Viewpoint Campsite	5-24-72
(141)	View from Viewpoint	5-24-72
(142)	Big Beaver Creek Valley	7-27-70
(143)	Big Beaver Creek Campsite	9-14-72

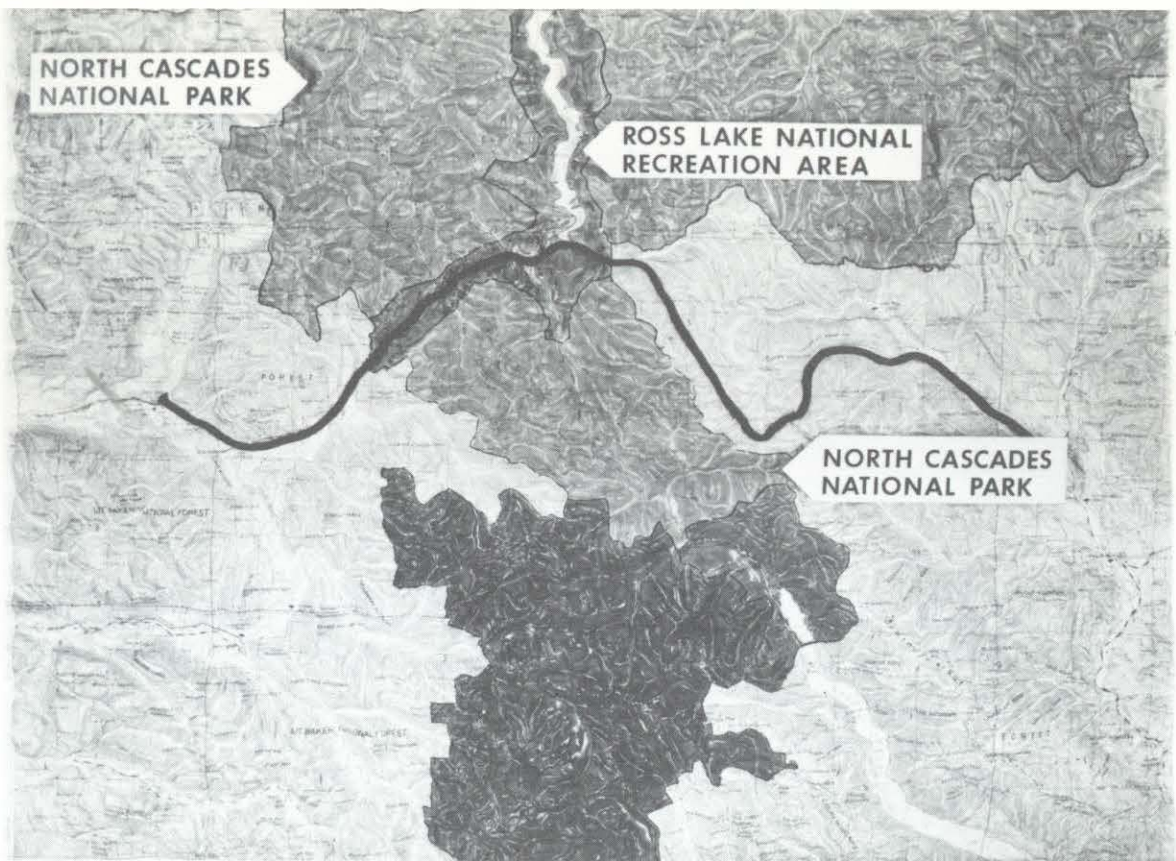
<u>Photo No.</u>	<u>Description</u>	<u>Date</u>
(144)	Big Beaver Creek Valley Campsite	9-14-72
(145)	Roland Point	7-27-70
(146)	Roland Point Campsite	6-16-72
(147)	Rainbow Point	9- 6-69
(148)	Rainbow Point Campsite	6-16-72
(149)	Rainbow Point Campsite	6-16-72
(150)	Devil's Dome	9- 6-69
(151)	Devil's Dome Campsite	6-15-72
(152)	Devil's Dome Campsite	6-15-72
(153)	Dry Creek Point	9- 9-69
(154)	Dry Creek Point Campsite	6-15-72
(155)	Dry Creek Point Campsite	6-15-72
(156)	Dry Creek Point Campsite	6-15-72
(157)	View from Dry Creek Point	6-15-72
(158)	Hozomeen	9- 9-69
(159)	Hozomeen Campsite	6-16-72
(160)	Hozomeen Campsite	6-16-72
(161)	Title "Big Beaver Valley"	
(162)	B.B. Creek from Ross Lake	8-16-72
(163)	Mouth B.B. Creek	7-27-70
(164)	Valley of B.B. Creek	7-27-70
(165)	Valley of B.B. Creek	9- 8-70
(166)	Valley of B.B. Creek	7-27-70
(167)	Valley Constriction B.B. Creek	7-27-70
(168)	Valley of B.B. Creek	7-27-70
(169)	McMillan Cr. and B.B. Creek	9- 8-70
(170)	Valley of B.B. Creek and Ponds	9- 8-70
(171)	Big Beaver Creek	7-27-70
(172)	Lodgepole Pine	8-16-69
(173)	Second Growth Fire Species	8-16-69
(174)	B.B. Creek, Ponds and Marsh	7-27-70
(175)	Valley of B.B. Creek	7-27-70
(176)	Valley of B.B. Creek	9- 8-70
(177)	Valley of B.B. Creek	7- 8-70
(178)	Decayed Cedar	8-24-72
(179)	Hollow Cedar	8-24-72
(180)	Rotted Cedar	8-24-72
(181)	Fire Scarred Cedar Trunks	8-23-72
(182)	Fire Scarred Douglas-Fir	8-16-69
(183)	Infected Pacific Silver Fir	8-23-72
(184)	Infected Cedar	8-23-72
(185)	Windthrown Cedar	8-24-72
(186)	Map - NCNP	
(187)	Baker River	9- 8-70
(188)	Cedar In Baker River Valley	8-15-71
(189)	Valley of Little Beaver Cr.	9- 9-69
(190)	Cedar in Little Beaver Valley	9-13-69
(191)	Chilliwack River Valley	9- 9-70
(192)	Cedar in Chilliwack Valley	8-22-70
(193)	Cedar in Chilliwack Valley	8-22-70
(194)	Cedar Range Map	



