

PROVINCE OF BRITISH COLUMBIA
DEPARTMENT OF RECREATION AND CONSERVATION
HON. W. K. KIERNAN, *Minister* H. G. MCWILLIAMS, *Deputy Minister*

REPORT OF THE
**Department of Recreation
and Conservation**

containing the reports of the

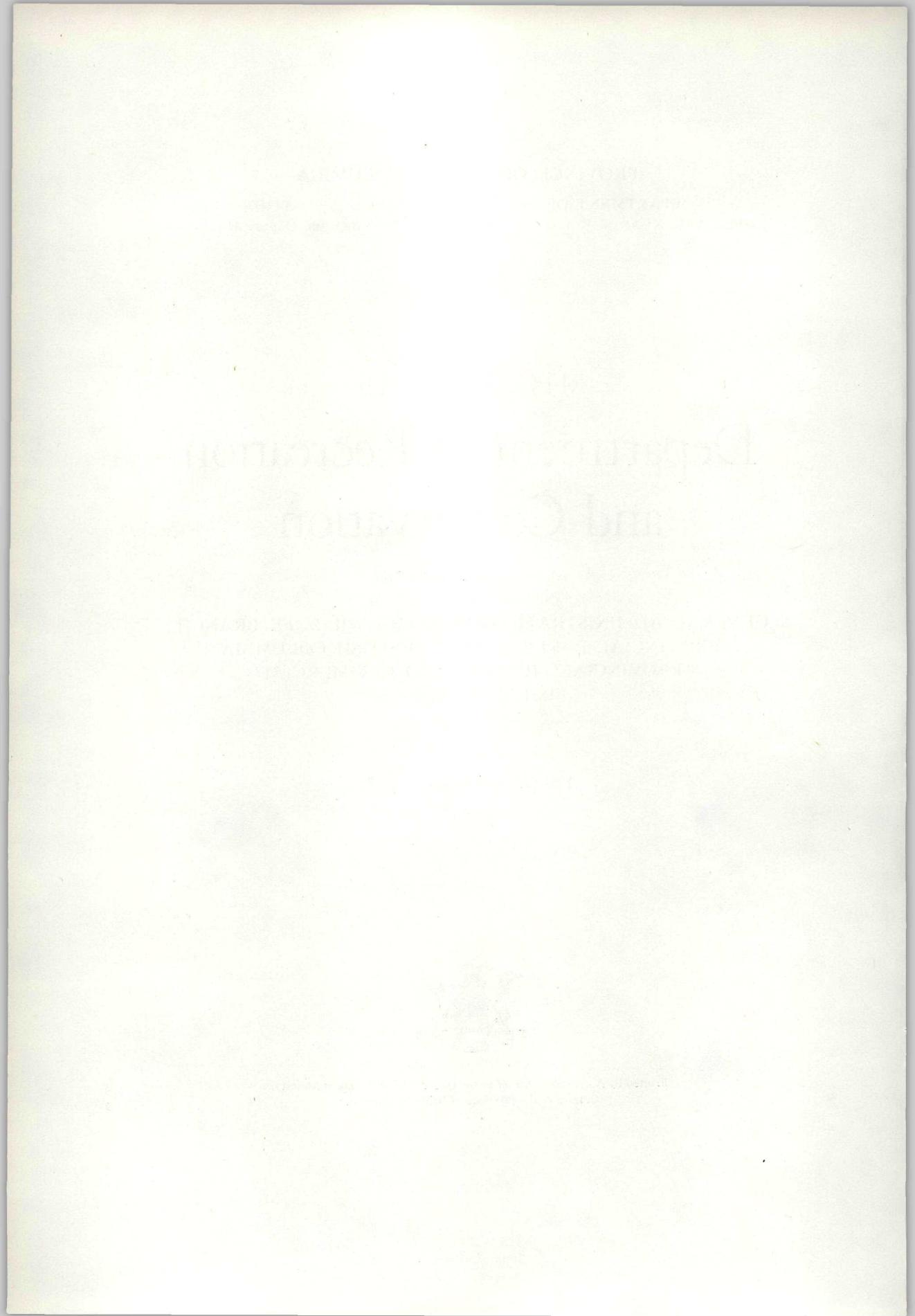
GENERAL ADMINISTRATION, FISH AND WILDLIFE BRANCH,
PROVINCIAL PARKS BRANCH, BRITISH COLUMBIA
PROVINCIAL MUSEUM, AND COMMERCIAL
FISHERIES BRANCH

Year Ended December 31

1969



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1970



VICTORIA, BRITISH COLUMBIA, February 19, 1970.