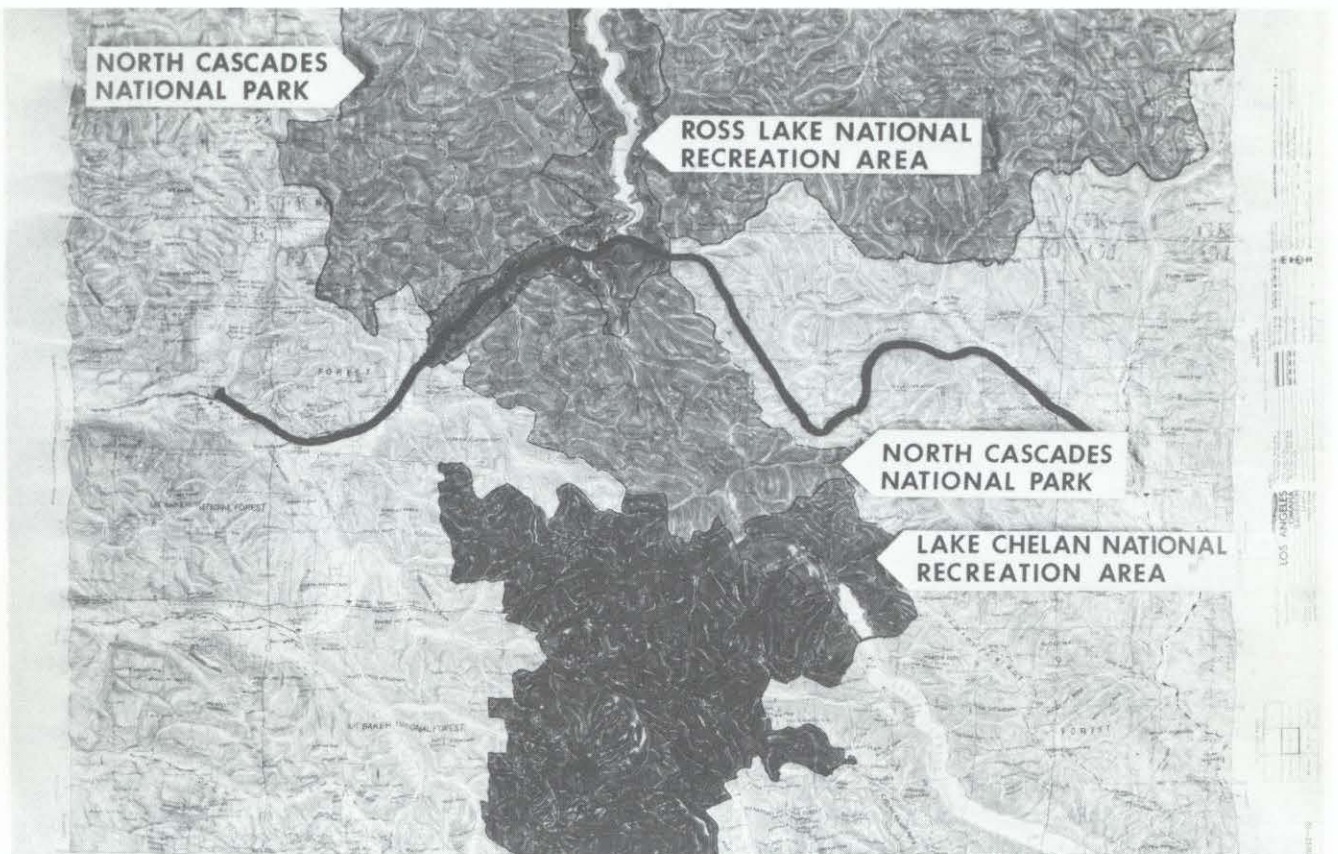
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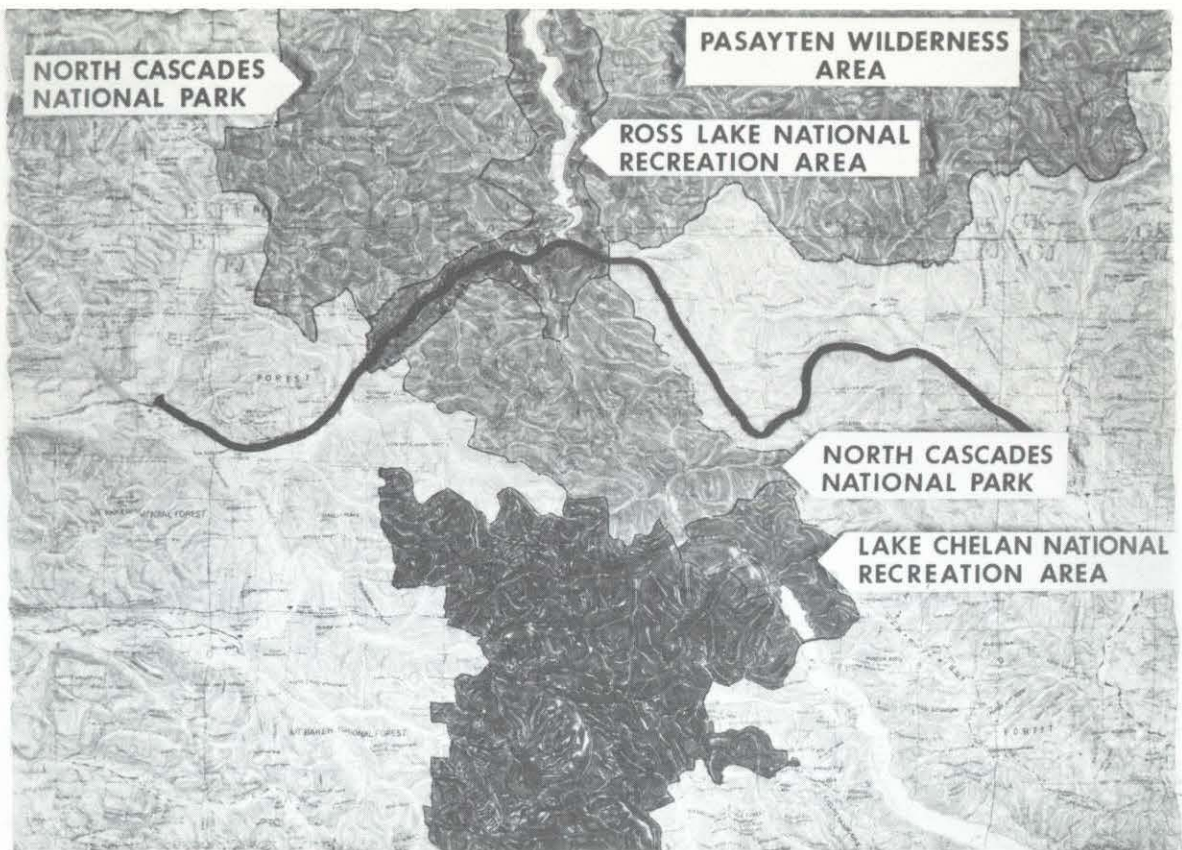
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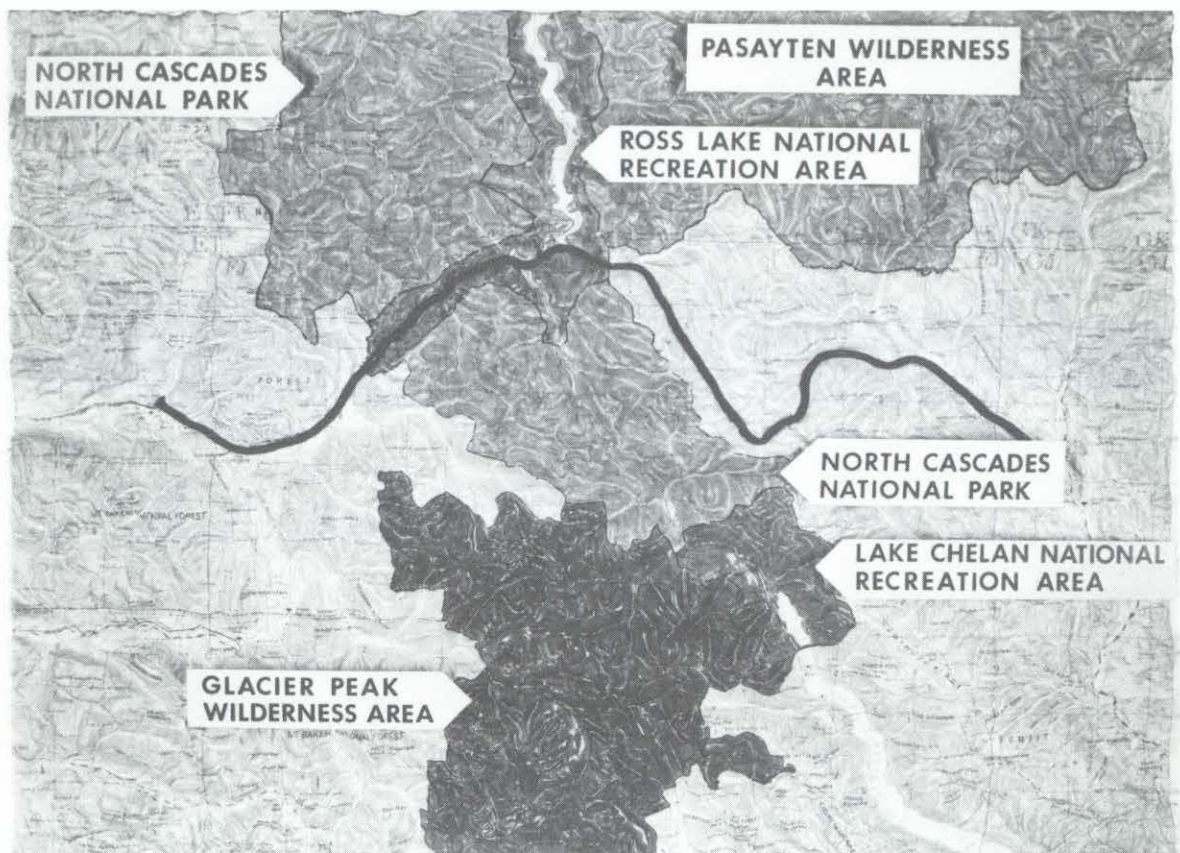
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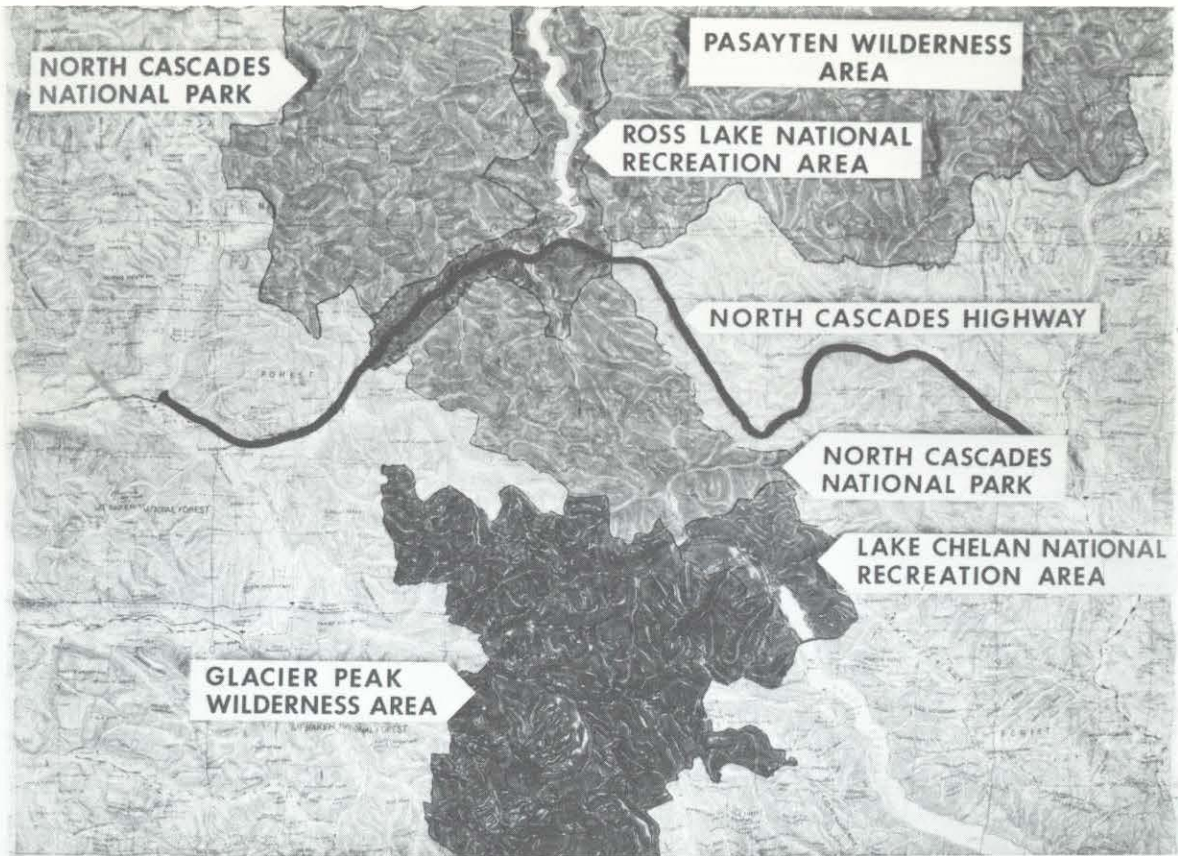
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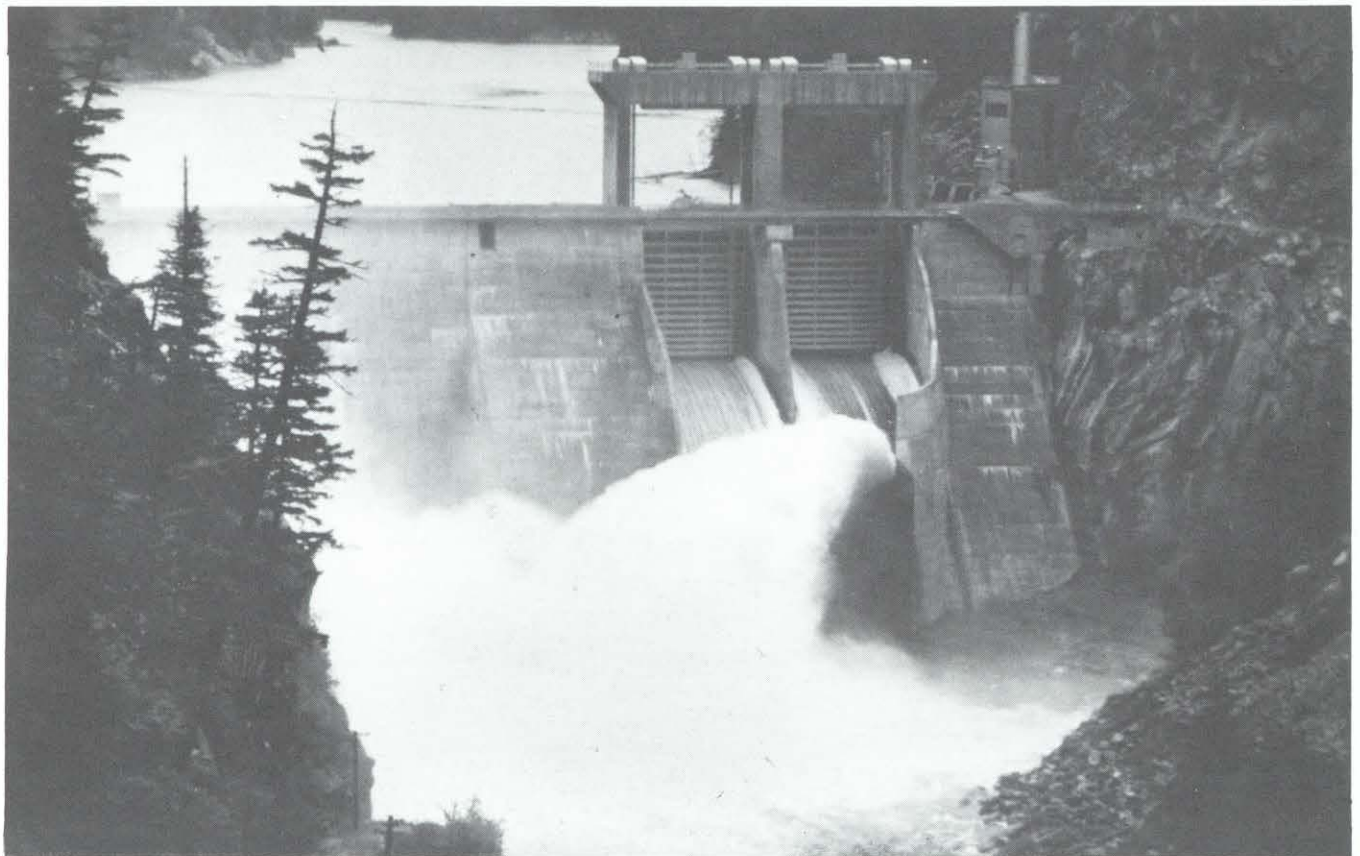
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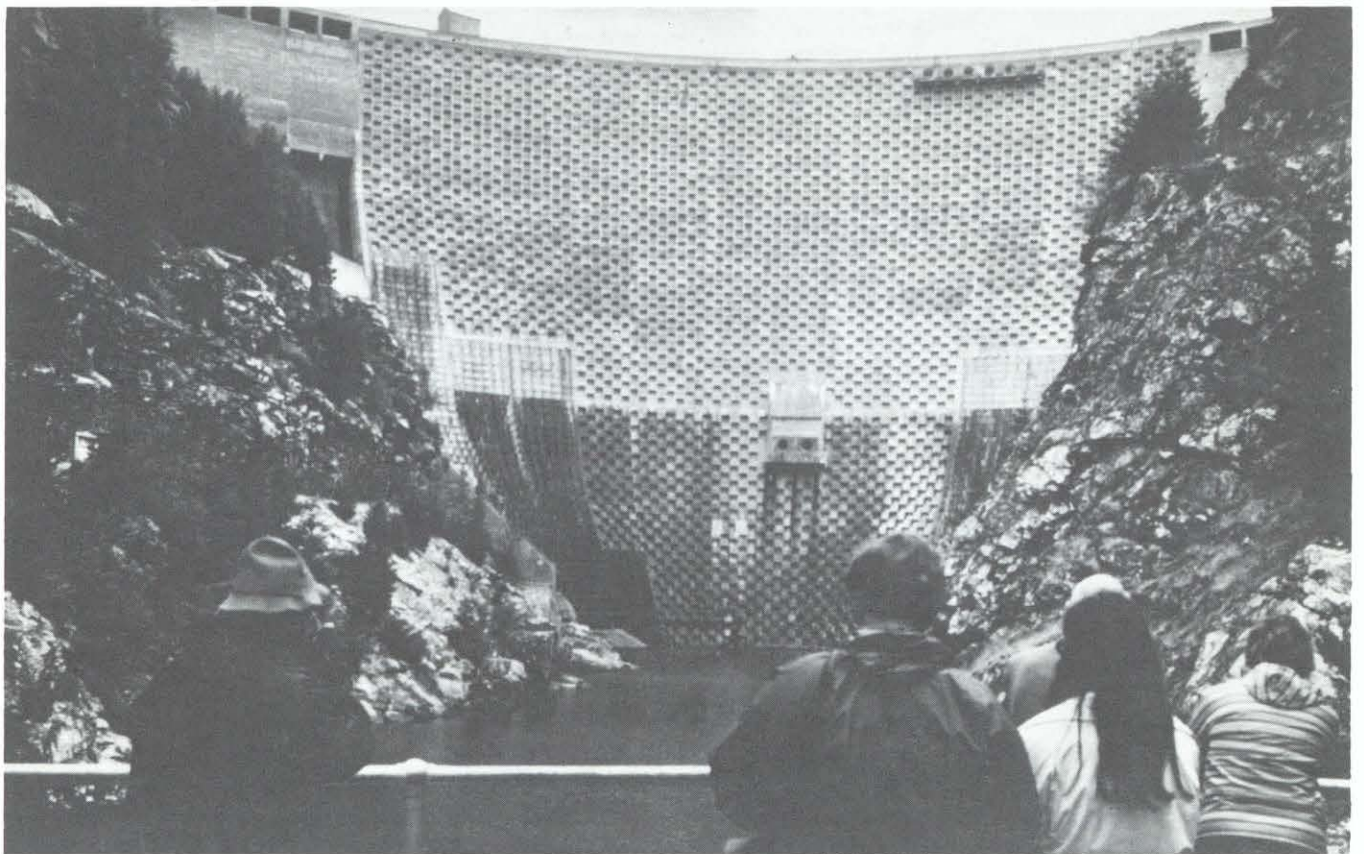
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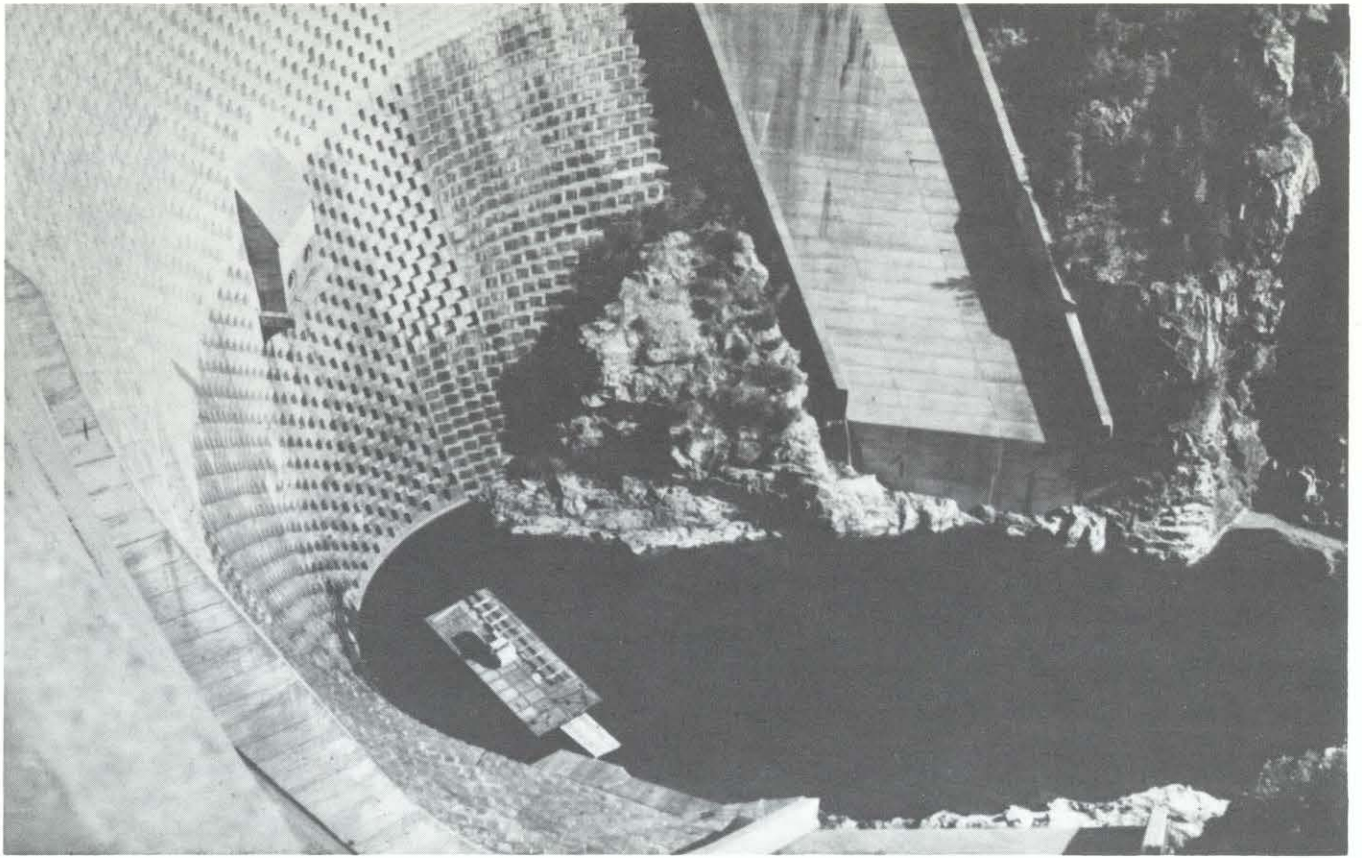
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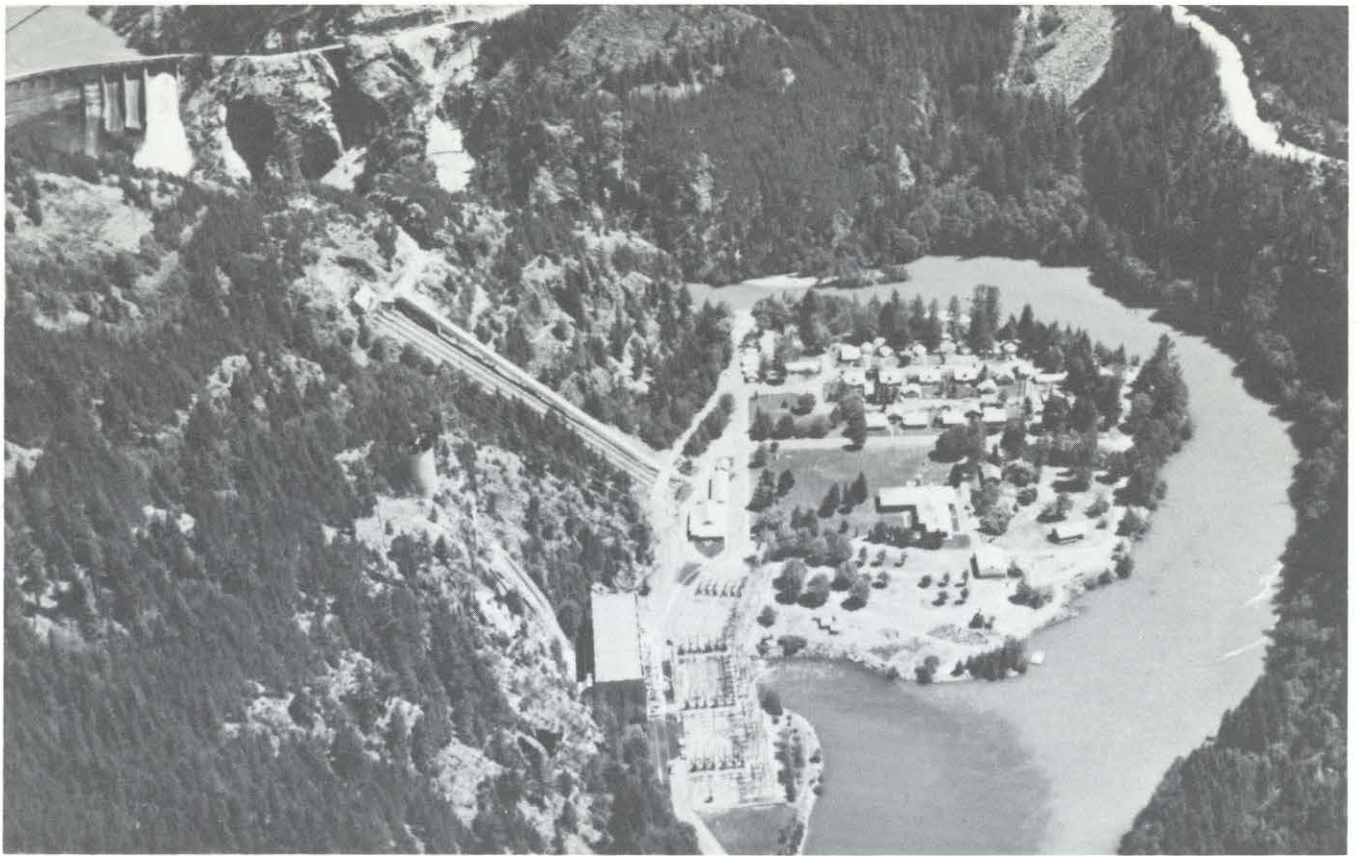
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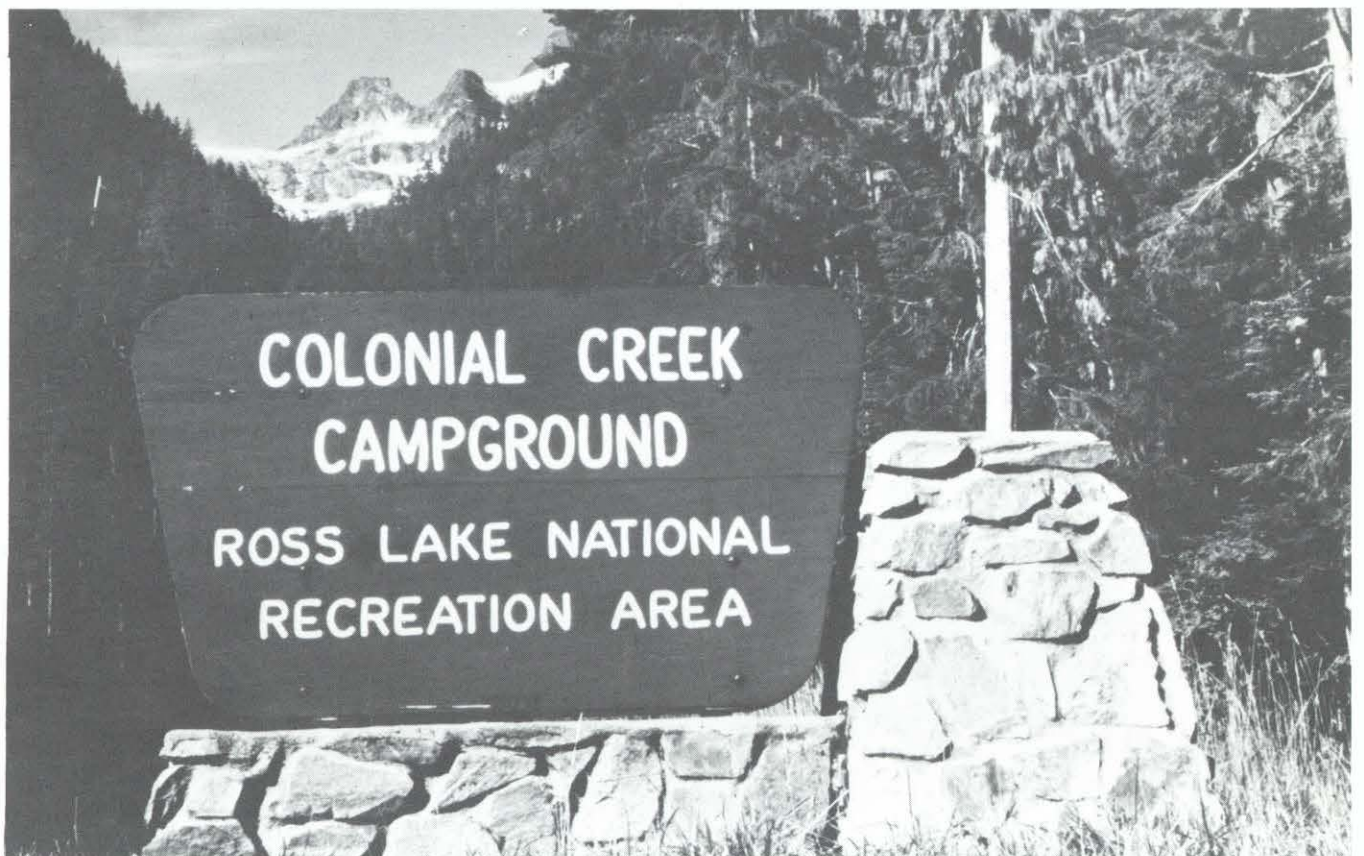
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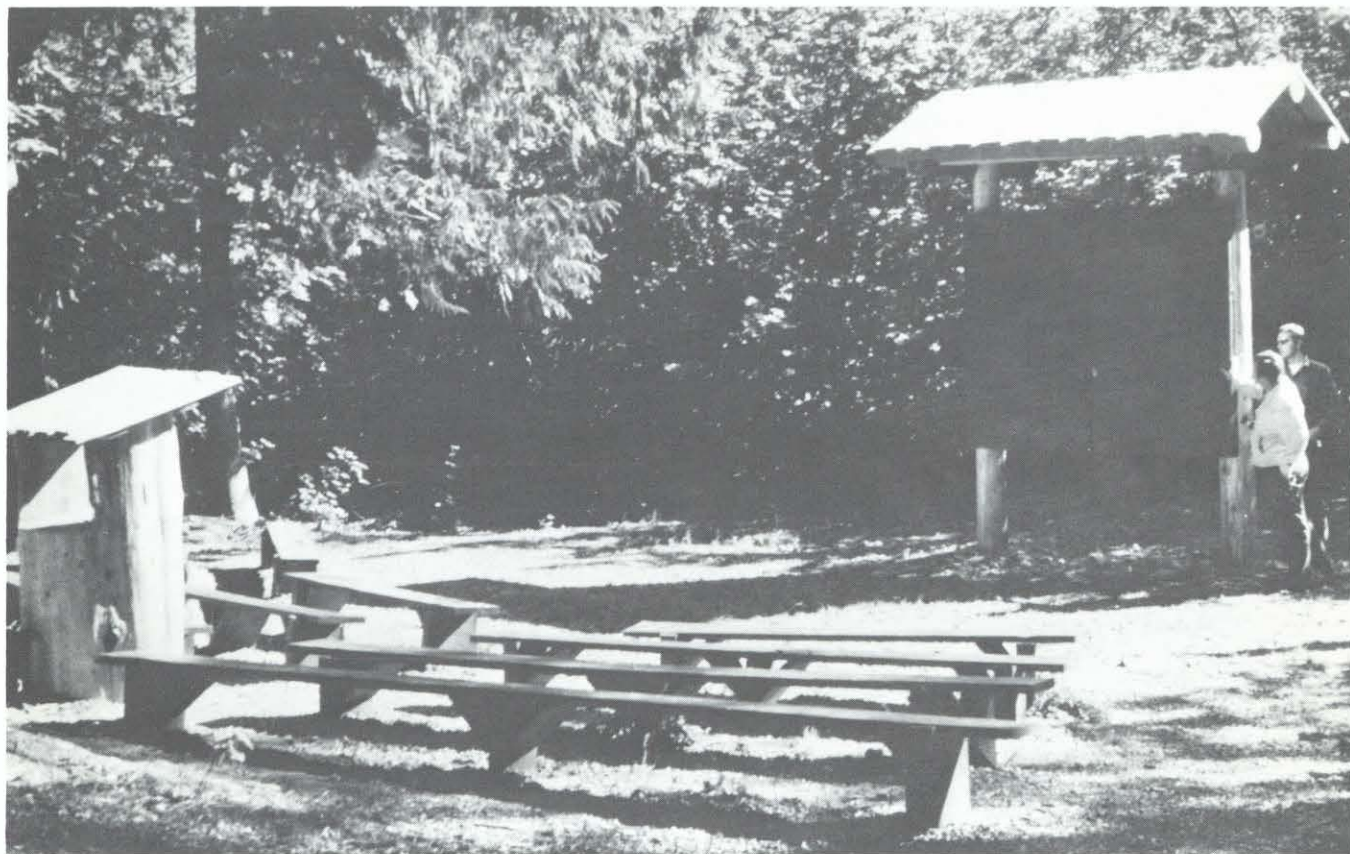
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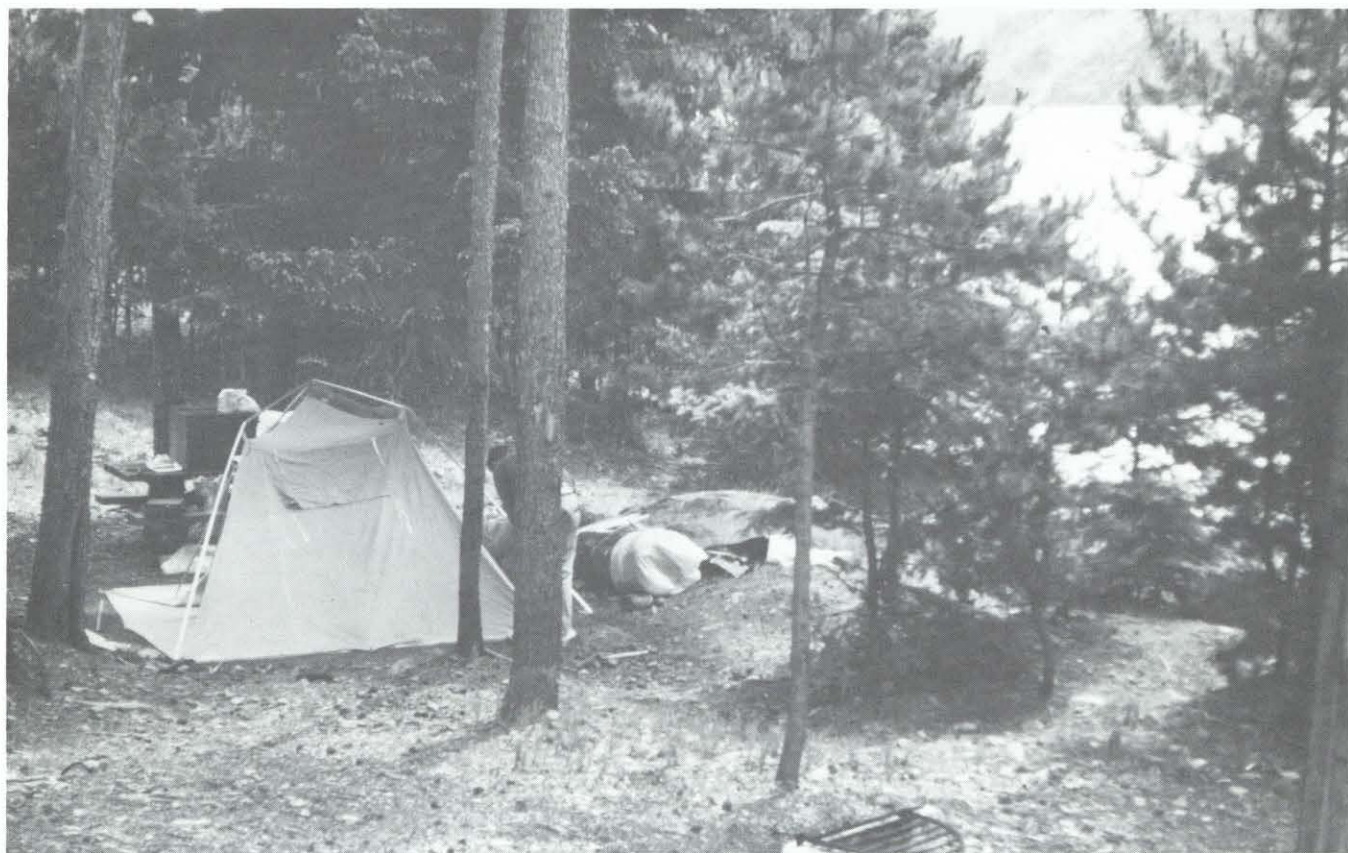
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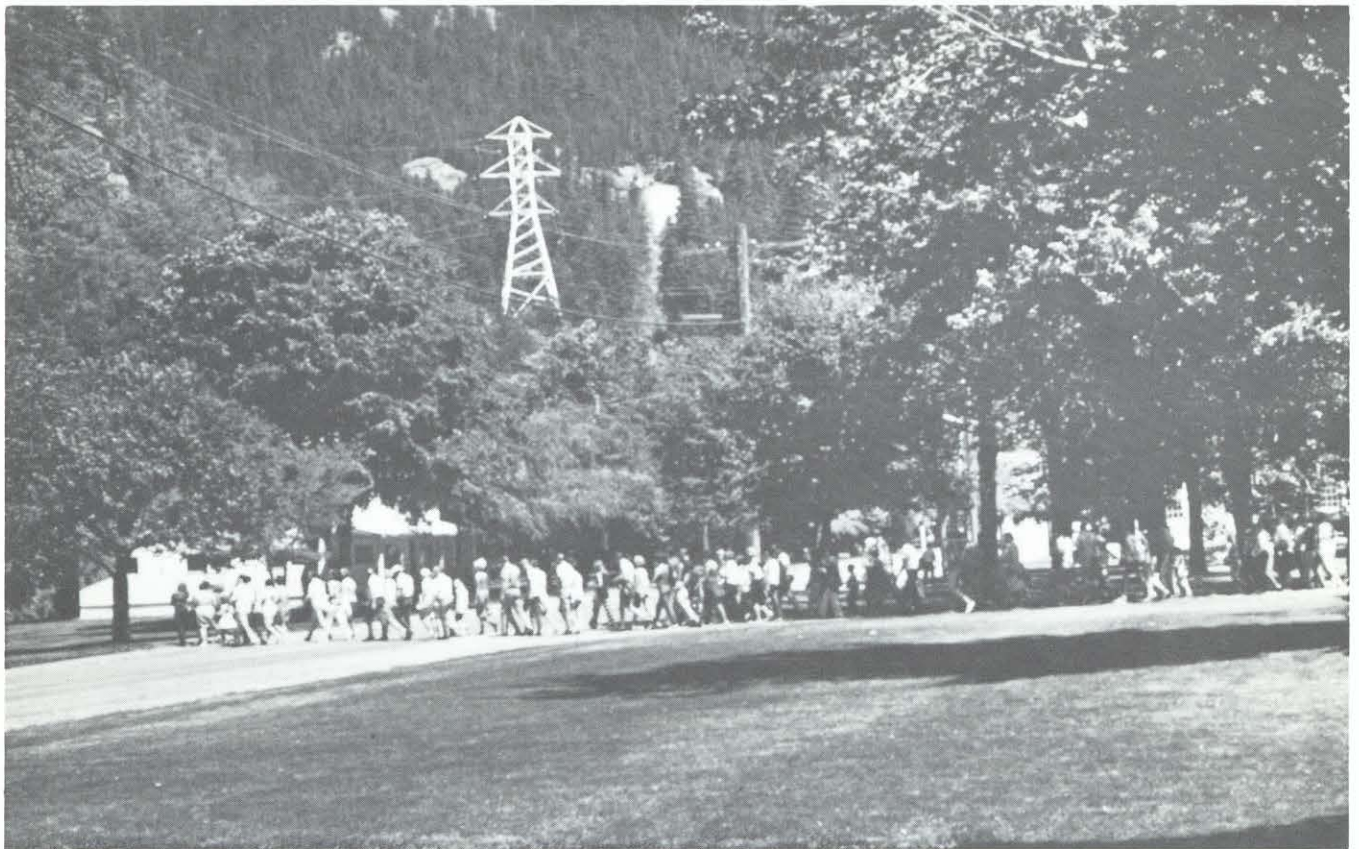
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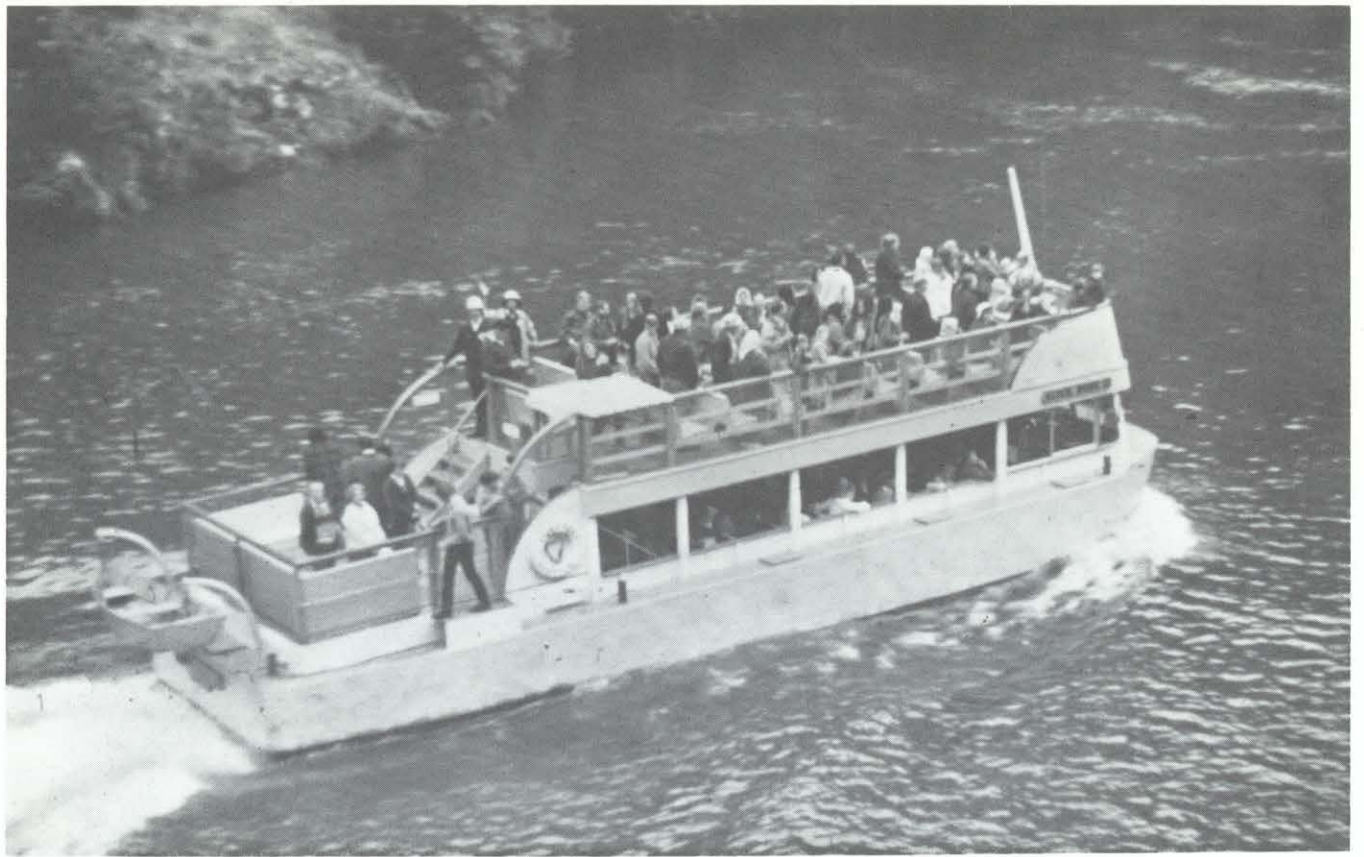
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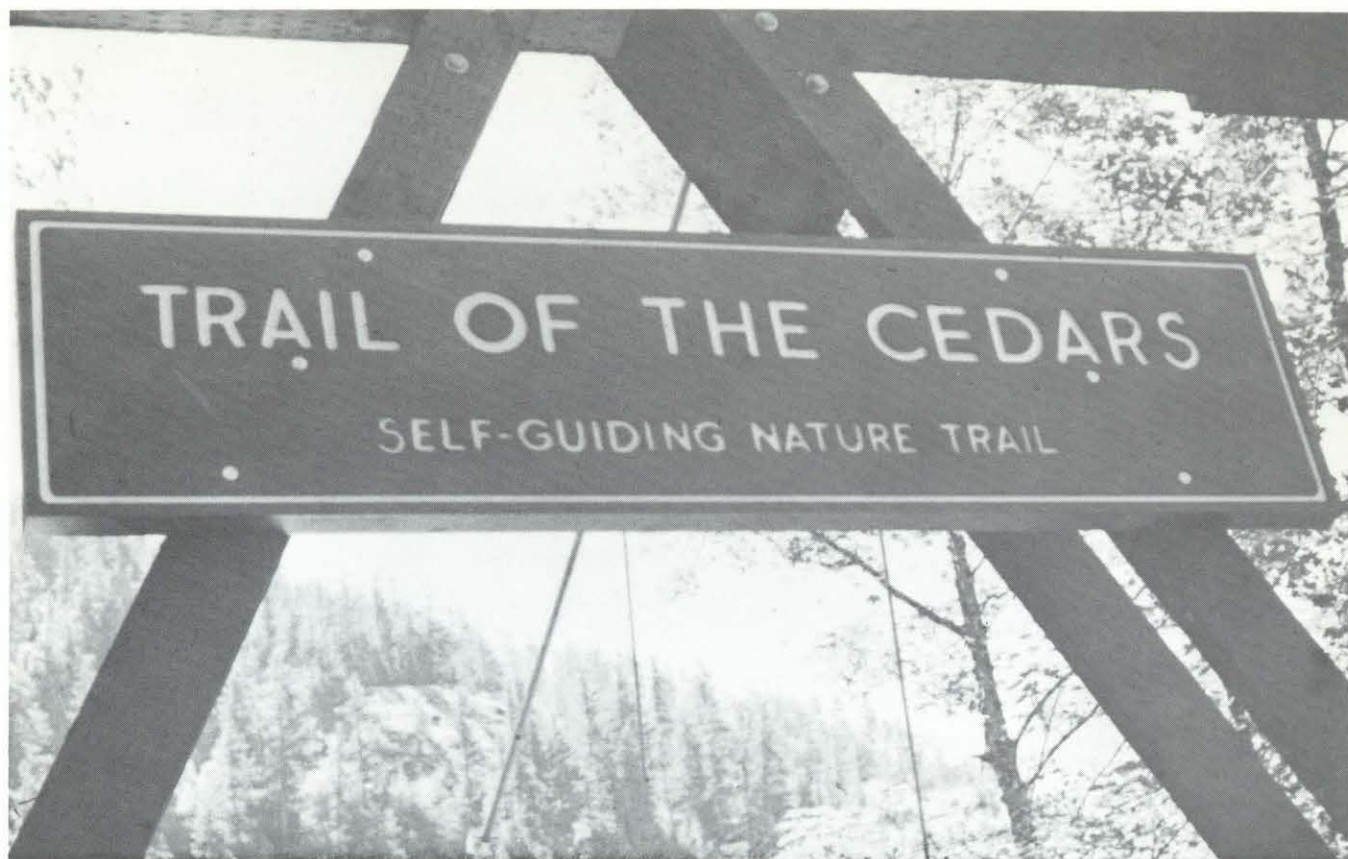
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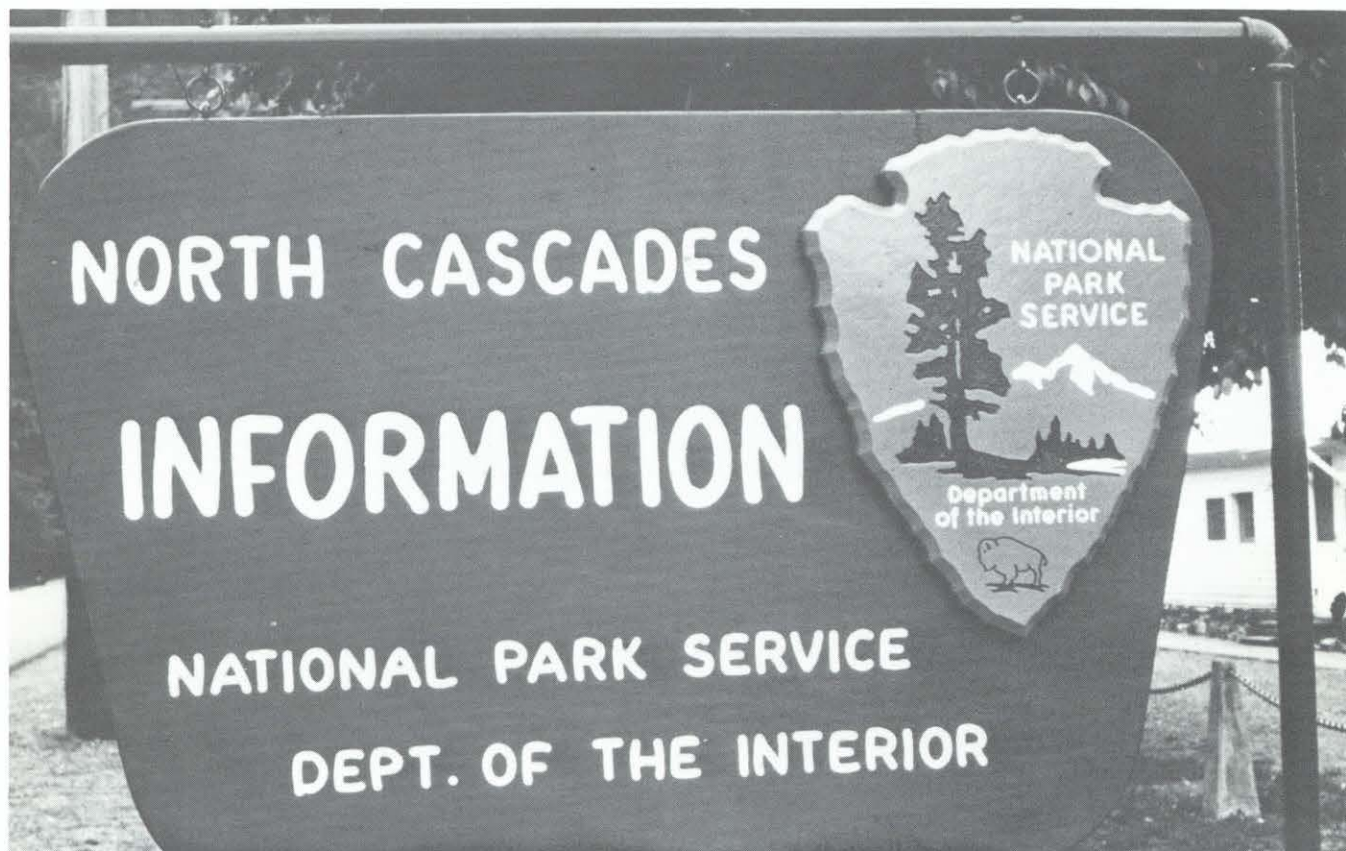
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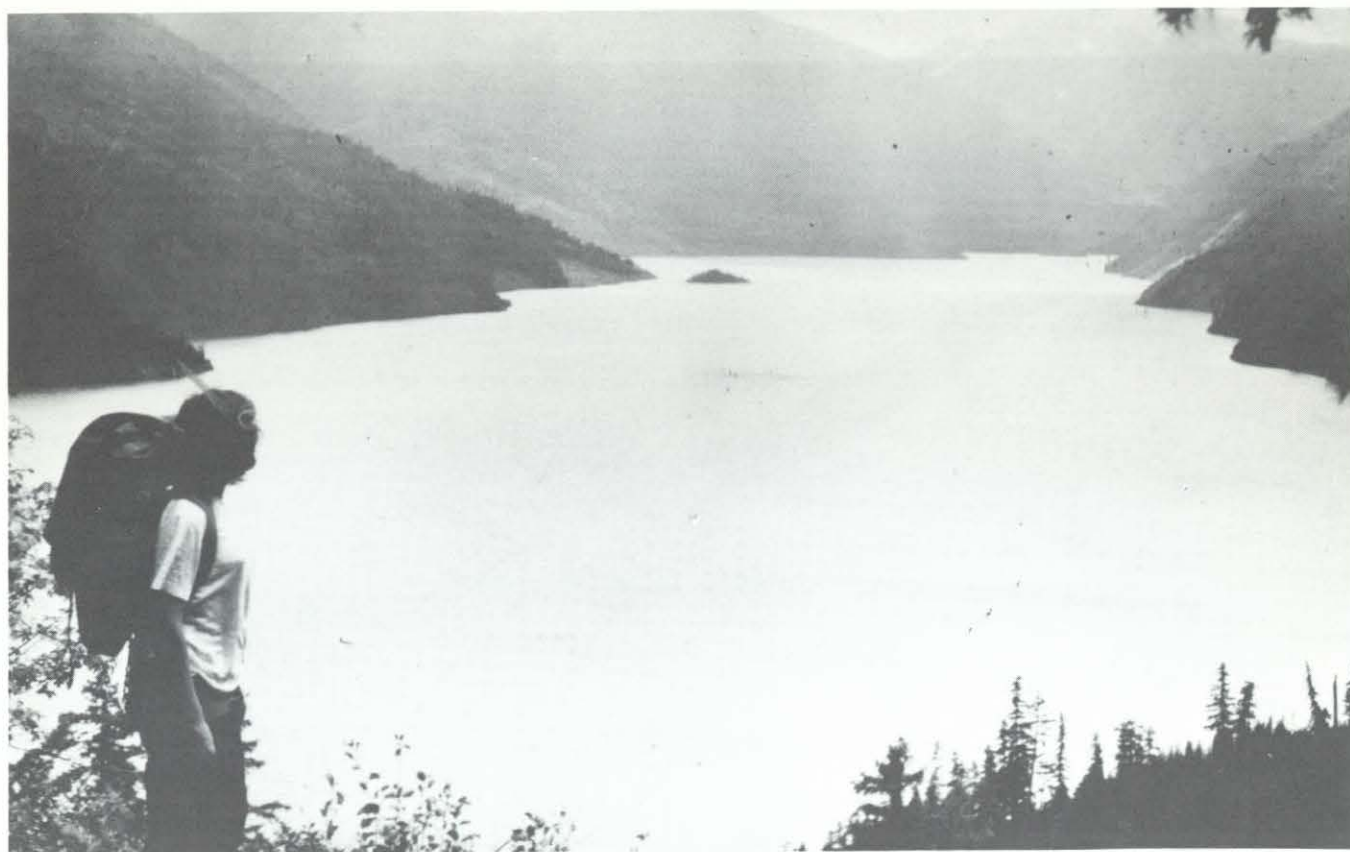
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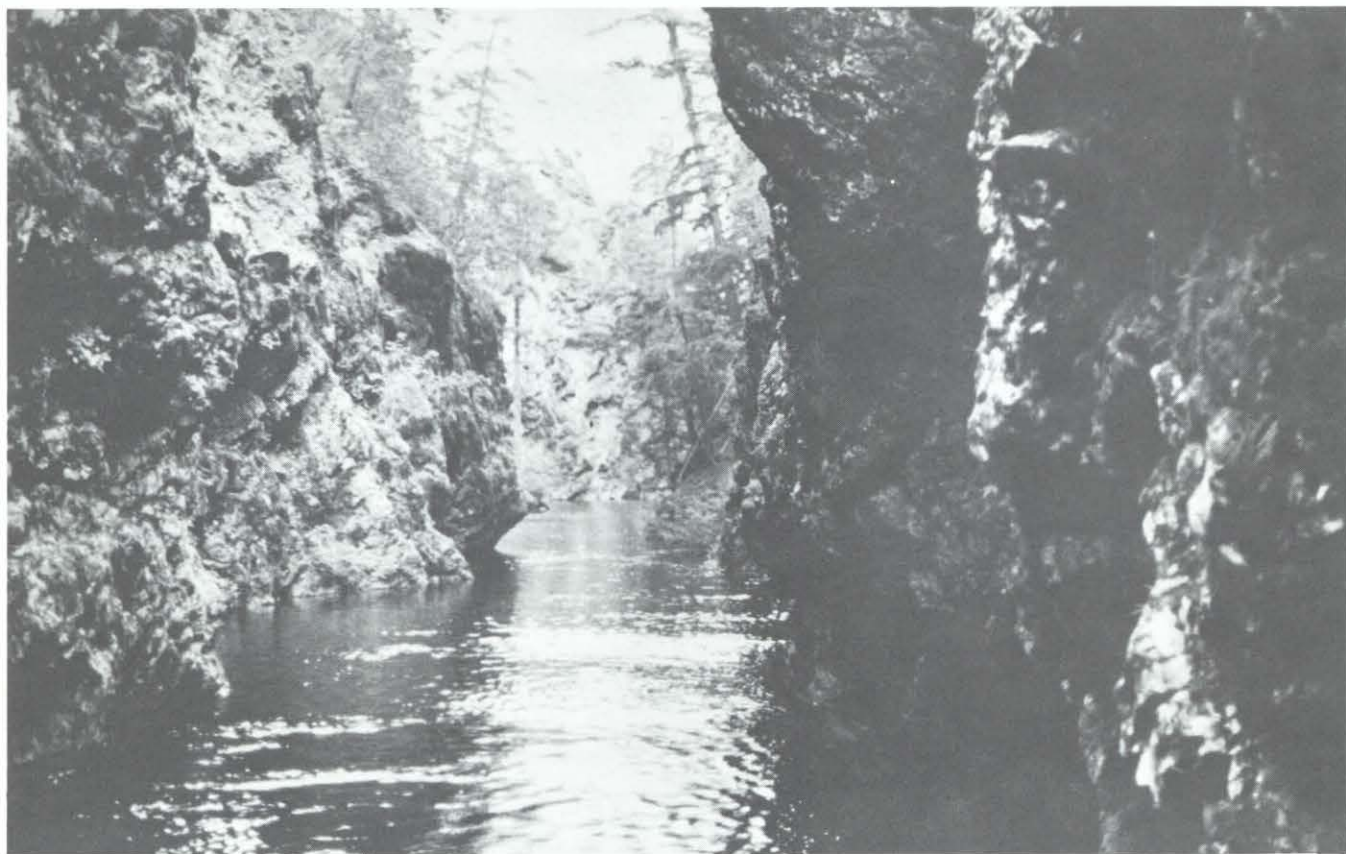
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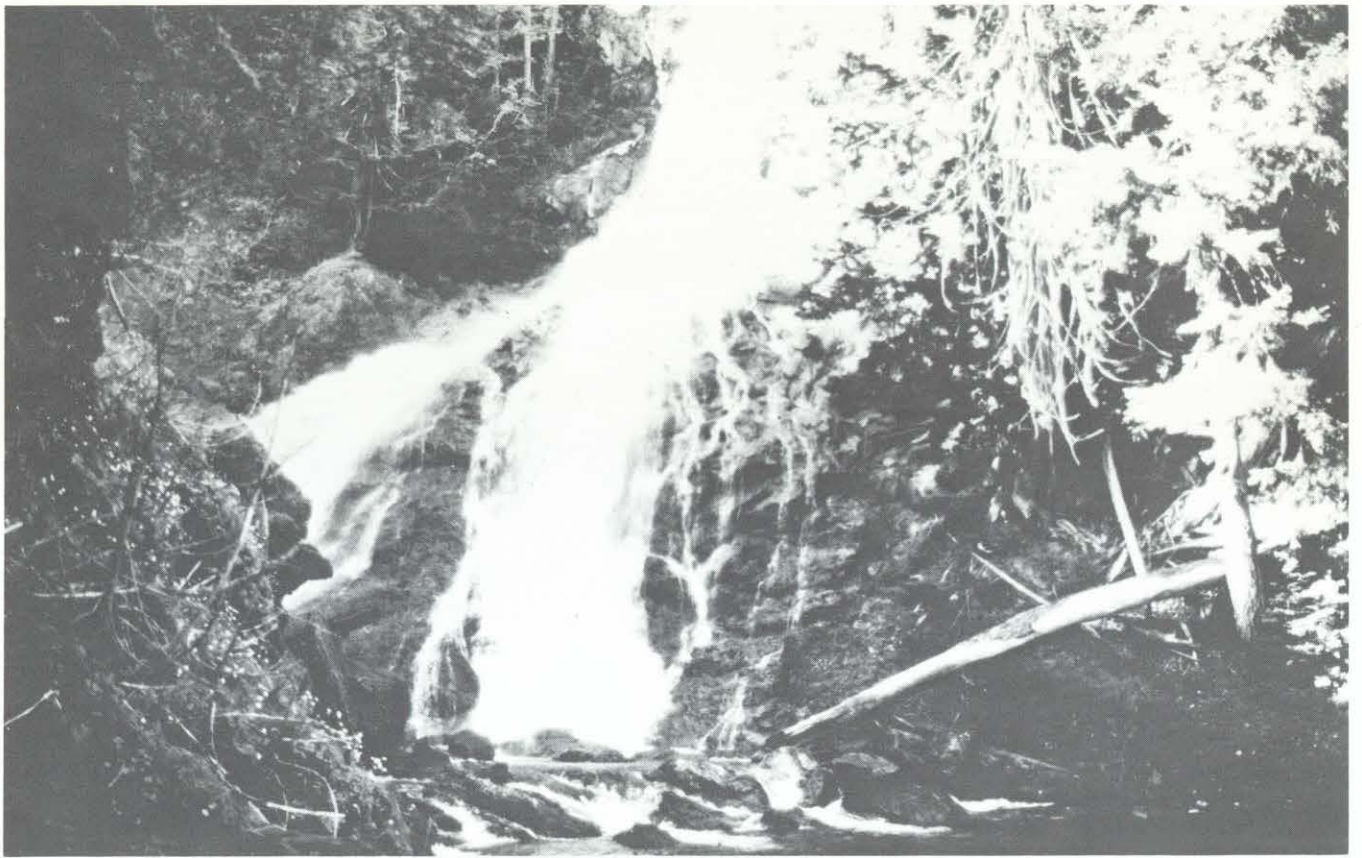
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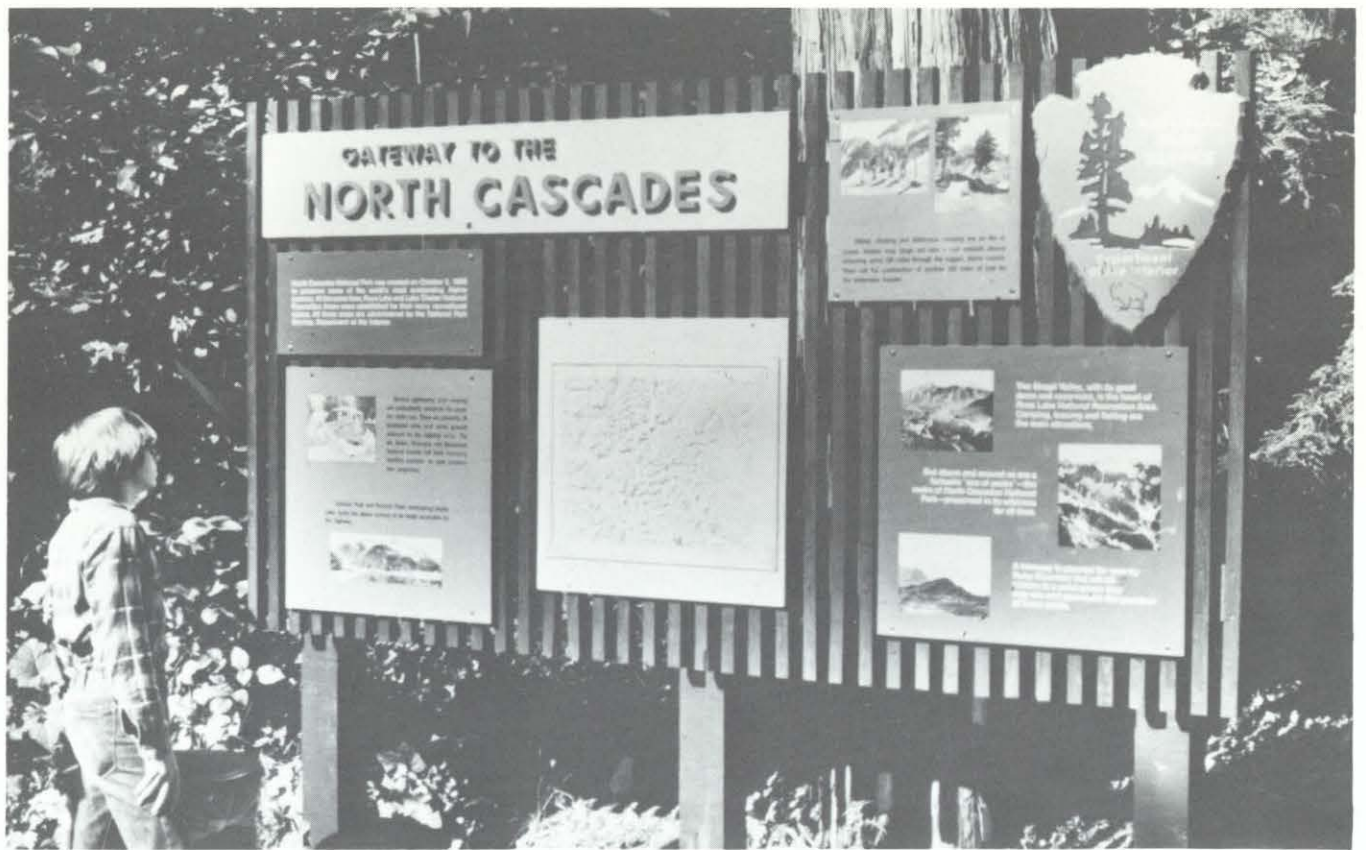
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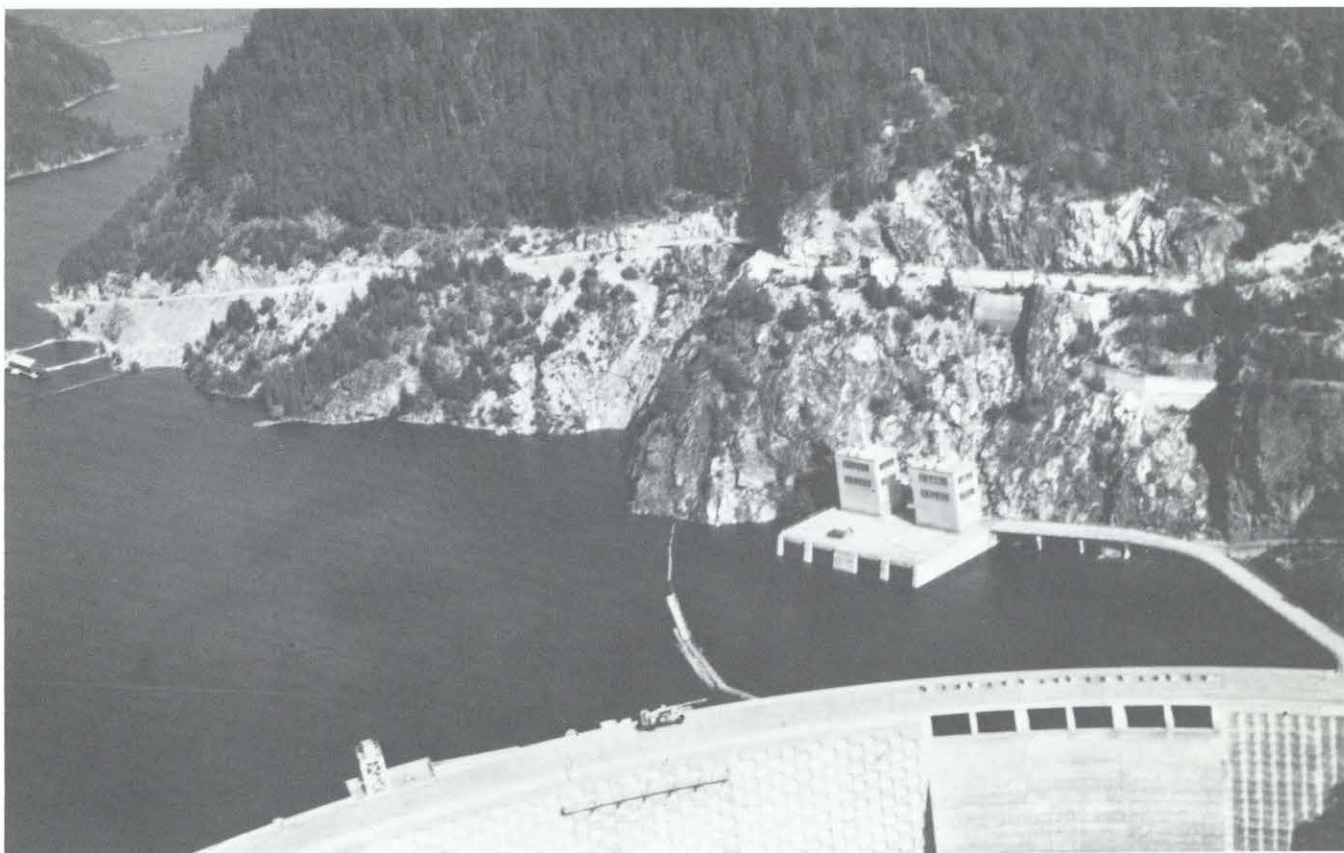
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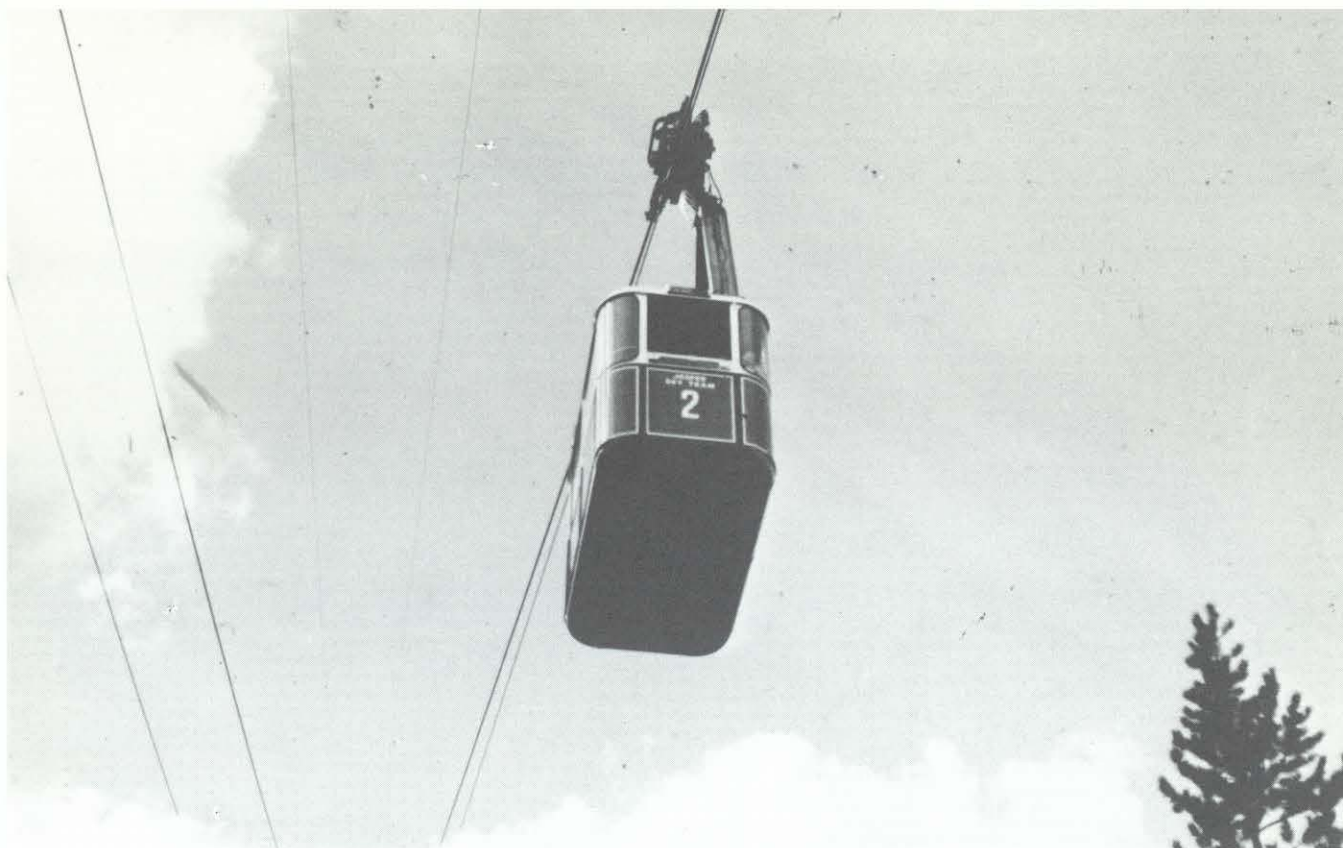
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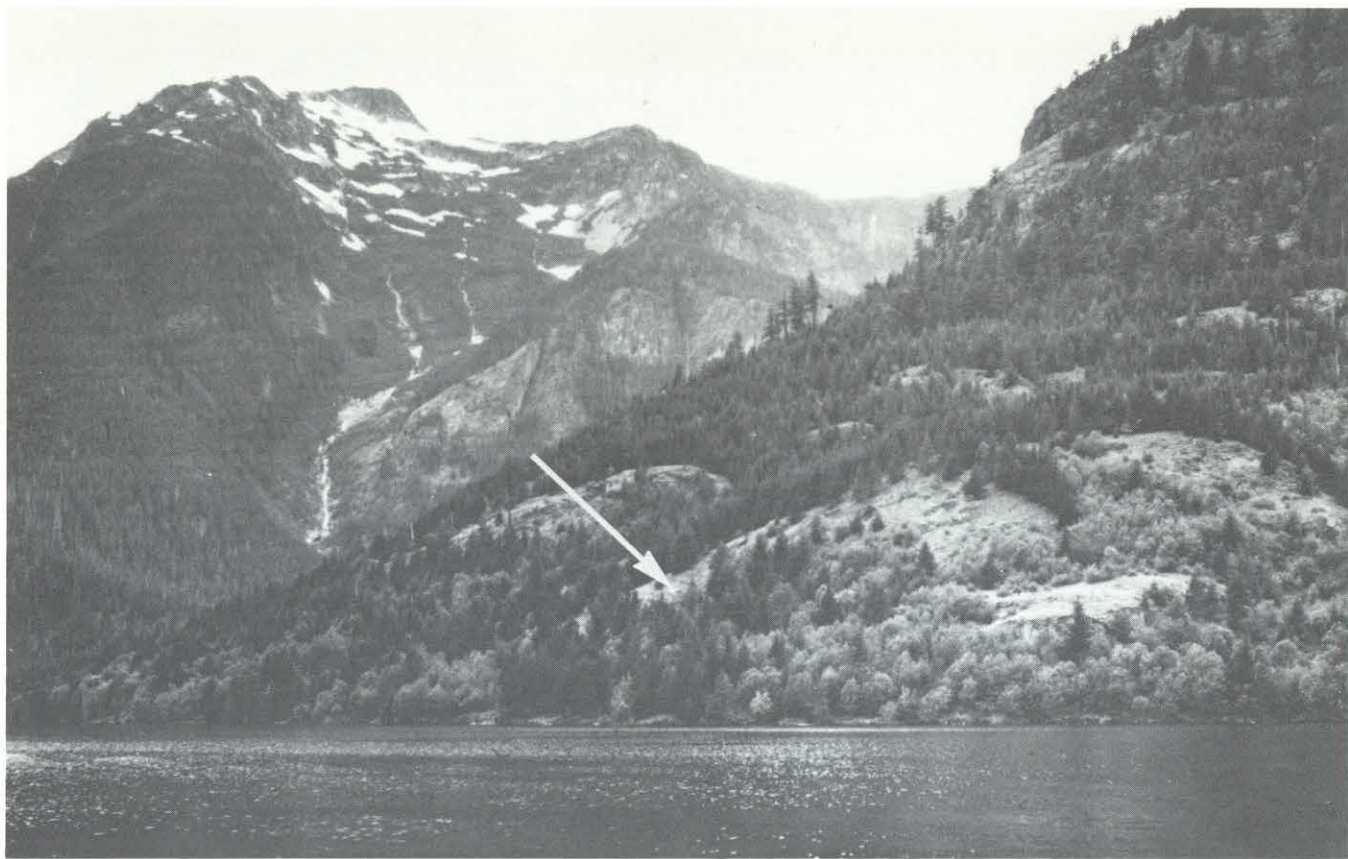
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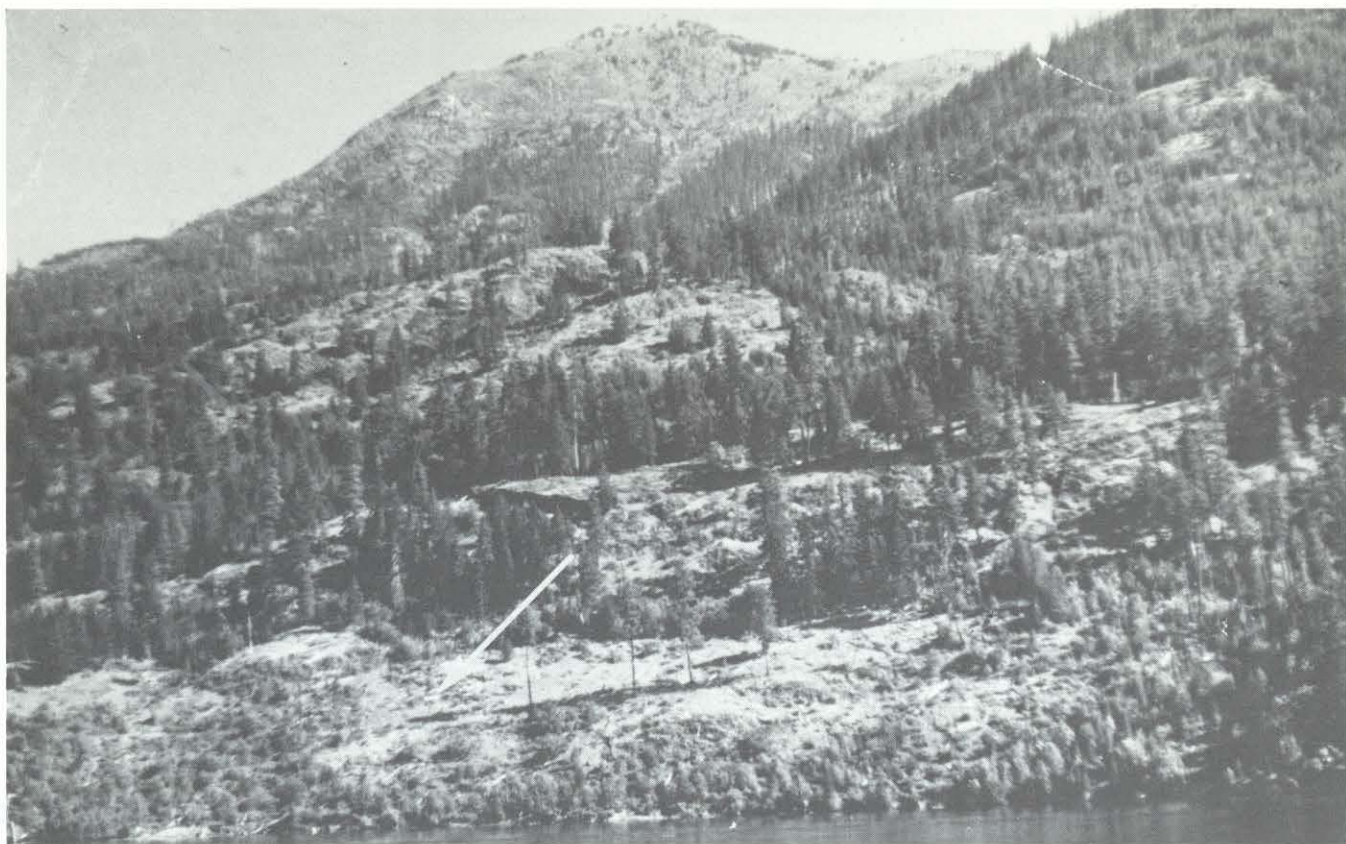
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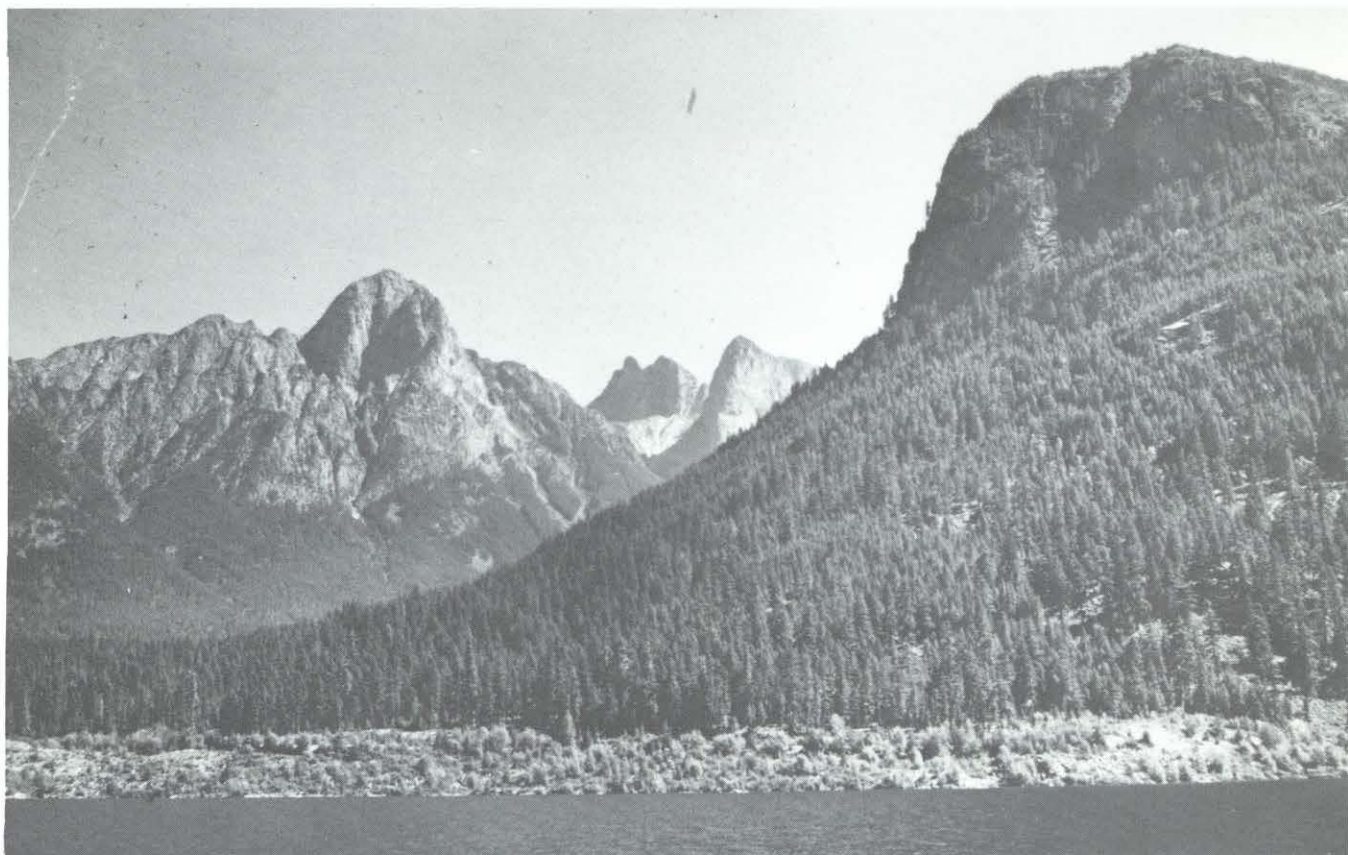
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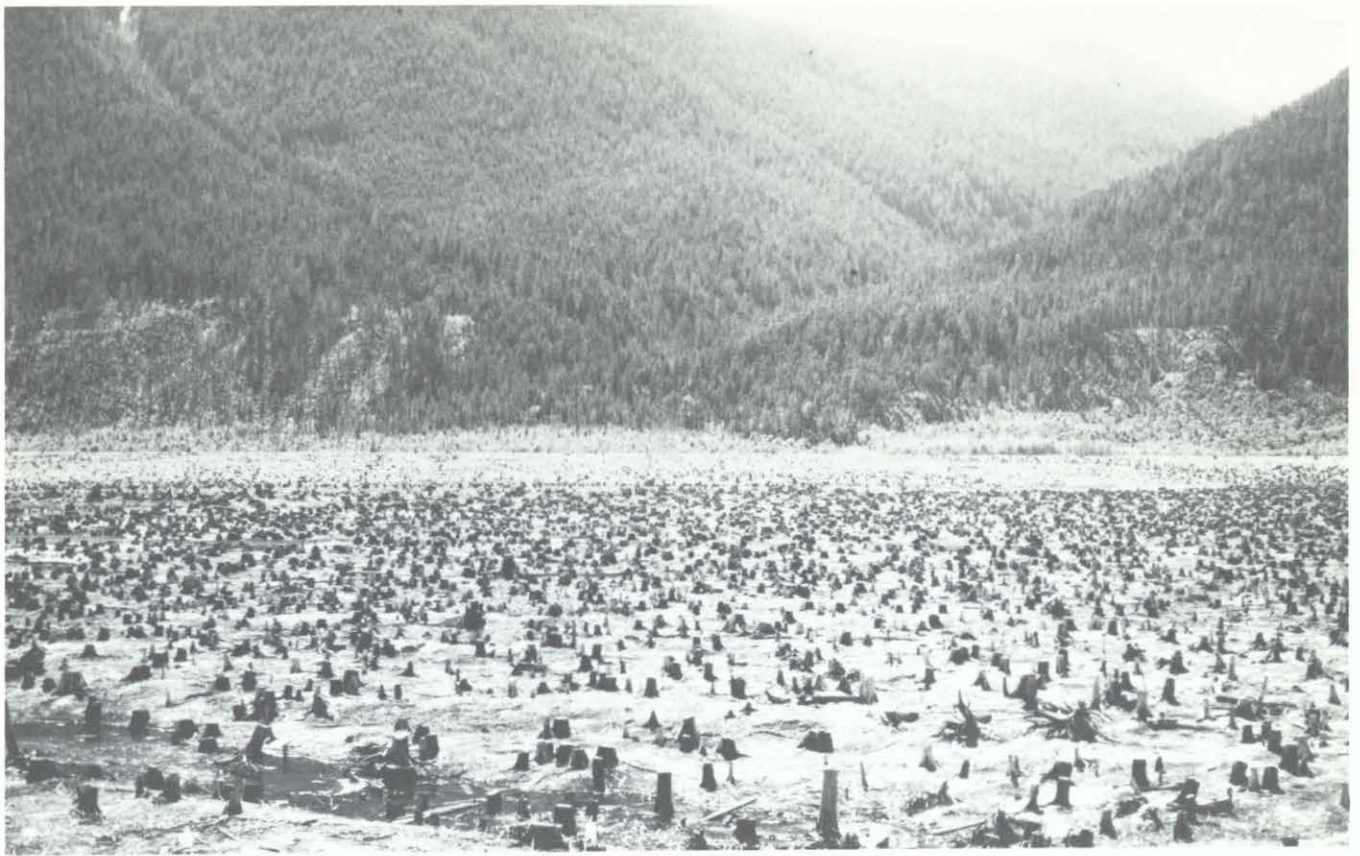
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ARMS