*To Colonel the Honourable JOHN R. NICHOLSON, P.C., O.B.E., Q.C., LL.D.,
Lieutenant-Governor of the Province of British Columbia.*

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the Department of Recreation and Conservation for the year ended December 31, 1969.

W. K. KIERNAN,
Minister of Recreation and Conservation.

VICTORIA, BRITISH COLUMBIA, February 18, 1970.

*The Honourable W. K. Kiernan,
Minister of Recreation and Conservation.*

SIR,—I have the honour to submit the Annual Report of the Department of Recreation and Conservation for the year ended December 31, 1969.

H. G. McWILLIAMS,
Deputy Minister of Recreation and Conservation.

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ORGANIZATION
DEPARTMENT OF RECREATION AND CONSERVATION
Victoria, British Columbia
Year ending December 31, 1969

MINISTER OF RECREATION AND CONSERVATION

HON. W.K. KIRKMAN

Wildlife Review

Editor

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Public Information Officer

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Administrative Officer

D.J. Robinson

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Creston Valley
Wildlife Management
Authority

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Supervisor

J. Kemp

Commercial Fisheries
DIRECTOR

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C.E. Estlin

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P.J. Presidente

Research
Technician

D.M. Galbraith

G.D. Taylor

In-Service
Training
Coordinator

J.G. Terpening

Abbotsford
Warden

5 Seasonal Staff

5 Seasonal Staff

Van Colue
I/C R.A.H. Sparrow
Superintendent

J.G. Terpening

Abbotsford

Warden

Summerland

5 Seasonal Staff

5 Seasonal Staff

R. Riley

R.H. McLean

J.W. Cartwright

D.J. Low

Kamloops

Conservation Officers:

J.N. Bone

Veron, Kellen, Penitcon,

Grand Forks, Princeton

Protection

L.G. Smith

Enforcement
Management

J.W. Carter

R.H. McLean

J.W. Cartwright

R.H. McLean

Report of the Department of Recreation and Conservation, 1969

H. G. McWILLIAMS, DEPUTY MINISTER AND COMMISSIONER OF FISHERIES

INTRODUCTION

For the first time, since the Department was formed in 1957, three branches, along with the Deputy Minister's office, are now located together in the newly renovated Dogwood Building. This has proved to be of great assistance in increasing the efficiency of administration for the whole Department and made possible a much better liaison between the branch personnel.

To help meet the need and the demand for more recreational facilities in all parts of the Province, a Regional Park Officer was appointed to Fort St. John and a District Park Officer appointed to look after the Lower Mainland area from offices in Vancouver. Park use continues to climb at an alarming rate, with more than 7,000,000 visits to our parks in 1969. A few years ago we estimated that we would not reach this figure until 1973.

The museum staff, in their new building, are meeting the challenge with exciting plans to develop displays for a living museum over a period of years, as funds become available. At the end of the year the Curatorial Tower was completed, which will enable many of the curators to expand their research work in the various phases of human and natural history. It was a busy year and one of progress toward the ultimate goal for an outstanding Provincial Museum.

The participation of the Commercial Fisheries Branch in cost-sharing agreements with the oyster industry and the Federal Department of Fisheries are proving to be very beneficial. The depuration plant at Ladysmith now in operation is an example of a successful venture. The development of equipment by industry to harvest aquatic plants made considerable progress during the year and indications are that at least one company will be in operation in the immediate future.

The activities of the Fish and Wildlife Branch continue to expand along with the increased use by hunters and fishermen of these resources. The Hunter-training Programme has been most successful and a large number of instructors are now qualified to conduct classes in many localities throughout the Province on safety in the woods.

The Departmental publication *Wildlife Review* ended the year with about 31,000 paid subscriptions. Additional special bulk purchases, mostly by the Canadian Forestry Association and the four Branches of the Department, brought the average circulation of the quarterly magazine to 34,000. This publication, edited by Mr. W. T. Ward, continues to draw favourable comment from around the world and its conservation theme results in a large volume of requests being received for information and education material on conservation generally.