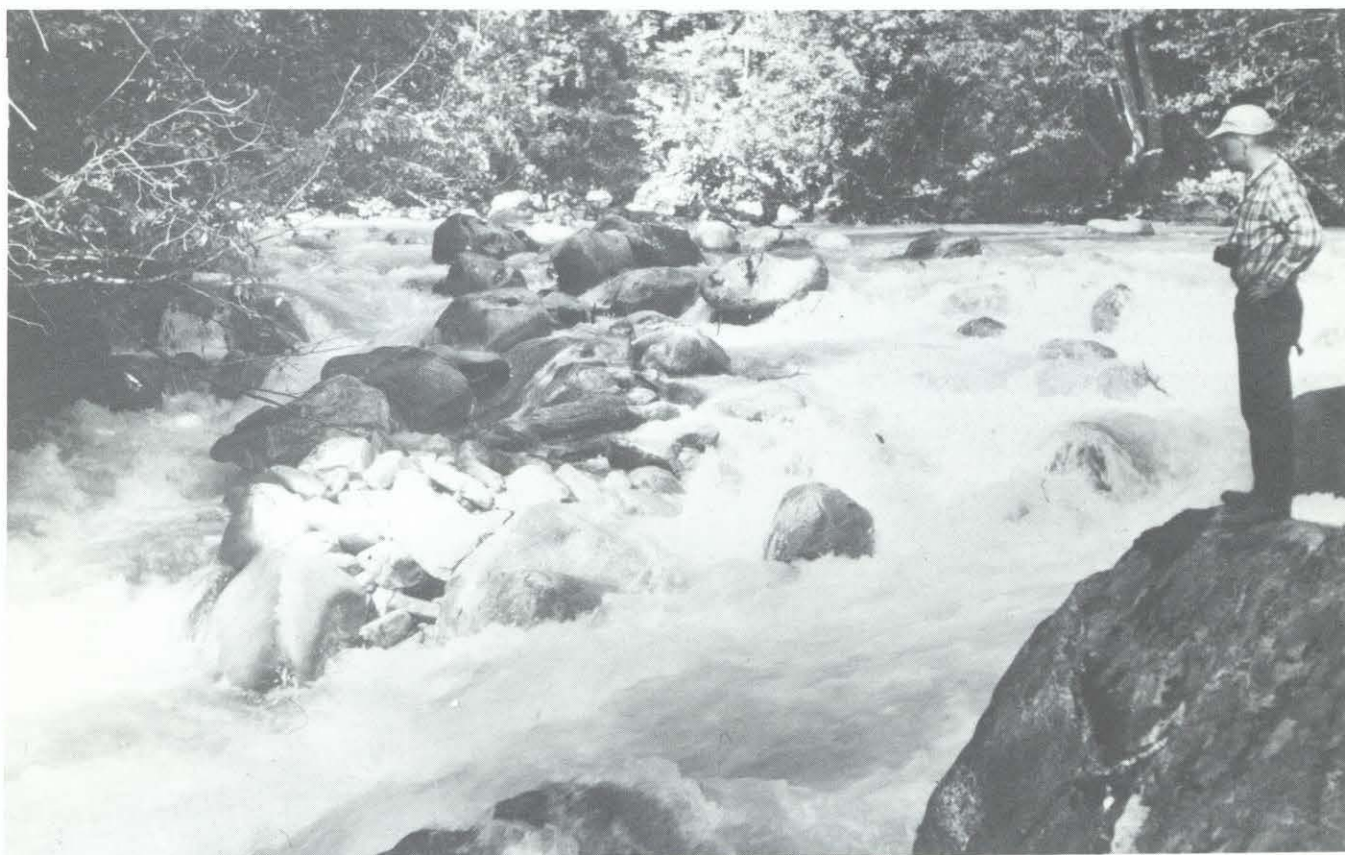
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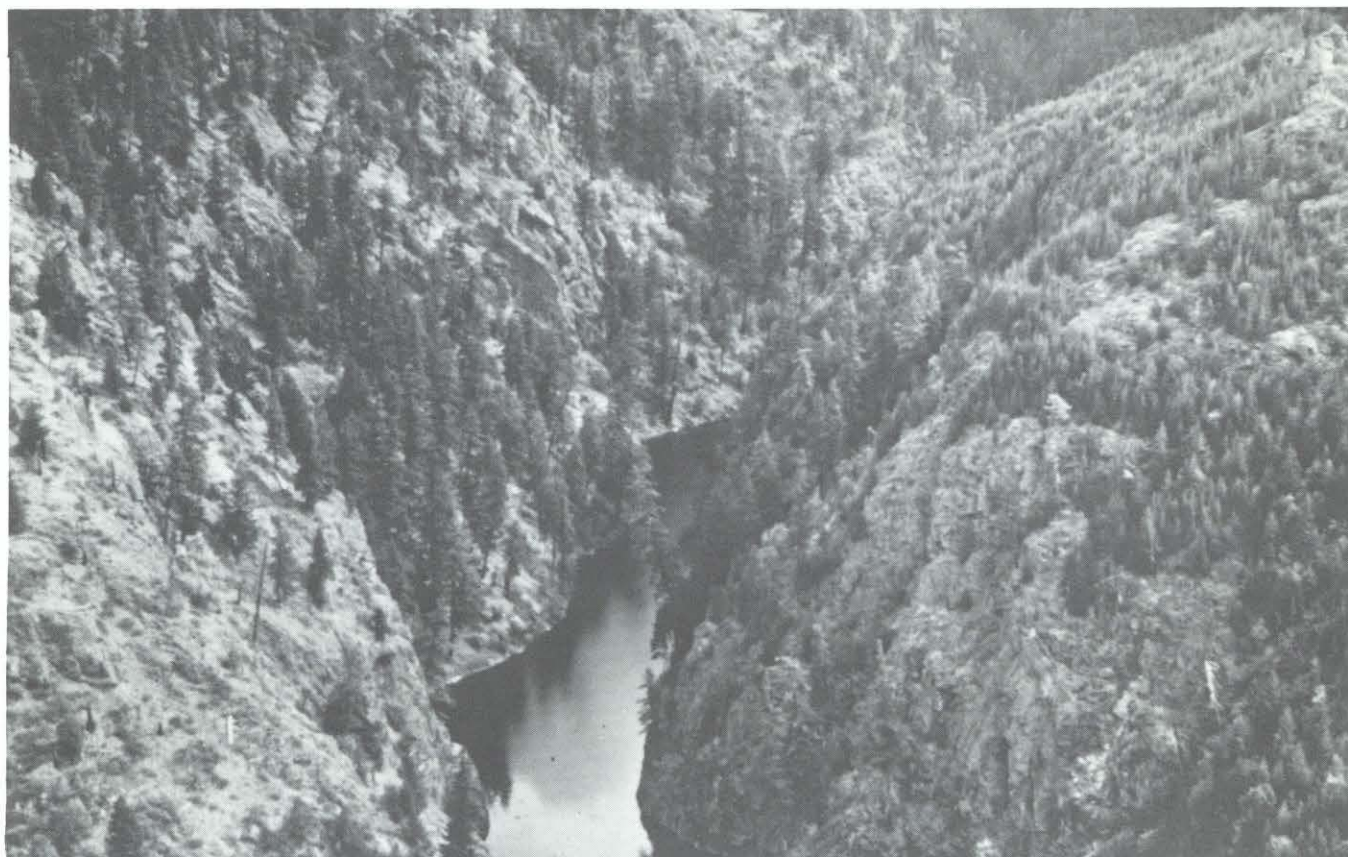
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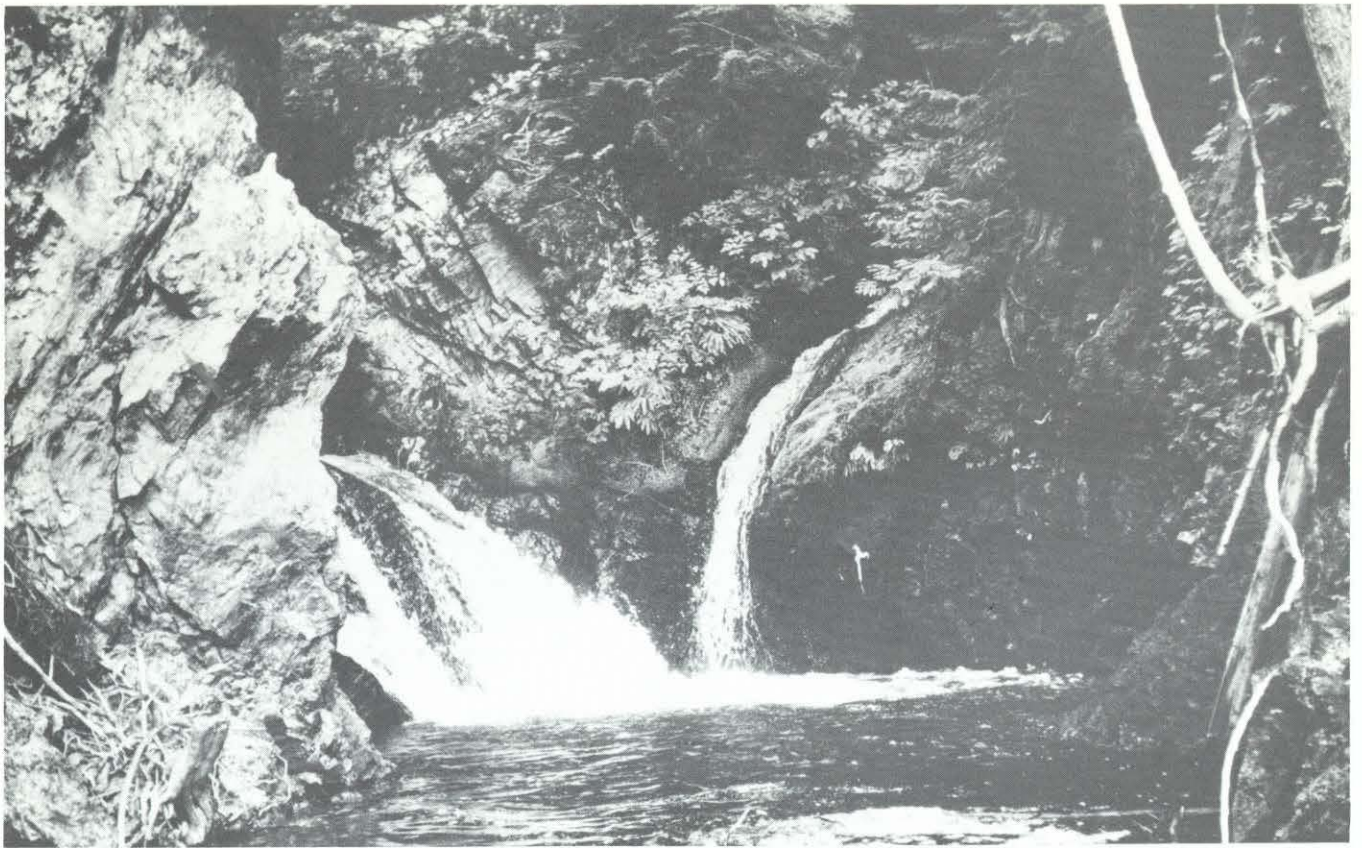
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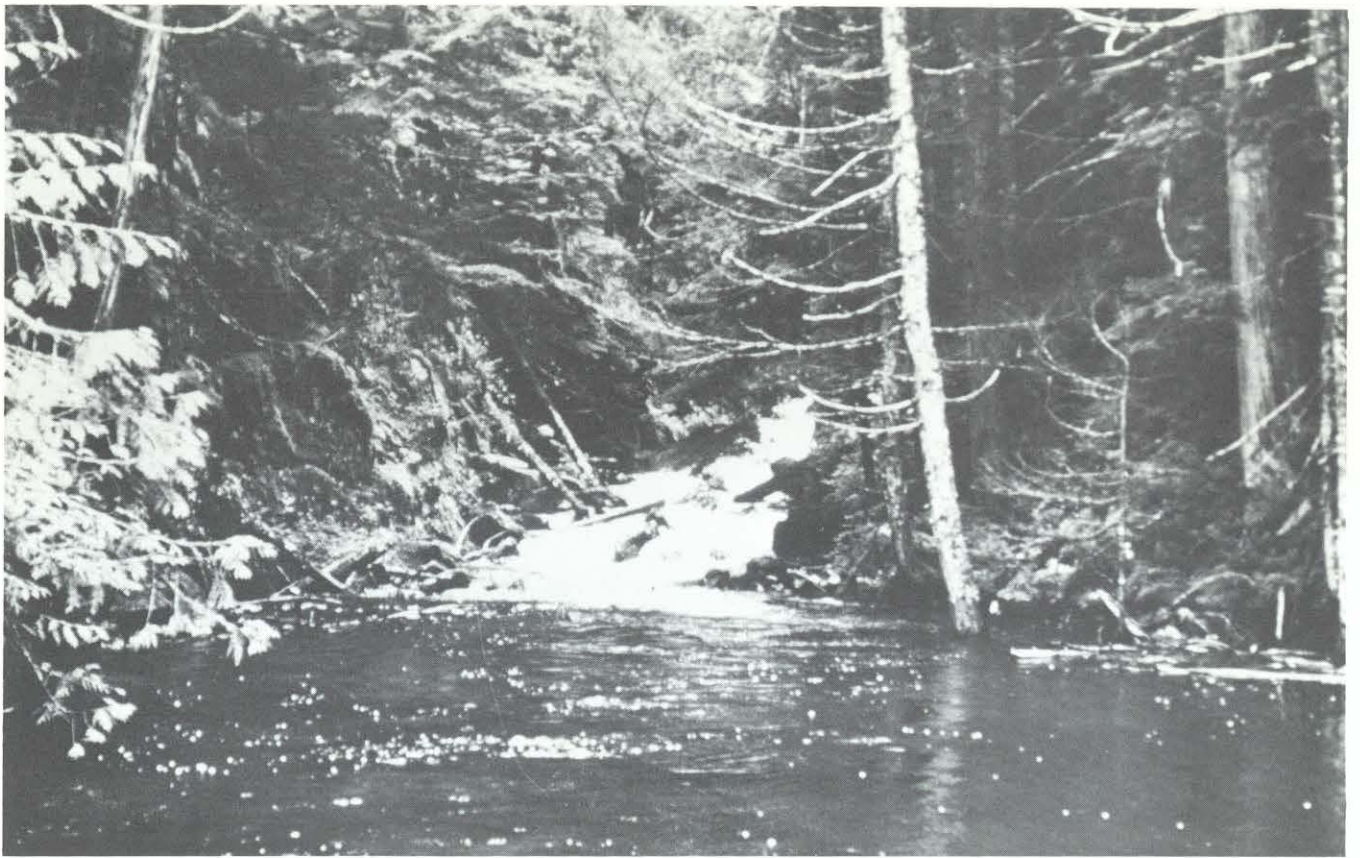
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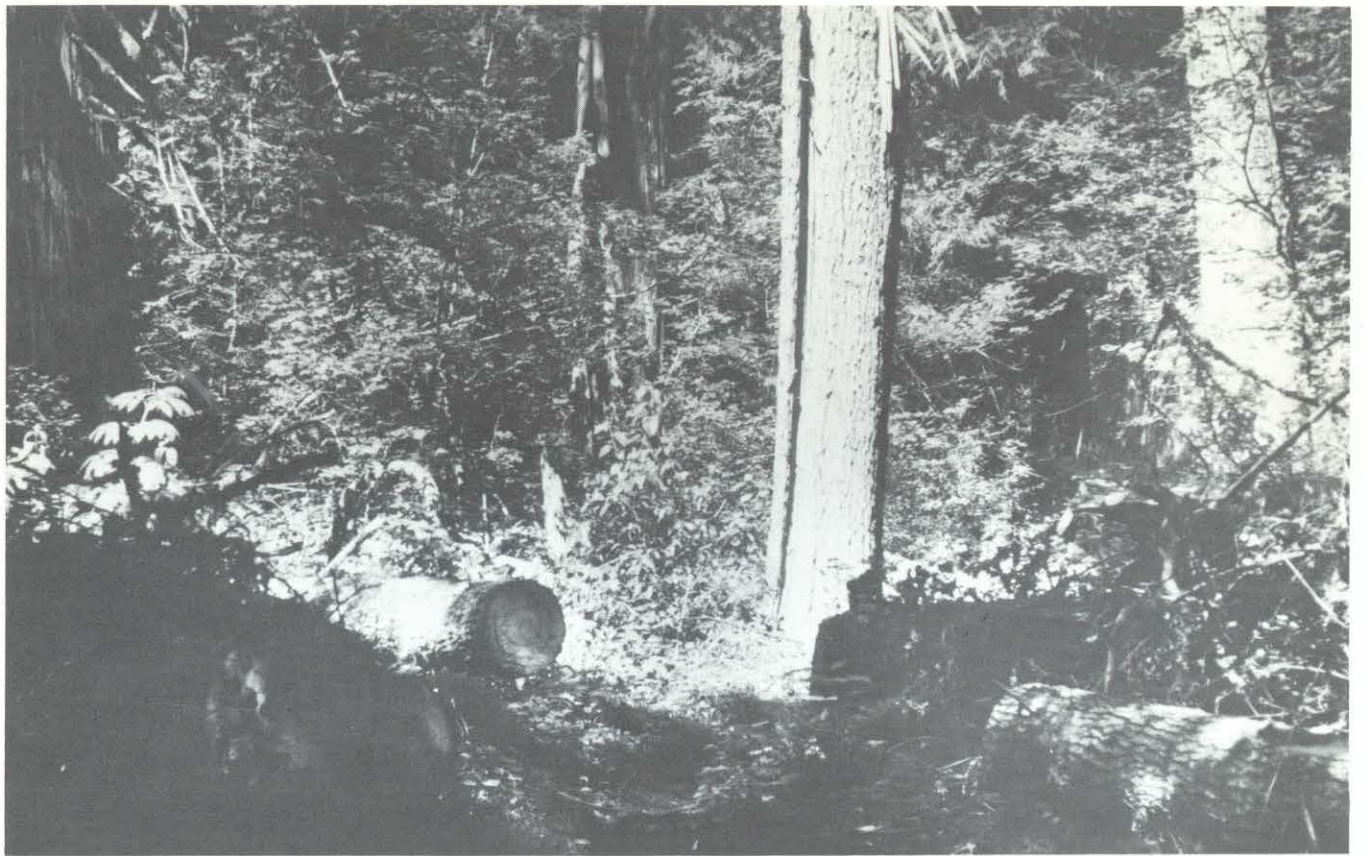
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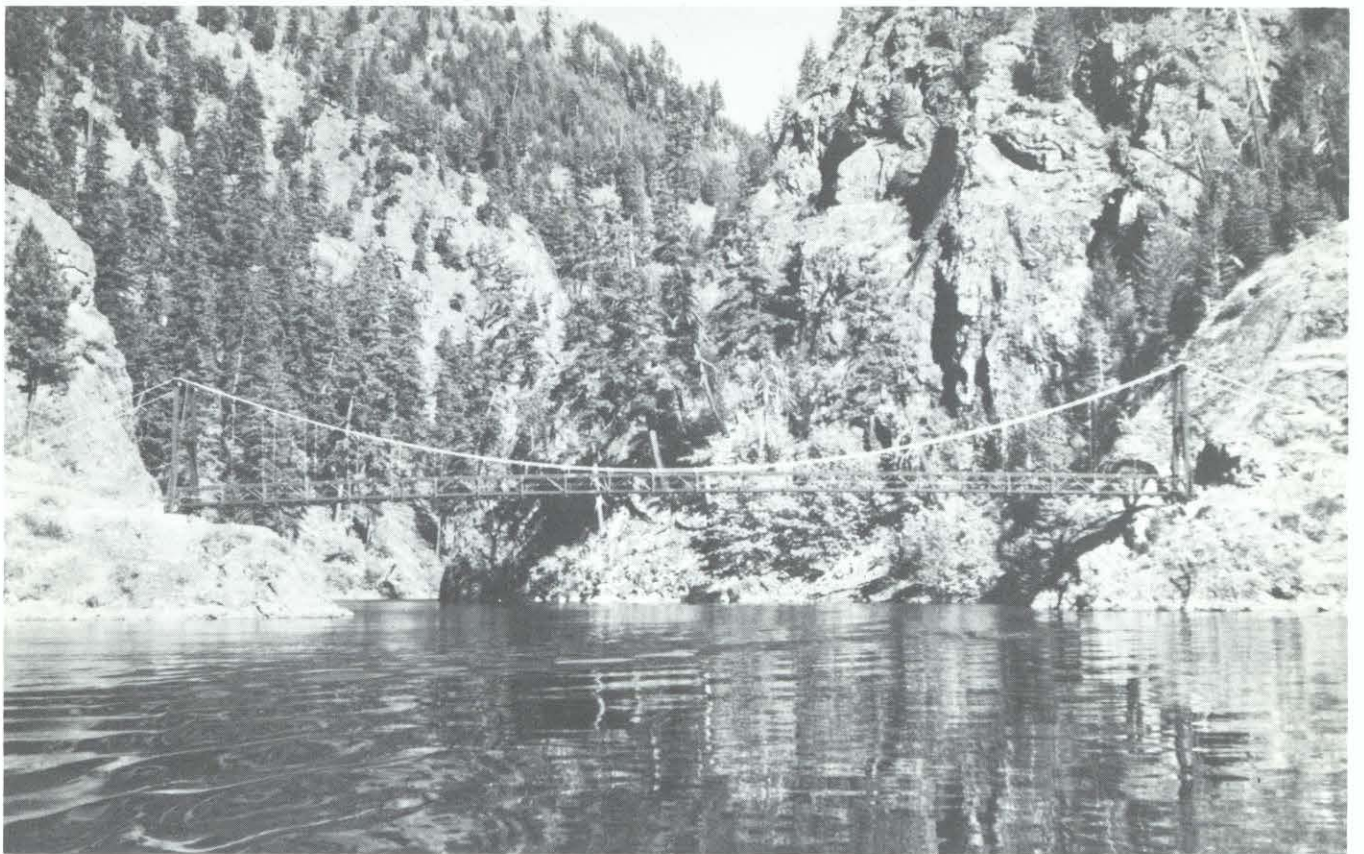
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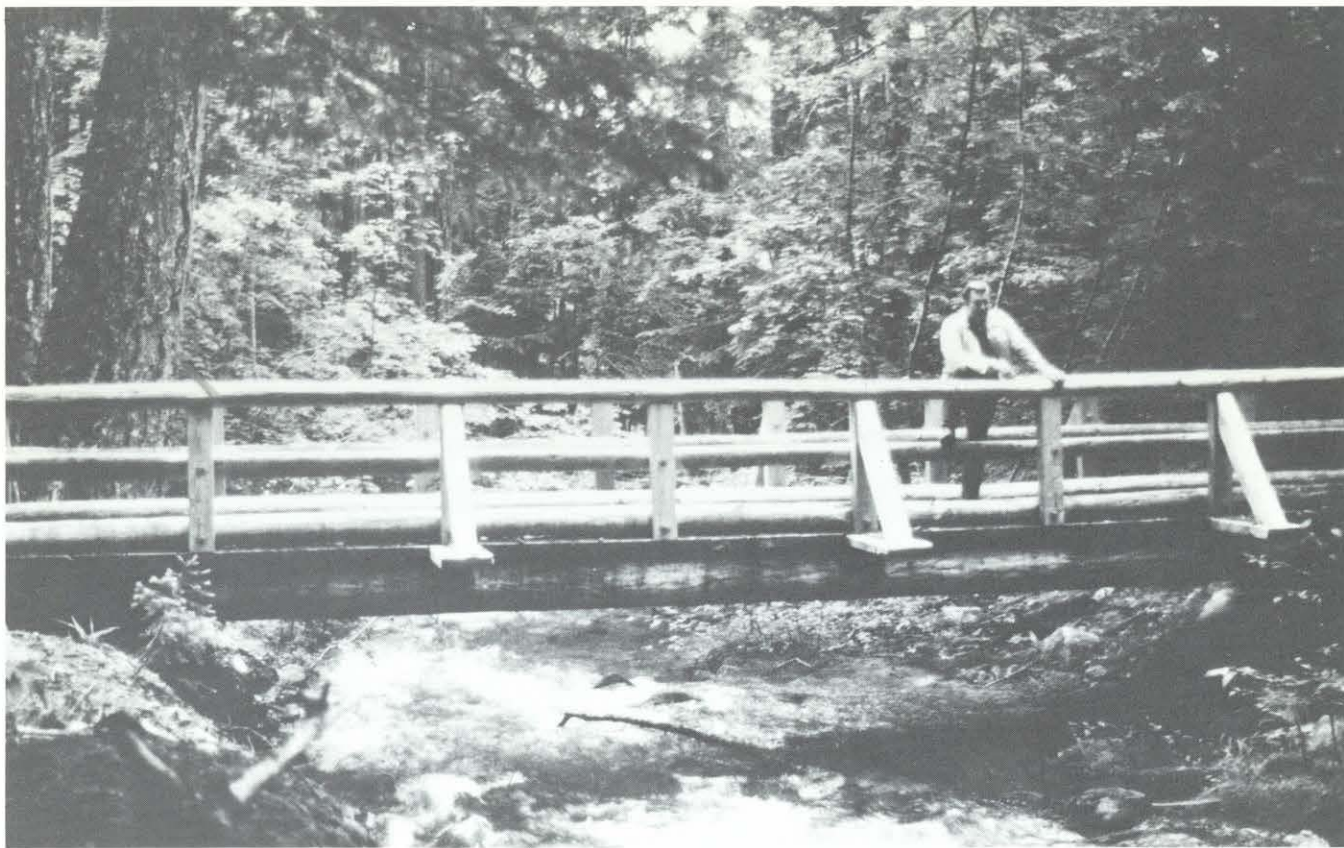
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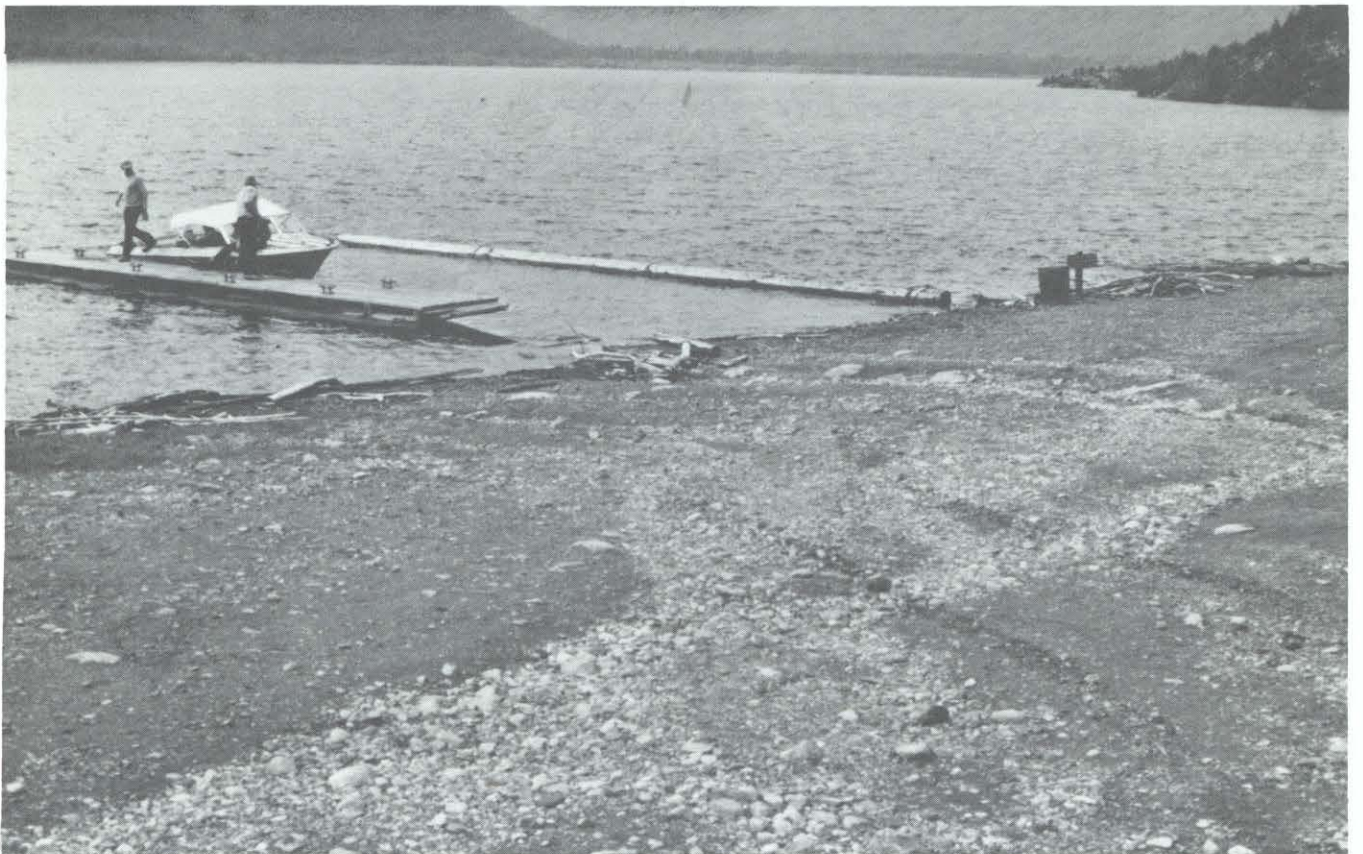
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CITY LIGHT
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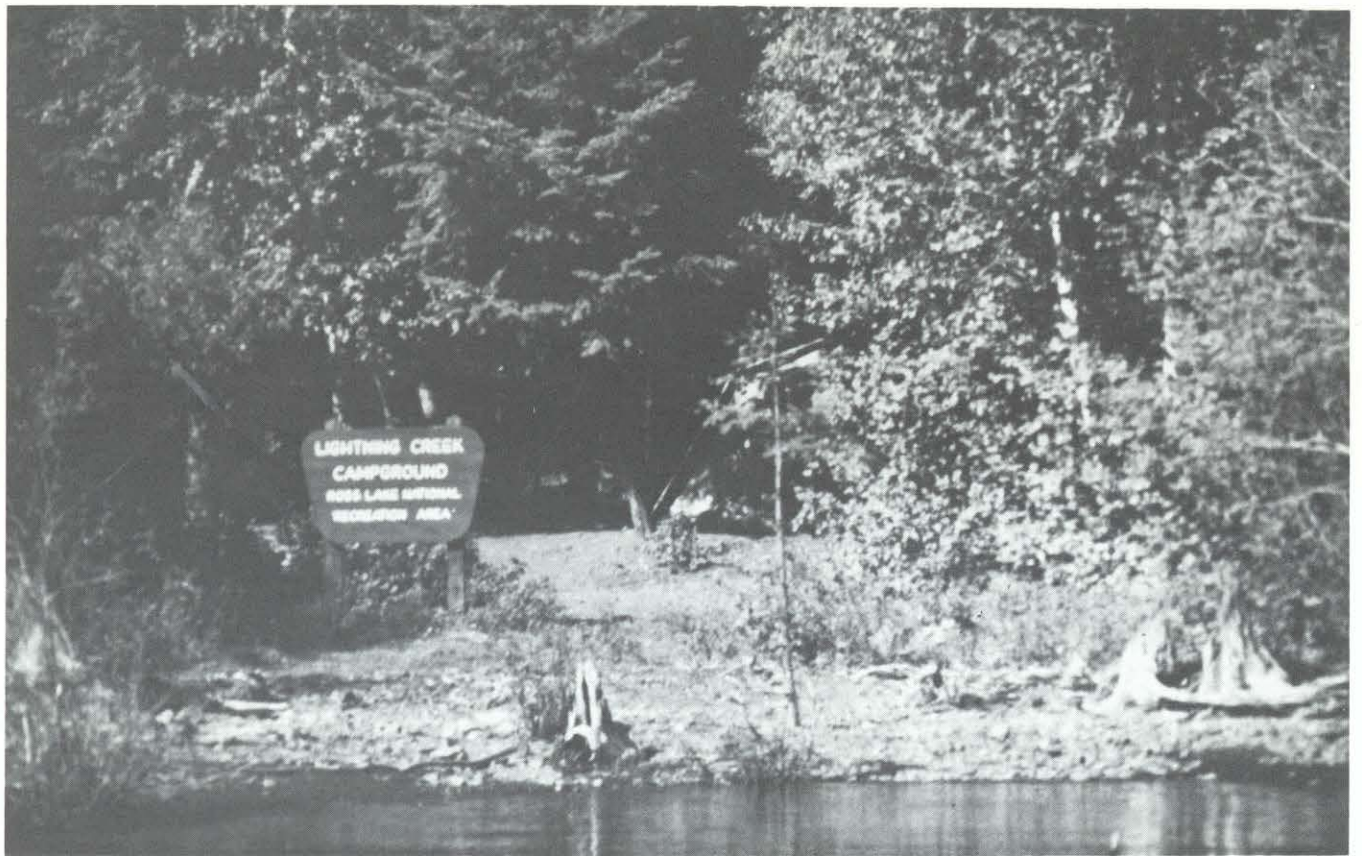
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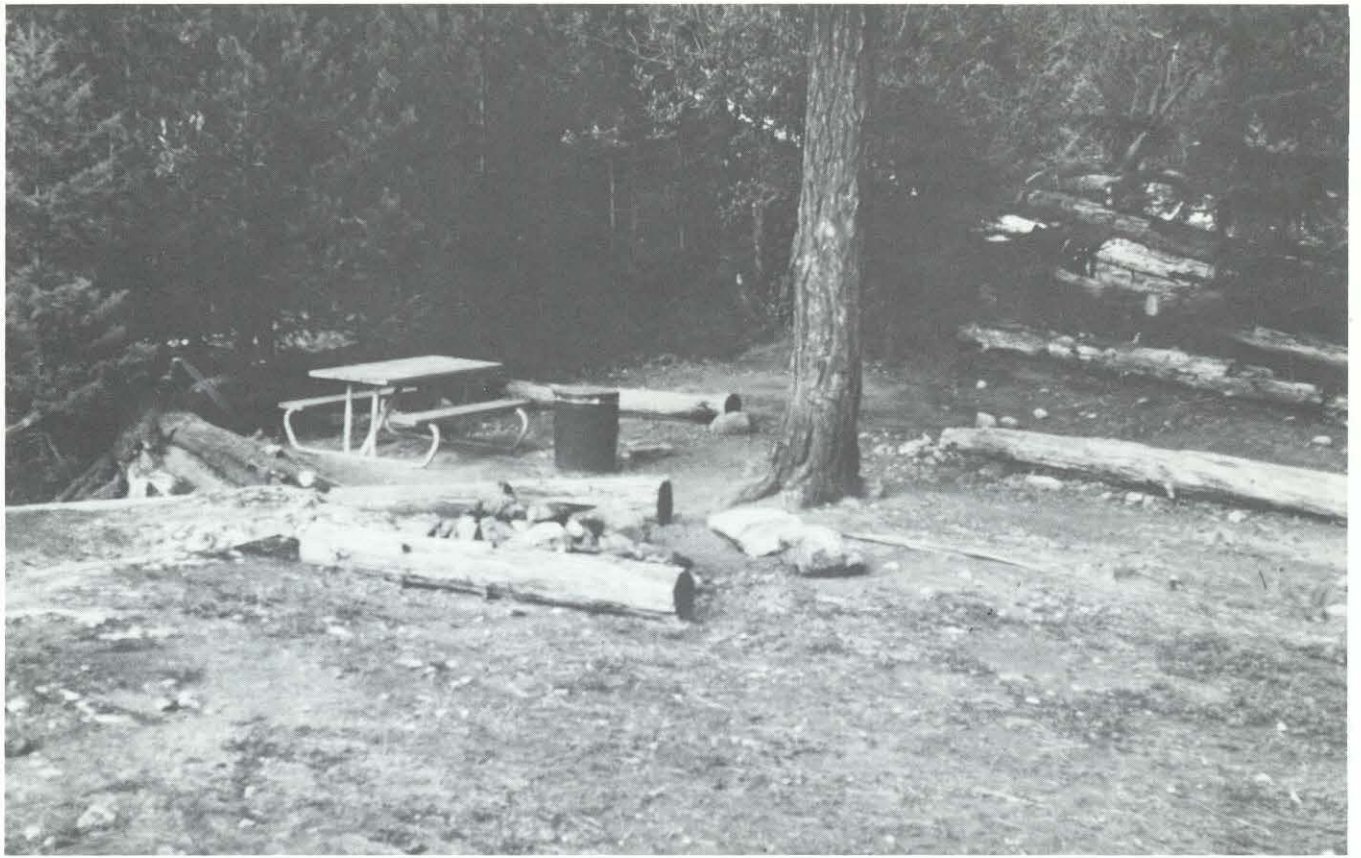
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POTENTIAL CAMPSITE AREAS

(133)



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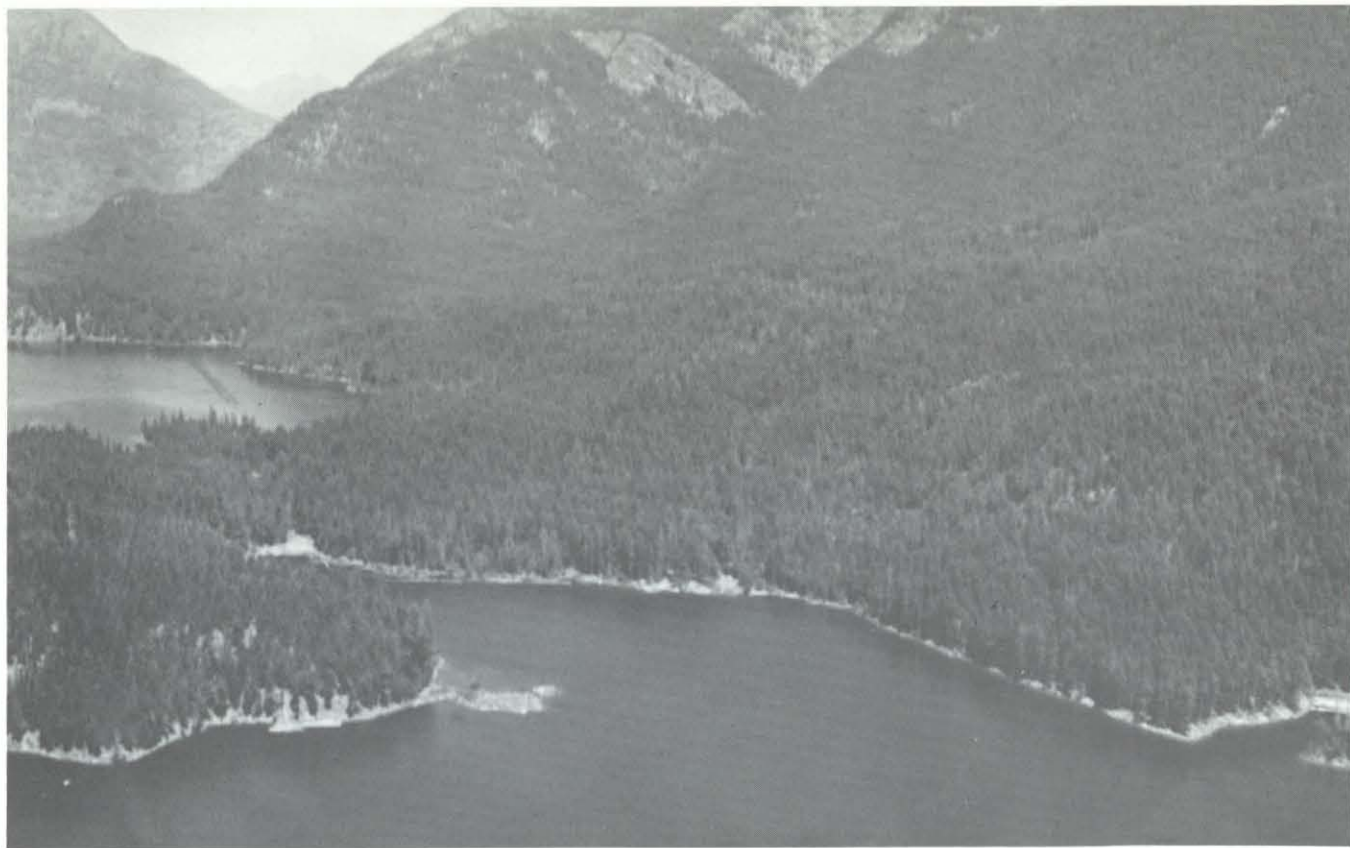
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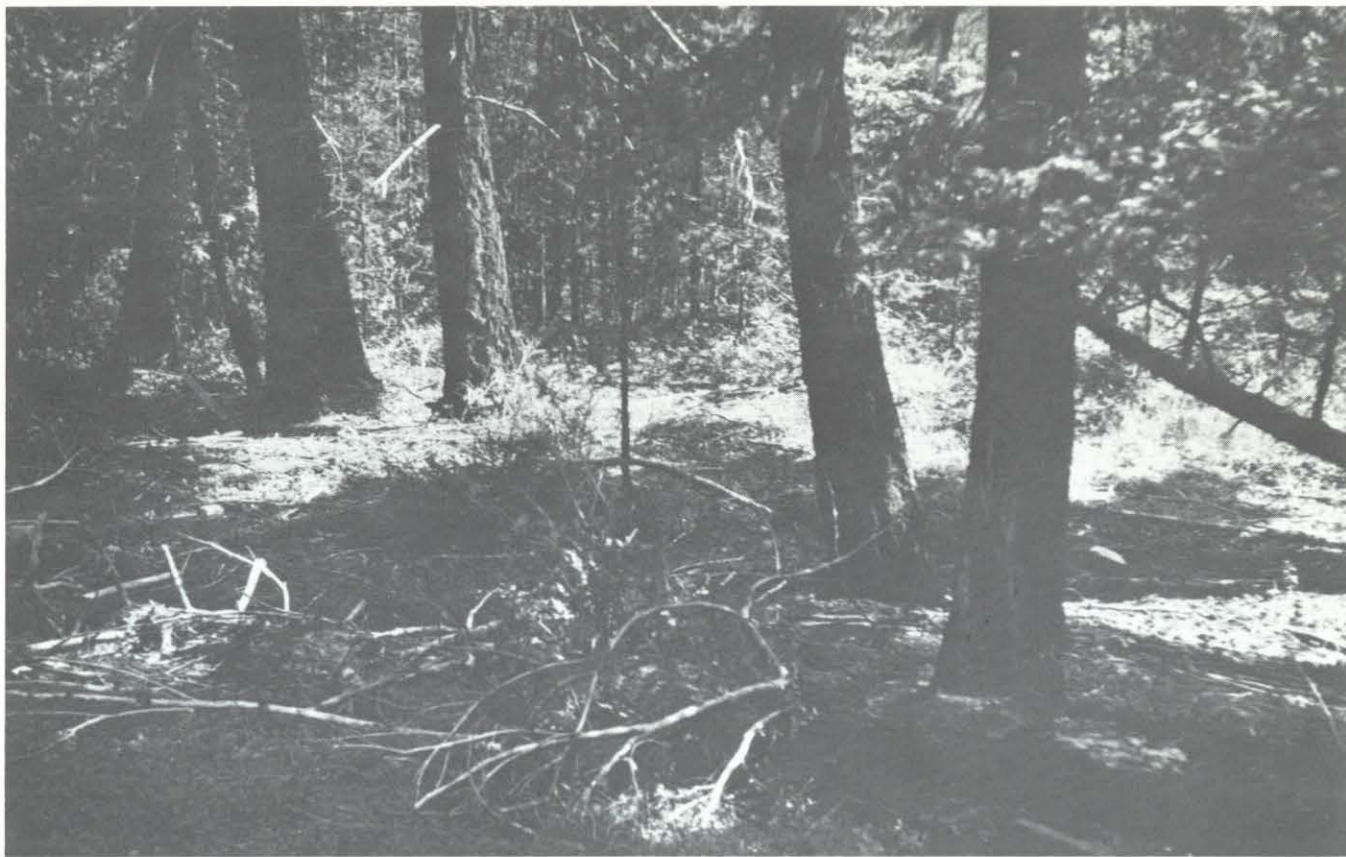
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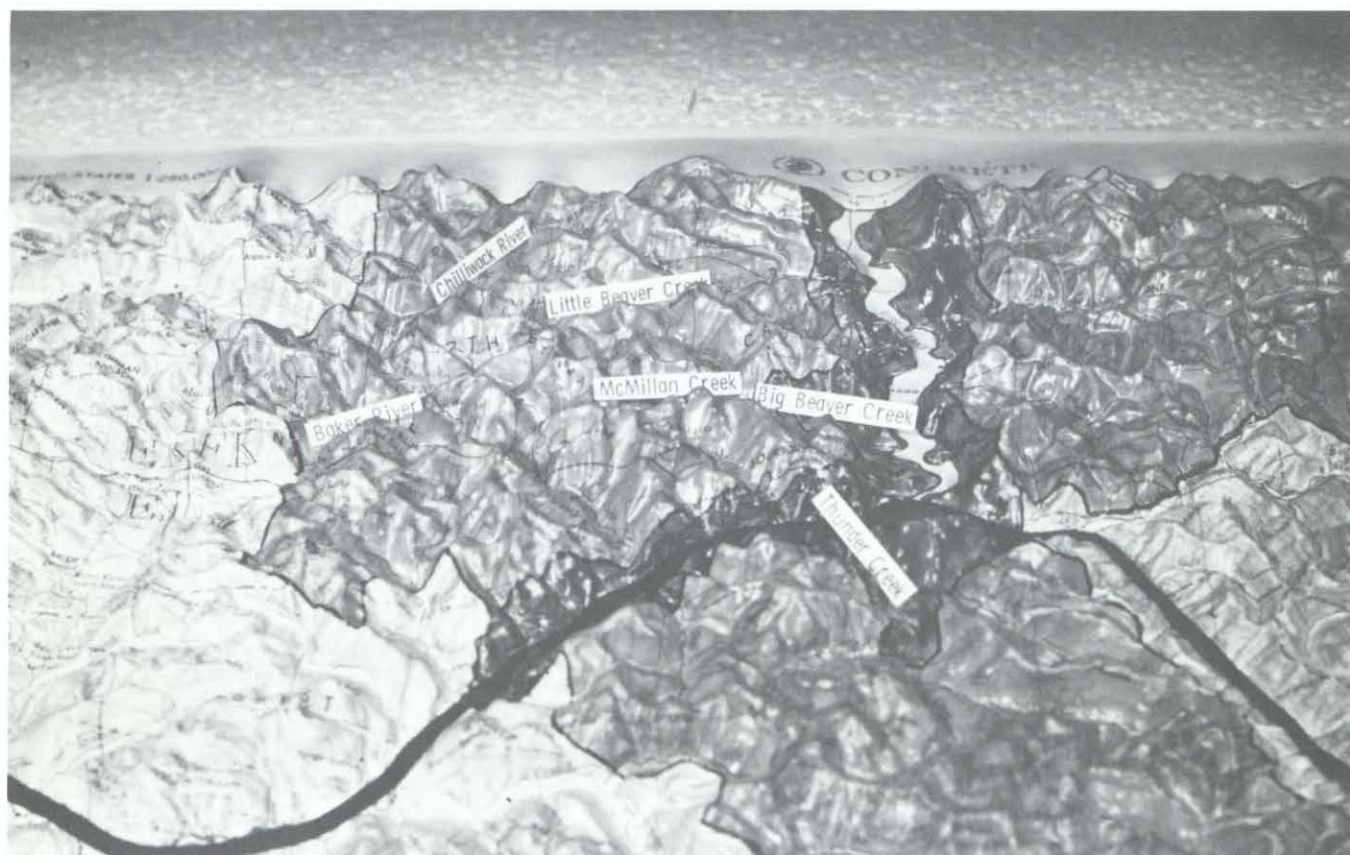
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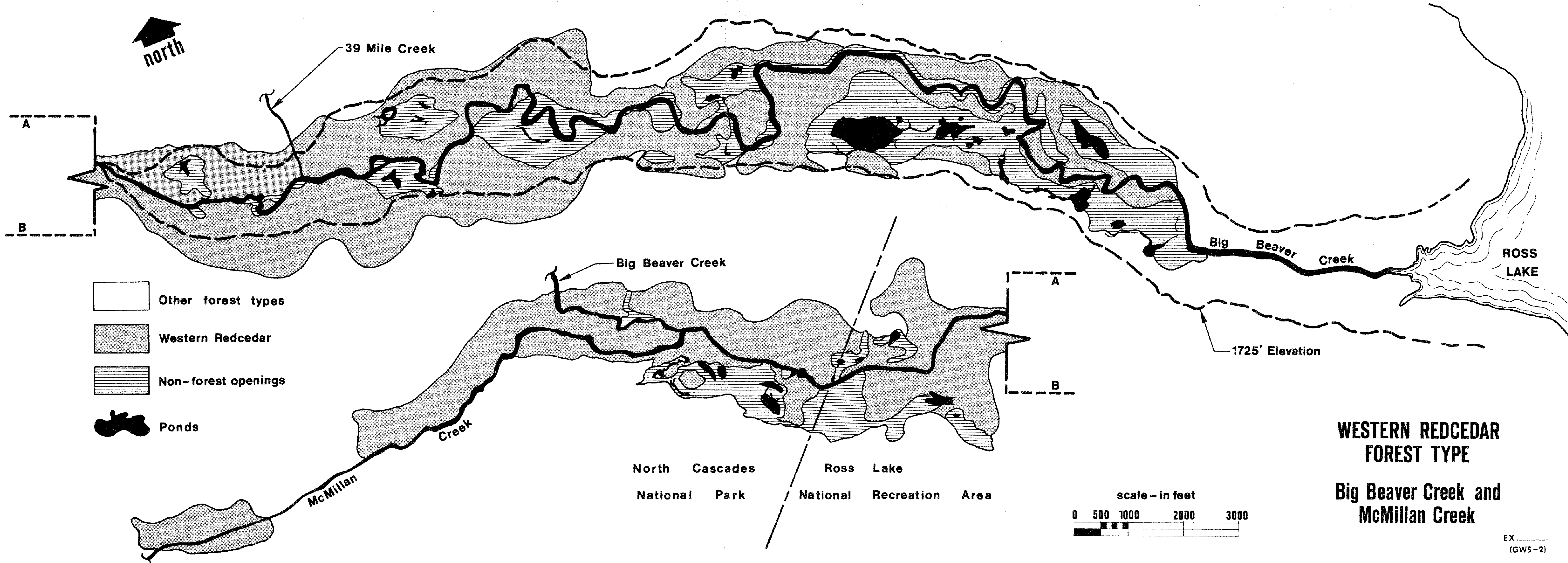