DR. G. CLIFFORD CARL

As Director of the Provincial Museum for nearly 30 years, Dr. Carl requested to be relieved of the administration responsibilities so that he could devote his full time to research in marine biology. This will include the planning and construction of a Hall of the Sea, which will be a dramatic display of the ecology of our seashore. Dr. Carl's decision to spend his full time on this work will be a lasting benefit to the museum.

GENERAL ADMINISTRATION



Библиотека
Гражданской Академии



GENERAL ADMINISTRATION

General Administration consists of the Deputy Minister's Office, the attached Public Information Officer, and the Accounts and Personnel Office.

The staff of General Administration works closely with all branches, including the Department of Travel Industry, in such Departmental matters as putting policy into effect, office and work facilities, personnel, and finance.

The Personnel Section of General Administration processed 57 requisitions to the Civil Service Commission for the purpose of obtaining new and replacement positions for all Branches of the Department. It was deemed necessary to increase the establishment of the Department of Recreation and Conservation by the addition of the following 10 new positions:—

Fish and Wildlife Branch—one Research Officer 3, two Wildlife Assistants 3.
Parks Branch—one Park Assistant 6, one Park Assistant 4.

Provincial Museum—one Clerk 5, one Curator 3 (Biology), one Museologist.
General Administration—one Clerk 2, one Clerk 3.

This section also processed 97 Civil Service Commission requisitions for the Department of Travel Industry.

The personnel officer sat in on many interviewing panels for the selection of these candidates.

One employee in this Department completed the three-year Executive Development Course and two employees in this Department were selected for the one-year Basic Public Administration Course. Two employees in the Fish and Wildlife Branch were awarded 25-year continuous-service certificates.

Examinations for positions of conservation officers in the Fish and Wildlife Branch were held in various cities in British Columbia for the purpose of establishing an eligibility list to fill current and future vacancies.

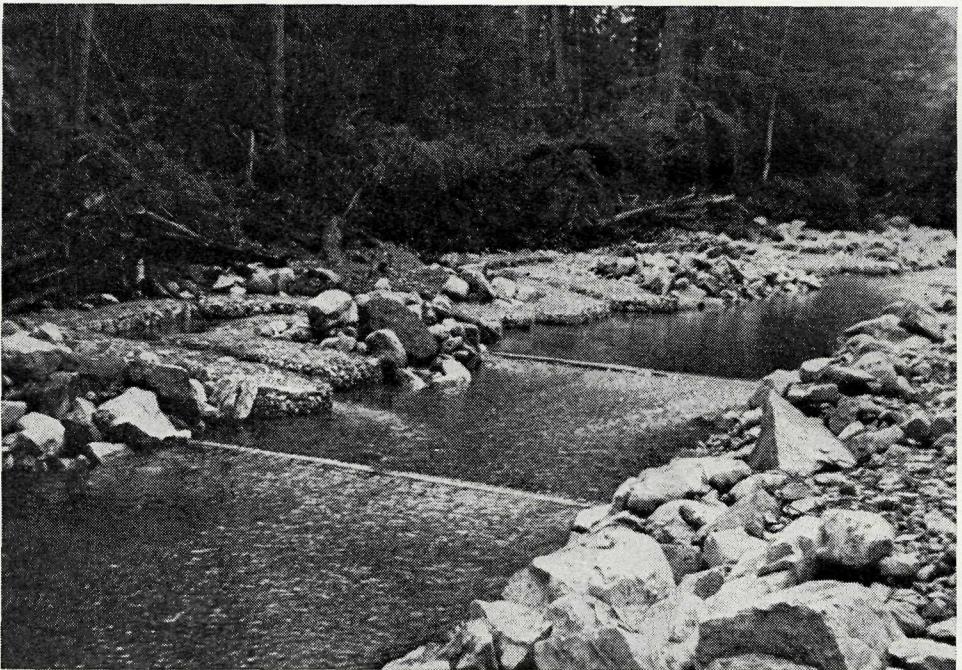
Regular meetings are held with employees of the Parks Branch and the Fish and Wildlife Branch for the purpose of reviewing personnel accidents and seeking methods of improving safety.

FISH and WILDLIFE BRANCH





Outlet stream of Ruby Lake prior to improvement. Natural and man-made debris clogs stream bed.



Improved spawning-channel provides optimum conditions of gravel, water velocity, and depth for spawning cutthroat trout, and side channels for rearing fry.

FISH AND WILDLIFE BRANCH

J. HATTER, DIRECTOR

A number of highlights which characterized the year 1969 are summarized as follows:—

- (1) Reintroduction of sea-otter to the west coast of Vancouver Island.
- (2) Establishment of a Governmental land use committee to make recommendations *re* best use of land.
- (3) There was a record collection of 15,000,000 wild eggs from trout and kokanee.
- (4) Mostly in the underdeveloped northern half of the Province, 135 lakes were surveyed for fisheries potential.
- (5) The Hunter-training Programme was activated and trained 289 instructors, who completed 20 student courses containing 258 students.
- (6) Mr. R. Goodlad was appointed Regional Supervisor in the Prince George Region.
- (7) Mr. F. Harper was appointed Regional Wildlife Biologist for the Peace River, with headquarters at Fort St. John.
- (8) Enforcement activity was increased on many Interior lakes.
- (9) Branch revenue was \$2,705,000 for fiscal year 1968/69, an increase of \$429,000 over 1967/68.
- (10) New guiding regulations were established to provide a better basis for administration of guide outfitters.
- (11) Commencement of wetland developments in the Creston Valley Wildlife Management Area.

Branch activities were once more expanded in 1969 due to a \$300,000 increase in funds, plus the addition of three permanent positions. Increased liaison with other resource agencies at the planning as well as operation level was the greatest administrative achievement during the year. The opportunity to work more closely with field officials of Water Resources, the Lands Branch, and especially the Forest Service, substantially improved the Branch's ability to maintain and protect fish and wildlife habitat.

To the many Provincial and Federal Departments, the British Columbia Wildlife Federation, Ducks Unlimited, the Royal Canadian Mounted Police, and the many other agencies whose advice, assistance, and co-operation were so useful, our thanks are gratefully extended.

WILDLIFE MANAGEMENT

Wildlife-management activities in the Province can be broadly described as having two purposes—the regulation of use and the preservation of the resource.

The regulation of use is an important part of a management programme, and one which the public is often the most conscious of through their experience in hunting. Activities aimed at the preservation of wildlife and its habitat often go unnoticed by the public but are of the greatest consequence in the long run.

It is the purpose of this annual report of the Wildlife Management Division to provide some measure of our success and failures in achieving these major objectives—the regulation of use and the preservation of wildlife in this Province.

PUBLIC USE OF WILDLIFE RESOURCES IN BRITISH COLUMBIA

The number of hunters, their hunting success, and their opinions about hunting have traditionally been an important measure of public appreciation of wildlife resources and of the management of these resources. The activities of the Fish and Wildlife Branch have in the past been financed solely by sportsman revenue, and the Branch is the only Government agency charged with the responsibility of managing wildlife resources in the Province, including the many non-game species comprising our wildlife endowment. Under these circumstances, wildlife management activities have in the past been oriented to hunting and the hunter. Virtually no measure of the nature and extent of non-consumptive use of wildlife exists in the Province, and there are, consequently, few criteria by which public need for non-consumptive use of wildlife can be expressed or rationally accommodated.

The Hunter in British Columbia.—The number of licensed hunters increased 2 per cent in 1968, to a total of 145,052 residents and 7,093 non-residents. Table 1 shows the trend in hunter numbers for the past five years in the Province.

Table 1.—Number of Licensed Resident and Non-resident Hunters in British Columbia, 1964–68

	Residents	Non-residents
1968.....	145,052	7,093
1967.....	143,021	6,933
1966.....	134,351	6,635
1965.....	134,448	5,797
1964.....	130,151	5,265

Game Harvests in British Columbia.—Harvest statistics for the 1969 hunting season are not yet available for publication in this report. Those for the past several years are presented in Table 2, and illustrate a general upward trend for most kinds of game. Elk and bighorn sheep harvest estimates have tended to show a decline in recent years, reflecting a decline in the population of these animals, mainly in the East Kootenay region of the Province.