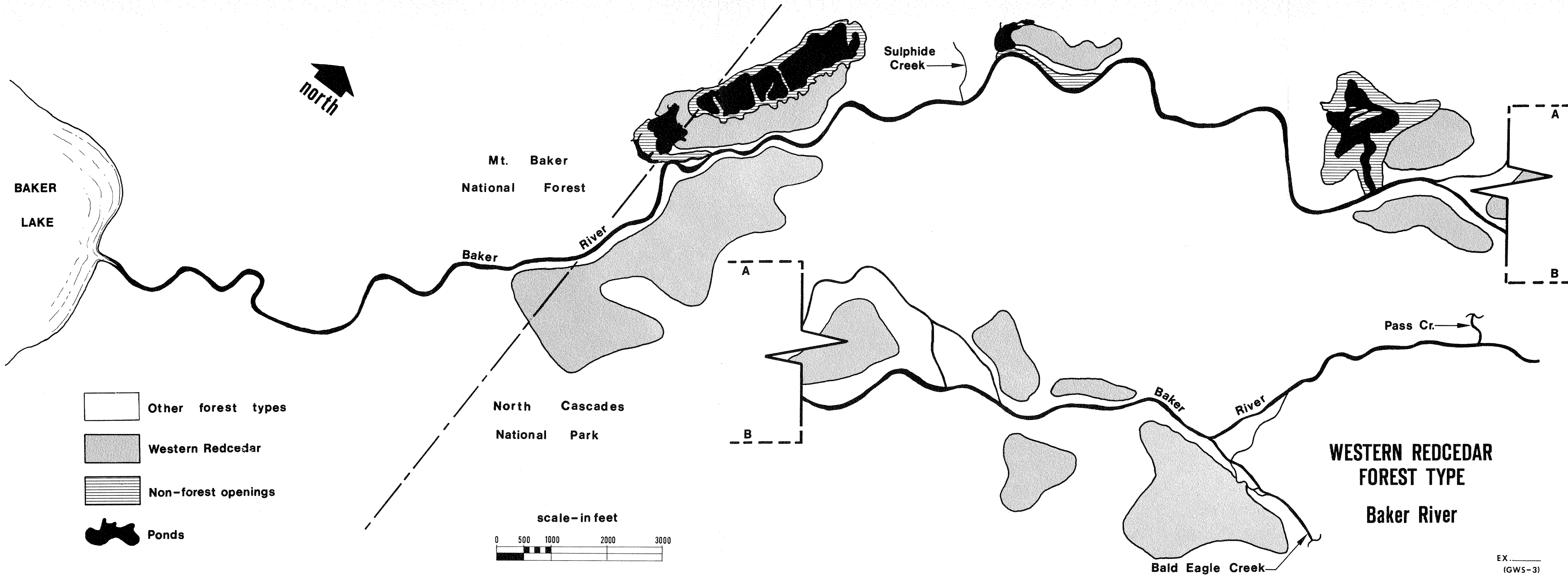
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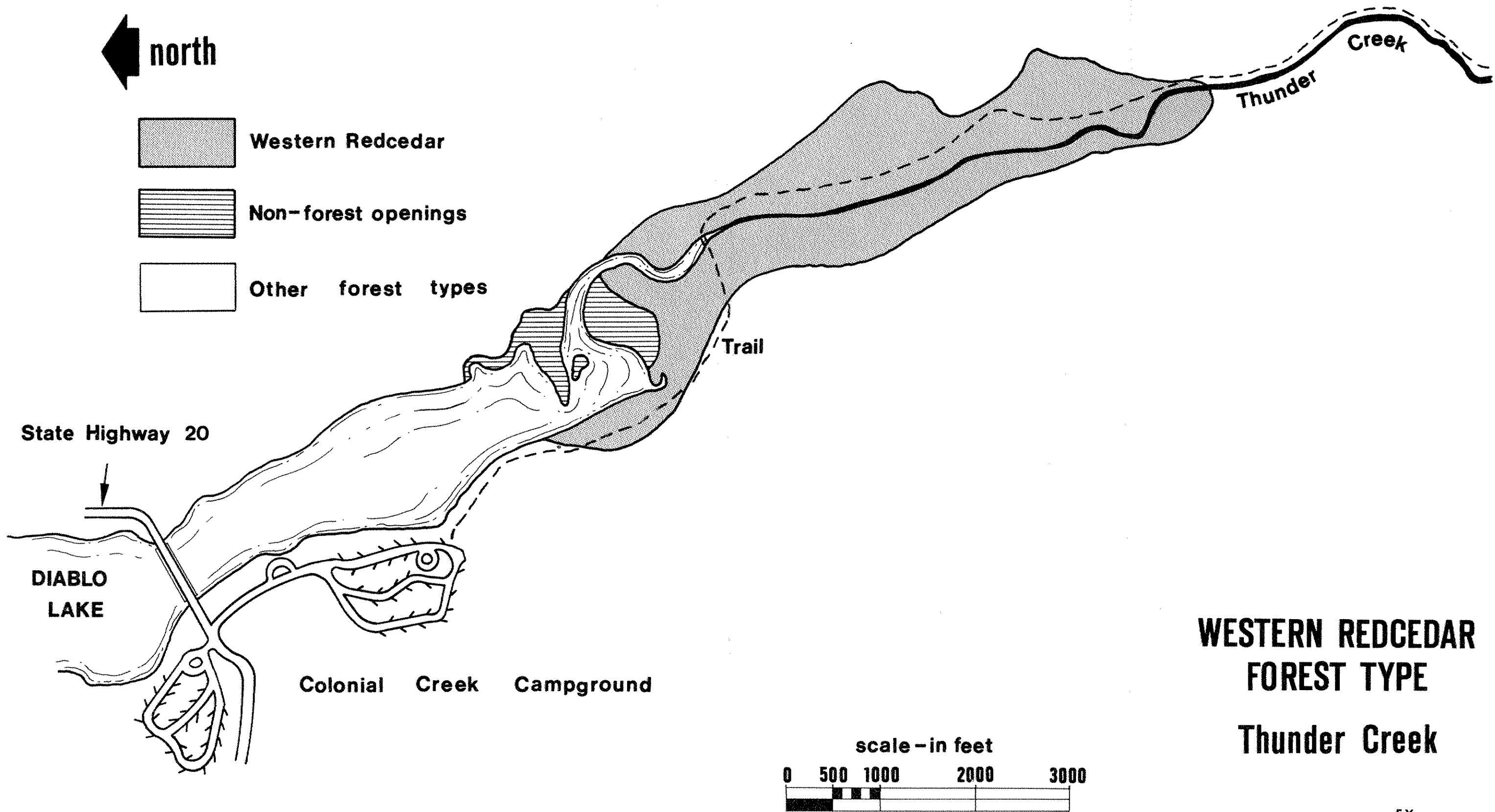


Botanical range of western redcedar

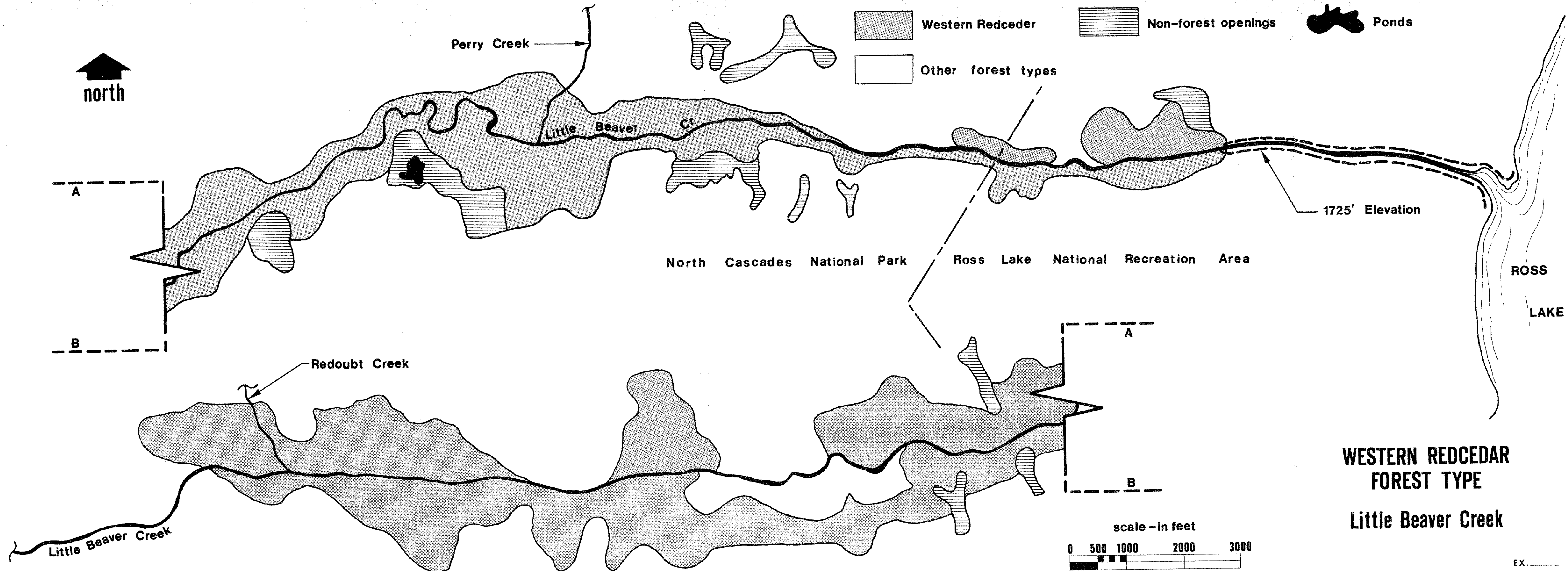
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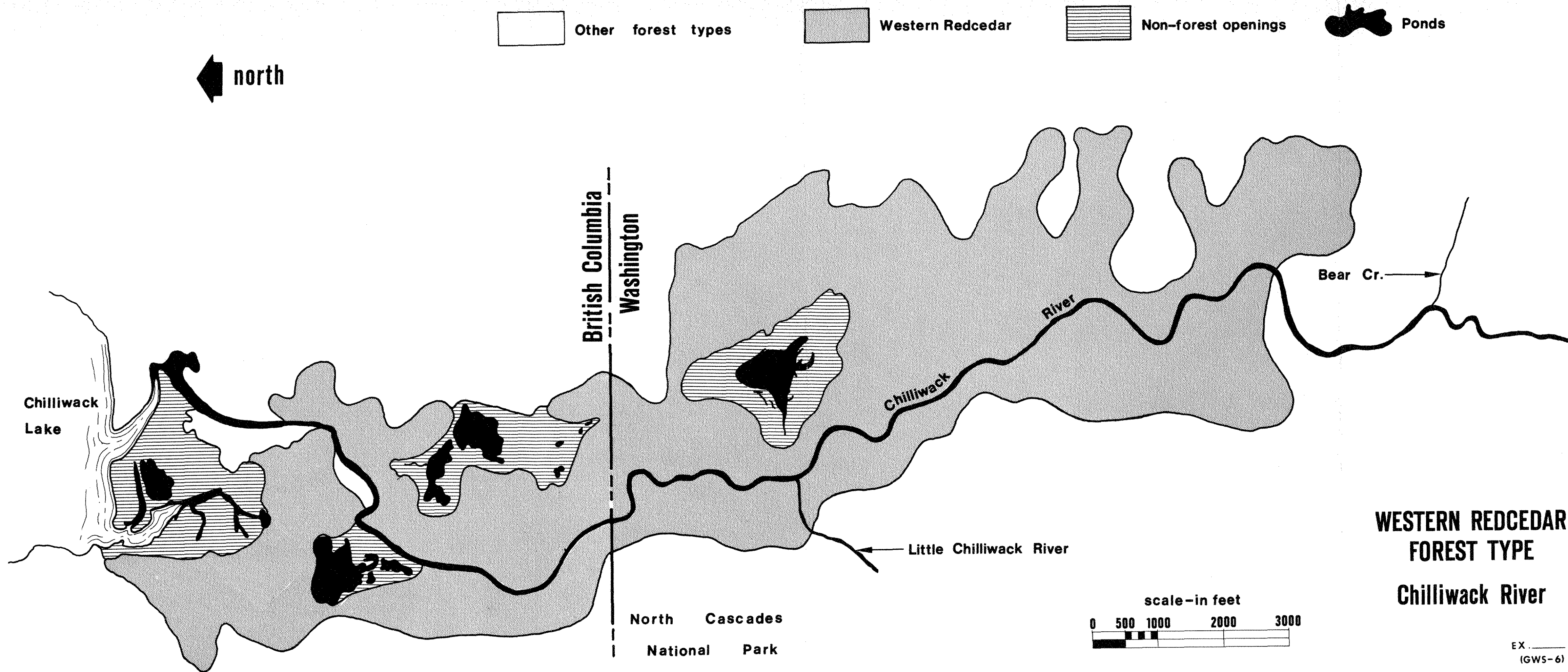


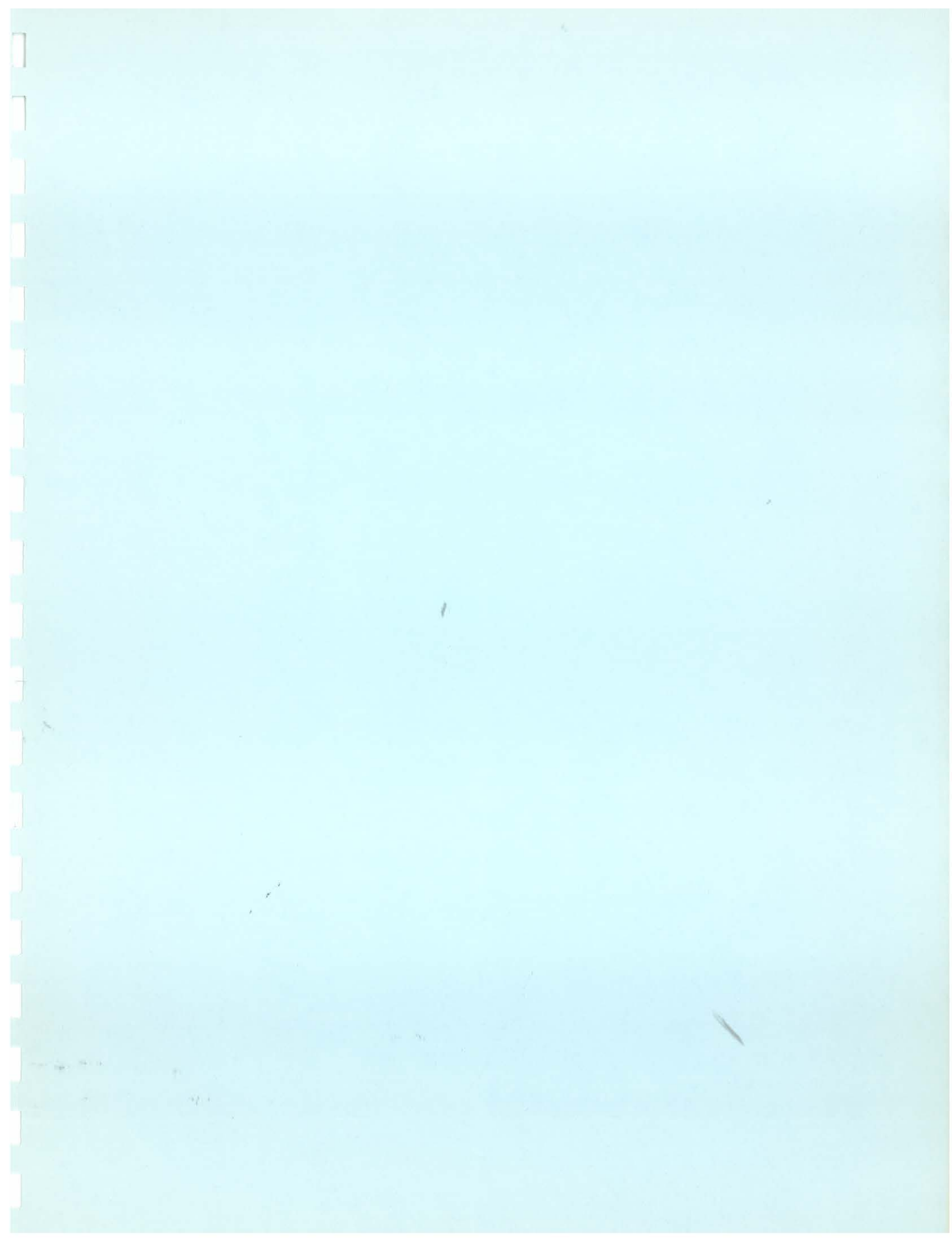




**WESTERN REDCEDAR
FOREST TYPE
Thunder Creek**







List of Exhibits to Accompany

Testimony of Lee D. Doran

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(LDD-1)	Map of Skagit River - Ross Lake System
_____	(LDD-2)	Diagram of Food Utilization by Fish in Skagit River System
_____	(LDD-3)	Diagram of Composition of Bottom Fauna in Skagit River System
_____	(LDD-4)	Diagram of Composition of Bottom Fauna in Skagit River, by Survey Sections

MAP 2
SKAGIT RIVER SYSTEM
Above Ross Dam

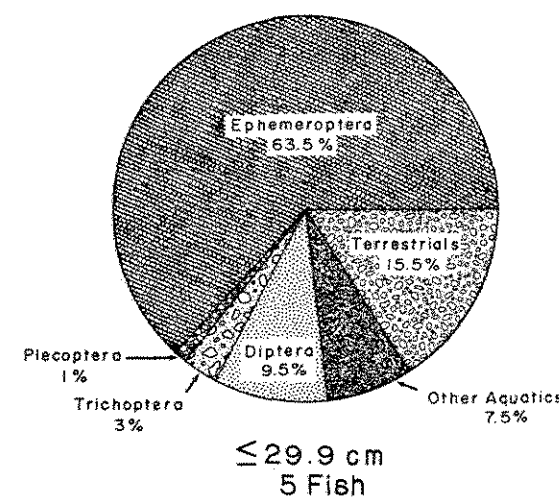


FOOD UTILIZATION

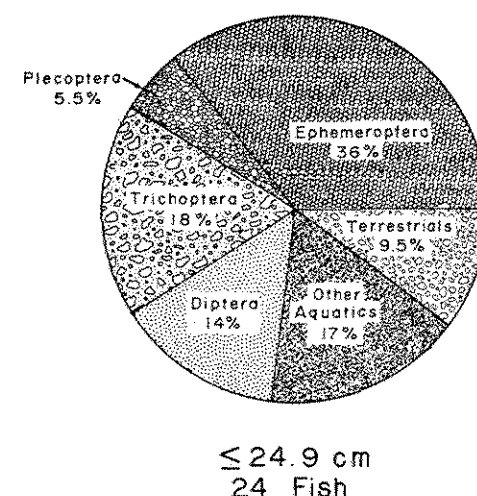
Skagit River System

1971

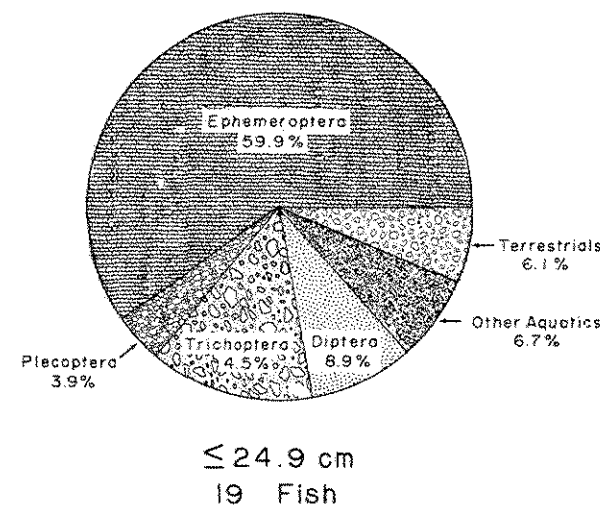
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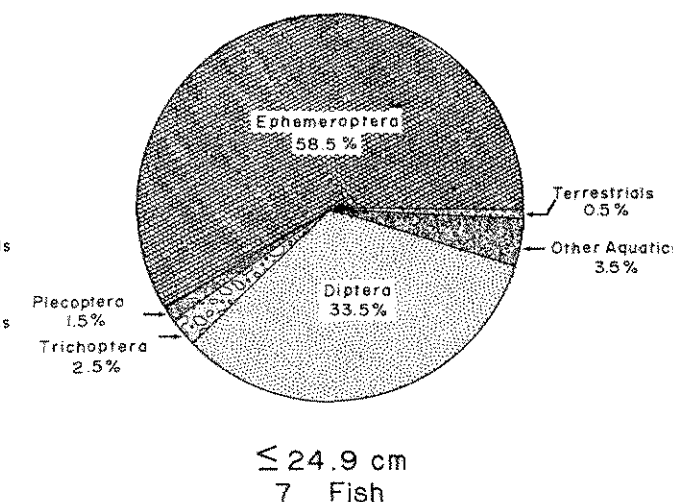
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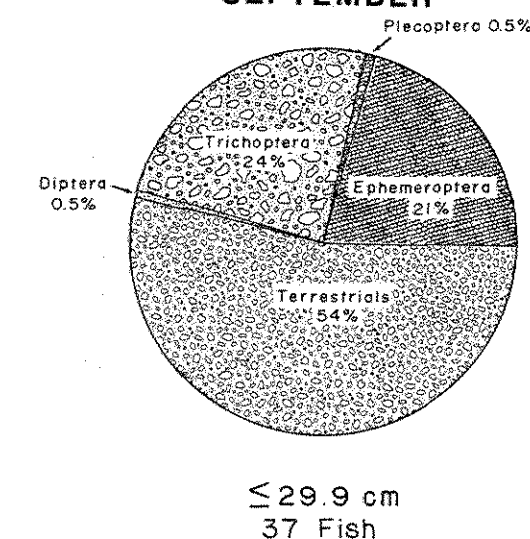
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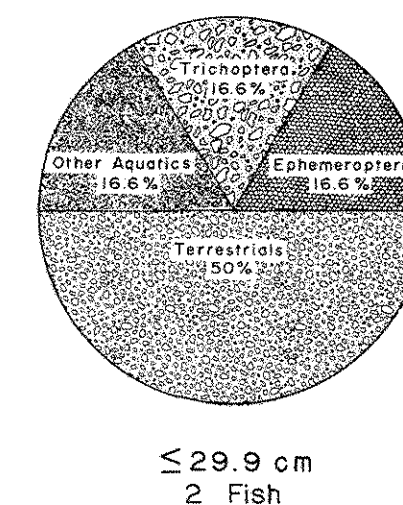
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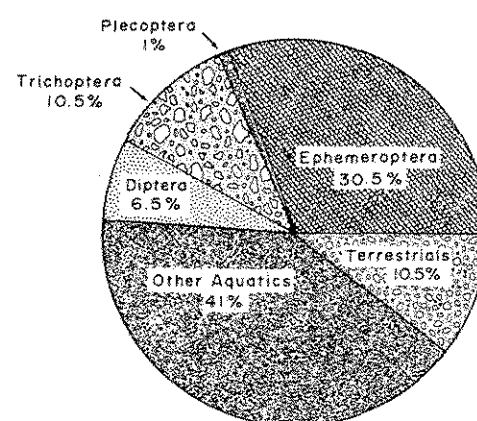
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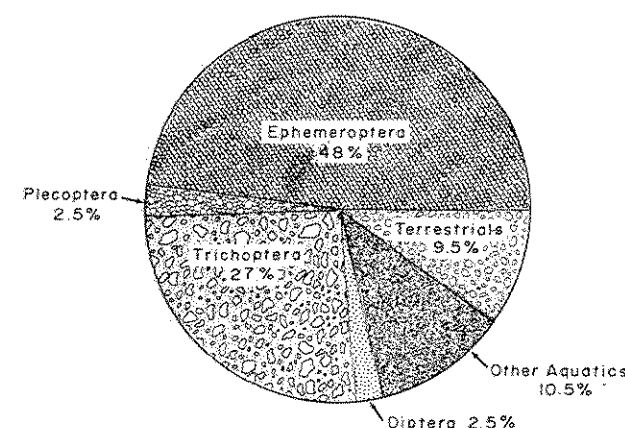
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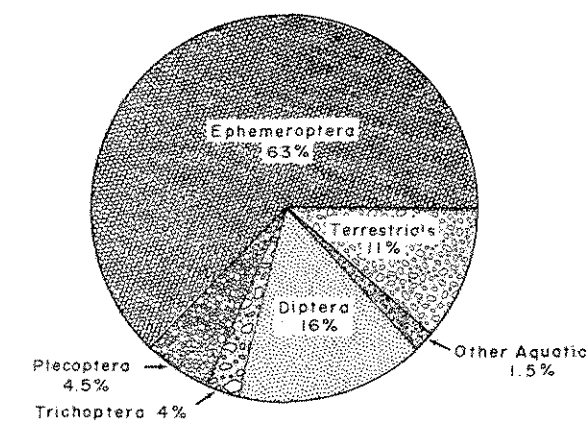
25 to 29.9 cm
27 Fish



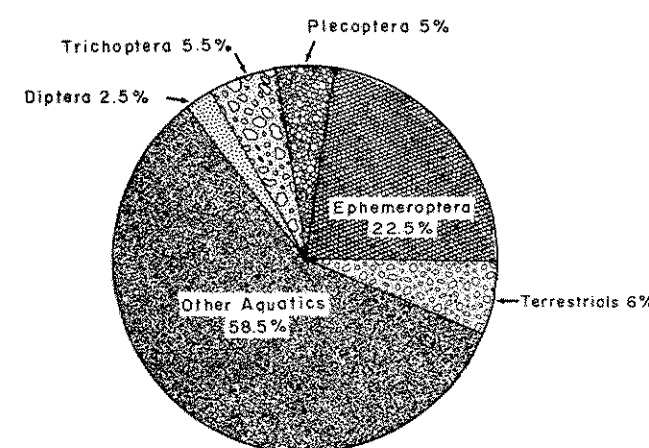
25 to 29.9 cm
10 Fish



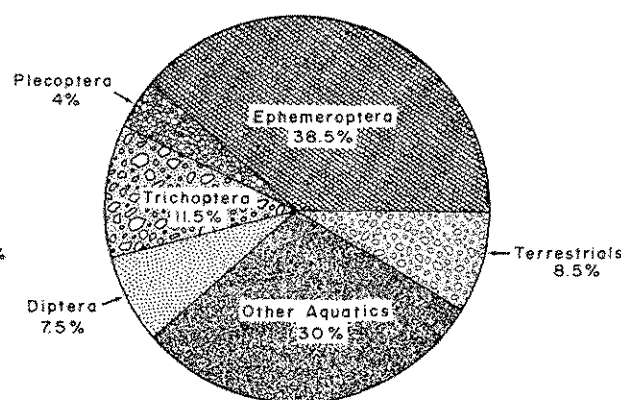
25 to 29.9 cm
6 Fish



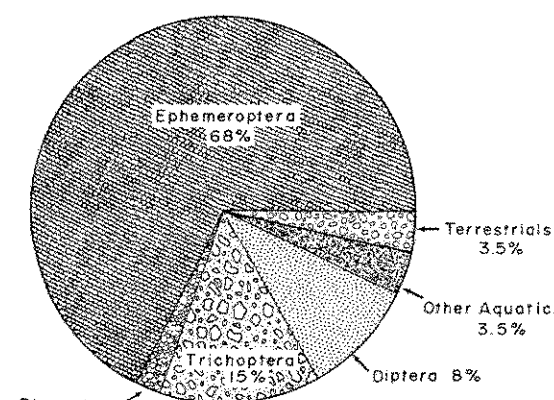
≥ 30 cm
32 Fish



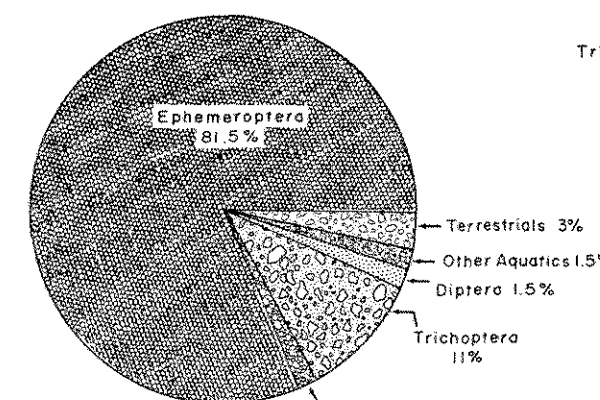
≥ 30 cm
60 Fish



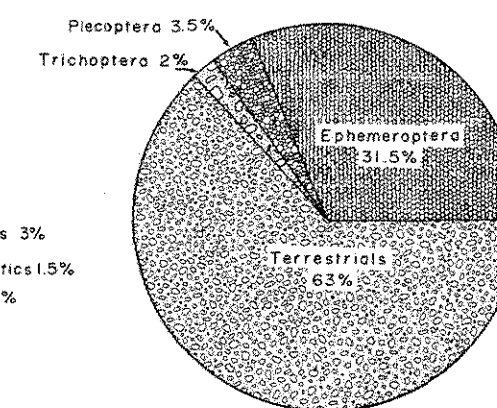
≥ 30 cm
12 Fish



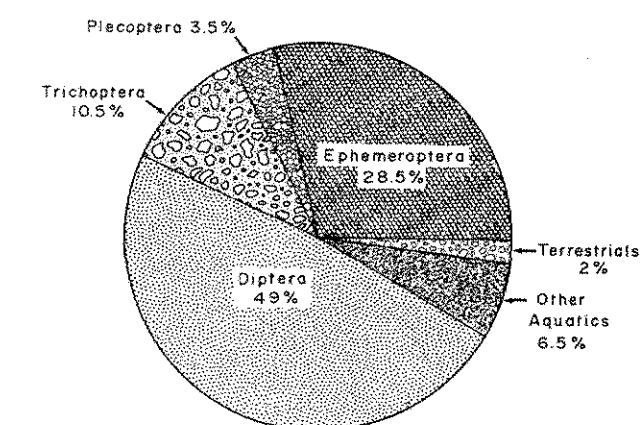
≥ 30 cm
16 Fish



≥ 30 cm
11 Fish



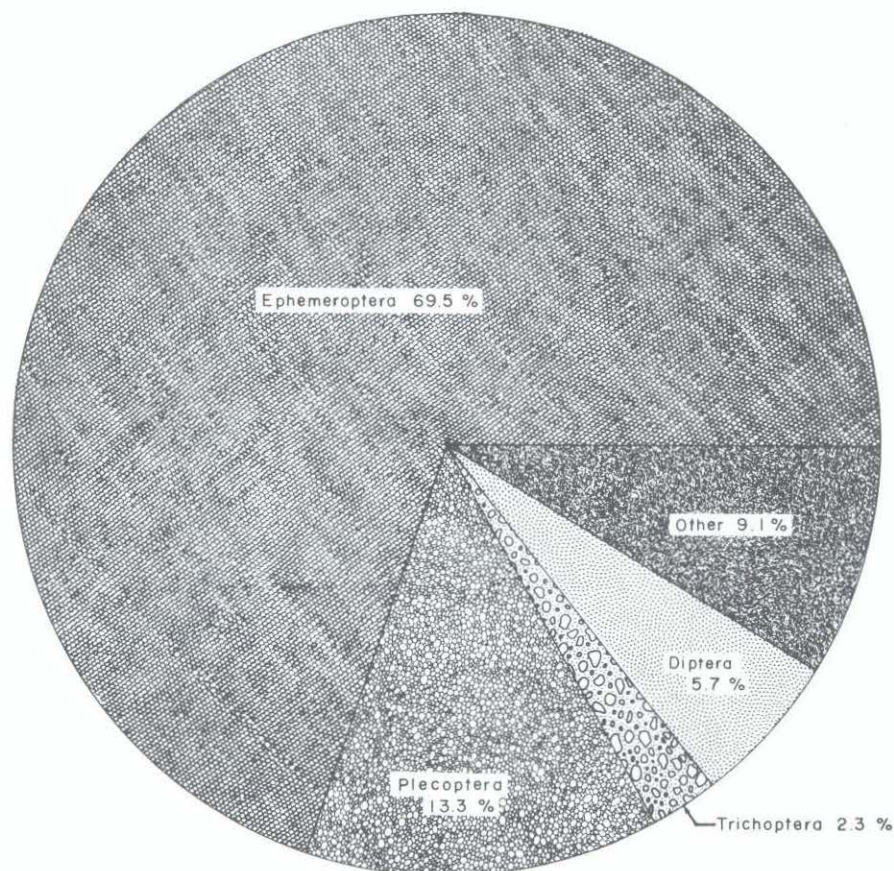
≥ 30 cm
4 Fish



COMPOSITION OF BOTTOM FAUNA

Skagit River System

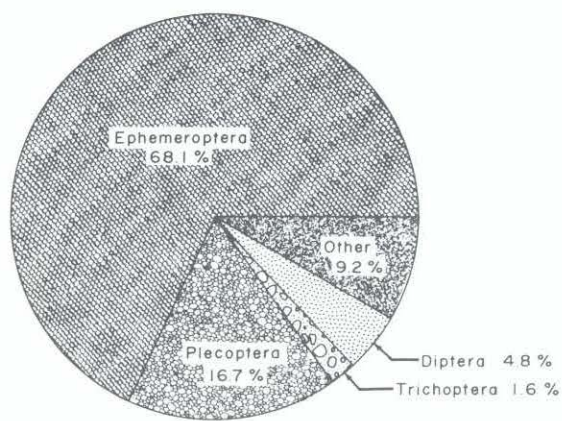
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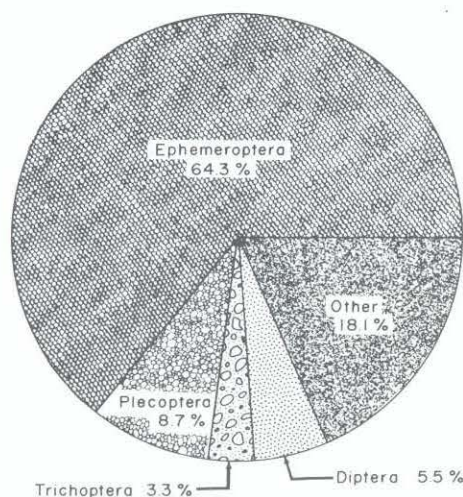
COMPOSITION OF BOTTOM FAUNA

Skagit River System

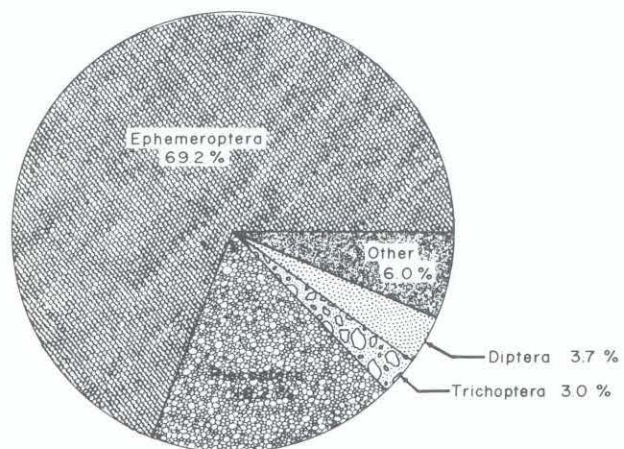
1971



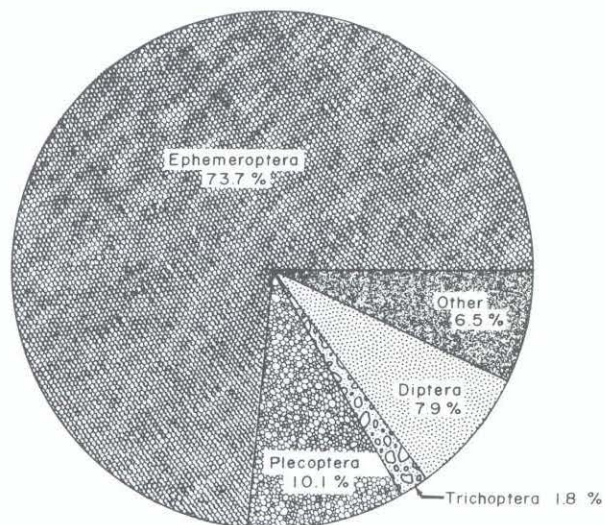
AREA F



AREA U



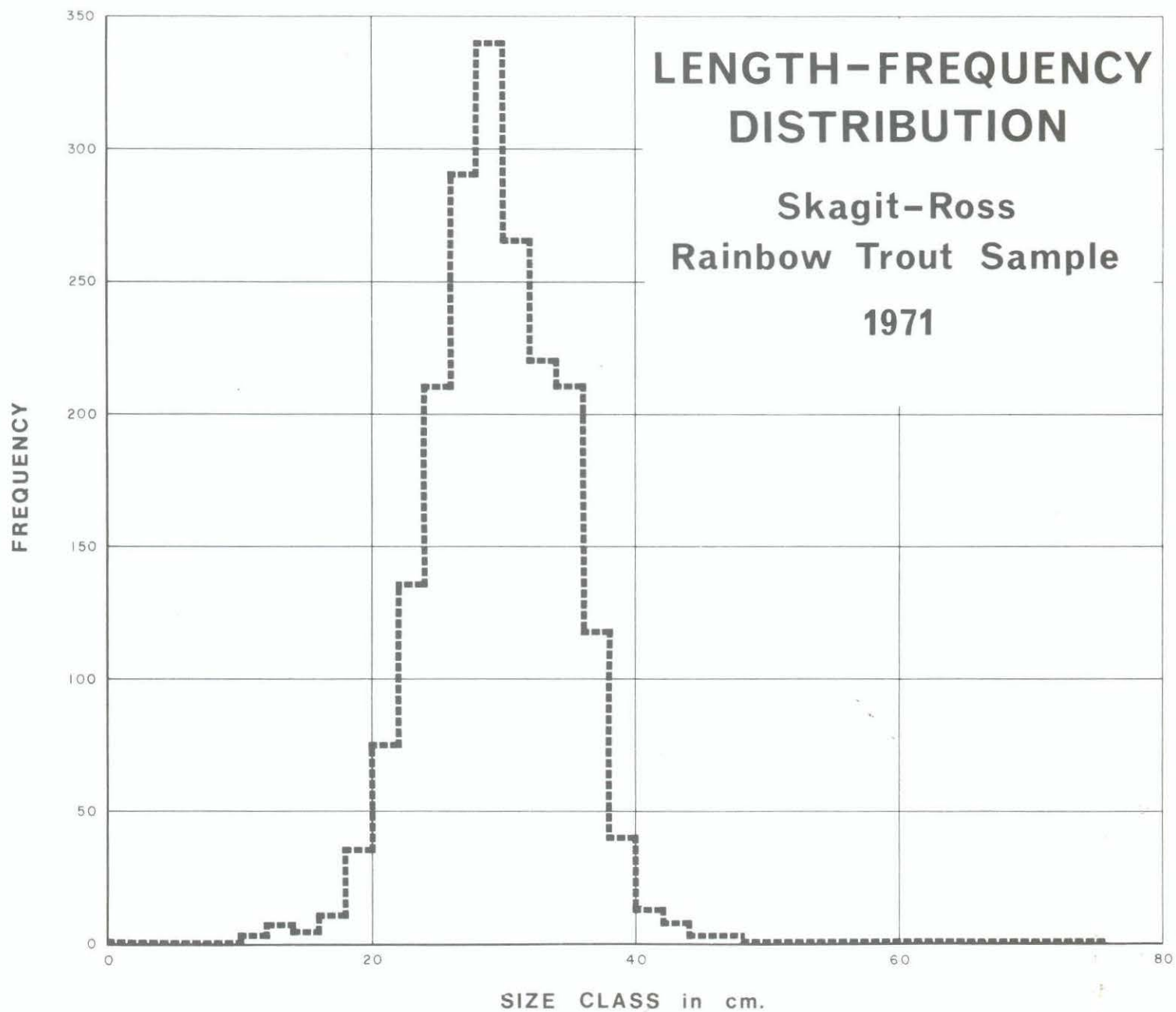
AREA M



AREA A

List of Exhibits to Accompany
Testimony of Dr. Norman J. Wilimovsky

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(NJW-1)	Chart: Length-Frequency Distribution; Skagit-Ross, 1971
_____	(NJW-2)	Chart: Weight-Frequency Distribution; Skagit-Ross, 1971
_____	(NJW-3)	Chart: Mean Calculated Length, 1971
_____	(NJW-4)	Chart: Catch Per Angler Day, 1941-70