Table 2.—Summary of the Game Harvests by Residents of British Columbia, 1950–67

Species	1950	1955	1960	1965	1966	1967	1968
Deer.....	18,165	50,918	58,572	56,877	76,692	70,534	77,013
Moose.....	3,330	6,198	11,293	15,183	19,940	19,397	22,469
Elk.....	—	1,594	2,669	1,800	1,970	1,709	2,257
Caribou.....	—	—	—	521	798	1,577	830
Goat.....	—	—	—	1,967	1,762	1,191	1,661
Sheep.....	—	—	—	242	225	221	267
Ducks.....	316,175	305,358	390,004	474,670	491,493	483,182	381,819
Pheasants.....	31,475	36,788	46,611	39,223	29,207	32,324	23,531
Grouse.....	222,100	186,552	343,962	621,162	508,514	978,485	623,979
Licensed hunters.....	67,396	82,459	113,203	134,448	134,351	143,048	145,052

Hunter Success in British Columbia.—The seasonal success of hunters in the Province provides an additional indication of hunting quality and trends in the Province. This information is given in Table 3 for deer and moose, the major big-game species harvested. As shown in this table, success in recent years has remained relatively stable, further indicating that, despite a steady increase in hunter numbers,

wildlife populations have been capable of sustaining this use. Figures for 1969 are not yet available for inclusion in Table 3. For reasons explained elsewhere, success will be lower in 1969.

Table 3.—Season Success for Deer and Moose Expressed As the Per Cent of Hunters Hunting These Species Who Bagged One or More Animals (Some Hunters Bag More than One of Each Species).

	Moose (Per Cent)	Deer (Per Cent)
1968	44	79
1967	50	74
1966	49	82
1965	45	61
1964	42	78

The sex and age composition of the harvest, as contained in Table 4, has remained fairly stable for the past several years. Despite changing season lengths and variations in opportunity caused by weather, the male/antlerless ratio in most big-game harvests has remained stable.

Data relating to hunter numbers, their success, and wildlife harvests indicate that, on the average, wildlife resources in the Province are capable of sustaining present levels of use at least. Local variations are not shown by these data, nor is the distribution of hunting pressure and harvests. In the main, local variations and trends in harvests and populations of game are not a cause for concern, with the exception of the East Kootenay Region.

*Table 4.—Composition of the Game Harvest, Expressed in Per Cent
Male and Antlerless Animals*

Year	Ratio	Caribou ¹	Elk	Moose	Goat ¹	Deer
1964	Male	78	37	59	53	66
	Antlerless	22	63	41	47	34
1965	Male	76	48	57	55	67
	Antlerless	23	50	40	42	33
1966	Male	75	66	54	53	70
	Antlerless	23	33	43	45	30
1967	Male	63	63	52	57	65
	Antlerless	35	35	45	42	32
1968	Male	74	57	56	54	71
	Antlerless	26	42	44	45	29

¹ Antlerless (females and young of the year).

Hunting success for the 1969 season will fall below the past five years' average in most areas of the Province. A severe winter in 1968/69 caused widespread mortality in big-game populations in southern areas of the Province, while northern regions were more fortunate. The effects of this winter on game were reported in a Wildlife Management Division publication, "1968/69 Winter Hard on Deer," by Ian Smith, wildlife biologist, available from the Branch on request.

The decreased success on big game in 1969 is partly attributable to unusually mild fall weather throughout the Province.

Road-check results have indicated reduced success in 1969. Vancouver Island and Mainland Coast checks showed about a 50–60 per cent reduction in success, and it is expected the season harvest will decline by about 40 per cent.

South Okanagan and Kootenay region road checks similarly indicated reduced success, about 40 per cent.

Hunter-success data from the Cache Creek check (Table 5) is mainly derived from the more northern management areas of the Province, and illustrates less decline in hunter success than was experienced in southern management areas in 1969.

Table 5.—Cache Creek Check-station Results

	1965	1966	1967	1968	1969
Moose.....	5,931	7,264	7,258	6,661	5,336
Deer.....	2,232	3,008	3,635	2,678	2,761
Goat.....	138	197	183	163	148
Sheep.....	54	74	63	59	49
Black Bear.....	149	138	121	209	135
Caribou.....	213	414	514	366	351
Elk.....	13	22	21	43	20
Waterfowl.....	7,118	7,265	6,720	6,298	6,967
Grouse.....	5,894	6,494	17,482	14,399	23,715
Residents.....	17,424	19,123	20,503	19,198	20,919
Non-residents.....	3,384	4,093	4,106	3,908	3,610

Non-resident Hunting.—Table 6 summarizes non-resident hunter activity in the Province over the past 19 years. As shown, there is a gradual increase in the annual participation by non-residents, and a corresponding increase in wildlife harvested. Most non-resident hunting centres on the trophy species, usually in the more remote areas of the Province. For this reason there is a minimum of conflict between non-resident and resident hunters in the pursuit of the rare species of big game, such as thinhorn sheep, caribou, and grizzly bear.

Table 6.—Big-game Harvest in British Columbia by Non-residents, 1950–68

Year	Licence Sales	Deer	Moose	Elk	Goat	Sheep	Caribou	Grizzly Bear	Bear Black
1950.....	2,535	379	1,012	109	238	90	60	90	123
1951.....	3,333	396	1,389	114	198	101	75	112	164
1952.....	1,018	59	104	26	192	71	57	78	102
1953.....	3,211	306	1,140	113	257	116	85	97	166
1954.....	2,675	306	1,015	100	212	105	70	110	176
1955.....	2,639	353	1,164	111	235	85	87	104	136
1956.....	2,897	310	1,245	123	203	108	88	95	149
1957.....	3,186	263	1,287	121	330	136	129	127	186
1958.....	2,989	318	1,268	169	305	147	98	104	108
1959.....	3,392	357	1,368	140	259	119	150	141	220
1960.....	3,767	407	1,649	145	445	192	217	153	190
1961.....	3,826	393	1,878	137	392	191	197	128	132
1962.....	4,370	435	2,047	176	433	214	270	184	206
1963.....	5,226	467	2,436	214	560	312	290	166	163
1964.....	5,265	427	2,512	178	439	271	331	193	183
1965.....	5,797	307	2,817	194	580	390	397	241	244
1966.....	6,635	352	3,266	184	692	376	578	212	250
1967.....	6,933	417	3,328	182	569	392	492	181	152
1968.....	7,093	383	3,285	205	621	415	611	268	368

The regulation of the consumptive use of wildlife resources in the Province has been effective in two ways. Hunter success is generally high throughout the Province, and wildlife populations have been able to sustain the use to which they have been put. Annual census programmes, game checks, hunter samples, and other information systems have become a routine and effective means of acquiring data, enabling continuation of public use of wildlife.

PROTECTION OF WILDLIFE RESOURCES IN BRITISH COLUMBIA

Protection of wildlife and its habitat is the more important of the two major components of wildlife management. This role is more diverse in terms of the activities associated with it, and is often the more difficult in many ways to achieve.

The preservation of habitat is of paramount importance in protecting wildlife, and the loss of habitat is the most common event likely to occur in the rapidly evolving social and economic trends in British Columbia. Strip mining, river basin developments, settlement of land for both rural and urban development, widespread use of pesticides, and use of range by domestic live stock are examples of the social and economic forces in the Province having a profound impact on wildlife populations and their habitat, and which for many reasons are an inevitable consequence of human population growth and behaviour.

Management of wildlife must recognize that loss of populations and habitat is inevitable, but must on the other hand tailor its endeavour to meet public needs for the resource. This process implies that we must be able to identify the public need for wildlife, and that conflicting demands on wildlife habitat must be curtailed when the supply of wildlife falls short of public demand for the resource. Improved production techniques and improved rationing of the resource are important and continuing needs in management, the former of which we are just beginning to attempt.

The Wildlife Management Division has conducted a variety of activities relating to the protection of the resource.

Economic Studies

These continued in 1969 with the completion of a study on the non-resident hunting industry, the commencement of economic studies of the resident hunting industry, and economic consequences of the Creston wildlife developments within the Creston Valley Management Area. These studies will complete a series of such studies that have been conducted in recent years, the results of which have been published and which are available in limited supply.

River Basin Study Activities

Several major hydro dam projects have been undertaken in the Province in recent years, all of which greatly influence wildlife resources. In 1969, studies on the effect of the Libby project on wildlife were completed, and methods of mitigating losses were proposed. Similar work has been done this year in the Ross project area near Hope, and studies of the post-impoundment effects of the Peace River project on moose populations were continued.

While no mitigation measures have yet been undertaken as a result of this work, experience in assessing the effects of impoundment on wildlife has been gained, and the extent of wildlife-resource losses documented.

It is anticipated that the Libby project will displace about 6,000 whitetail deer and 500 elk, and that displacement of settlement, roads, and other amenities will further reduce wildlife capabilities of the area.

Habitat Inventory Activities

The Wildlife Management Division has continued to provide advisory service to the ungulate sector of the Canada Land Inventory staff, and to participate in various committees established for the inventory programme. Mapping of land capability for ungulates has now been done over much of the Province, the results of which will be integrated with other resource capabilities and subsequently in-

cluded in published maps of primary land capabilities. This information will provide a useful technical basis for land-use planning in the Province, including wildlife resources.