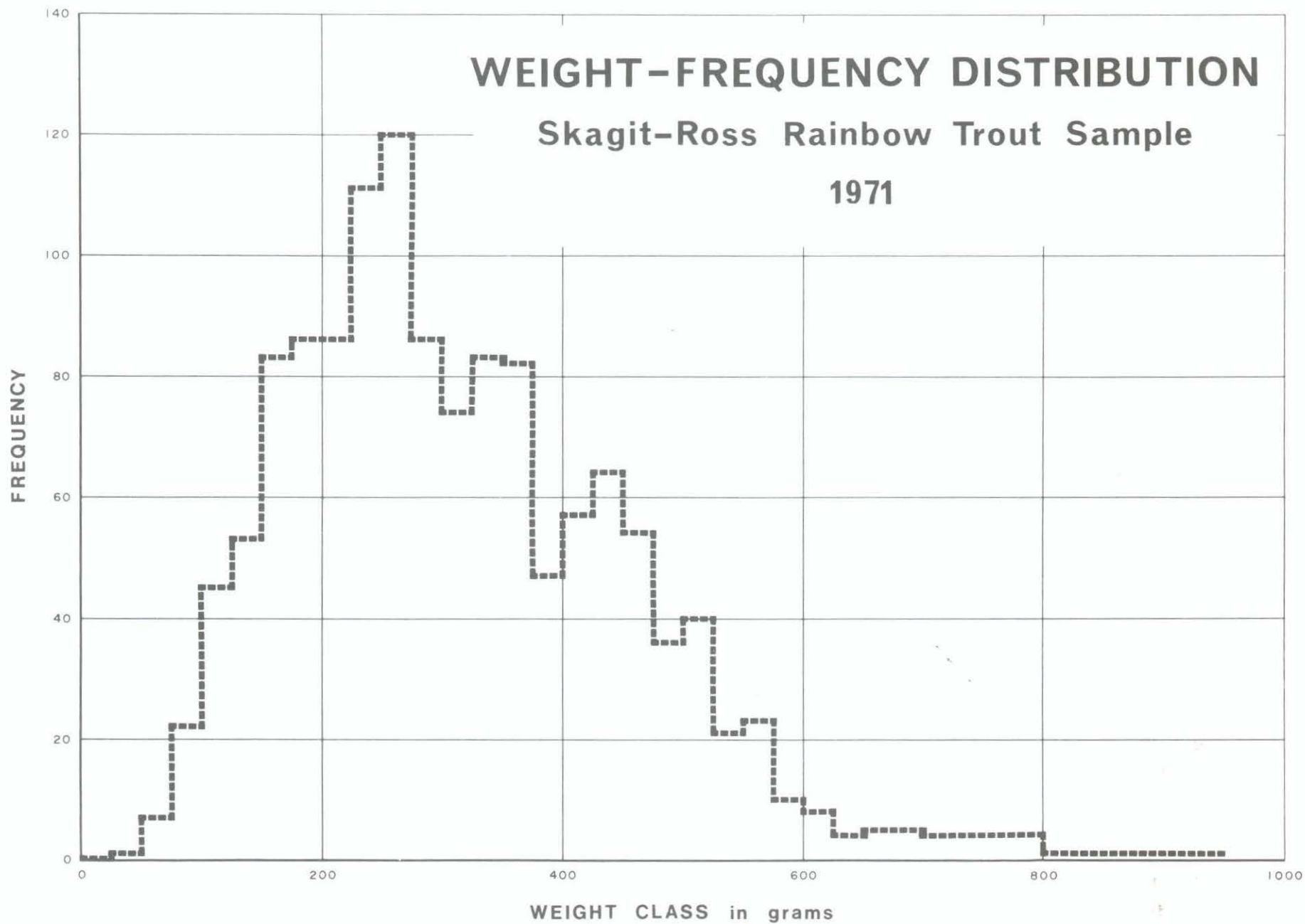


FIGURE 3.5-4
MEAN CALCULATED LENGTH
Rainbow Trout
1971

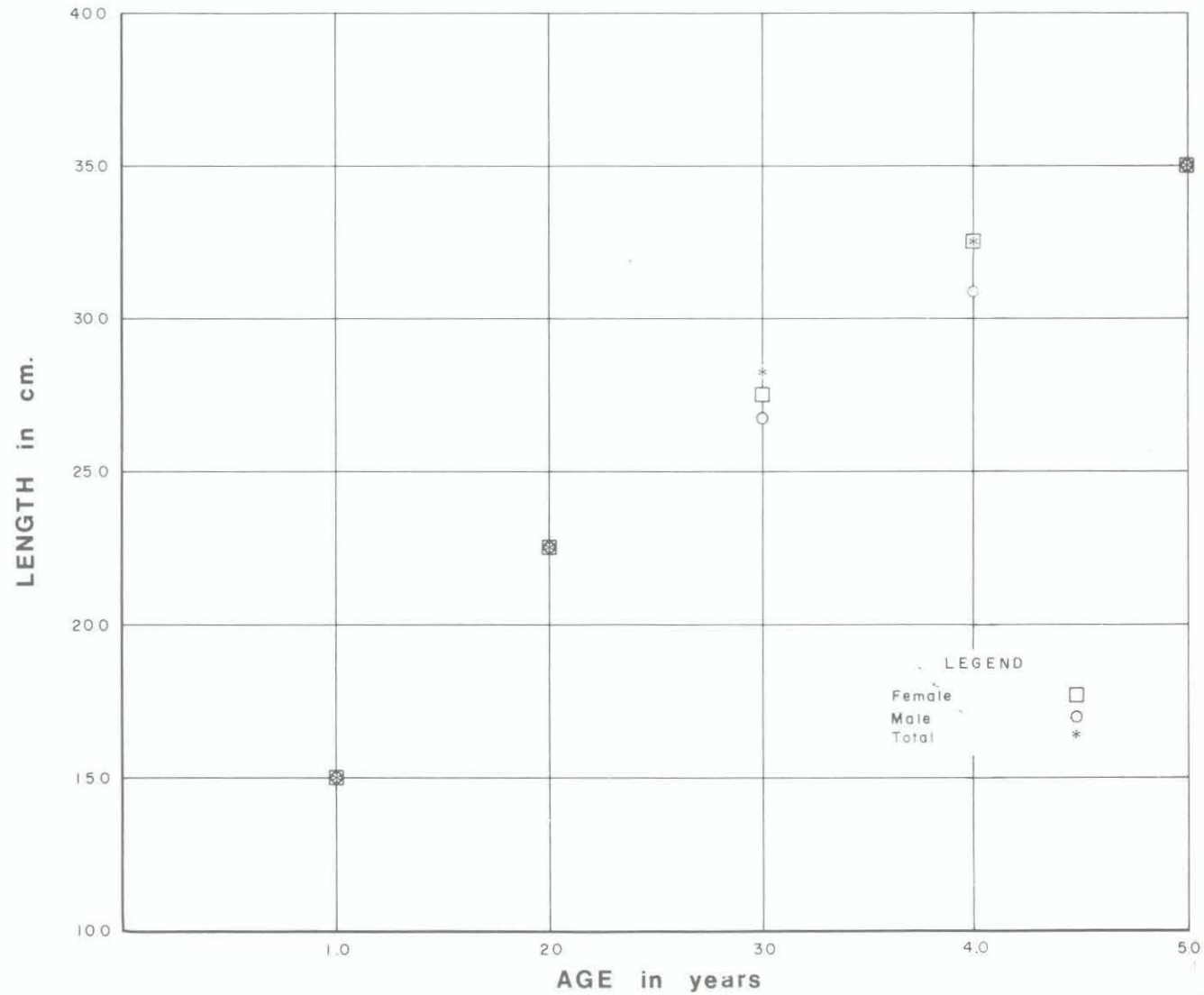


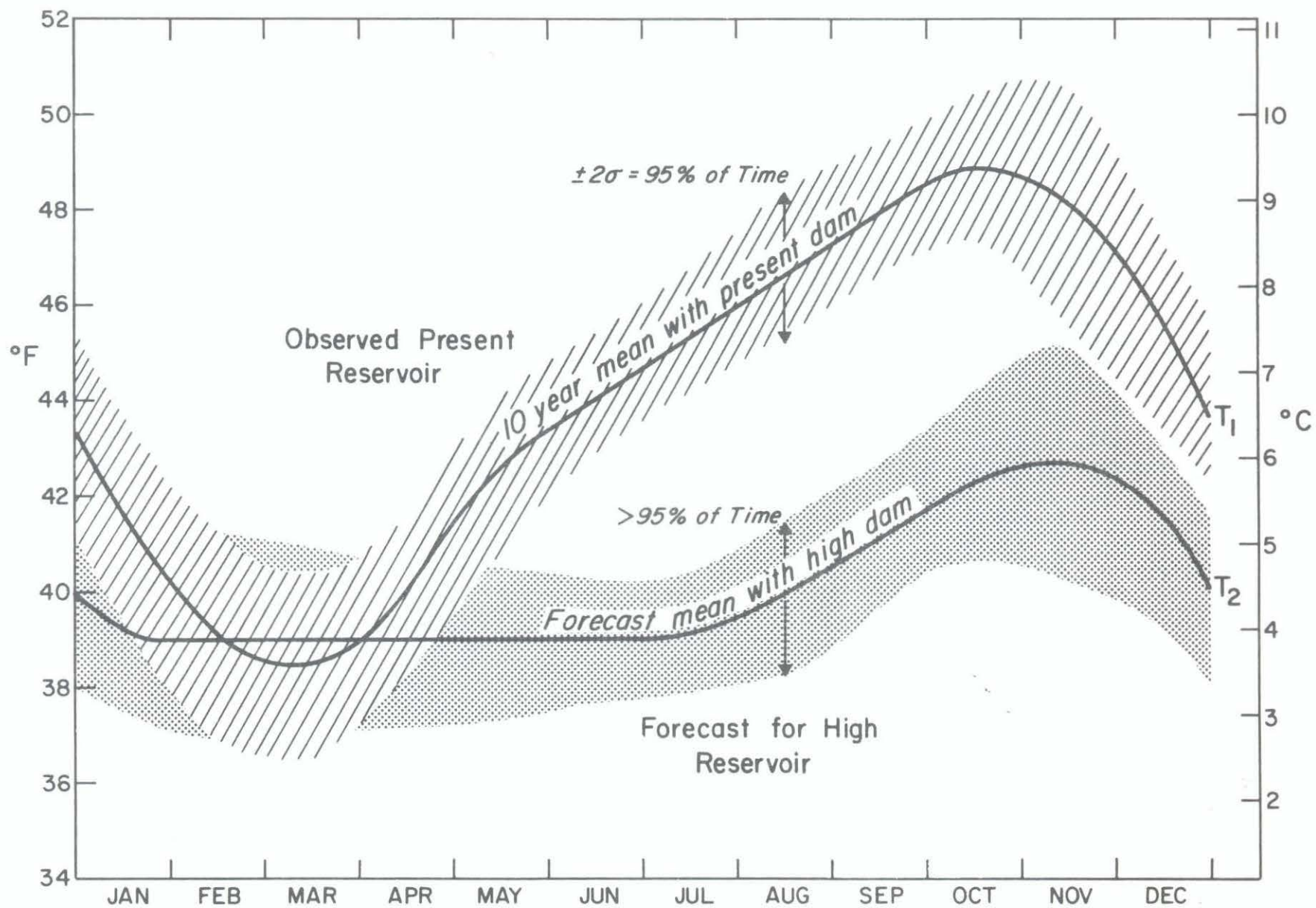
TABLE 3.6-2

CREEL CHECK DATA FOR YEARS 1941 THROUGH 1970 FROM ROSS LAKE

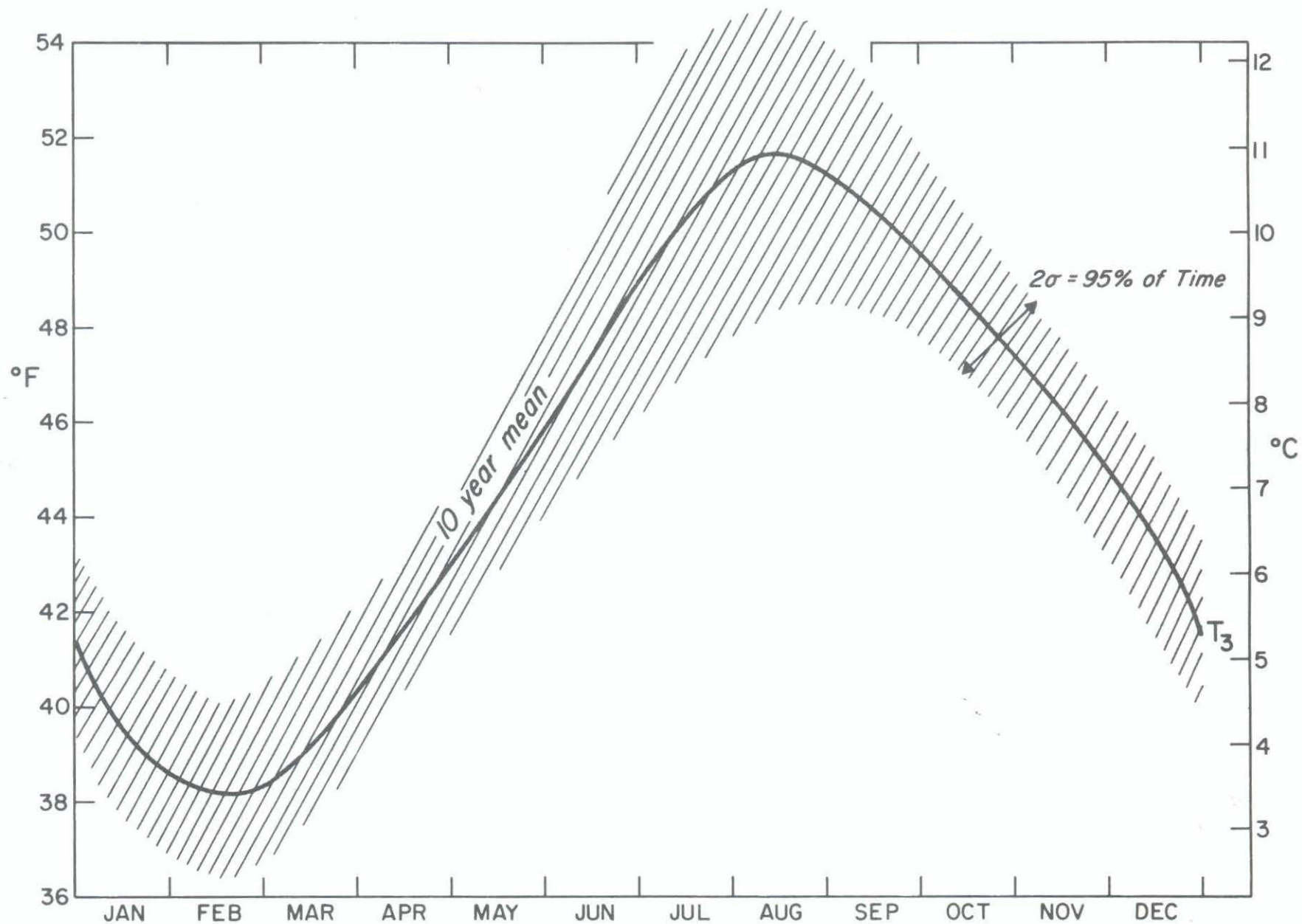
Year	Number of Anglers Checked	Recorded Catch				Total	Catch Per Angler Day
		Rainbow	Cutthroat	Eastern Brook	Dolly Varden		
1941	14	212				212	15.1
1946	12	144			3	147	12.2
1950	364	2213	769	6	159	3147	8.6
1951	160	1371		2	36	1409	8.8
1952	243	1146	46		68	1260	5.2
1953	165	735	58	2	12	807	5.0
1954	277	1413	55	6	27	1501	5.4
1955	261	964	60	26	49	1099	4.2
1956	218	642	88	42	65	837	3.8
1957	64	222	8	39	24	293	4.6
1958	70	323	4	19		348	5.0
1959	290	1933			26	1959	6.7
1960	585	2452	4	40	84	2580	4.4
1961	675	2248	2	17	212	2479	3.7
1962	907	4334	4	81	107	4526	5.0
1963	484	2598		1		2599	5.4
1964	42	87	3		3	93	2.2
1965	162	515				515	3.2
1966	458	1928		63	6	1997	4.4
1967	336	940	1	7	4	952	2.8
1968	520	1392			4	1396	2.6
1969	366	751	6		8	765	2.1
1970	717	2593	5		17	2615	3.6

List of Exhibits Accompanying
Direct Testimony of
Dr. Wayne V. Burt

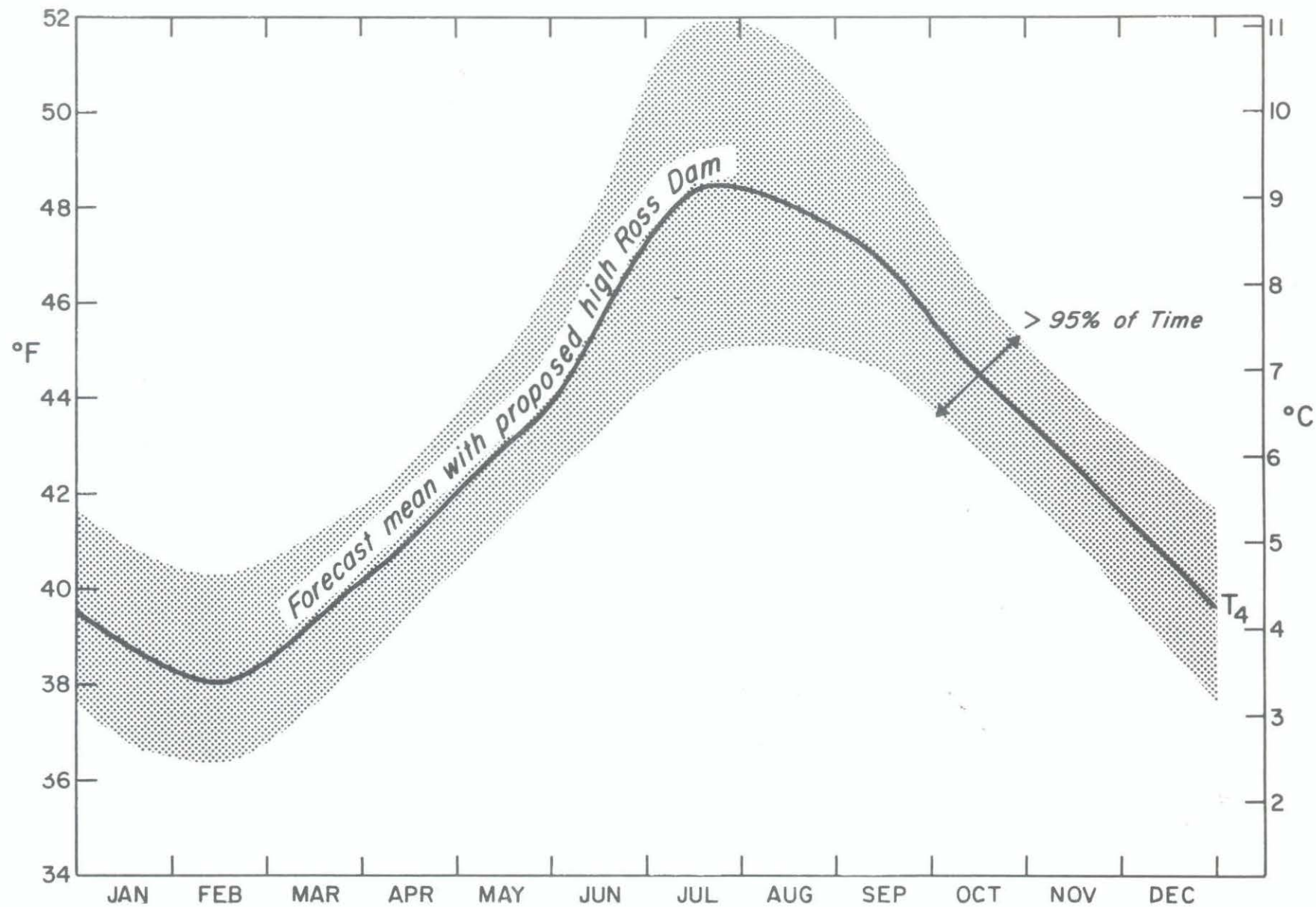
<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(WVB-1)	Graph - Observed and Forecast Temperature at Ross Dam
_____	(WVB-2)	Graph - Observed Temperature at Alma Creek Guaging Station
_____	(WVB-3)	Graph - Forecast Temperature at Alma Creek Guaging Station



Observed and Forecast Temperature Variability in Skagit River at Ross Dam Powerhouse



Observed Variability of Skagit River Temperature Six Miles Below Newhalem with Present Dams

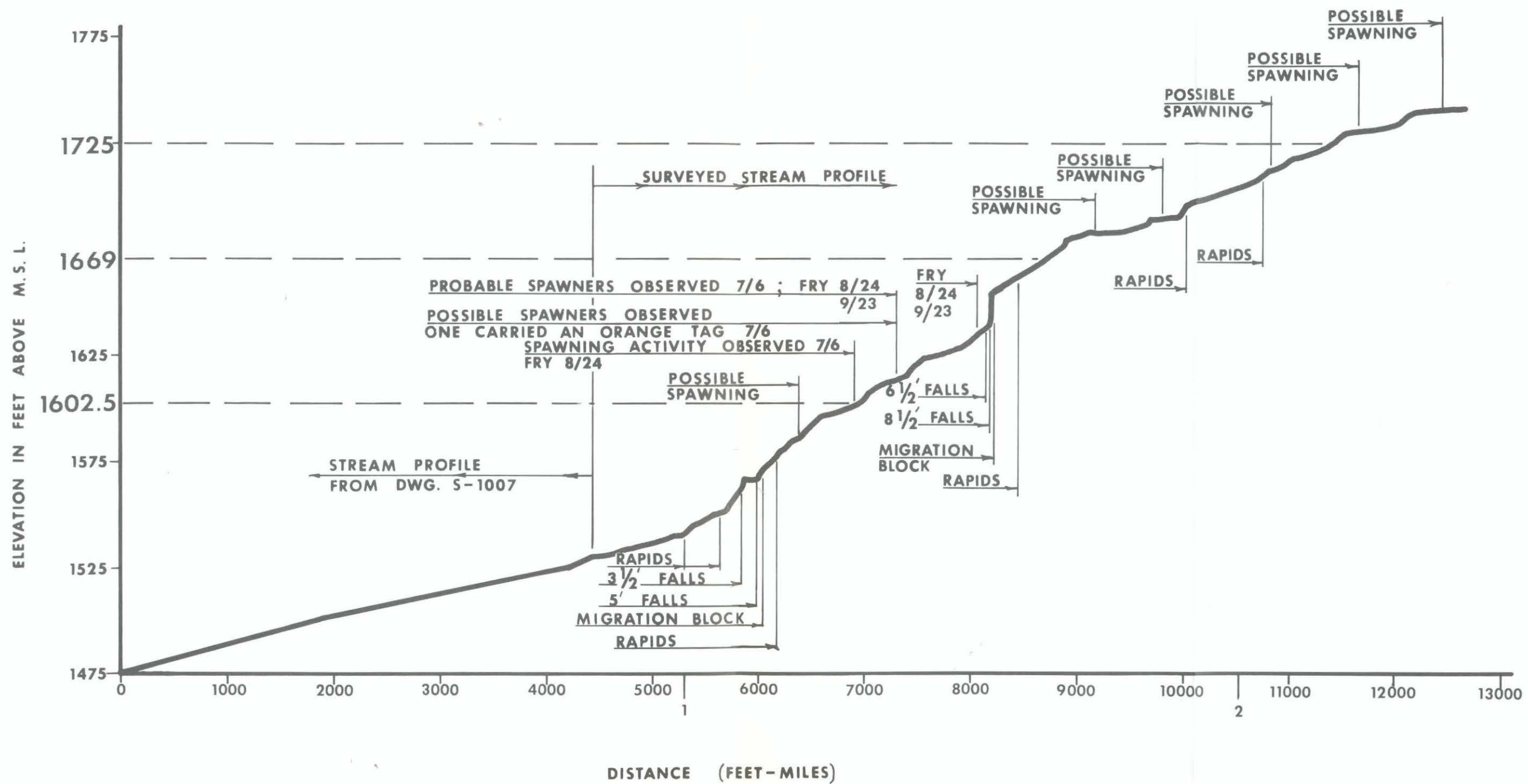


Forecast Variability for Skagit River Temperature for Six Miles Below Newhalem

List of Exhibits to Accompany
Testimony of Dr. Robert L. Burgner

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(RLB-1)	Gradient Profile for Lightning Creek
_____	(RLB-2)	Average Plankton Counts - 1971-72
_____	(RLB-3)	Graph: Depth Distribution of Plankton - 1972
_____	(RLB-4)	Food Utilization - Ross Lake, 1971

FIGURE 3.3-5
LIGHTNING CREEK



Average number of Planktonic organisms per m², Ross Lake, 1971. Vertical hauls.

	Date				
	May 7	May 20	June 28	July 9	September 20
<u>Daphnia pulex</u>	6752	13123.5	33737	26315.5	50027.5
<u>Bosmina coregoni</u>	8259	8957.5	82909.5	47345.5	24380
<u>Leptodora kindtii</u>	0	0	525	1045.5	0
<u>Holopedium gibberum</u>	0	0	980.5	663.5	342.5
<u>Polyphemus pediculus</u>	0	0	0	0	257
<u>Diaptomus</u> spp.	1942	3811	8670.5	8903.5	38306
<u>Cyclops</u> sp.	244	884	859	3797	714.5
Total crustacea (excluding Nauplii)	17197	26776	127681.5	88061.5	92085.5
Nauplii	512	4506.5	6338	6465	5268.5
<u>Asplanchna priodonta</u>	57239.5	73287	125011	478474	55949

EX.
(RLB-2)

Average number of Planktonic organisms per m², Ross Lake, 1972. Vertical hauls.

Species	Date				
	April 18	June 14	July 19	September 15	December 28
<u>Daphnia pulex</u>	9106	7259.5	17002	25023	10570.5
<u>Bosmina coregoni</u>	2229	12608.5	18211.5	7577.5	21268.5
<u>Leptodora kindtii</u>	63.5	127.5	1082.5	254.5	0
<u>Holopedium gibberum</u>	254.5	1146.5	1146	63.5	0
<u>Polyphemus pediculus</u>	0	0	0	637	0
<u>Diaptomus</u> spp.	509	2037.5	18466.5	46739.5	3757
<u>Cyclops</u> sp.	191	63.5	955.5	637	254.5
Total crustacea (excluding Nauplii)	12353	23242.5	56864.5	80935	35978
Nauplii	127.5	2865.5	9214	14263.5	1209.5
<u>Asplanchna priodonta</u>	37570	69027	110991	10188.5	77560

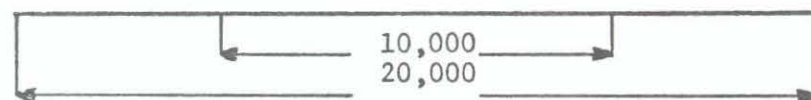
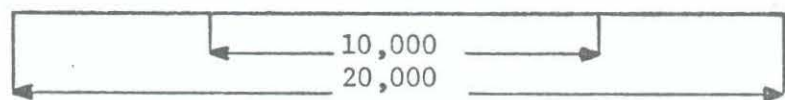
Total crustacea (excluding nauplii).

June 14, 1972

July 19, 1972

0
50
100

0
50
100

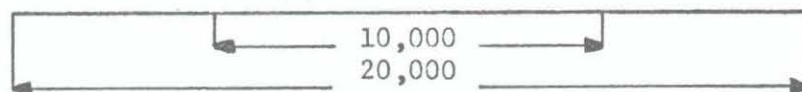


Depth (ft)

September 15, 1972

0
50
100

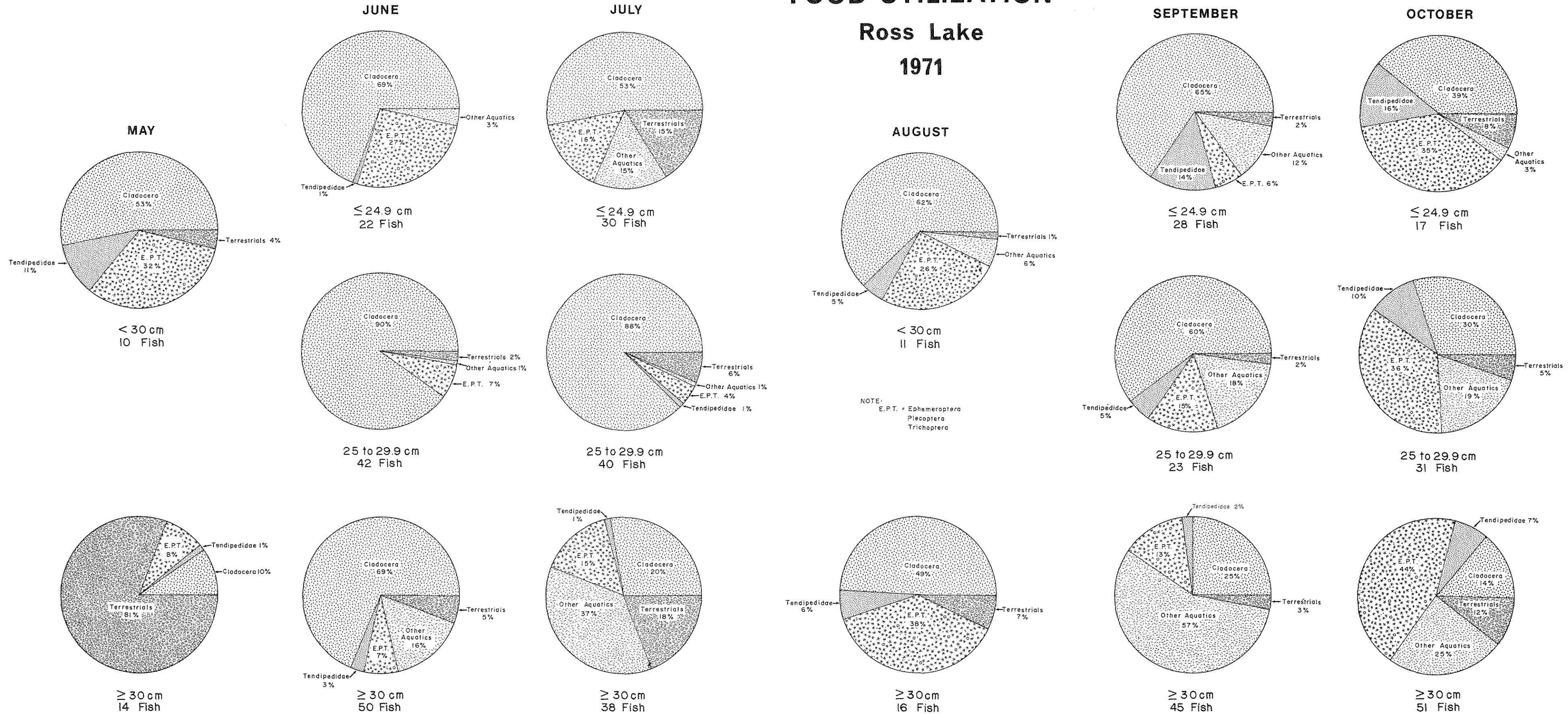
0
50
100



EX. (RLB-3)

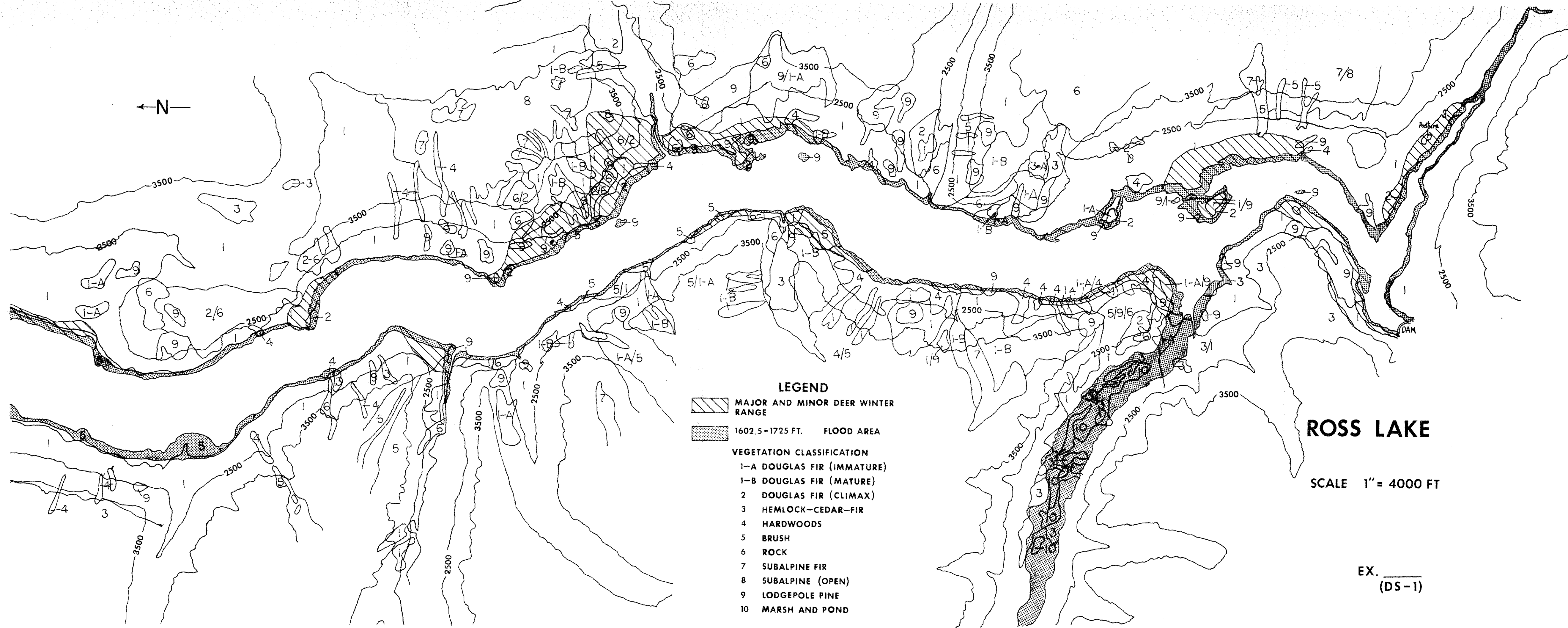
Numbers of organisms per 2-min horizontal tow

FIGURE 3.4-7
FOOD UTILIZATION
Ross Lake
1971




List of Exhibits Accompanying
Direct Testimony
of Dr. David R. M. Scott

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(DS-1)	Map of Ross Lake Indicating Deer Ranges and Vegetation Types
_____	(DS-2)	Plant Species List of Ross Lake Basin
_____	(DS-3)	Plant Data From Survey Plots
_____	(DS-4)	Vertical Diagrams From Survey Plots



LEGEND

 MAJOR AND MINOR DEER WINTER RANGE

 1602.5-1725 FT. FLOOD AREA

VEGETATION CLASSIFICATION

- 1-A DOUGLAS FIR (IMMATURE)
- 1-B DOUGLAS FIR (MATURE)
- 2 DOUGLAS FIR (CLIMAX)
- 3 HEMLOCK-CEDAR-FIR
- 4 HARDWOODS
- 5 BRUSH
- 6 ROCK
- 7 SUBALPINE FIR
- 8 SUBALPINE (OPEN)
- 9 LODGEPOLE PINE
- 10 MARSH AND POND

ROSS LAKE

SCALE 1" = 4000 FT

EX. _____
(DS-1)

TREE SPECIES LIST

<i>Acer circinatum</i> Pursh.	Vine maple
<i>Acer glabrum</i> Torr.	Mountain maple
<i>Acer macrophyllum</i> Pursh.	Big leaf maple
<i>Abies amabilis</i> (Dougl.) Forbes	Silver fir
<i>Abies grandis</i> (Dougl.) Lindl.	Grand fir
<i>Abies lasiocarpa</i> (Hook.) Nutt.	Subalpine fir
<i>Alnus rubra</i> Bong.	Red alder
<i>Betula papyrifera</i> Marsh.	Birch
<i>Chamaecyparis nootkatensis</i> (D. Don) Spach.	Alaska yellow cedar
<i>Juniperus communis</i> L.	Prostrate juniper
<i>Picea engelmannii</i> Parry ex. Engelm.	Engelmann spruce
<i>Pinus albicaulis</i> Engelm.	White bark pine
<i>Pinus contorta</i> Dougl. ex Loud. var. <i>latifolia</i> Engelm.	Lodgepole pine
<i>Pinus monticola</i> Dougl. ex D. Don	White Pine
<i>Pinus ponderosa</i> Dougl. ex Loud.	Ponderosa Pine
<i>Populus tremuloides</i> Michx.	Aspen
<i>Populus trichocarpa</i> T & G ex Hook.	Cottonwood
<i>Prunus emarginata</i> (Dougl.) Walpers	Cherry
<i>Pseudotsuga menziesii</i> (Mirbel) Franco	Douglas-fir
<i>Rhamnus purshiana</i> DC	Cascara
<i>Salix</i> L.	Willow
<i>Taxus brevifolia</i> Nutt.	Western yew
<i>Thuja plicata</i> Donn	Western redcedar
<i>Tsuga heterophylla</i> (Raf.) Sarg.	Western hemlock
<i>Tsuga mertensiana</i> (Bong.) Carr.	Mountain hemlock

COMPLETE SPECIES LIST

Acer circinatum Pursh.
Acer glabrum Torr.
Achillea millefolium L.
Actaea rubra (Ait.) Willd.
Adenocaulon bicolor Hook.
Adiantum pedatum L.
Allium L.
Allotropa virgata T & G ex Gray
Alnus sinuata (Regel) Rydl.
Amelanchier alnifolia Nutt.
Anaphalis margaritacea (L.) B & H
Antennaria Gaertn.
Apocynum androsaemifolium L.
Aquilegia formosa Fisch.
Arceuthobium Bieb.
Arctostaphylos uva-ursi (L.) Spreng.
Arenaria L.
Arunais sylvester Kostel
Asarum caudatum Lindl.
Aster L.
Athyrium filix-femina (L.) Roth
Balsamorhiza sagittata (Pursh) Nutt.
Berberis aquifolium Pursh.
Berberis nervosa Pursh.
Carex L.

Cassiope D. Don
Castilleja mutis ex L.
Ceanothus sanguineus Pursh.
Ceanothus velutinus Dougl. ex Hook.
Chimaphila umbellata (L.) Bart.
Cirsium Mill.
Clintonia uniflora (Schult) Kunth
Corallorhiza maculata Raf.
Cornus canadensis L.
Cornus stolonifera Michx.
Corylus cornuta var. *californica* (DC) Sharp
Cryptogramma crispa (L.) R. Br. ex Hook.
Delphinium L.
Dicentra formosa (Andr.) Walpers
Drosera anglica Huds.
Epilobium alpinum L.
Epilobium angustifolium L.
Epilobium minutum Lindl. ex Hook.
Equisetum L.
Eriogonum L.
Eriophyllum lanatum (Pursh.) Forbes
Erythronium grandiflorum Pursh.
Erythronium montanum Wats.
Fragaria virginiana Duchesne
Galium L.
Galium aparine L.
Gaultheria ovatifolia Gray

Gaultheria shallon Pursh.
Geranium L.
Goodyera oblongifolia Raf.
Habenaria Willd.
Heuchera micrantha Dougl. ex Lindl.
Hieracium L.
Holodiscus discolor (Pursh.) Maxim.
Hydrophyllum capitatum Dougl. ex Benth.
Lathyrus L.
Lilium columbianum Hanson
Linnaea borealis Kuntze
Listera borealis Morong
Lomatium ambiguum (Nutt.) Coult & Rose
Lonicera ciliosa (Pursh.) DC
Lonicera involucrata (Rich.) Banks ex Spreng.
Lupinus L.
Lycopodium L.
Lysichiton americanum St. John
Mitella L.
Monotropa uniflora L.
Montia L.
Oplopanax horridum (J.E. Smith) Mig.
Pachistima myrsinites (Pursh.) Raf.
Pedicularis L.
Penstemon Mitch.
Philadelphus lewisii Pursh.
Phlox diffusa Benth.
Phyllodoce Salisb.

Polystichum munitum (Kaulf.) Presl.
Populus tremuloides Michx.
Prunus emarginata (Dougl.) Walpers
Pteridium aquilinum (L.) Kuhn
Pyrola L.
Rhamnus purshiana DC
Ribes L.
Ribes sanguineum Pursh.
Rosa gymnocarpa Nutt.
Rosa nutkana Presl.
Rubus L.
Rubus parviflorus Nutt.
Rubus pedatus J.E. Smith
Rubus spectabilis Pursh.
Rumex acetosella L.
Salix L.
Sambucus racemosa L.
Sedum oreganum Nutt.
Senecio L.
Smilacina racemosa (L.) Desf.
Smilacina stellata (L.) Desf.
Sorbus sitchensis Roemer
Spiraea L.
Spiraea betulifolia Pall.
Spiraea densiflora Nutt. ex T & G
Spiraea douglasii Hook.
Streptopus amplexifolius (L.) DC
Symphoricarpos albus (L.) Blake

Symphoricarpos mollis Nutt.

Taxus brevefolia Nutt.

Thalictrum occidentale Gray

Tiarella unifoliata Hook.

Trientalis latifolia Hook.

Trillium ovatum Pursh.

Vaccinium L.

Vaccinium membranaceum Dougl. ex Hook.

Vaccinium ovalifolium Smith in Rees

Vaccinium parvifolium Smith in Rees

Viburnum L.

Vicia L.

Viola L.

Viola glabella Nutt.

HARDWOOD TYPE

PLOT #	1A	1B	12A	12B	13A	13B	14A	14B	19	23A	34	42
ALTITUDE (FT.)	1750	1700	1750	1750	2000	1950	1650	1675	1800	1925	1650	1630
ASPECT & % SLOPE	SW25	S25	W10	W20	W20	W20	E30	E20	W15	SW10	E15	SE15
<i>Acer circinatum</i>			1.5	1.8		1.5			1.2			1.5
<i>Acer glabrum</i>							1.1	1.5			1.7	
<i>Acer macrophyllum</i>										1.3		
<i>Amelanchier alnifolia</i>		1.7			1.1			1.5	1.4			
<i>Berberis aquifolium</i>		1.8	1.1		1.2	1.3	1.4					1.7
<i>Berberis nervosa</i>			4.9	4.9	4.9	3.8	2.8	4.9	1.7	3.8	5.10	
<i>Chimaphila umbellata</i>				1.1	1.2					1.1		
<i>Clintonia uniflora</i>				1.1								
<i>Corylus cornuta</i> var. <i>californica</i>		1.1			1.2							
<i>Epilobium angustifolium</i>								1.1				
<i>Epilobium minutum</i>	1.1											
<i>Fragaria virginiana</i>	1.3	1.1										
<i>Galium aparine</i>												1.2
<i>Gaultheria ovatifolia</i>											1.3	
<i>Gaultheria shallon</i>						1.7						
<i>Goodyera oblongifolia</i>									1.3			
<i>Hieracium</i> spp.									1.1			
<i>Lathyrus</i> spp.	1.2	1.9			1.5	1.4						
<i>Lonicera ciliosa</i>	1.4			1.1	1.3		1.1	1.5	1.1			
<i>Pachistima myrsinites</i>		1.3			1.2		1.1	1.1				
<i>Pseudotsuga menziesii</i>			1.1						1.3			1.2
<i>Pteridium aquilinum</i>								2.3		1.1		1.3
<i>Pyrola</i> spp.											1.7	
<i>Rhamnus purshiana</i>		3.8										
<i>Rosa gymnocarpa</i>		1.7			1.6	1.3	2.6	1.2	1.6		1.1	
<i>Rubus parviflorus</i>								1.6	1.1	1.4		2.9
<i>Rubus pedatus</i>				1.1		1.3	1.7	1.4	1.6		1.5	1.3
<i>Smilacina stellata</i>			1.5	1.2	1.6	1.6				1.1		
<i>Spiraea</i> spp.							1.9					
<i>Symphoricarpos albus</i>								1.2				
<i>Trientalis latifolia</i>	1.4	2.10		1.5	2.10	1.9	1.9	1.3	1.8	1.2	2.10	1.9
<i>Vaccinium membranaceum</i>				1.1		1.1					1.3	
Grass	2.7	1.2										
Moss	1.3	1.2	1.3	1.3	1.3	1.4	1.7	1.2		1.3	1.2	1.3

DOUGLAS-FIR (IMMATURE) TYPE

PLOT #	4A	4B	15B	16A	22A	22B	33	37	38
ALTITUDE (FT.)	2000	1900	1750	1650	1900	1950	1650	1620	1605
ASPECT & % SLOPE	SW10	SW22	NE25	NE15	NW10	SW10	E5	E25	NE5
<i>Acer circinatum</i>						1.1			
<i>A. glabrum</i>			1.1					1.5	
<i>Amelanchier alnifolia</i>	1.5	1.6		1.1			1.4	1.1	
<i>Anaphalis margaritacea</i>									1.2
<i>Arctostaphylos uva-ursi</i>				1.3					
<i>Berberis nervosa</i>	2.7	1.6	5.10	1.5	4.9	2.10	2.10	2.7	1.4
<i>Chimaphila umbellata</i>	1.2	1.1			1.2		1.3		
<i>Cornus canadensis</i>									1.6
<i>Corylus cornuta</i> var. <i>californica</i>						1.1			
<i>Epilobium angustifolium</i>								1.3	1.3
<i>Erthronium grandiflorum</i>									1.1
<i>Gaultheria ovatifolia</i>					1.1		1.2		
<i>Goodyera oblongifolia</i>		1.1							
<i>Hieracium</i> spp.				1.1					1.2
<i>Lathyrus</i> spp.	1.1	1.1							
<i>Linnaea borealis</i>				3.5					1.3
<i>Pachistima myrsinites</i>	1.2	1.3		1.8	3.8	1.2		2.6	3.10
<i>Prunus emarginata</i>								1.1	1.1
<i>Pseudotsuga menziesii</i>	1.1			1.6					1.4
<i>Pteridium aquilinum</i>					1.1				
<i>Pyrola</i> spp.			1.3	1.1			1.3		
<i>Rubus</i> spp.	1.3	1.10	1.1		1.3	1.4	1.4	1.2	
<i>Rosa gymnocarpa</i>	1.1	1.1	1.1		1.1		1.3		
<i>Smilacina stellata</i>								1.1	
<i>Trientalis latifolia</i>	1.2	1.7		1.1		1.2	1.3		
<i>Trillium ovatum</i>			1.1						
<i>Vaccinium membranaceum</i>	1.1			1.3	1.1				1.1
<i>Vaccinium parvifolium</i>								1.1	
<i>Viola</i> spp.								1.2	
Moss	1.2	1.1	2.5	2.7	2.9	1.8	4.10	1.5	2.5

DOUGLAS-FIR (OLD GROWTH) TYPE

LOT #	7A	7B	9A	9B	11A	11B	11C	16B	20	28	30	31	36	39	41
ALTITUDE (FT.)	1700	1700	1800	1800	1700	1700	1800	1800	1800	1620	1700	2600	2400	1700	1800
ASPECT & %SLOPE	SW25	SW25	SW10	SW20	NW5	NW5	W10	NE15	SW10	S5	N35	SE5	W10	W5	E30
<i>Adiantum amabilis</i>												1.1			
<i>Acer circinatum</i>		2.5	2.8	1.6	1.1	1.4			1.2	1.1	1.1				
<i>Acer macrophyllum</i>	1.2														
<i>Adiantum pedatum</i>		1.1													
<i>Amelanchier alnifolia</i>	1.2						1.1	1.1	1.2	1.2	2.7	1.4	1.3		
<i>Asarum caudatum</i>			2.6											1.1	
<i>Berberis nervosa</i>	1.4		2.6	1.4	1.4	1.1	3.10	1.6	2.9	3.8	2.9	1.1	2.10	4.10	1.5
<i>Chimaphila umbellata</i>	2.6							1.7	1.3	2.9	1.8	1.4	1.2	1.3	1.3
<i>Clintonia uniflora</i>														1.4	
<i>Oryzopsis cornuta</i> var. <i>californica</i>													1.1		
<i>Galium aparine</i>								1.1							
<i>Caultheria ovatifolia</i>										1.5			1.2		
<i>Caultheria shallon</i>											2.4				
<i>Goodyera oblongifolia</i>	1.2	1.1						1.2		1.2				1.1	1.2
<i>Geranium</i> spp.															1.1
<i>Linnaea borealis</i>								2.8	2.10			1.5		1.4	
<i>Lonicera ciliosa</i>	2.8								1.5					1.1	
<i>Lupinus</i> spp.												1.3			
<i>Archostemma myrsinites</i>	2.5	1.2		1.2				1.7			1.2	1.3	1.1	1.3	1.1
<i>Pedicularis</i> spp.												1.6			
<i>Pinus monticola</i>						1.1									
<i>Pseudotsuga menziesii</i>	1.3	1.1							1.1				1.1		1.6
<i>Psidium aquilinum</i>			1.1	1.1			1.1								
<i>Pyrola</i> spp.	1.4									1.1	1.5				
<i>Ribes</i> spp.	1.1	1.1													
<i>Rosa gymnocarpa</i>	1.1						1.2		1.5	1.2			1.3		1.4
<i>Rubus parviflorus</i>			1.1						1.1						
<i>Rubus pedatus</i>	1.4			1.1			1.4		1.4				1.1		
<i>Rubus</i> spp.															1.1
<i>Smilacina stellata</i>	1.1			1.1									1.1		
<i>Corbus sitchensis</i>										1.1					
<i>Symphoricarpos mollis</i>									1.4						
<i>Thuja plicata</i>	1.2	1.1	1.5												1.4
<i>Trientalis latifolia</i>	1.6						1.8		1.4	1.5	1.3		2.9	1.1	1.6
<i>Pseudotsuga heterophylla</i>										1.1					1.2
<i>Laccinium membranaceum</i>							2.9	3.10			2.5	4.9			
Grass		1.1							1.3			1.1	1.4		
Loss	3.8	1.1	1.1	2.3	1.5	2.8		4.9	1.4	2.5	4.9	2.5	2.4	2.5	2.5

BRUSH TYPE

PLOT #	35	43	44
ALTITUDE (FT.)	1630	1650	1630
ASPECT & %SLOPE	SE20	E25	SW20
<i>Acer circinatum</i>			1.1
<i>Amelanchier alnifolia</i>			1.2
<i>Apocynum androsaemifolium</i>	1.1		
<i>Berberis aquifolium</i>	1.5		
<i>Berberis nervosa</i>	2.8	1.5	2.9
<i>Ceanothus velutinus</i>		1.1	1.1
<i>Corylus cornuta</i> var. <i>californica</i>			1.1
<i>Epilobium minutum</i>		1.1	
<i>Pachistima myrsinites</i>	1.5	1.5	1.6
<i>Pseudotsuga menziesii</i>	1.1	1.1	1.1
<i>Ribes</i> spp.		1.2	
<i>Rosa gymnocarpa</i>	1.3	1.8	1.6
<i>Rubus parviflorus</i>			1.2
<i>Spiraea</i> spp.	2.10	1.3	1.4
<i>Trientalis latifolia</i>		1.5	1.8
Grass	1.3	1.4	
Moss	1.2	1.7	2.7

LODGEPOLE PINE TYPE

PLOT #	10A	10B	15A	21	45	46
ALTITUDE (FT.)	1700	1603	1675	1650	1700	1650
ASPECT & % SLOPE	SW10	W0	E15	SW5	S25	S20
<i>Acer circinatum</i>	1.1	1.1				1.4
<i>Amelanchier alnifolia</i>	3.10	1.7	1.7			
<i>Apocynum androsaemifolium</i>				1.1		
<i>Arctostaphylos uva-ursi</i>				1.1	1.7	
<i>Berberis aquifolium</i>	1.1	1.5				
<i>Berberis nervosa</i>		2.9	5.10	1.8	1.1	1.9
<i>Chimphila umbellata</i>	1.1	1.1	1.2			1.5
<i>Corylus cornuta</i> var. <i>californica</i>	1.1	1.1				
<i>Gaultheria shallon</i>					1.3	5.10
<i>Hieracium</i> spp.				1.9		
<i>Linnaea borealis</i>			1.1			
<i>Pachistima myrsinites</i>	3.7	1.7	1.2		1.5	1.1
<i>Pteridium aquilinum</i>					1.3	1.3
<i>Pseudotsuga menziesii</i>					1.3	1.4
<i>Pyrola</i> spp.				1.1	1.4	1.5
<i>Rhamnus purshiana</i>	1.3					
<i>Rosa gymnocarpa</i>		1.7	1.2	1.3		
<i>Spiraea betulifolia</i>				1.3	1.2	
<i>Trientalis latifolia</i>	2.6	1.6	1.5	1.1		1.1
Grass	2.10	1.3	1.1	4.10		
Moss	1.5	1.5	2.8	4.10	1.2	1.4

ROCK OUTCROP

PLOT #	47
ALTITUDE (FT.)	1650
ASPECT & % SLOPE	SE5
<i>Achillea millefolium</i>	1.7
<i>Allium</i> spp.	1.7
<i>Epilobium minutum</i>	1.10
<i>Lomatium ambiguum</i>	1.4
Moss	5.10
Grass	2.9

HEMLOCK TYPE

PLOT #	17	32	40	48	49	50	51
ALTITUDE (FT.)	3600	2440	1600	1800	1800	1800	1725
ASPECT & % SLOPE	W5	E10	E30	S5	S5	S10	S5
<i>Abies amabilis</i>	1.1				1.2	1.6	
<i>Acer circinatum</i>		1.2		1.2	1.5		1.5
<i>Acer glabrum</i>					1.1		
<i>Actaea rubra</i>							1.3
<i>Adiantum pedatum</i>			1.4				
<i>Amelanchier alnifolia</i>	1.1						
<i>Asarum caudatum</i>					1.5	1.3	1.2
<i>Athyrium filix-femina</i>							1.5
<i>Berberis nervosa</i>	1.4	2.7			1.1		
<i>Chimaphila umbellata</i>	1.6						
<i>Clintonia uniflora</i>	1.1	1.2		2.8	1.6	1.6	1.1
<i>Cornus canadensis</i>				1.1	1.3	1.4	
<i>Dicentra formosa</i>							1.1
<i>Delphinium</i> spp.				1.1			
<i>Gaultheria ovatifolia</i>	2.7					1.3	
<i>Goodyera oblongifolia</i>					1.3	1.2	
<i>Linnaea borealis</i>	2.8	1.1	1.2	1.6	1.4	1.1	
<i>Oplopanax horridum</i>				1.1			2.5
<i>Pachistima myrsinites</i>	1.1				1.6		
<i>Ribes</i> spp.			1.1				
<i>Rosa gymnocarpa</i>					1.2		
<i>Rubus pedatus</i>		1.2					
<i>Sorbus sitchensis</i>	1.1						
<i>Streptopus amplexifolius</i>				1.9	1.3	1.1	1.6
<i>Symphoricarpos albus</i>	1.1						
<i>Tiarella unifoliata</i>				1.7	1.6	1.5	2.10
<i>Tsuga heterophylla</i>		1.2	1.5			1.1	
<i>Trillium ovatum</i>							1.4
<i>Vaccinium membranaceum</i>	3.9		1.7	2.8		1.2	
<i>Vaccinium parvifolium</i>				1.1	1.1	1.2	
Moss	2.5	5.9	5.10	2.5	3.8	3.9	1.4

DOUGLAS-FIR CLIMAX TYPE

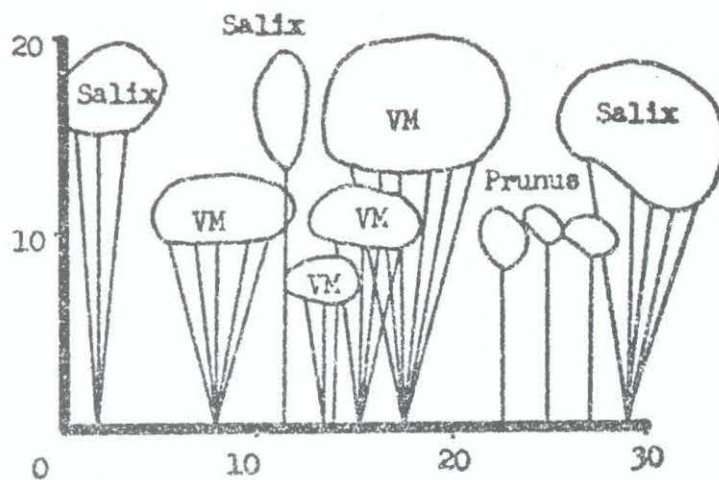
PLOT #	2A	2B	3A	3B	8	18	29
ALTITUDE (FT.)	1725	1725	1800	1725	2000	2000	1700
ASPECT & % SLOPE	SW30	SW30	SW20	SW30	SW25	S15	S20
<i>Achillea millefolium</i>		1.2	1.6	1.2			1.1
<i>Allium</i> spp.			1.1	1.3			
<i>Amelanchier alnifolia</i>	2.10	1.2			2.9		1.6
<i>Apocynum androsaemifolium</i>		3.9				1.1	
<i>Berberis aquifolium</i>			1.5	1.1	1.3		
<i>Berberis nervosa</i>					1.3		
<i>Chimaphila umbellata</i>					1.4		1.1
<i>Corylus cornuta</i> var. <i>californica</i>					1.1		
<i>Cryptogramma crispa</i>			1.5	2.6			
<i>Erigonum</i> spp.			1.7	1.5			
<i>Fragaria virginiana</i>			1.1		1.1		1.9
<i>Galium aparine</i>				1.2			
<i>Hieracium</i> spp.						1.8	1.5
<i>Lomatium ambiguum</i>			1.5				
<i>Lonicera ciliosa</i>					1.1		1.7
<i>Pachistima myrsinites</i>		1.1			1.1		1.6
<i>Philadelphus lewisii</i>			1.1				
<i>Pseudotsuga menziesii</i>	1.1	1.1				1.3	1.3
<i>Rosa gymnocarpa</i>	1.3			1.1	1.1		
<i>Smilacina stellata</i>					1.2		
<i>Spiraea</i> spp.						1.6	
<i>Symphoricarpos albus</i>				1.4			
<i>Trientalis latifolia</i>	2.10				1.4	1.2	1.3
<i>Vaccinium</i> spp.						1.2	
Grass	1.6	2.9	3.9	2.7	1.2	1.1	3.10
Moss		1.1			1.1	3.8	4.10
<i>Carex</i> spp.		1.1	1.2				

Abies lasiocarpa Type

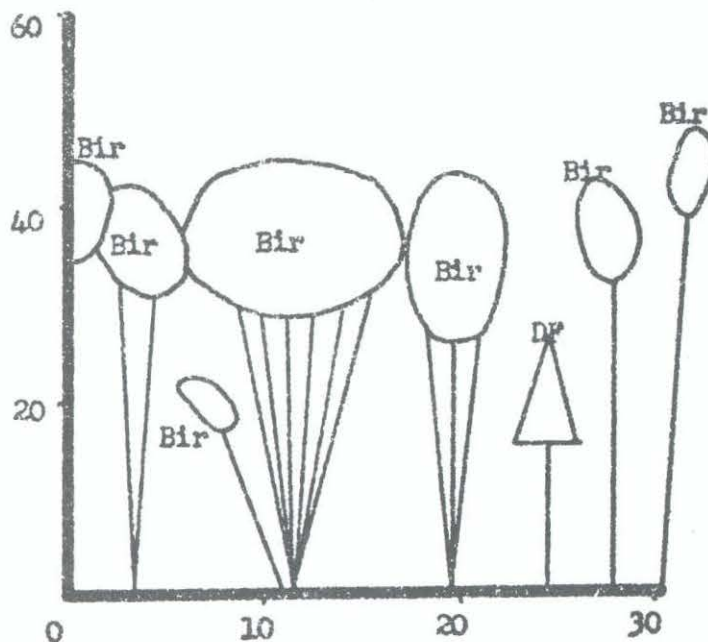
PLOT #	6A	6B	26A
ALTITUDE (FT.)	4000	4000	6000
ASPECT & % SLOPE	SE20	SE27	S40
<i>Abies lasiocarpa</i>	1.1	1.4	1.3
<i>Amelanchier alnifolia</i>			1.2
<i>Arenaria</i> spp.			1.3
<i>Aster</i> spp.			2.6
<i>Epilobium alpinum</i>			1.5
<i>Erythronium montanum</i>	1.1	1.1	
<i>Fragaria virginiana</i>	1.1	1.3	
<i>Goodyera oblongifolia</i>		1.1	
<i>Hydrophyllum capitatum</i>			1.1
<i>Lupinus</i> spp.	1.3	1.2	1.1
<i>Mitella</i> spp.			1.6
<i>Pachistima myrsinites</i>	1.6		1.4
<i>Rubus</i> spp.	1.2	1.2	
<i>Senecio</i> spp.			1.5
<i>Thalictrum alpinum</i>			2.6
<i>Vaccinium</i> spp.	3.8	1.2	1.1
<i>Viola glabella</i>	1.6	2.9	
Grass	1.6	1.10	1.3

SUBALPINE TYPE

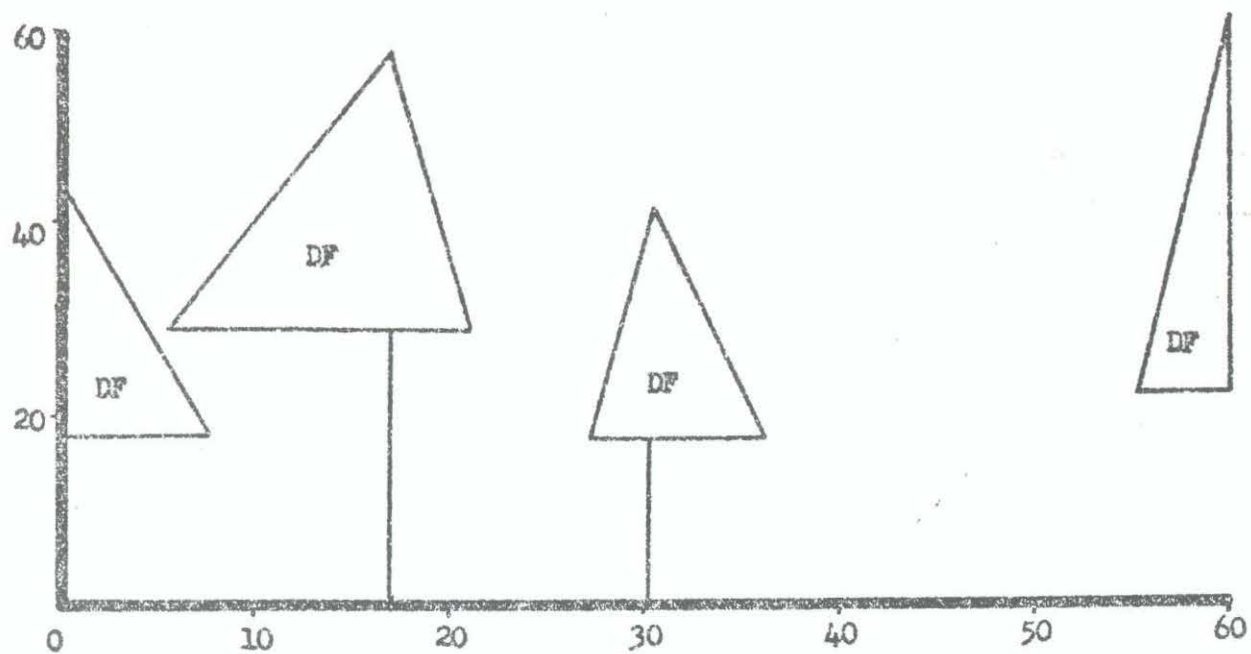
PLOT #	5A	5B	24A	25A
ALTITUDE (FT.)	5000	5000	6300	6300
ASPECT & % SLOPE	S20	SE10	S25	S20
<i>Abies lasiocarpa</i>	1.3			1.1
<i>Antennaria</i> spp.	1.9	1.8		1.1
<i>Epilobium alpinum</i>		1.1		
<i>Erythronium montanum</i>	1.3	1.3	1.9	
<i>Fragaria virginiana</i>	1.2			
<i>Hieracium</i> spp.			1.9	
<i>Lupinus</i> spp.	1.1		1.1	1.1
<i>Montia</i> spp.			1.9	
<i>Pachistima myrsinites</i>	1.2	2.8	1.1	
<i>Phlox diffusa</i>			5.10	
<i>Thalictrum alpinum</i>				2.6
<i>Vaccinium</i> spp.	3.9	1.4	4.10	4.8
<i>Viola</i> spp.				1.1
Grass	1.8	1.8	1.9	



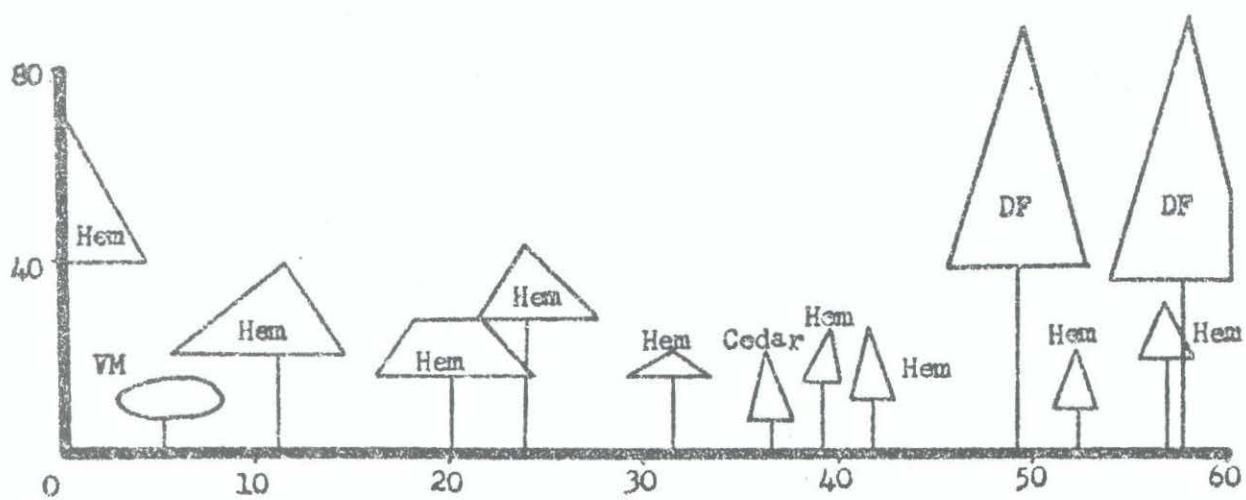
"Hardwood" Type (Plot #42)



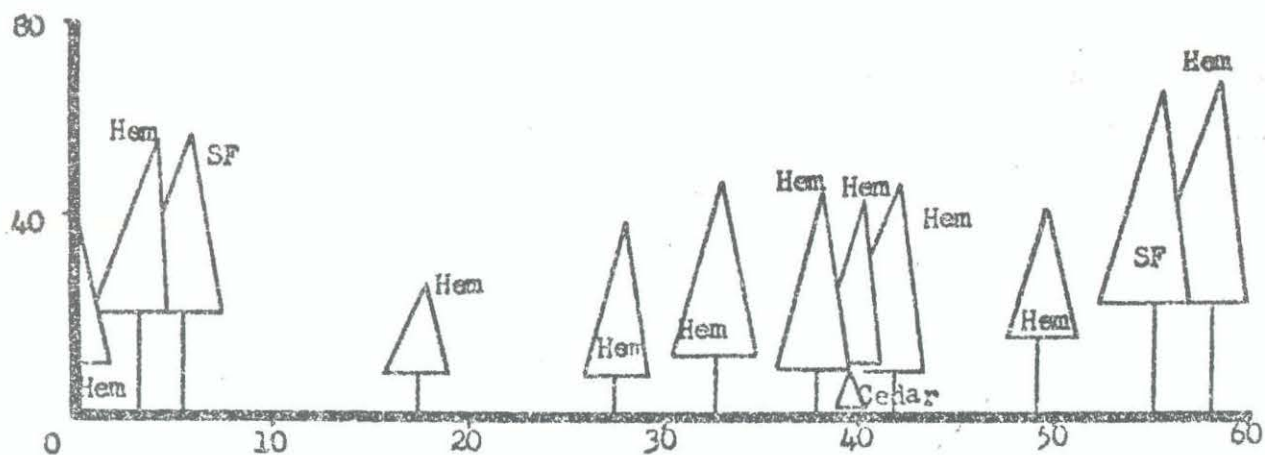
"Hardwood" Type (Plot 23A)



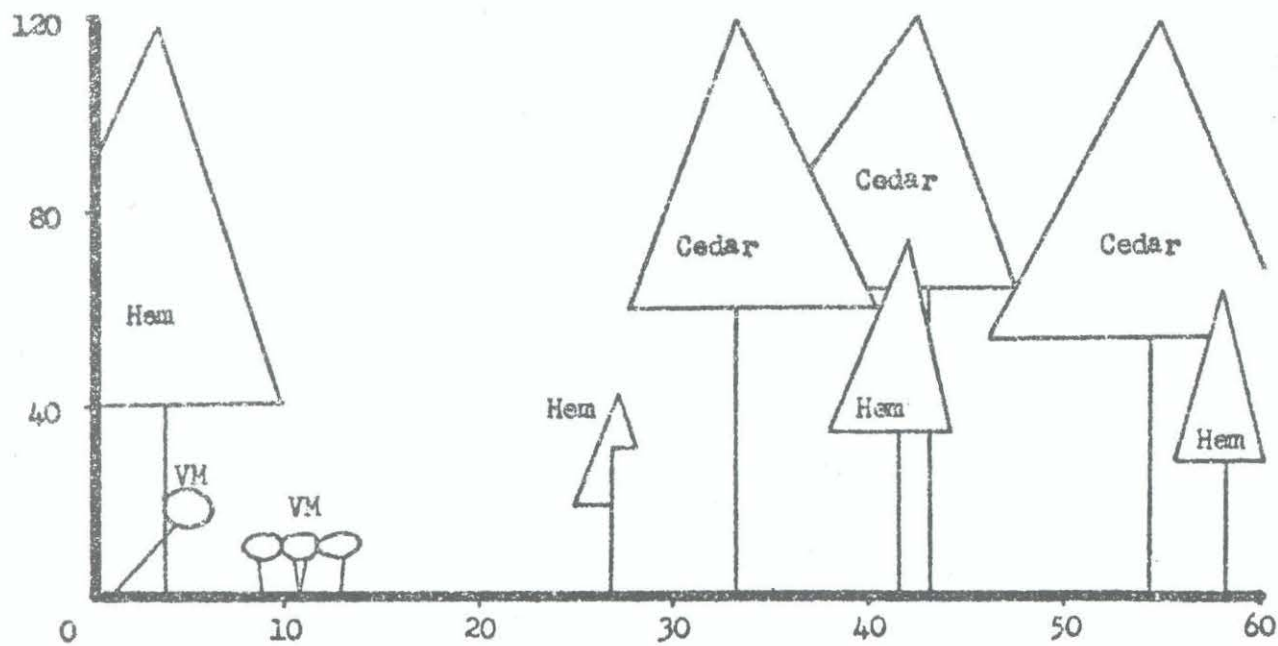
"Douglas Fir Climax" Type (Plot #18)



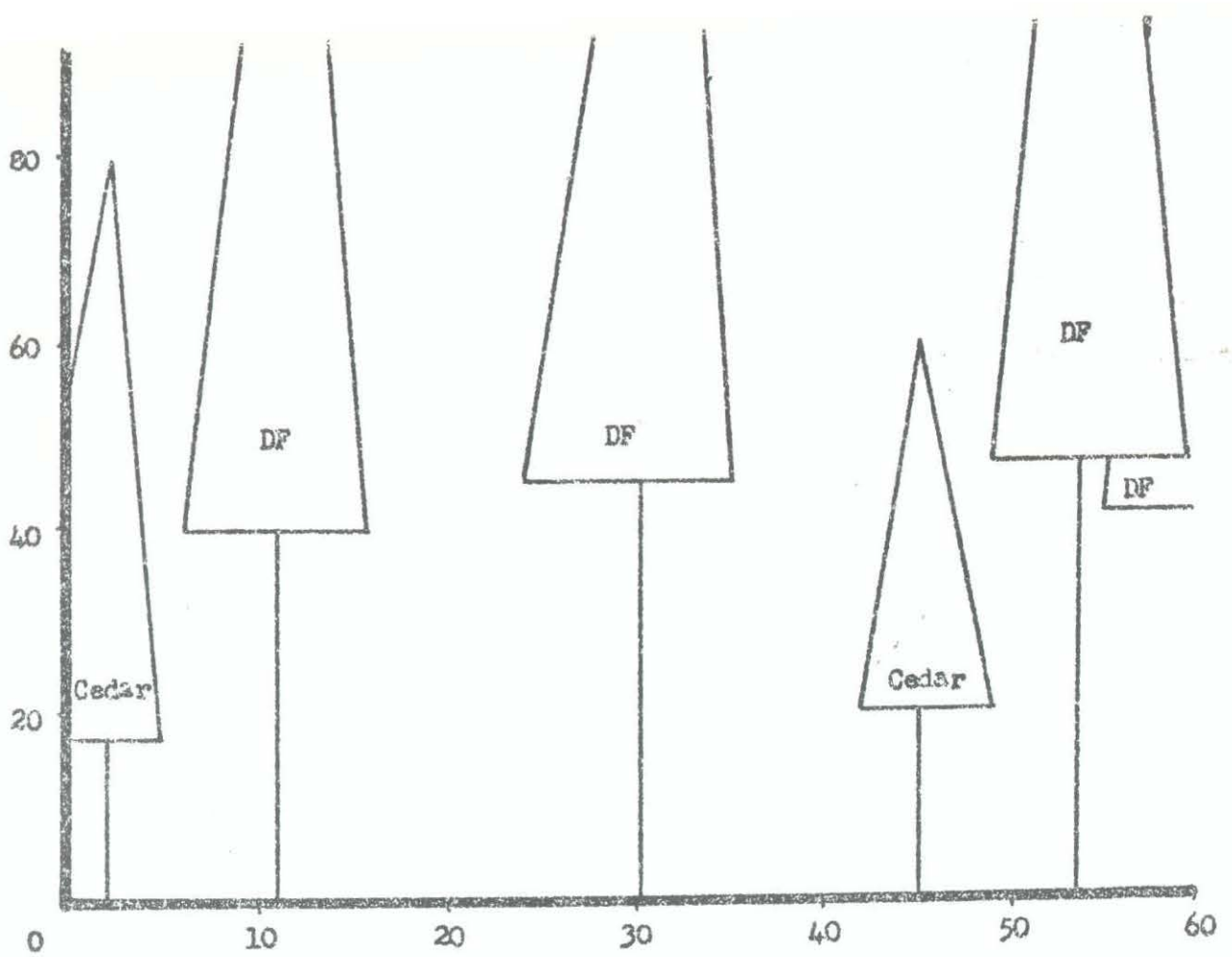
"Hemlock" Type (Plot #32)



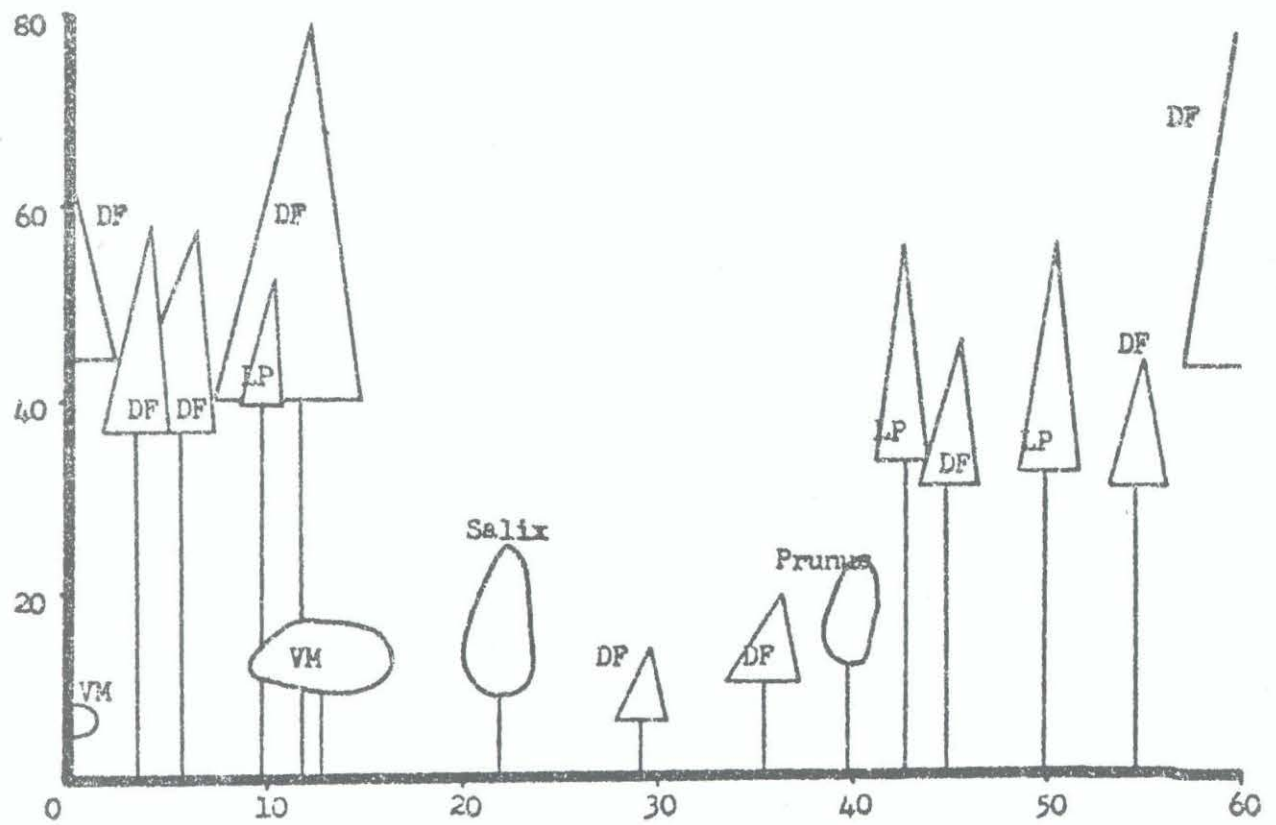
"Hemlock" Type (Plot #50)



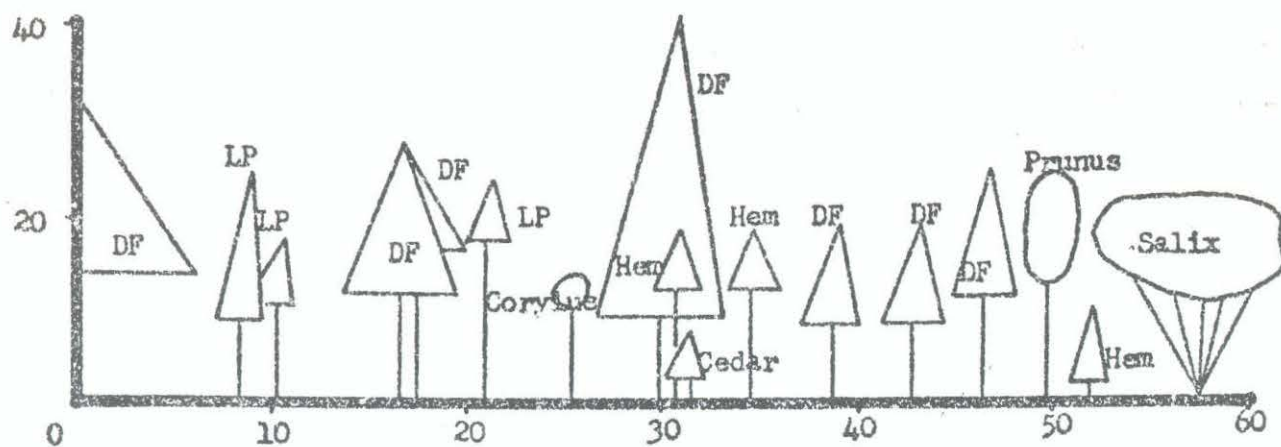
"Hemlock" Type (Plot #49)



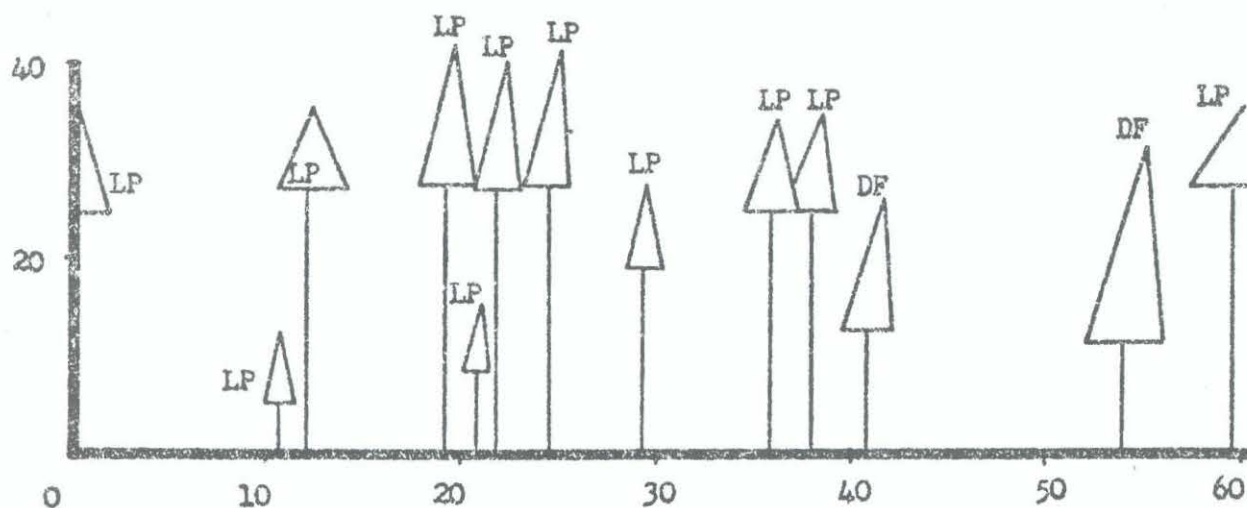
"Douglas Fir" Type Old Growth (Plot #41)



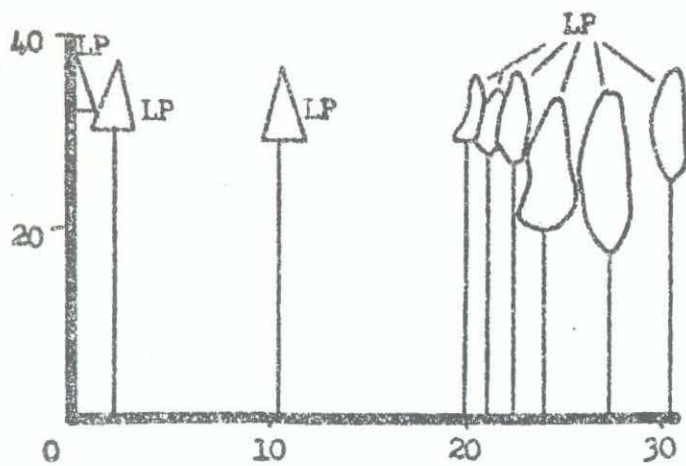
"Douglas Fir" Type Immature (Plot #33)



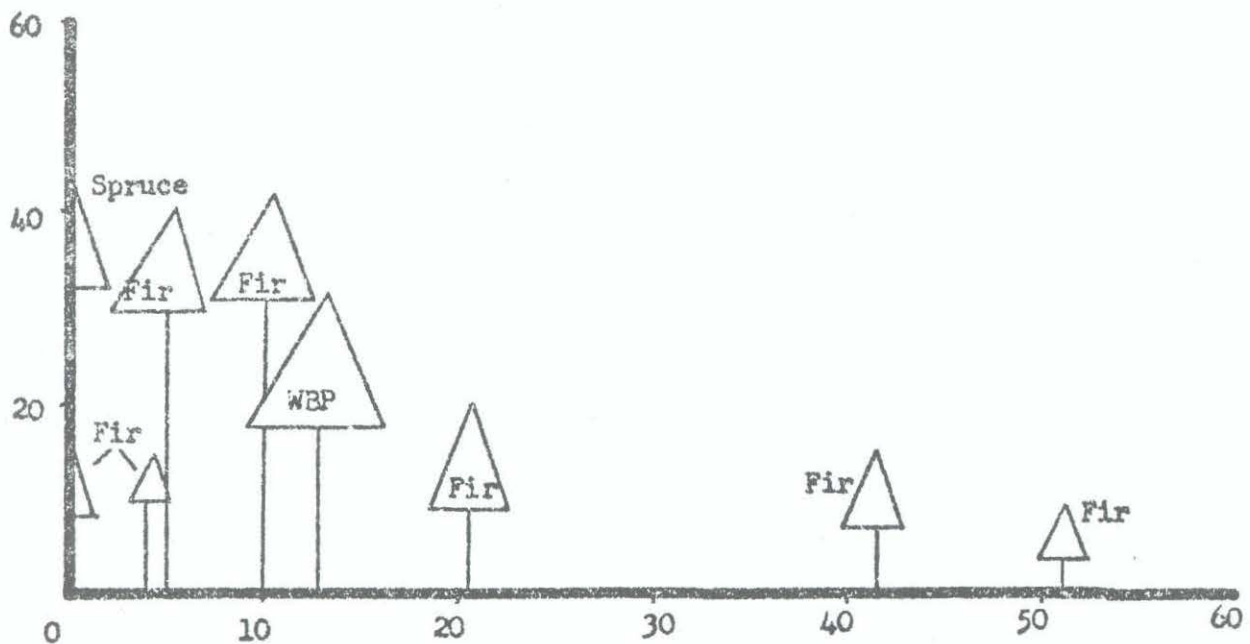
"Lodgepole Pine" Type (Plot #15A)



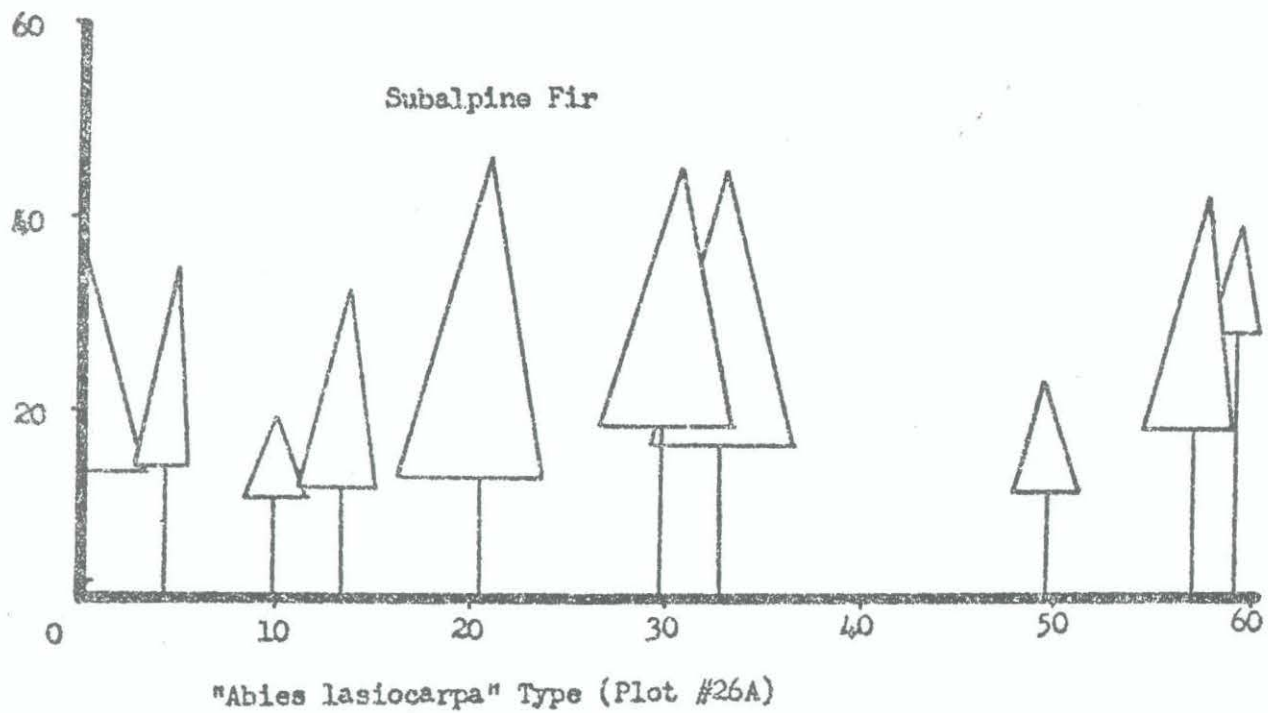
"Lodgepole Pine" Type (Plot #45)



"Lodgepole Pine" Type (Plot #21)



"Subalpine" Type (Plot #25A)



List of Exhibits to Accompany
Testimony of Dr. James F. Bendell

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(JFB-1)	Photo - Lower Skagit Valley in Canada
_____	(JFB-2)	Map - Vegetation and Animal Habitat Types - Two-Part Study Area
_____	(JFB-3)	List of Mammals Remaining in Study Area After Inundation
_____	(JFB-4)	Photo - Development of Waterfowl Habitat
_____	(JFB-5)	Photo - Mixed Forest Habitat
_____	(JFB-6)	List of Birds Observed in Study Area
_____	(JFB-7)	List of Birds Observed in Study Area Grouped by Habitat Type
_____	(JFB-8)	Photo - Hybridization of Deer
_____	(JFB-9)	Maps - Seasonal Deer Ranges
_____	(JFB-10)	Photo - Lowland Meadows
_____	(JFB-11)	Photo - Deer Radio Tagging Equipment
_____	(JFB-12)	Maps - Results of Radio Tagging Surveys
_____	(JFB-13)	Photo - Development of Meadow-type Range



Photo of Lower Skagit Valley in Canada

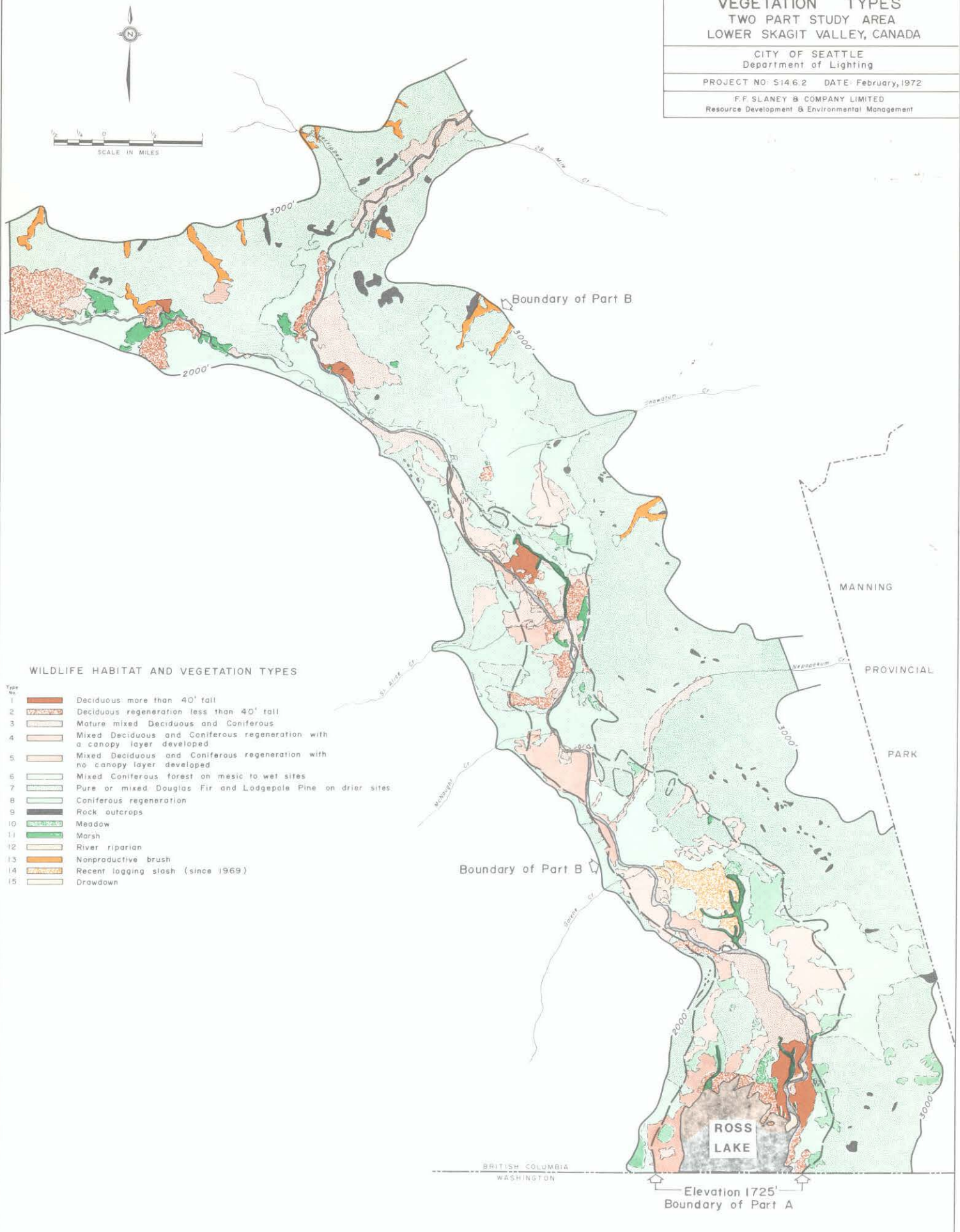
View of the Study Area with Ross Lake in Left Foreground

EXHIBIT — (JFB-2)
**WILDLIFE HABITATS AND
 VEGETATION TYPES**
 TWO PART STUDY AREA
 LOWER SKAGIT VALLEY, CANADA

CITY OF SEATTLE
 Department of Lighting

PROJECT NO: S14.6.2 DATE: February, 1972

F.F. SLANEY & COMPANY LIMITED
 Resource Development & Environmental Management



LIST OF LARGE MAMMAL POPULATIONS
REMAINING IN STUDY AREA

<u>Species</u>	<u>Estimated Remaining Populations in Study Area</u>
Coyote	5-10
Cougar	10-12
Bobcat	10-15
Raccoon	5-10
Marten	40-50
Mink	10-15
Otter	10
Beaver	30-50
Black Bear	15-25
Weasel	50-70

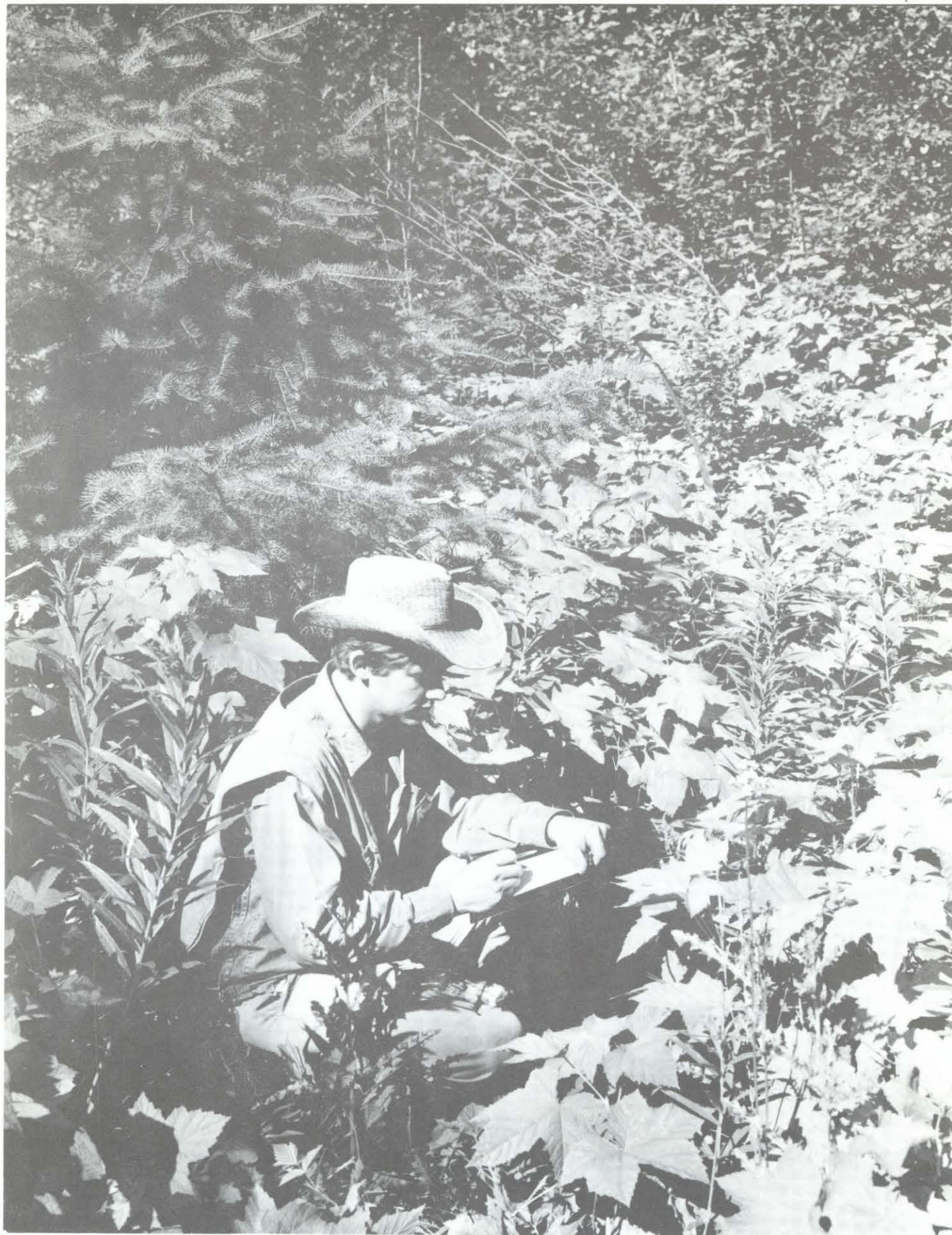


May 1971



September 1972

Development of Waterfowl Habitat
Dam across swale impounds water during drawdown.