Land-use Activities

Numerous activities and events have occurred in the past year that can most conveniently be described under "land use." These include:—

- (a) A continuous review of applications for the purchase and lease of lands throughout the Province is maintained in co-operation with the Lands Branch, resulting in recommendations designed to protect wildlife resources from conflicts with other land uses. In many instances, arising from this work, applications for land purchase and lease are disallowed, thereby affording protection to wildlife resources.
- (b) Reserves are frequently established on areas of particular importance to wildlife in co-operation with the Lands Branch and other agencies in Government. Many of these include wetlands and coastal marshes of importance to waterfowl and waterfowl hunting. A total of 12 such reserves of varying status was created in 1969, covering some 96,000 acres. A total of 44 such reserves now exists in the Province.
- (c) For the second year, an extensive survey of wildlife winter ranges in the Peace River region has been conducted in co-operation with the Lands Branch and Grazing Division, resulting in the establishment of four major reserves, with provision for multiple-resources use, including wildlife resources. These reserves are new in their concept and status, and should provide long-term protection of important wildlife habitat in the event they become permanently allocated under reserve status.
- (d) In 1969 the Government announced that a Ministers' Committee on land use, and other committees for this purpose, had been established to review land-use matters in the Province. The Wildlife Management Division has contributed technical information on wildlife for this programme. This is the first time that a comprehensive arrangement in Government has been made to study land use with wildlife resource needs included in such considerations.

Pesticide Study Activities

The Division received 167 samples of fish, birds, mammals, and shellfish. Of these, 119 or 71 per cent contained residues of DDT, DDD, DDE Dieldrin, Aldrin, Heptachlor, Heptachlor epoxide, Lindane, and mercury.

WATERFOWL MANAGEMENT

Waterfowl resources are largely under the jurisdiction of the Federal Government; however, the Province has traditionally been very much involved in the preparation of migratory bird regulations, preservation of wetland habitat, and assessment of waterfowl harvests.

These activities were continued in 1969, in co-operation with the Canadian Wildlife Service.

Ducks Unlimited (Canada) established a working staff in the Province for the first time in 1969, and initiated several wetland development works during the year.

A Technical Committee on Waterfowl Management was established in the Province in 1969, consisting of representatives of the Canadian Wildlife Service, Fish and Wildlife Branch, and Ducks Unlimited (Canada). This committee is structured to co-ordinate waterfowl management programmes in the Province, re-

view technical programmes and results, and to maintain a constant review of matters affecting migratory bird populations and the hunting of this resource.

Several events of note respecting waterfowl resources occurred during 1969. These include:—

- (a) The commencement of wetland developments in the Creston Valley Wildlife Management Area.
- (b) Internal pothole and dyke construction works on the Serpentine Marsh unit.
- (c) The construction and seeding of islands in the Pitt Marsh for nesting habitat.
- (d) A contracted study of waterfowl habitat and hunting opportunity in the Lower Mainland Region.
- (e) Engineering studies of the Duck, Barber, and Woodward Island Marshes in the Fraser River. These studies have been designed to indicate development possibilities, and the costs of such work for waterfowl habitat improvement.
- (f) Plans are being formulated for a comprehensive programme of waterfowl habitat improvement in the Lower Mainland Region, including the development of hunting opportunity.

TECHNICAL WILDLIFE MANAGEMENT ACTIVITIES

The annual operation of the Cache Creek Checking Station provides important information on the moose and deer populations of the Central and Northern Interior. Increased numbers of hunters predicated a fundamental change in the method of recording the data. Based on a preliminary trial in late 1968, the 1969 operations of Cache Creek were compiled on a computer. The change-over required renovations to the station and retraining of branch personnel. The new method worked very well and the results of Cache Creek were available two weeks after the station closed, instead of several months later.

The fourth year of the five-year mule deer trapping and tagging programme was completed on the Dewdrop ranges, north and west of Kamloops. Over 150 deer captures and recaptures had been made, and thus far returns of 19 marked deer have been received from hunters. The conclusion so far is that the members of the mule deer population being studied are remarkably faithful to small territories on a specific winter range.

The experimental burning for production of moose winter range was continued in Wells Gray Park. Over 600 acres of Green Mountain were burned before hot, dry weather forced a cancellation.