Mixed Forest Habitat

Mixed Deciduous-Coniferous Forest Ruffed Grouse Habitat

BIRD CHECK LIST - TWO PART STUDY AREA LOWER SKAGIT VALLEY, CANADA

LEGEND

SEASON: Fall August 15 to December 1
 Winter December 1 to April 1
 Spring April 1 to June 15
 Summer June 15 to August 15

OCCURRENCE: A Abundant, seen daily in large numbers.
 F Frequent, seen daily but in low numbers.
 R Rare, seen irregularly although resident.
 C Casual, seen only once or twice per season.
 T Migrate through Study Area.
 STATUS: B Recorded as a breeding bird.

HABITAT TYPES: 1a. River. 1b Lake. 1c Pond. 1d Riparian.
 2a. Sedge Meadow. 2b. Grass Meadow.
 3. Willow-Birch.
 4a. Mature Cottonwood. 4b Immature Cottonwood.
 5. Mixed Deciduous-Coniferous.
 6. Cedar-Hemlock
 7a. Mature Douglas Fir. 7b Immature Douglas Fir.
 8. Fir-Pine or Pine
 9. Alpine, Sub-Alpine.

Species	Seasonal Occurrence				Habitat Type	Breeding Status	Species	Seasonal Occurrence				Habitat Type	Breeding Status
	Fall	Winter	Spring	Summer				Fall	Winter	Spring	Summer		
Common Loon	-	-	CT	R	1b		Screech Owl	C	-	-	-	7b	
Red-necked Grebe	-	-	-	CT	1b		Horned Owl	-	R	R	R	7a, 4a	B
Eared Grebe	RT	-	CT	-	1b		Pygmy Owl	C	R	R	R	5, 7a, b, 4b	B
Horned Grebe	CT	-	-	-	1b		Spotted Owl	C	R	-	C	7a, b, 6	B
Western Grebe	AT	-	-	-	1b		Short-eared Owl	-	-	CT	-	4a, 2b	
Pied-Billed Grebe	CT	-	-	CT	1b		Saw-whet Owl	-	C	-	-	7a	
Great Blue Heron	RT	R	R	C	1a, 1b		Poor-will	-	-	CT	-	2b	
Whistling Swan	CT	-	-	-	1b		Common Nighthawk	-	-	FT	F	1a, b,	B
Canada Goose	CT	-	-	-	1b		Black Swift	-	-	AT	F	--	
White-fronted Goose	CT	-	-	-	1b		Vaux's Swift	-	-	AT	F	--	B
Mallard	AT	F	RT	R	1b, 1c, 1a	B	Rufous Hummingbird	-	-	AT	F	4b, 7a, b, 2b, 1d	B
Pintail	RT	-	RT	-	1b, 1a		Calliope Hummingbird	-	-	FT	F	2b, 5	B
Green-winged Teal	RT	F	RT	R	1b, 1c, 1a	B	Belted Kingfisher	FT	R	RT	R	1a, 1b,	B
Cinnamon Teal	-	-	CT	-	1c		Red-shafted Flicker	R	-	FT	R	1b, 4a, b, 6, 7a, b	B
Blue-winged Teal	-	-	CT	R	1b, 1c	B	Pileated Woodpecker	R	F	FT	F	4a, 5, 6, 7a, b	B
American Widgeon	CT	-	CT	-	1b, 1c		Yellow-Bellied Sapsucker	CT	-	F	R	2a, b, 3, 4, b, 5, 6, B	
Shoveler	CT	-	-	-	1b							7a, 7b.	
Wood Duck	-	-	CT	-	1a,		Red-breasted Sapsucker	C	-	R	R	"	B
Ring-necked Duck	-	C	-	-	1c, 1b		Hairy Woodpecker	R	R	R	R	3, 4a, b, 5, 6, 7b	B
Canvasback	CT	-	-	-	1b		Downy Woodpecker	R	F	C	C	1d, 3, 4a, b, 5,	B
Greater Scaup	C	C	CT	-	1b, 1c		Black-backed Three-toed Woodpecker	-	-	CT	-	4b, 7b	
Lesser Scaup	CT	C	CT	-	1c, 1b		Northern Three-toed Woodpecker	CT	-	R	C	6, 7b	
Common Goldeneye	RT	F	RT	R	1a, 1b, 1c	B							
Barrow's Goldeneye	-	-	CT	-	1c		Eastern Kingbird	-	-	RT	R	1c, 2b, 7b	
Bufflehead	FT	F	C	-	1a, 1b, 1c		Western Kingbird	-	-	RT	R	2b, 7b	
Harlequin Duck	-	-	-	R	1a	B	Say's Phoebe	-	-	CT	-	2b	
White-winged Scoter	-	-	CT	-	1b		Trail's Flycatcher	-	-	CT	C	1d, 5	B
Ruddy Duck	CT	-	-	-	1b		Hammond's Flycatcher	-	-	AT	A	7a, b, 8	B
Hooded Merganser	CT	R	-	-	1a, 1c, 1b		Dusky Flycatcher	-	-	R?	R	5, 7a	B
Common Merganser	RT	-	FT	R	1a, 1b, 1c	B	Western Flycatcher	-	-	R?	-	7b	B
Red-breasted Merganser	-	-	CT	-	1b		Western Wood Peewee	-	-	RT	R	4a, b, 5, 7a, b, 8	B
Goshawk	-	R	R	R	6, 7a, 5	B	Olive-sided Flycatcher	-	-	RT	R	5, 7a, b, 8	
Sharp-shinned Hawk	RT	-	R	R	4b	B	Horned Lark	RT	-	RT	-	1b	
Cooper's Hawk	RT	-	R	R	7a, 5	B	Violet-green Swallow	-	-	AT	F	--	B
Red-tailed Hawk	RT	C	R	R	1b, 6, 7a	B	Tree Swallow	-	-	AT	F	--	B
Golden Eagle	CT	CT	CT	-	--		Bank Swallow	-	-	CT	-	1b	
Bald Eagle	-	CT	CT	-	--		Rough-winged Swallow	-	-	FT	R	1a, 1b, 2a	B
Marsh Hawk	RT	-	CT	-	1d, 2b		Barn Swallow	-	-	R	R	--	B
Osprey	-	-	CT	-	1b		Cliff Swallow	-	-	RT	-	1b	
Pigeon Hawk	RT	-	CT	-	2b, 7a		Gray Jay	R	R	C	C	6, 7b, 9	B
Sparrow Hawk	RT	-	R	R	1b, 2b, 4a	B	Steller's Jay	R	R	R	R	1d, 4a, b, 5, 6, 7a, b, 8	
Blue Grouse	-	F	-	F	7a	B							
Spruce Grouse	-	C	-	C	8	B	Black-billed Magpie	R	R	-	-	4a, 4b	
Ruffed Grouse	-	F	-	F	1d, 3, 4a, b, 5, 6, 7a, b	B	Common Raven	F	R	R	R	--	B
					3		Common Crow	F	R	R	R	1b	B
White-tailed Ptarmigan	-	C	-	-	1b		Northwestern Crow	R	R	-	-	1b	
Sandhill Crane	CT	-	-	-	1b		Clark's Nutcracker	R	R	-	C	7a	B
Virginia Rail	CT	-	-	C	3, 2a	B	Chestnut-backed Chickadee	A	A	A	A	5, 6, 7a, b, 8	B
American Coot	AT	-	CT	-	1b		Black-capped Chickadee	RT	R	C	C	5, 6, 7a, b, 8	B
Semipalmated Plover	CT	-	-	-	1b		Red-breasted Nuthatch	F	F	F	F	5, 6, 7a, b, 8	B
Killdeer	C	R	F	R	1b, 1a	B	Brown Creeper	R	R	R	R	5, 6, 7a, b, 8	B
Golden Plover	CT	-	-	-	1b		American Dipper	FT	F	RT	R	1a	B
Common Snipe	R	R	R	R	2a, 1c,	B	House Wren	-	-	R	R	5, 7a	B
Long-billed Curlew	-	-	CT	-	1b		Winter Wren	FT	R	R	R	3, 8	B
Spotted Sandpiper	CT	-	FT	R	1b, 1a	B	American Robin	FT	-	AT	A	1d, 8	B
Greater Yellowlegs	-	-	CT	-	1b		Varied Thrush	FT	C	FT	R	5, 8	B
Lesser Yellowlegs	-	-	CT	-	1b		Hermit Thrush	-	-	RT	-	4a, 5, 7a, 8	
Pectoral Sandpiper	CT	-	-	-	1b		Swainson's Thrush	-	-	FT	F	1d, 3, 5, 7a	B
Long-billed Dowitcher	CT	-	-	-	1b		Veery	-	-	F	F	1d, 3, 4a, b, 5	B
Semipalmated Sandpiper	-	-	CT	-	1b		Western Bluebird	-	-	CT	-	2b	
							Mountain Bluebird	RT	-	AT	-	1b, 2b	
Glaucous-winged Gull	-	-	CT	RT	1b		Townsend's Solitaire	CT	-	RT	C	3, 5	
California Gull	-	-	RT	RT	1b		Golden-crowned Kinglet	AT	F	R	R	4, 8	B
Ring-billed Gull	-	-	RT	-	1b		Ruby-crowned Kinglet	AT	-	FT	-	2a, 3, 4b, 5, 7b	
Band-tailed Pigeon	RT	-	CT	R	7a, b, 6	B	Water Pipit	FT	-	RT	-	1b, 2b	
Rock Dove	-	-	CT	-	--		Cedar Waxwing	-	-	-	F	3, 4a, b, 5, 7b	B
Mourning Dove	CT	-	FT	R	4b, 2b	B							

Seasonal Occurrence					Habitat Type	Breeding Status	Seasonal Occurrence					Habitat Type	Breeding Status
Species	Fall	Winter	Spring	Summer			Species	Fall	Winter	Spring	Summer		
Loggerhead Shrike	-	-	C	C	2a, 4b		Western Tanager	-	-	FT	F	2b, 3, 4a, 5, 8	B
Common Starling	R	-	R	R	2b, 5, 7b	B	Black-headed Grosbeak	-	-	R	R	1d, 4b, 7b	B
Hutton's Vireo	-	-	CT	-	3		Lazuli Bunting	-	-	CT	-	2b	
Solitary Vireo	-	-	RT	R	1d, 4a, 4b		Evening Grosbeak	F	F	R	R	3, 5, 7a, b,	
Red-eyed Vireo	-	-	R	R	1d, 4a, b,	B	Purple Finch	A	F	RT	R	4b, 5, 6, 7a, b	B
Warbling Vireo	-	-	F	R	1d, 4a, b,	B	Pine Grosbeak	-	C	C	-	4a, 5, 6, 7a, b	
Orange-crowned Warbler	-	-	RT	C	4b, 5		Pine Siskin	F	A	A	F	1a, 8	B
Nashville Warbler	-	-	RT	R	7a		American Goldfinch	-	C	RT	R	1d, 3, 7b, 1b, 4b	
Yellow Warbler	-	-	AT	A	1d, 3, 4a,	B	Red Crossbill	C	F	R	R	1d, 4b, 5, 7a, b	B
Audubon's Warbler	FT	-	AT	F	1b, 1d, 3, 8,	B	White-winged Crossbill	-	-	C	-	7b	
Black-throated Gray Warbler	-	-	RT	R	4b, 5, 7b		Rufous-sided Towhee	C	C	RT	R	1d, 3, 4a, b, 5, 6, 7b	B
Townsend's Warbler	-	-	RT	F	5, 7a, b, 8	B	Savannah Sparrow	-	-	CT	-	1b, 2b	
Northern Waterthrush	-	-	-	CT	1b,		Vesper Sparrow	RT	-	RT	-	1b, 2b, 1a	
MacGillivray's Warbler	-	-	R	F	1d, 4b, 7b, 5, 6,	B	Lark Sparrow	-	-	CT	-	1b	
Common Yellow-throat	-	-	R	R	1c, d, 3,	B	Slate-colored Junco	CT	C	CT	-	5, 7b	
Wilson's Warbler	-	-	RT	R	3, 5, 7b,		Oregon Junco	RT	R	AT	F	1d, 2b, 4b, 5, 8	B
American Redstart	-	-	CT	R	1d, 3, 4a, b,	B	Tree Sparrow	C	-	C	-	5,	
Bobolink	-	-	CT	-	2b, 4a,		Chipping Sparrow	-	-	AT	F	1b, 2b, 7b,	B
Western Meadowlark	RT	-	RT	-	2b		Harris' Sparrow	CT	-	-	-	2b	
Yellow-headed Blackbird	-	-	CT	R	1b, 1c, 3,		White-crowned Sparrow	AT	-	FT	R	1d, 2a, b, 4b, 7b	B
Red-winged Blackbird	RT	-	F	R	1b, 1c, 3	B	Golden-crowned Sparrow	-	-	FT	-	4b, 3, 7b, 2b	
Bullock's Oriole	-	-	CT	C	4b, 5, 7b		Fox Sparrow	-	-	CT	-	2b	
Brewer's Blackbird	RT	-	RT	R	1b, c, 3, 2b	B	Lincoln's Sparrow	-	-	RT	-	1d, 2b	
Brown-headed Cowbird	-	-	FT	F	1b, 2b, 3, 5	B	Song Sparrow	R	F	F	F	1d, 3	B
							Snow Bunting	CT	-	-	-	2b	

BIRD SPECIES NOT OBSERVED BUT WHICH MAY UTILIZE
THE CANADIAN SKAGIT VALLEY

Arctic Loon	Black Tern
Double-crested Cormorant	Snowy Owl
Green Heron	Hawk Owl
American Bittern	Long-eared Owl
Gadwall	Black-chinned Hummingbird
Redhead	Lewis' Woodpecker
Surf Scoter	Lapland Longspur
Turkey Vulture	Purple Martin
Swainson's Hawk	Mountain Chickadee
Rough-legged Hawk	Boreal Chickadee
Peregrine Falcon	Common Bushtit
Sora Rail	White-breasted Nuthatch
Black-bellied Plover	Bewick's Wren
Solitary Sandpiper	Long-billed Marsh Wren
Baird's Sandpiper	Catbird
Least Sandpiper	Bohemian Waxwing
Dunlin	Northern Shrike
Short-billed Dowitcher	Magnolia Warbler
Western Sandpiper	Myrtle Warbler
Sanderling	Yellow-breasted Chat
Wilson's Phalarope	House Sparrow
Northern Phalarope	Cassin's Finch
Western Gull	House Finch
Herring Gull	Gray-crowned Rosy Finch
Mew Gull	Common Redpoll
Bonaparte's Gull	Lark Bunting
Common Tern	White-throated Sparrow
Arctic Tern	
Caspian Tern	

SPECIES WITH RESTRICTED NESTING DISTRIBUTIONS IN THE TWO PART STUDY AREA

Observed Nesting in Part B only	Observed Nesting in Part A only
Spotted Owl	Mallard
Goshawk	Green-winged Teal
Red-tailed Hawk	Common Goldeneye
Blue Grouse	Killdeer
Band-tailed Pigeon	Common Snipe
Raven	Sparrow Hawk
Clark's Nutcracker	Mourning Dove
Gray Jay	Barn Swallow
	Common Crow
	House Wren
	Brewer's Blackbird
	White-crowned Sparrow

LIST OF BIRD SPECIES GROUPED ON BASIS OF HABITAT ASSOCIATIONS & BREEDING STATUS

Group ASpecies Associated with Wetland HabitatsStatus: Breeding

* Mallard
 * Green-winged Teal
 * Blue-winged Teal
 * Common Goldeneye
 * Common Snipe
 * Spotted Sandpiper
 * Virginia Rail
 * Killdeer

Status: Non-Breeding

Common Loon
 Red-necked Grebe
 Eared Grebe
 Horned Grebe
 Western Grebe
 Pied-billed Grebe
 Great Blue Heron
 Whistling Swan
 Canada Goose
 White-fronted Goose
 Pintail
 Cinnamon Teal
 American Widgeon
 Shoveler
 Wood Duck
 Ring-necked Duck
 Canvasback
 Greater Scaup
 Lesser Scaup
 Barrow's Goldeneye
 Bufflehead
 White-winged Scoter
 Ruddy Duck
 Hooded Merganser
 Red-breasted Merganser
 Bald Eagle
 Osprey
 Sandhill Crane
 American Coot
 Semipalmated Plover
 Golden Plover
 Long-billed Curlew
 Greater Yellowlegs
 Lesser Yellowlegs
 Pectoral Sandpiper
 Long-billed Dowitcher
 Semipalmated Sandpiper
 Glaucous-winged Gull
 California Gull
 Ring-billed Gull

Group CSpecies Associated with Meadowland HabitatsStatus: Breeding

* Sparrow Hawk
 * Mourning Dove
 * Common Crow
 * Chipping Sparrow

Status: Non-Breeding

Short-eared Owl
 Marsh Hawk
 Poor-will
 Eastern Kingbird
 Western Kingbird
 Say's Phoebe
 Horned Lark
 Black-billed Magpie
 Northwestern Crow
 Western Bluebird
 Water Pipit
 Bobolink
 Western Meadowlark
 Lazuli Bunting
 Northern Waterthrush
 Savannah Sparrow
 Vesper Sparrow
 Lark Sparrow
 Harris' Sparrow
 Golden-crowned Sparrow
 Lincoln's Sparrow
 Snow Bunting
 Mountain Bluebird

Group BSpecies Associated with Conifer HabitatsStatus: Breeding

* Goshawk
 * Sharp-shinned Hawk
 * Cooper's Hawk
 * Red-tailed Hawk
 * Blue Grouse
 * Spruce Grouse
 * Band-tailed Pigeon
 * Horned Owl
 * Spotted Owl
 * Vaux's Swift
 * Pileated Woodpecker
 * Yellow-bellied Sapsucker
 * Red-breasted Sapsucker
 * Hairy Woodpecker
 * Hammond's Flycatcher
 * Gray Jay
 * Common Raven
 * Clark's Nutcracker
 * Chestnut-backed Chickadee
 * Red-breasted Nuthatch
 * Brown Creeper
 * Golden-crowned Kinglet
 * Audubon's Warbler
 * Purple Finch
 * Pine Siskin
 * Red Crossbill
 * Townsend's Warbler

Status: Non-Breeding

Golden Eagle
 Pigeon Hawk
 White-tailed Ptarmigan
 Rock Dove
 Screech Owl
 Saw-whet Owl
 Black Swift
 Black-backed Three-toed Woodpecker
 Northern Three-toed Woodpecker
 Olive-sided Flycatcher
 Bank Swallow
 Cliff Swallow
 Steller's Jay
 Townsend's Solitaire
 Ruby-crowned Kinglet
 Nashville Warbler
 Black-throated Grey Warbler
 Pine Grosbeak
 White-winged Crossbill
 Fox Sparrow

Group DSpecies Associated with Riparian HabitatsStatus: Breeding

* Harlequin Duck
 * Common Merganser
 * Belted Kingfisher
 * Traill's Flycatcher
 * Rough-winged Swallow
 * American Dipper
 * Red-eyed Vireo
 * Common Yellowthroat
 * Western Wood Peewee
 * Tree Swallow
 * Barn Swallow
 * Red-winged Blackbird
 * Brewer's Blackbird
 * American Redstart
 * Song Sparrow

Status: Non-Breeding

Yellow-headed Blackbird

Group ESpecies Associated with Deciduous HabitatsStatus: Breeding

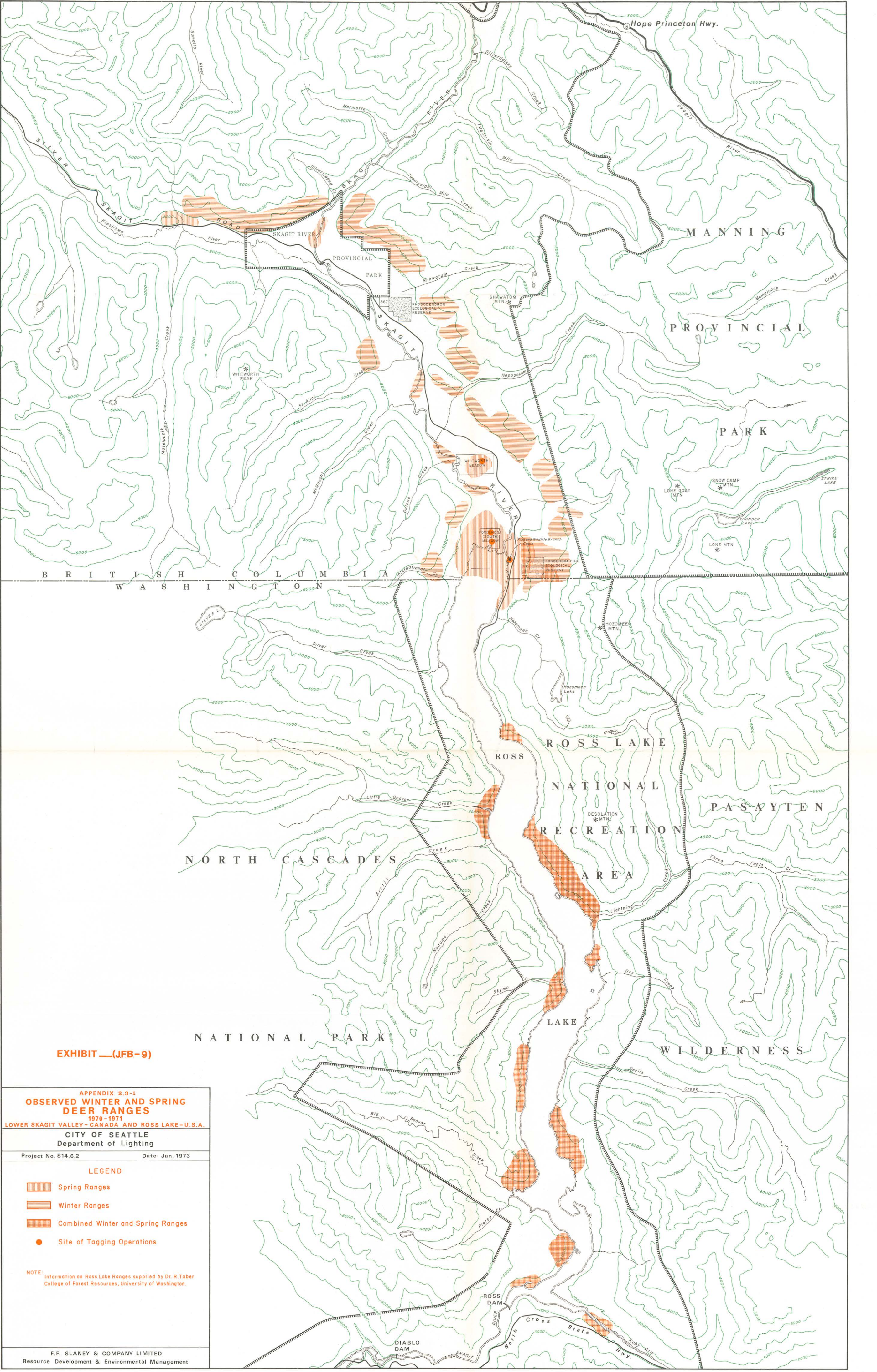
* Ruffed Grouse
 * Pygmy Owl
 * Common Nighthawk
 * Rufous Hummingbird
 * Calliope Hummingbird
 * Red-shafted Flicker
 * Downy Woodpecker
 * Dusky Flycatcher
 * Western Flycatcher
 * Violet-green Swallow
 * House Wren
 * Winter Wren
 * American Robin
 * Veery
 * Swainson's Thrush
 * Cedar Waxwing
 * Common Starling
 * Warbling Vireo
 * Yellow Warbler
 * MacGillivray's Warbler
 * Black-headed Grosbeak
 * Brown-headed Cowbird
 * Rufous-sided Towhee
 * Oregon Junco
 * Black-capped Chickadee
 * Varied Thrush
 * Western Tanager
 * White-crowned Sparrow

Status: Non-Breeding

Tree Sparrow
 Hermit Thrush
 Loggerhead Shrike
 Hutton's Vireo
 Solitary Vireo
 Orange-crowned Warbler
 Wilson's Warbler
 Bullock's Oriole
 Slate-colored Junco
 Evening Grosbeak
 American Goldfinch



Hybridization of Deer - Hybridized Coastal Blacktail - Mule Deer



APPENDIX 2.3-1
**OBSERVED WINTER AND SPRING
DEER RANGES**
1970-1971
LOWER SKAGIT VALLEY-CANADA AND ROSS LAKE-U.S.A.

CITY OF SEATTLE
Department of Lighting

Project No. S14.6.2 Date: Jan. 1973

LEGEND

- Spring Ranges
- Winter Ranges
- Combined Winter and Spring Ranges
- Site of Tagging Operations

NOTE: Information on Ross Lake Ranges supplied by Dr. R. Taber
College of Forest Resources, University of Washington.

F.F. SLANEY & COMPANY LIMITED
Resource Development & Environmental Management

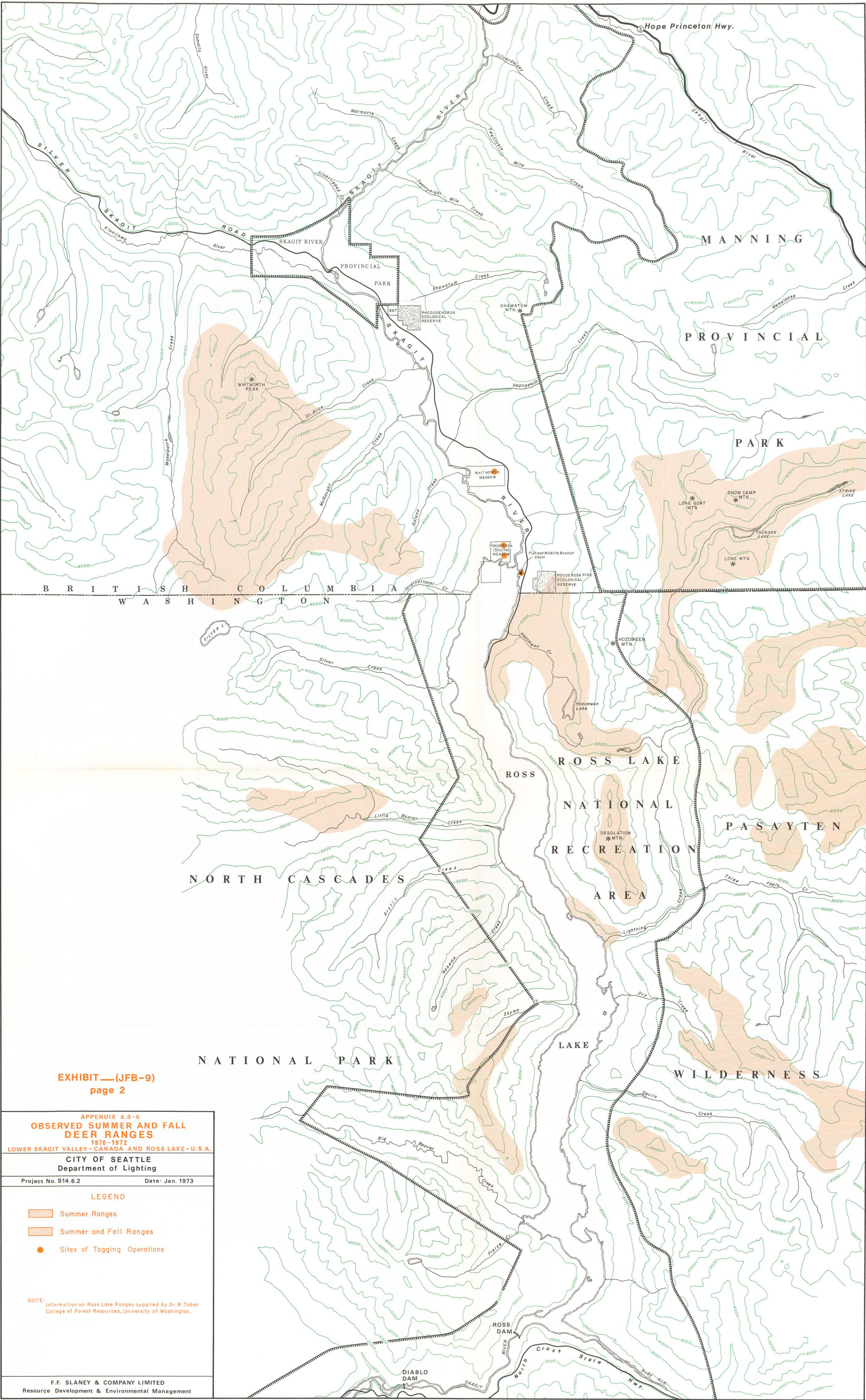


EXHIBIT (JFB-9)
page 2

APPENDIX 2.3-5
OBSERVED SUMMER AND FALL
DEER RANGES
1970-1972
LOWER SKAGIT VALLEY-CANADA AND ROSS LAKE-U.S.A.

CITY OF SEATTLE
Department of Lighting
Project No. S14.6.2 Date: Jan. 1973

LEGEND

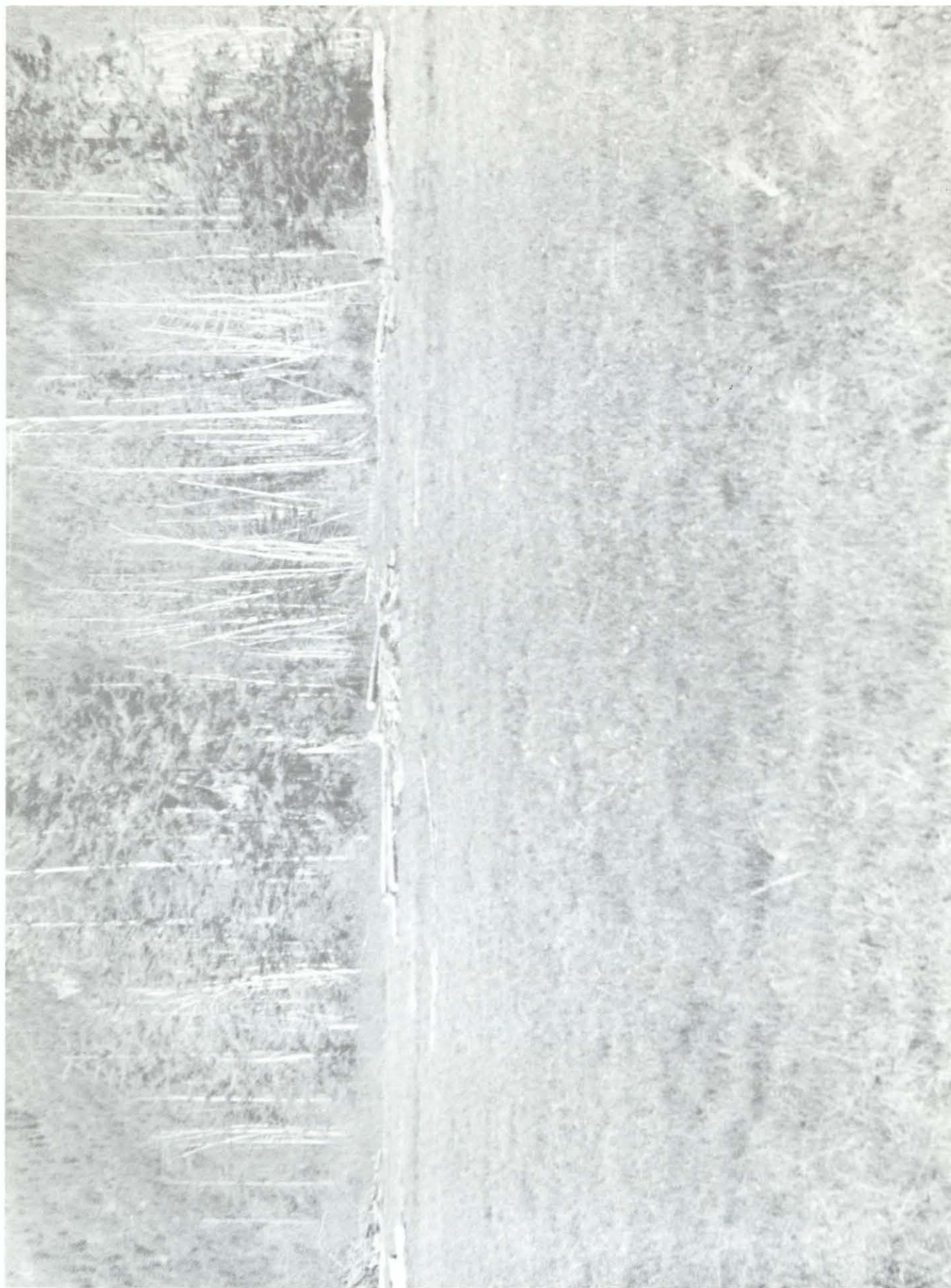
Summer Ranges

Summer and Fall Ranges

Sites of Tagging Operations

NOTE: Information on Ross Lake Ranges supplied by Dr. R. Taber
College of Forest Resources, University of Washington.

F.F. SLANEY & COMPANY LIMITED
Resource Development & Environmental Management



Lowland Meadow - Meadows are part of spring range for deer.



Deer Radio Tagging Equipment

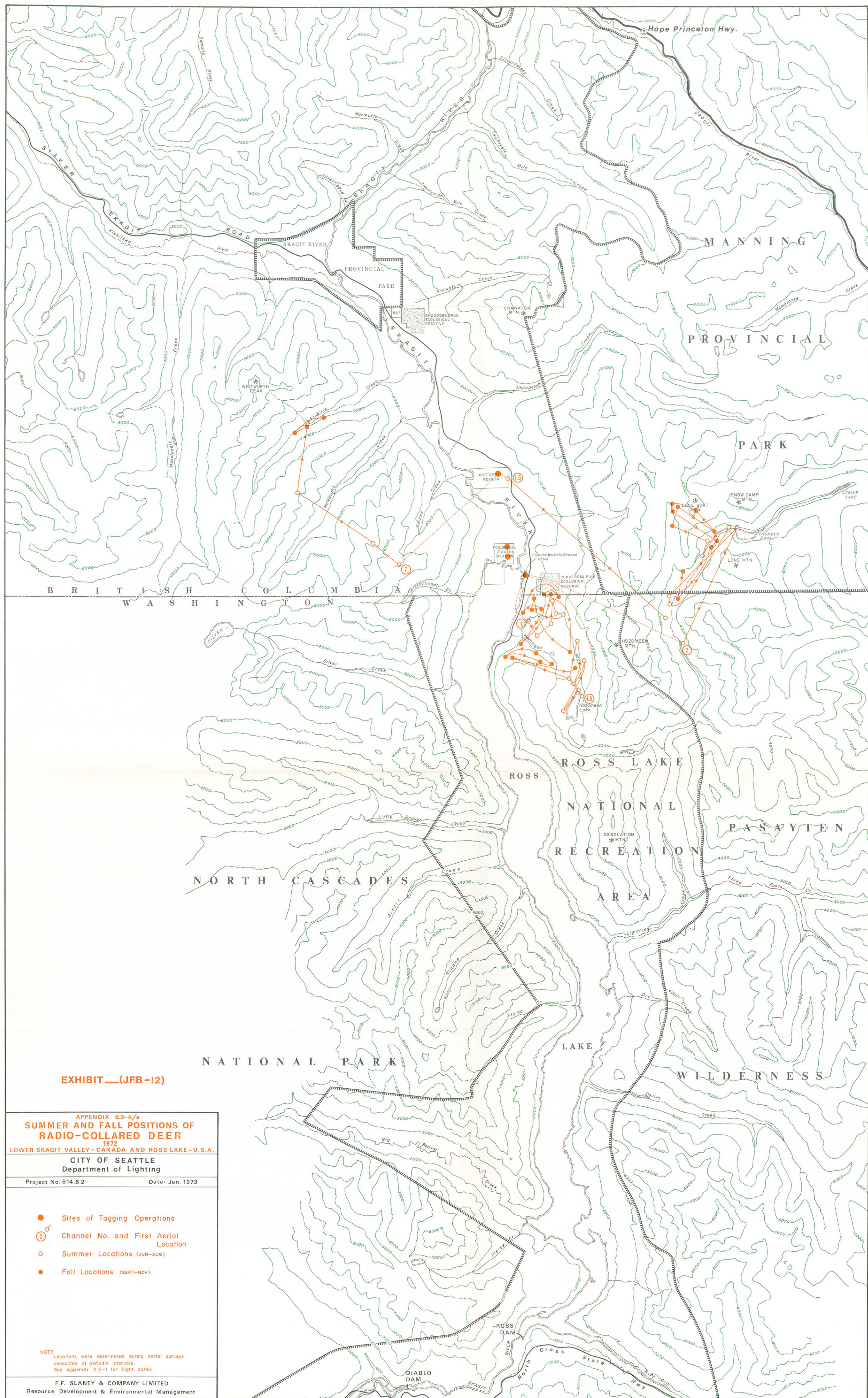


EXHIBIT (JFB-12)

APPENDIX 2.3-6/a

SUMMER AND FALL POSITIONS OF

RADIO-COLLARED DEER

1972

LOWER SKAGIT VALLEY-CANADA AND ROSS LAKE-U.S.A.

CITY OF SEATTLE

Department of Lighting

Project No. S14.6.2 Date: Jan. 1973

- Sites of Tagging Operations
- ② Channel No. and First Aerial Location
- Summer Locations (JUN-AUG)
- Fall Locations (SEPT-NOV)

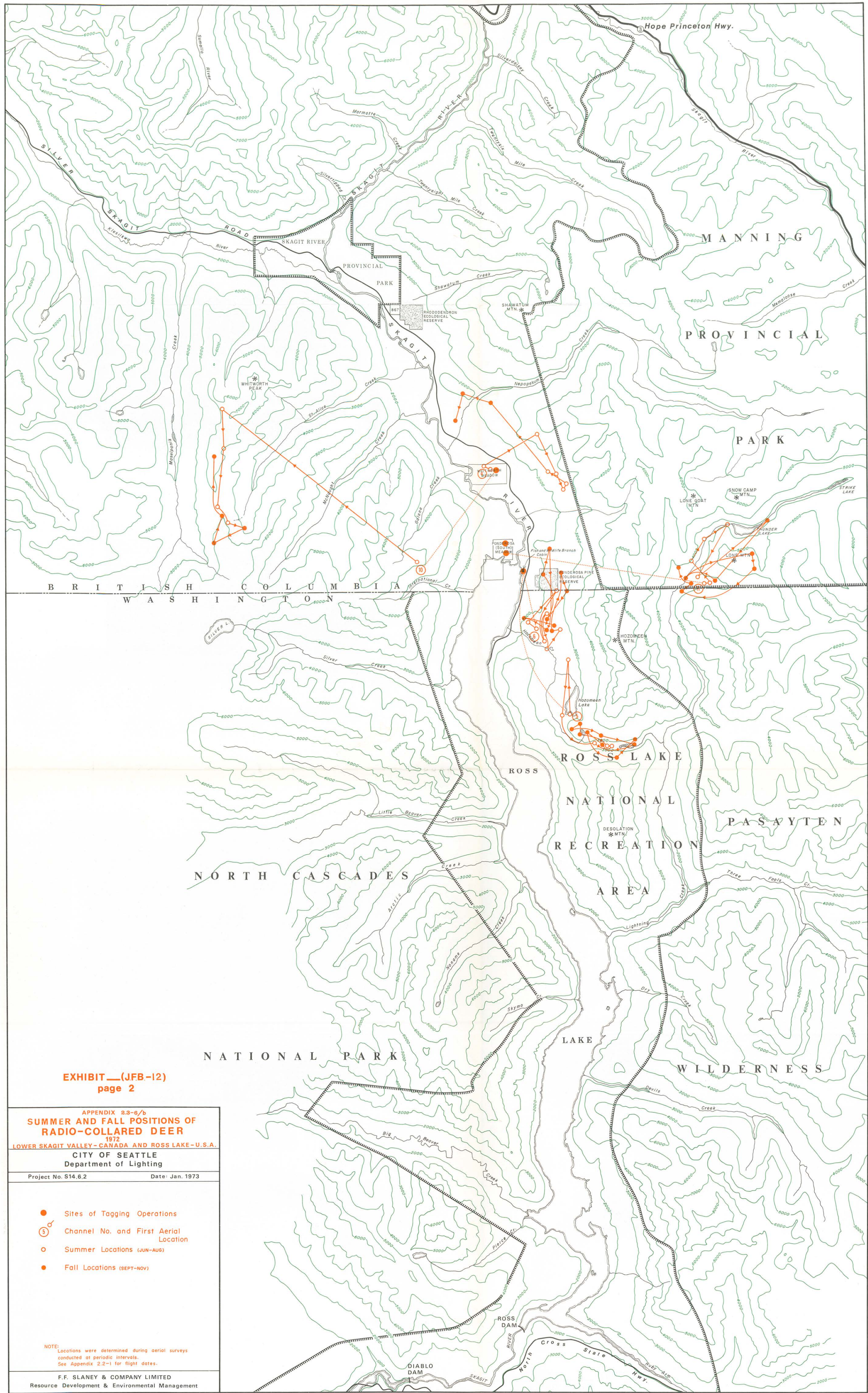
NOTE:

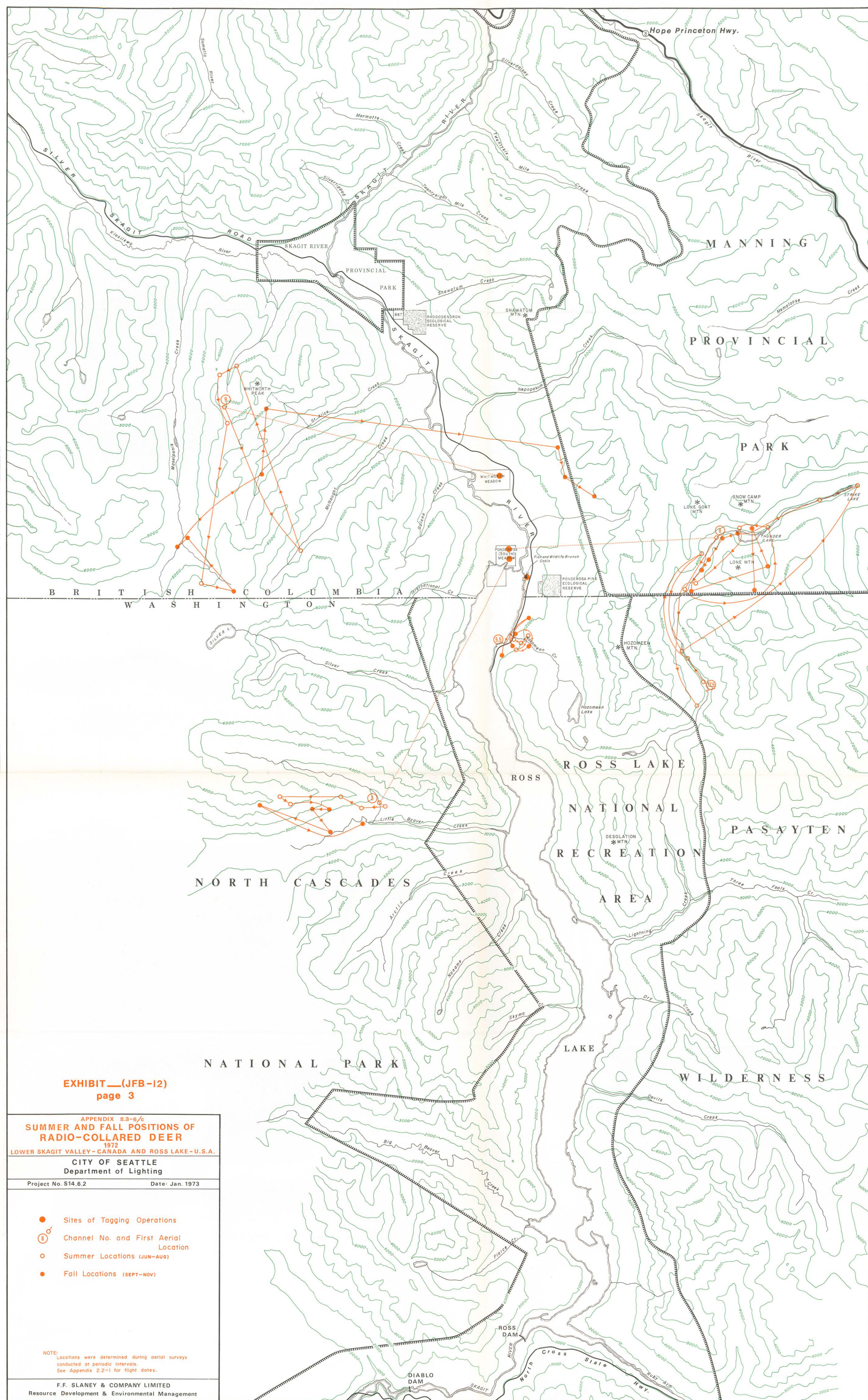
Locations were determined during aerial surveys conducted at periodic intervals.

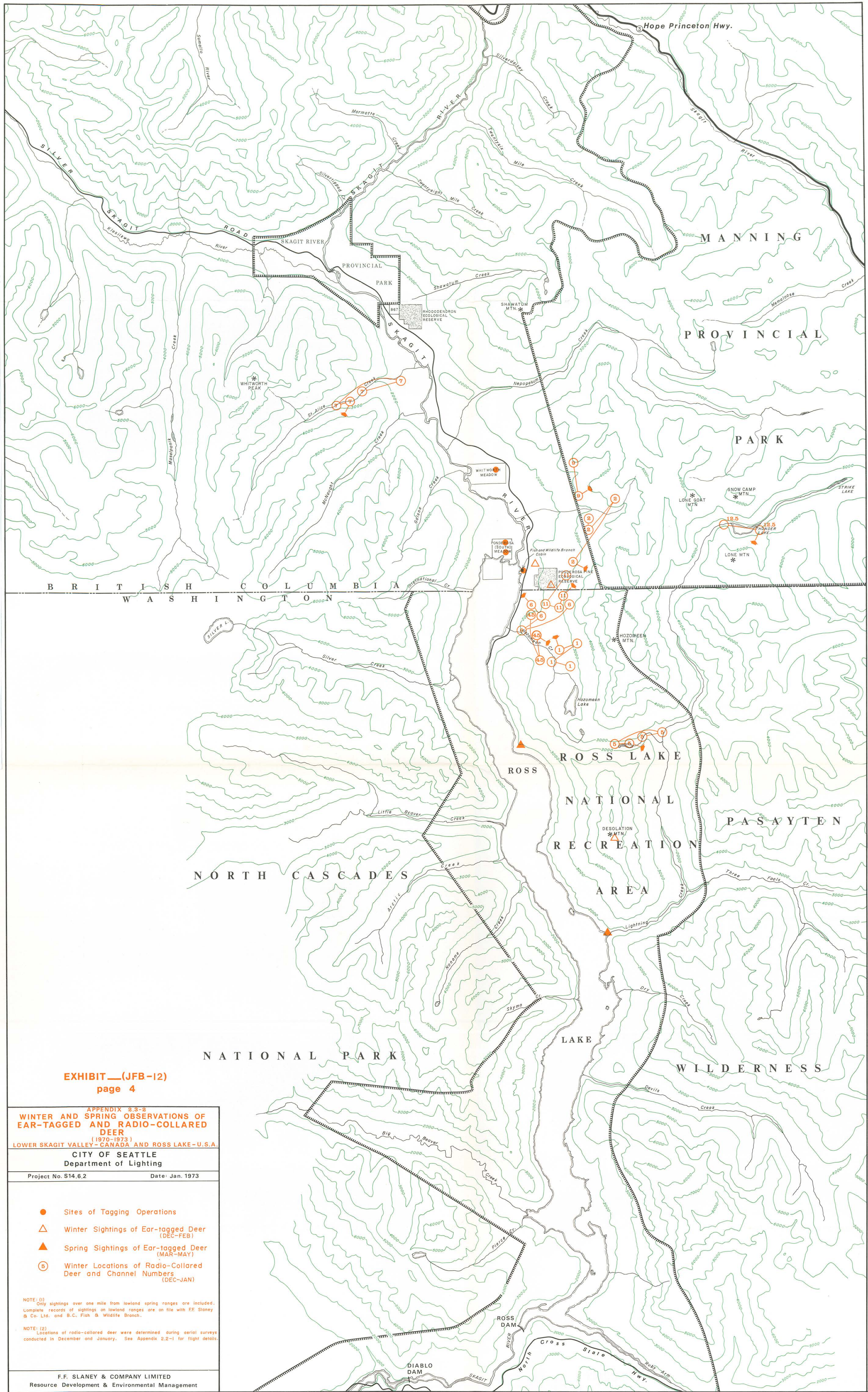
See Appendix 2.2-1 for flight dates.

F.F. SLANEY & COMPANY LIMITED

Resource Development & Environmental Management









Developed Meadow-Type Range

Elevation 1725 Feet

List of Exhibits to Accompany
Testimony of William E. Mills

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(WEM-1)	Regional and Provincial Park Systems of the Lower Mainland Region
_____	(WEM-2)	Major Potential Recreational Valleys Within 100 Miles of Vancouver
_____	(WEM-3)	Supply of Recreational Areas Within 100 Miles of Lower Mainland Population Center
_____	(WEM-4)	Recreation Capacity Standards
_____	(WEM-5)	Potential Recreation Areas With High Ross Reservoir
_____	(WEM-6)	Potential Recreation Areas Without High Ross Reservoir
_____	(WEM-7)	Summary of Recreation Potential With and Without High Ross Reservoir

REGIONAL AND PROVINCIAL PARK SYSTEMS OF THE LOWER MAINLAND REGION

Derived from Regional Parks Plan Lower Mainland Region, 1969.

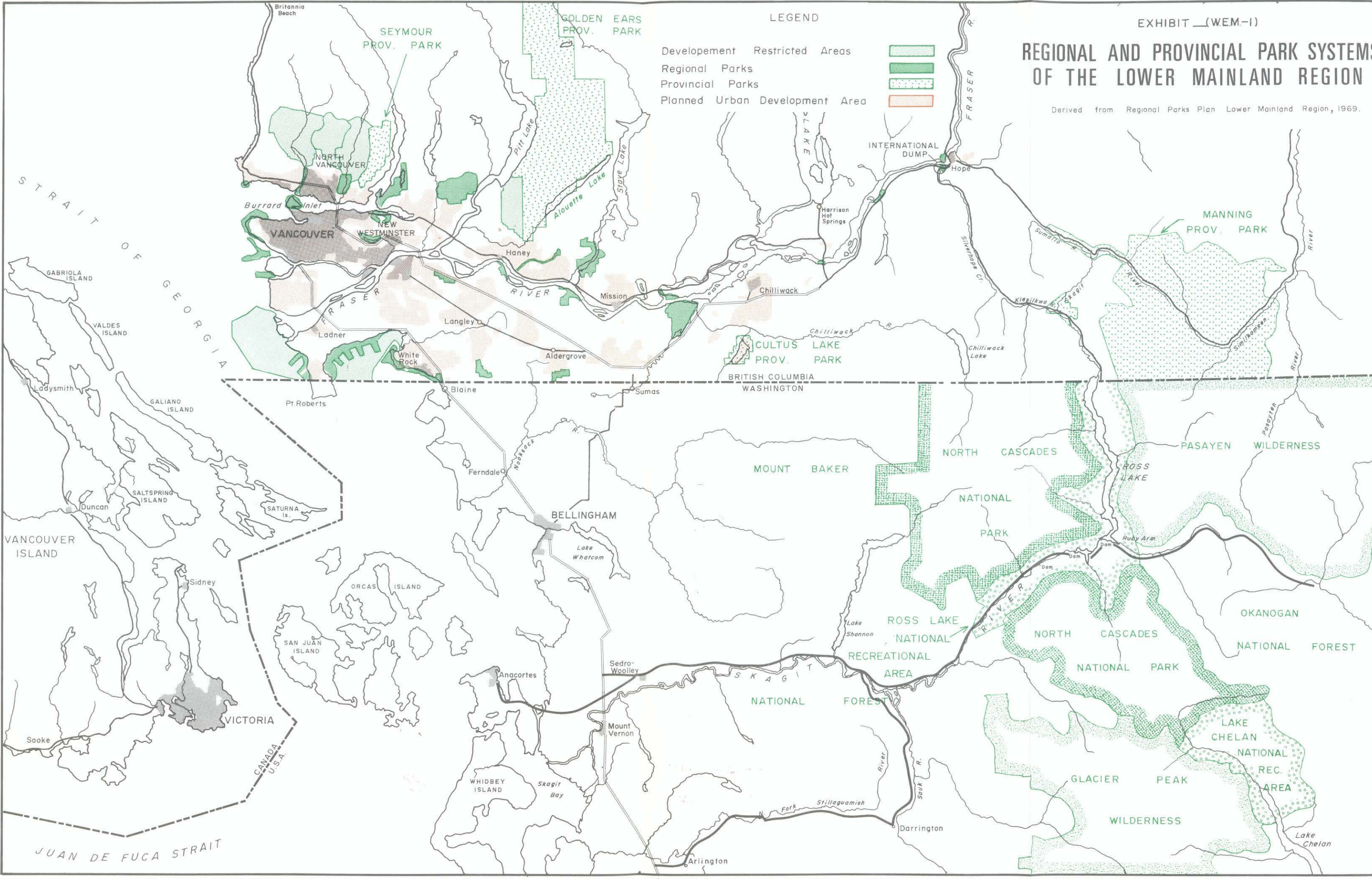
LEGEND

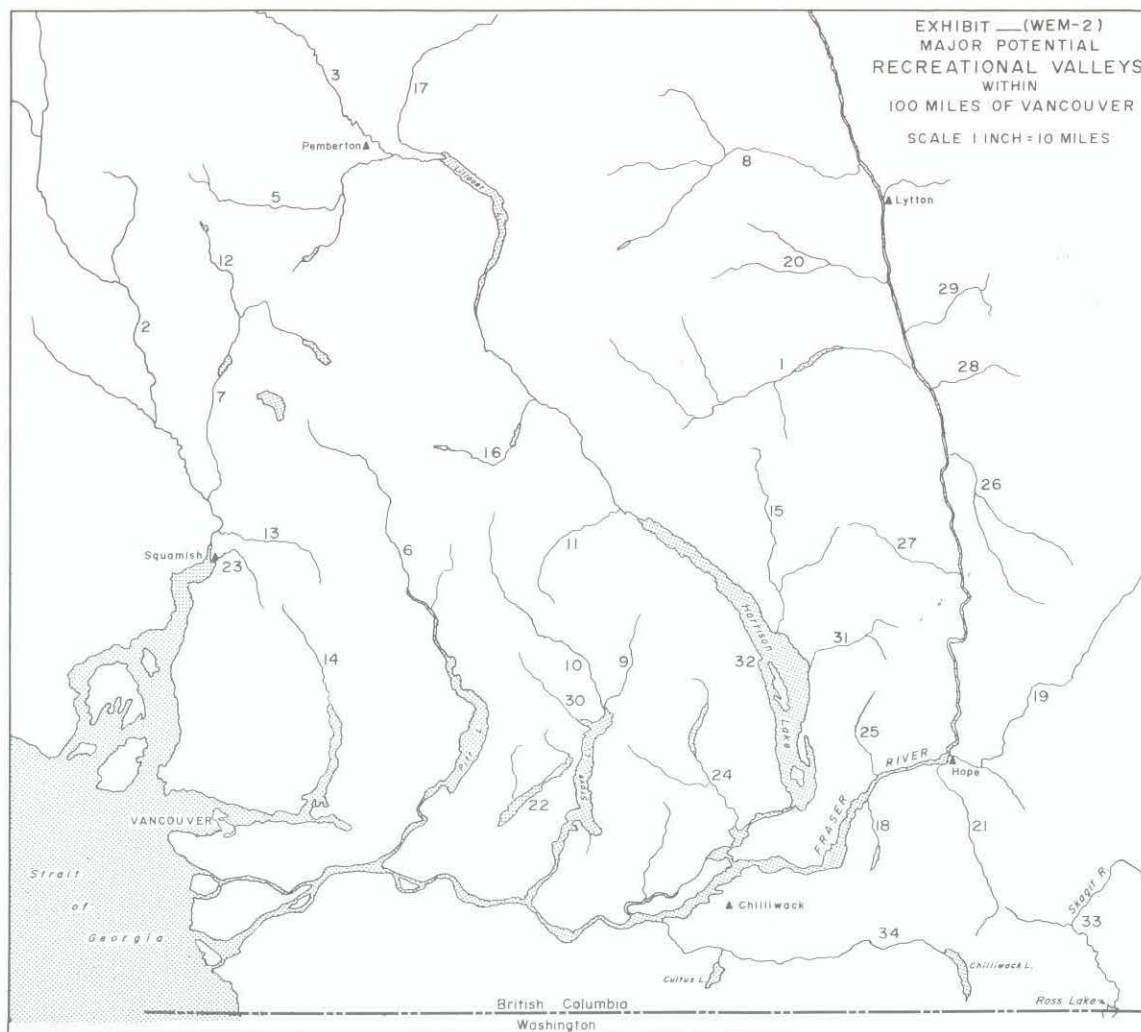
Development Restricted Areas

Regional Parks

Provincial Parks

Planned Urban Development Area





Characteristics of Each Valley

Map No.	Name of Drainage	Flat Land Acres	River/Stream Mile	Lakes Acres	Shoreline Miles
1	Nahatlatch	3800	44	1010	16
2	Squamish River	5000	57	0	0
3	Lillooet River (upper)	5000	58	0	0
4	Lillooet River (lower)	6000	50	9900	42
5	Soo River	5000	10	0	0
6	Pitt River	7000	32	0	0
7	Cheakamus River	1500	40	3000	18
8	Stein River	4000 +	55	0	0
9	Winslow Creek	3000	9	60	1
10	Stave River	2500	25	0	0
11	Sloquet Creek	4000	12	0	0
12	Callaghan Creek	3400	12	290	4
13	Mamquam	4700	14	0	0
14	Indian River	1600	13	0	0
15	Big Silver Creek	1770	20	0	0
16	Snowcap Creek	1200	10	580	7
17	Birkenhead River	2000	20	130	10
18	Wahleach Creek	1100	9	1000	8
19	Coquihalla River	1000	43	0	0
20	Kwoiek Creek	1700	12	800	16
21	Silverhope Creek	2000	28	168	3
22	Allouette Lake	600	0	4000	23
23	Stawamus	350	6	0	0
24	Chehalis	600	21	1560	12
25	Ruby Creek	—	7	0	0
26	Anderson River	—	24	0	0
27	Spuzzum Creek	—	16	0	0
28	Ainslie Creek	—	12	0	0
29	Mowhokam	—	12	0	0
30	Tingle Creek	500	8	0	0
31	Cogburn Creek	—	12	0	0
32	Harrison Lake	800	43	45400	116
33	Skagit River	10000	29	540	3
34	Chilliwack River	6200	28	3100	13
Totals:			804	71,011	291

SUPPLY OF RECREATIONAL AREAS
WITHIN 100 MILES OF
LOWER MAINLAND POPULATION CENTER

Supply

Areas Designated as Provincial Parks	146,068
Areas Designated as Regional Parks	45,927
Alternate Valleys with Recreational Potential	<u>80,000</u>
Total Potential Supply	271,995 acres

Significance of Lower Skagit Valley in Canada

Usable Recreation Land Without High Ross	10,200 acres
Usable Recreation Land With High Ross*	5,000 acres
Area of High Ross Reservoir	5,200 acres

* The 5,000 acres would not be lost to recreational use. The additional water surface would increase the recreation potential for such activities as swimming, boating and fishing.

RECREATION CAPACITY STANDARDS

<u>Activity</u>	<u>Recreation Capacity Standard</u>
Camping	4 units/acre around the lake 3 units/acre near the river
Picnicking	5 units/acre in meadowlands 7 units/acre in forested lands
Hunting	1 deer/100 man-days of hunting
Swimming	150 square feet of water/swimmer 200 square feet of beach and back-up area per person
Boating	1 power boat/20 acres of lake 4 anchored boats/acre of lake 2 trolling fishing boats/acre of lake 1 canoe/one-half mile of river
Fishing	3 fish/fisherman day
Hikers	40 hikers/mile of trail per day
Wildland Recreation	3 man-days use/acre per year

Sources:

Douglas, R. W. Forest Recreation, Pennsylvania State Univ.

Louisiana Parks and Recreation Commission. Louisiana State-wide Comprehensive Outdoor Recreation Plan, Supplement 1. Baton Rouge, La., August 10, 1966.

National Recreation and Parks Association. Outdoor Recreation Space Standards. Washington, D. C., 1965.

New York Office of Parks and Recreation. New York State-wide Comprehensive Recreation Plan, "Recreation Capacities and Current Use," Technical Report No. 2. 1963.

U.S. Dept. of Interior, Bureau of Outdoor Recreation. Outdoor Recreation Space Standards. 1967.

U.S. Outdoor Recreation Resources Review Commission. Study
Reports on Recreational Activities.

Report No. 1 Public Outdoor Recreation Areas - Acre-
age, Use, Potential.

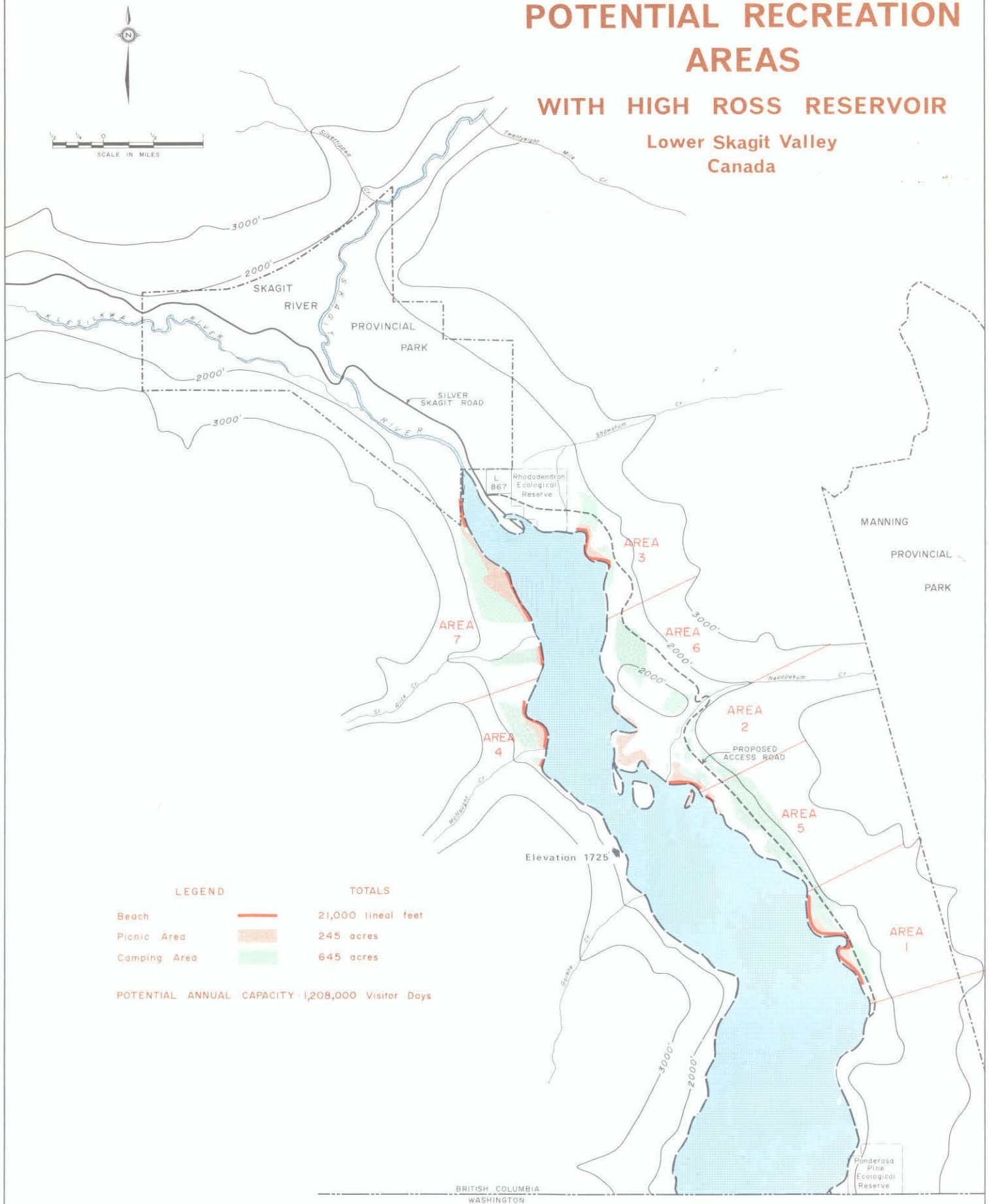
Report No. 7 Sport Fishing--Today and Tomorrow.

Report No. 12 Financing Public Recreation Facilities

Report No. 19 National Recreation Survey.

POTENTIAL RECREATION AREAS

WITH HIGH ROSS RESERVOIR
Lower Skagit Valley
Canada



POTENTIAL RECREATION AREAS

WITHOUT HIGH ROSS RESERVOIR

Lower Skagit Valley
Canada

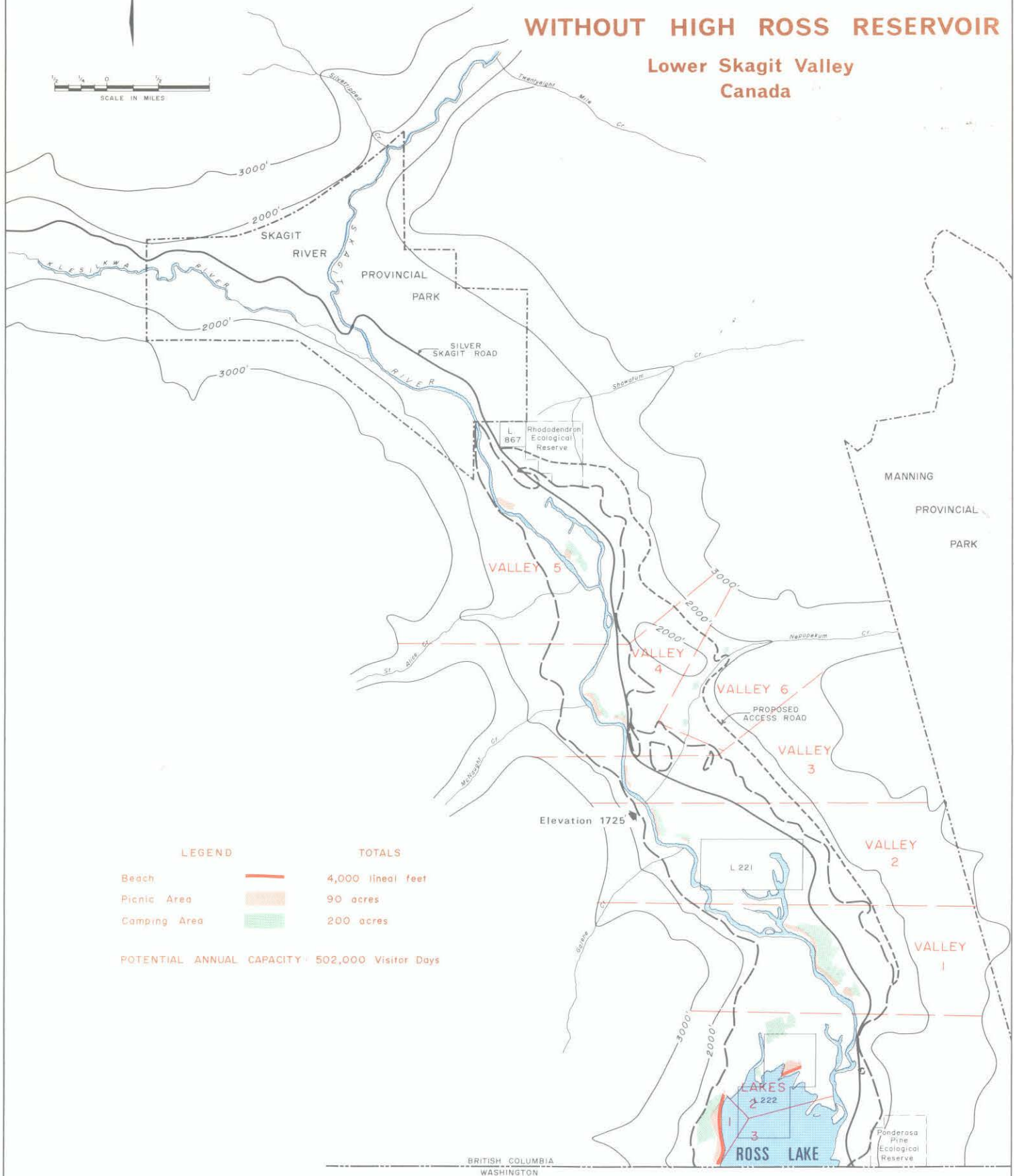


EXHIBIT _____ (WEM-7)

WITH HIGH ROSS

(Boating, Fishing, Hiking use included within total basic capacity).

List of Exhibits to Accompany
Testimony of Theodore J. Wirth

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(TJW-1)	Statistics on Use North Cascades National Park and Ross Lake NRA
_____	(TJW-2)	North Cascades Highway Use Figures
_____	(TJW-3)	Map of Ross Lake NRA U.S. Market Area
_____	(TJW-4)	Map of Whiskeytown NRA Market Area
_____	(TJW-5)	Comparison of Ross Lake NRA and Whiskeytown NRA
_____	(TJW-6)	1970 Visitor Use at Whiskeytown NRA
_____	(TJW-7)	Population, Ross Lake NRA Market Area
_____	(TJW-8)	Artist's Rendering on Photo from Jack Mountain, Showing Big Beaver Valley and Roland Point at El. 1725
_____	(TJW-9)	Tabulation of Usable Shoreline and Adjacent Land Areas at El. 1725
_____	(TJW-10)	Map Showing Existing and Proposed Recreation Facilities in Project 553
_____	(TJW-11)	Typical Campground Layout
_____	(TJW-12)	Estimated Cost of Campgrounds, Trails and Bridges

STATISTICS ON USE
NORTH CASCADES NATIONAL PARK
AND ROSS LAKE NATIONAL RECREATION AREA

The following information indicates yearly public use in the Skagit region, North Cascades National Park.¹

<u>Year</u>	<u>Total Visits</u>	<u>Total Overnite Stays</u> ²
1969	336,987	n/a
1970	275,921 ³	n/a
1971	200,367 ³	72,682 ⁴
1972	534,654	89,324 ⁴

Source: North Cascades National Park

¹Skagit region includes Ross Lake and northern park sector. These include data derived after the North Cross Cascades highway opened in September.

²Park Service did not maintain overnight stays during 1969 and 1970 seasons.

³The Park Superintendent believes that two major contributing factors in the decline of attendance in 1970 and 1971 were late seasons in the high country and the depressed economy in the Puget Sound area.

⁴The Park Service does not maintain statistics as to source of visitors, whether local or out of state. It does maintain a breakdown of type of overnight visits. The 1972 totals of visitors who made overnight stays as follows:

Concession Rooms and Cabins	6,879
Concession Trailers and Camping	3,236
Tent Campgrounds	7,526
Other Camp Areas	6,267
Recreation Vehicles in Type A Campgrounds	14,122
Recreation Vehicles in Type B Campgrounds (Including Hozomeen)	17,395
Camping Organized Groups	8,006
Camping in Back Country	19,298
Other Overnight	<u>6,595</u>
	89,324

Theodore J. Wirth

NORTH CASCADE HIGHWAY USE FIGURES*

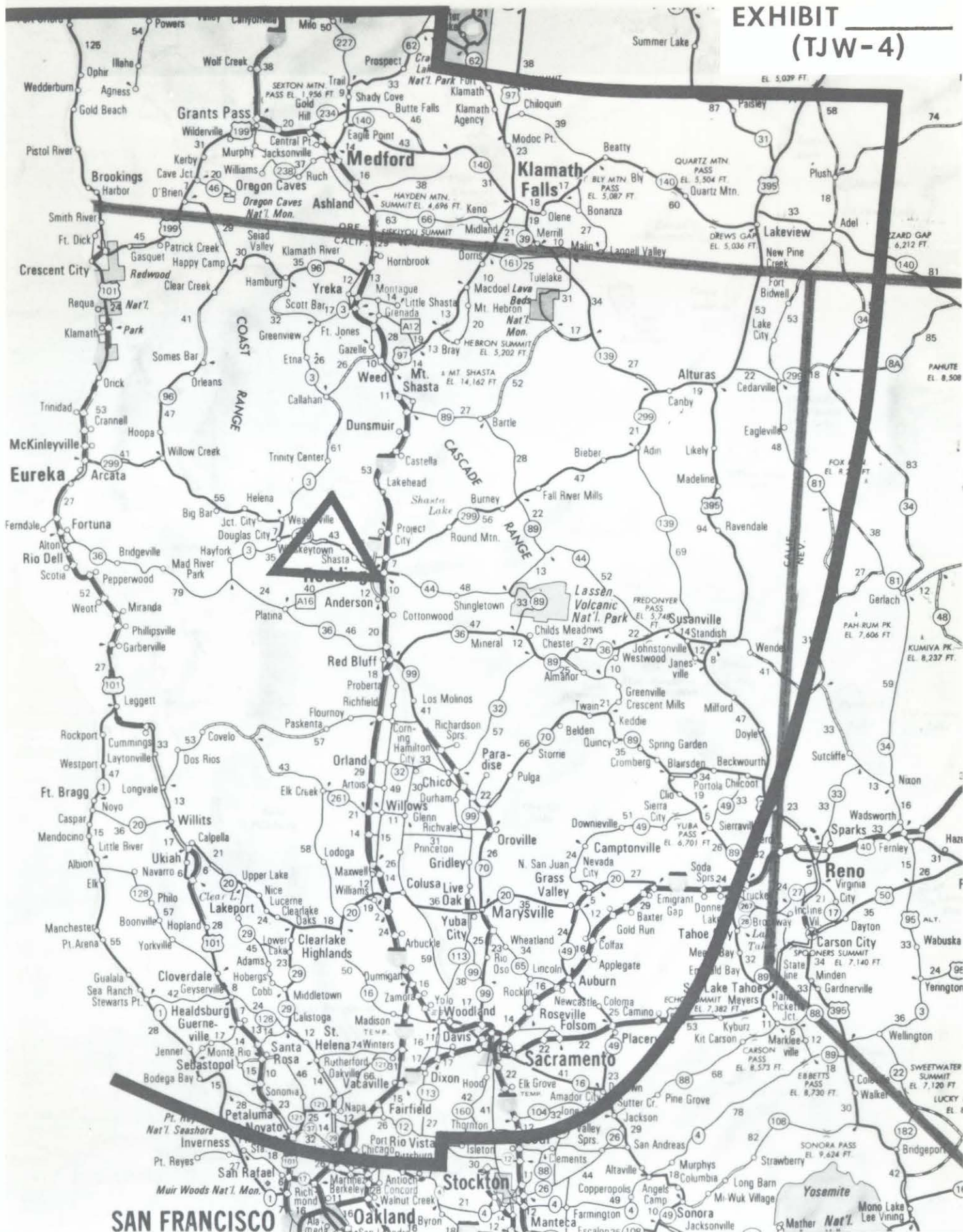
Survey Period	Visitors		Vehicles		Visitors Sub-Total	Vehicles Sub-Total	No. Visitors Per Vehicle (Av.)
	Eastbound	Westbound	Eastbound	Westbound			
Sept. 1 - Sept. 10	56,753	46,455	20,269	16,591	103,208	36,860	3.68
Sept. 11 - Sept. 17	35,409	28,132	12,646	10,047	63,541	22,693	2.80
Sept. 18 - Sept. 24	15,730	13,289	5,618	4,746	29,019	10,364	2.79
Sept. 25 - Oct. 1	16,976	14,599	6,063	5,214	31,575	11,277	2.79
Oct. 2 - Oct. 8	22,067	14,552	7,881	5,197	36,619	13,078	2.80
Oct. 9 - Oct. 15	19,566	13,213	6,988	4,719	32,779	11,707	2.79
Oct. 16 - Oct. 23	14,865	11,676	5,309	4,180	26,541	9,489	2.79
Oct. 24 - Oct. 30	7,809	9,288	3,377	3,351	17,097	6,728	2.54
Oct. 31 - Nov. 7	2,310	1,576	961	664	3,886	1,625	2.39
Nov. 8 - Nov. 12	1,618	2,905	675	1,291	4,523	1,966	2.30
<u>TOTALS</u>							
Sept. 2 - Nov. 28	200,404	156,639	72,415	56,445	357,043	128,860	2.77 (Av.)

*Commercial traffic not indicated in primary data

Source: North Cascades National Park, Sedro Woolley, Washington

EXHIBIT
(TJW-3)

EXHIBIT
(TJW-4)



WHISKEY TOWN N.R.A. - MARKET AREA

COMPARISON

	Ross Lake NRA	Whiskeytown NRA
A. Administration	NPS	NPS
B. Market Area Population ¹	2,153,200	1,690,200
C. Driving Time to and from Major Urban Population Center	3-4 hrs.	3-4 hrs.
D. Regional Industrial ² Characteristics ³		
Agriculture, forestry, fisheries	2.4%	4.1%
Mining	0.1	0.1
Construction	6.0	5.9
Manufacturing	24.4	19.4
Transportation, communi- cations, utilities	8.6	7.2
Wholesale and retail trade	22.4	20.5
Finance, insurance, real estate	6.9	4.7
Services	19.9	20.8
Government	<u>9.3</u>	<u>17.3</u>
TOTAL	100.0%	100.0%
Unemployment rate	8.3%	8.0%
Median income	\$10,400	\$10,700

¹ U.S. population only. See Ex. _____ (TJW-7). Figures derived from U.S. Census Bureau. Market area determined to be the area within 4 hrs- driving time of NRA.

² Statistics pertaining to urban centers within 4 hr. driving distance.

³ Source: U.S. Bureau of Census; Social & Economic Characteristics; California, Social and Economic Characteristics, 1970

	Ross Lake NRA	Whiskeytown NRA
E. Competitive and/or Compatible Recreation Areas in Vicinity	North Cascade NP Lake Chelan NRA Glacier Peak Wilderness Pasayten Wilderness Mt. Baker NF	Shasta NF Trinity NF Shasta Lake NRA Trinity NRA Lassen NP Trinity Alps Primitive Area
F. Access Roads	State Hwy. 20 (North Cascade Highway)	US5 and State Hwy. 299
G. Activities ⁴		
Boating	X	X
Camping	X	X
Fishing	X	X
Guided tours	X	X
Hiking	X	X
Horseback riding	X	X
Hunting	X	X
Mountain climbing	X	X
Swimming	X	X
Water sports	X	X
Facilities ⁴		
Bathhouse		
Boat ramp	X	X
Boat rentals	X	X
Museums	X	X
Nature trails	X	X
Picnic areas	X	X
Accommodations ⁴		
Cabins	X	X
Campgrounds	X	X
Groceries and ice	X	X
Group campsites	X	X
Post office	X	X
Restaurant	X	X

⁴ Developments listed for Ross Lake NRA are a combination of existing facilities and those generally proposed by the NPS. Figures for Ross Lake do not include Canada.

1970 VISITOR USE AT WHISKEYTOWN NRA

Activity

Sightseeing	291,089
Picnicking	34,931
Camping	116,435
Swimming	256,158
Water skiing	93,148
Boating	128,079
Fishing	232,871
Hunting	11,643
Other	<u>-0-</u>
TOTAL	1,164,354

Source of Visitors

Local (within state)	65%
Other	35%

Source: U.S. Bureau of Reclamation, Statistical Report of the Commissioner, Reclamation: Statistical and Financial Appendix, 1971.

POPULATION ROSS LAKE NRA MARKET AREA
1970 and Estimated 1980 and 1990

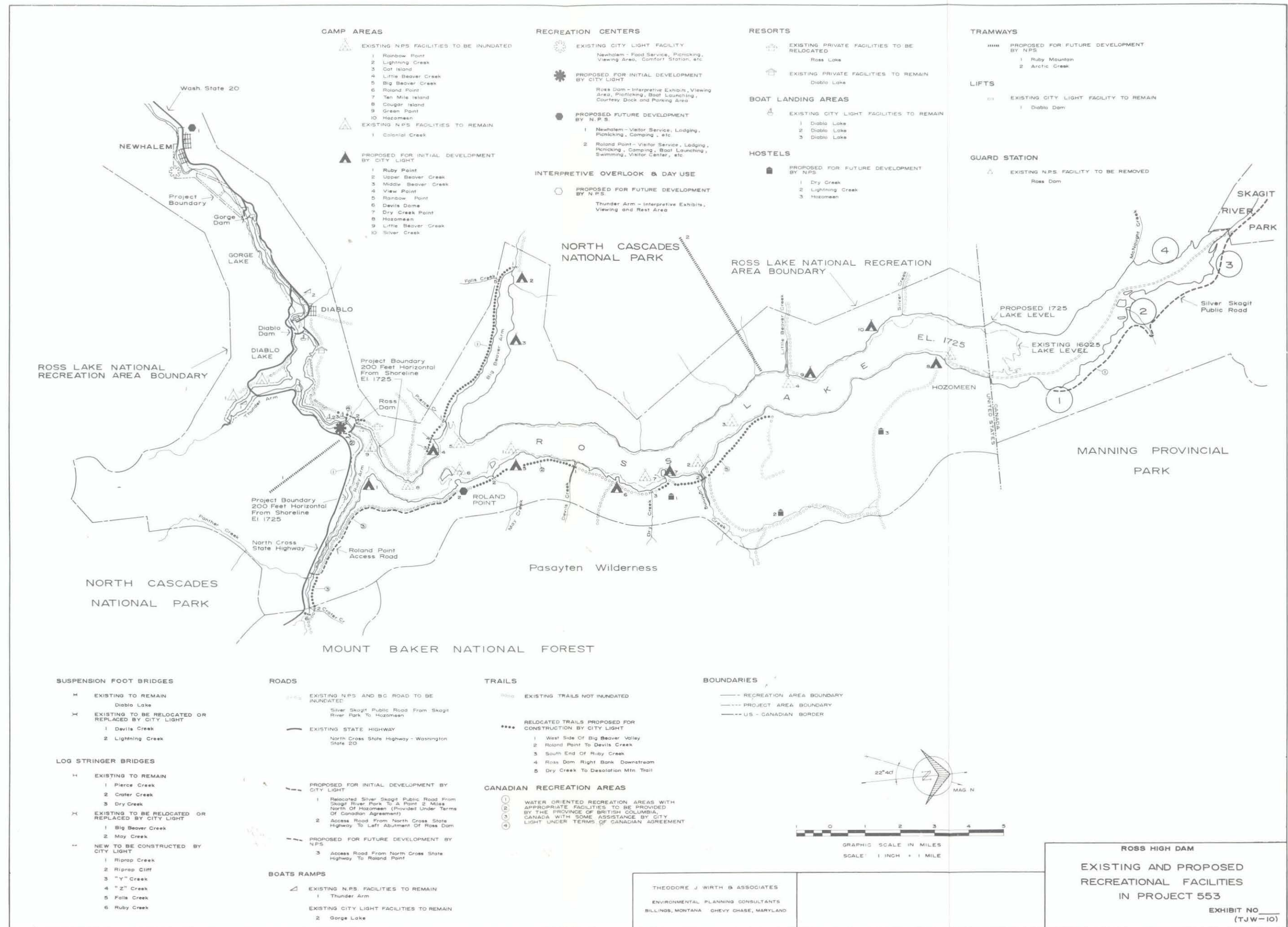
<u>AREA</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>
<u>United States</u>			
Metropolitan Seattle-Everett	1,421,900		
Metropolitan Tacoma	411,000		
Rural	<u>320,300</u>	<u> </u>	<u> </u>
Sub-Total	2,153,200	2,590,000	2,918,000
 <u>Canada</u>			
Metropolitan Vancouver, B.C.	1,026,000	1,335,000	1,630,000
Rural	<u>132,000</u>	<u>173,000</u>	<u>226,000</u>
Sub-Total	1,158,000	1,508,000	1,856,000
 TOTAL AREA	 3,311,200	 4,098,000	 4,774,000

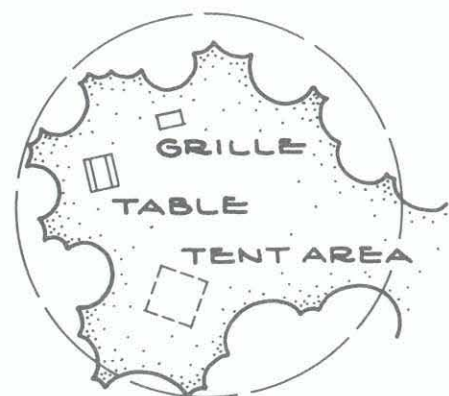


EXHIBIT NO. _____
(TJW-8)

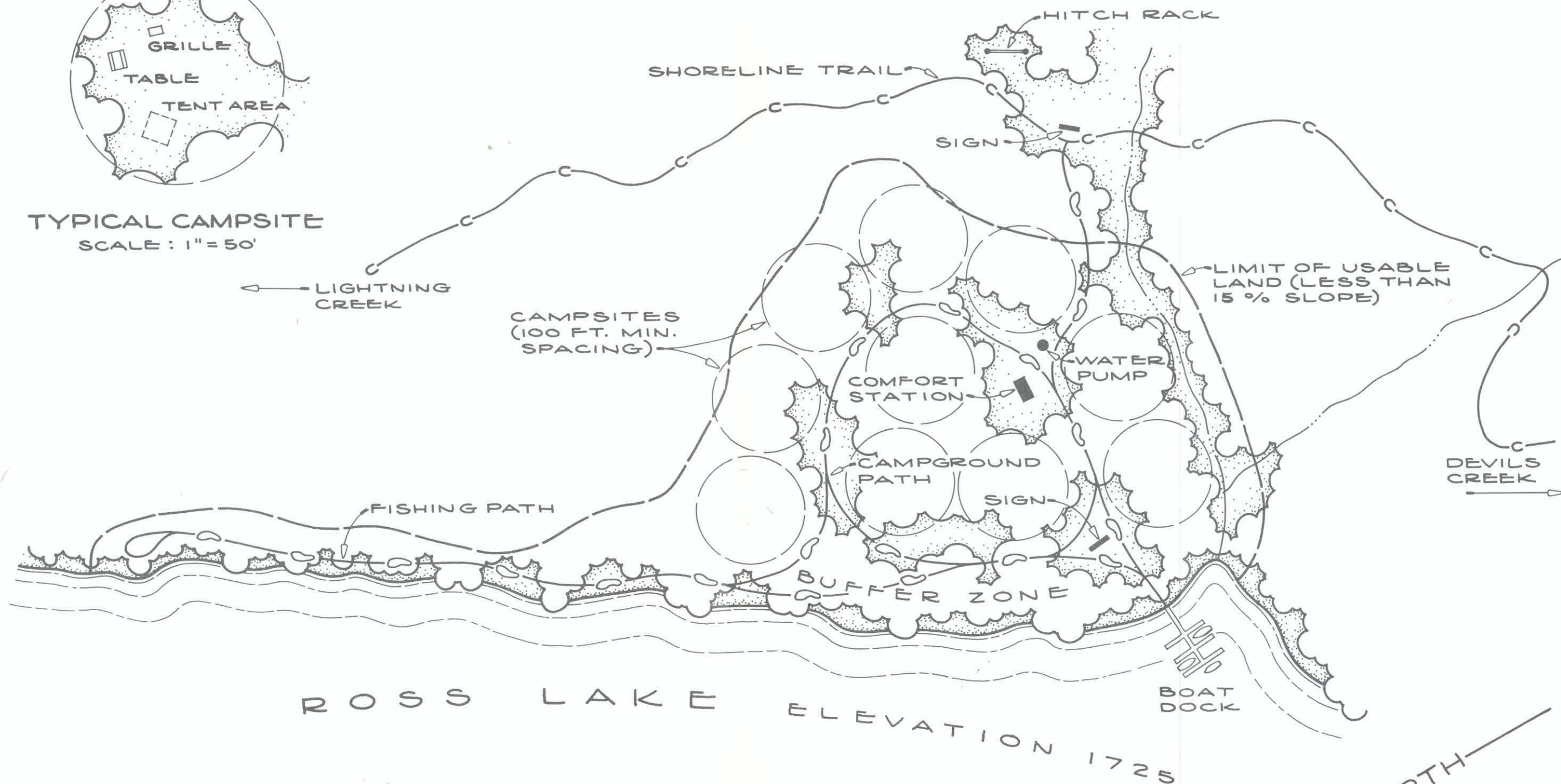
TABULATION OF USABLE SHORELINE AND
ADJACENT LAND AT ELEVATION 1725

Site		Usable Acres	Usable Shoreline (in feet)
Ruby Point	1A	7.84	800
View Point	2A	12.08	660
Big Beaver	3A	2.02	560
	3B	6.54	850
	3C	15.97	1,950
	3D	7.10	544
	3E	2.38	100
	3F	5.13	920
	3G	1.98	440
Roland Point	4A	1.43	535
	4B	16.86	1,420
Rainbow Point	5A	1.76	---
	5B	5.73	140
	5C	12.36	620
Devils Dome	7A	24.24	1,445
	7B	3.47	160
	7C	5.05	1,140
Dry Creek Pt.	8A	4.76	384
Little Beaver	9A	3.47	805
Silver Creek	10A	6.34	1,218
Hozomeen	11A	<u>19.28</u>	<u>2,760</u>
TOTAL		165.79	18,451





TYPICAL CAMPSITE
SCALE: 1" = 50'



TYPICAL BOAT-IN CAMPGROUND LAYOUT
(DEVILS DOME SITE 7c.)

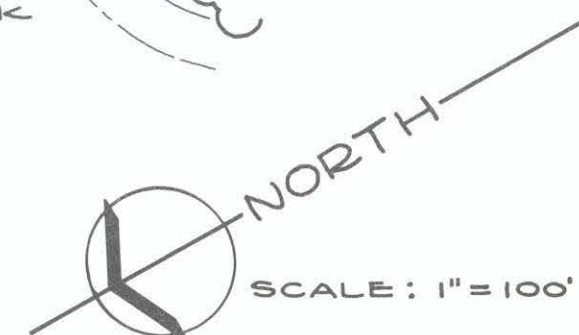


EXHIBIT _____
(TJW-11)

ESTIMATED COST OF CAMPGROUNDS, TRAILS AND BRIDGES

10 CAMPGROUND SITES (NEW)

New Tables (100)	@ \$	250.00	\$ 25,000.00
Grills (100)	@	106.25	10,625.00
Water Systems (10)	@	1,875.00	18,750.00
Garbage Containers (30)	@	100.00	3,000.00
Boat Docks (10)	@	21,640.00	216,400.00
Campground Path (10 areas)	@	4,000.00	40,000.00
Comfort Stations (10)	@	8,100.00	81,000.00
Clearing, Grubbing and Grading (10 areas)	@	3,000.00	30,000.00

\$424,775.00

REPLACEMENT AND/OR RELOCATION OF BRIDGES AND TRAILS

Suspension Bridges (2)	@	50,000.00	\$ 100,000.00
Log Stringer Bridges (8)	@	5,000.00	40,000.00
Trails (17.1 miles)	@	15,000.00	256,500.00

\$396,500.00

Total Construction Costs			\$821,275.00
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10% Contingency			<u>\$ 82,125.00</u>
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TOTAL DIRECT COST			\$903,400.00
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List of Exhibits Accompanying
Direct Testimony
of Dr. Albert N. Halter

<u>Exhibit No.</u>	<u>Reference No.</u>	<u>Description</u>
_____	(ANH-1)	Benefit-Cost Analysis of Projected Recreation Use of High Ross Dam

BENEFIT-COST ANALYSIS OF PROJECTED RECREATION USE OF HIGH ROSS DAM

Benefits - annual

Camping visitor days	26,100
Tour boat visitor days	100,000
Pleasure boats, visitor days	<u>24,000</u>
Total	150,100

Value of benefits - annual

Camping at \$7.50 per visitor day	\$195,750
Tour boats at \$5.00 per visitor day	500,000
Pleasure boats at \$6.00 per visitor day	<u>144,000</u>
	\$839,750

Discounted value of benefits

Present value of benefits 1976-1990, incl., discounted at 5-3/8%	\$7,654,534
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Costs

Capital cost of campgrounds, bridges, trails, etc.	\$ 903,400
Capital cost of boat launching facilities, parking, etc.	\$ 907,700
Annual operation and maintenance 10% of capital cost	\$ 181,110
Engineering and administrative costs during construction	\$ 153,940
Present value of capital, engineering and O & M costs incurred 1975-1990 incl., discounted at 5-3/8%	\$3,420,543
Benefit to cost ratio	2.24

BEFORE THE FEDERAL POWER COMMISSION

In Re Application of the)
City of Seattle, Washington for)
Amendment of License for Skagit River) F.P.C. Project 553
Ross Development Project No. 553 -)
Washington)

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of § 1.17 of the Rules of Practice and Procedure.

Dated at Washington, D. C. this 29th day of January, 1973.

/s/ Robert L. McCarty
Robert L. McCarty

Of counsel for
City of Seattle
Department of Lighting