Wildlife Management's involvement in waterfowl was expanded into the Cariboo area where a pothole fencing project was initiated on the Beecher's Prairie area west of Williams Lake. Three potholes were fenced in an effort to assess the possible effects of cattle on the ability of these potholes to produce waterfowl.

The effects of the severe winter were expressed most significantly in the Okanagan area through heavy losses in the introduced upland game birds of the Okanagan. Up to 90 per cent of the quail population was believed lost due to extremely cold temperatures and deep snowfall.

WILDLIFE RESEARCH

An assessment of the parasite burdens of several bands of Rocky Mountain bighorn sheep form the major component of one investigation. Results indicate few differences in the parasitic species present, but showed a positive role of certain

parasites in the die-off of East Kootenay sheep. The lungworm plays an important role and for the first time quantitative proof has been provided to support a long-standing suspicion. The roles of other abundant parasites are not clear, but it is suspected that they may have substantially increased the stress placed upon bighorns by a deteriorating environment.

The maintenance of captive bighorns has provided useful information about parasitic infections. Development of a lungworm infection in a lamb born in captivity provided some evidence for a direct pre- or post-natal transfer of infective larvæ. The seasonal production of parasitic larvæ in captive sheep provided quantitative results useful in the interpretation of field assessments of lungworm burdens in wild bighorns.

Since 1965, five important big-game winter ranges in the Rocky Mountain Trench have been intensively studied. Basic ecological descriptions, which include soil surveys, an assessment of climatological variables in relation to range production, and measurements of range condition and utilization by domestic and wild stock have been completed. Reseeding and fertilizer trials were included in this investigation to assess methods suitable for revegetation programmes. Currently, results obtained from the past four years are being analysed and prepared, together with recommendations for management programmes for each range. Additionally, a large number of plant samples are being chemically analysed to determine the nutritive quality of the untreated plant species as well as those which have been fertilized to increase production.

Winter counts of bighorn-sheep bands which suffered losses during the die-off have continued for four consecutive winters. No severe losses were recorded last winter, even though it was one of the worst on record. The bands affected in the 1965/67 die-off have recovered to different degrees, with no signs of improvement noted at Premier Ridge, Columbia Lake, or on the Bull River range. In terms of numbers and productivity, some recovery has been recorded for the Estella Mountain and Radium bands, with the Wigwam band still in the best condition with relatively high lamb production compared to other bands.

In March, a total of 16 bighorn lambs and ewes were trapped on the Wigwam winter range. Of these, four lambs were tagged and released and 12 ewes were shipped to the Research Section at the University of British Columbia for intensive study.

The tooth-annulation method of aging deer was verified by the use of a series of known-age jaws of black-tailed deer from Vancouver Island. This information, together with the age analysis of a large collection of jaws from deer of unknown age, by both annulations and tooth wear, will permit an evaluation of this latter method.

A similar study was carried out on moose jaws obtained from the Cache Creek Checking Station. From jaws aged by tooth wear a series of incisors were extracted, decalcified, sectioned, and stained. Initial examinations have verified the inherent errors of age estimation by tooth wear.

The Wildlife Research and Technical Services Section has been involved in five student programmes which have completed one summer's field activities, seven investigations which are more advanced and include two or more years of active student research, and was involved with two research projects which were completed in 1969.

GENERAL CONSERVATION ACTIVITIES

In perhaps the most widely publicized branch project, a total of 29 sea otters was released at Bunsby Islands in an attempt to reintroduce this rare species to

Canadian waters. The original population was exterminated prior to 1930 by the fur trade. Sea otters were obtained from Amchitka Island in Alaska through the co-operation of the Alaska Department of Fish and Game and the United States Atomic Energy Commission. A similar number of animals was released at the same time off the coast of Washington. Subsequent surveys indicate that both introduced populations dispersed immediately. Scattered reports indicate that at least some of the animals were still alive by December, 1969.

In a departure from previous years, all collections of young Peale's peregrine falcons on the Queen Charlotte Islands were carried out by Fish and Wildlife Branch personnel. A total of nine birds was collected and these were distributed by lottery among those residents who had applied for permits. A fee of \$200 per bird was assessed. In past years, collecting had been done by the falconers themselves, but it was felt that this procedure led to undue disturbance of nest sites in addition to allowing a greater opportunity for outside poaching. Under the new regulations, only Fish and Wildlife Branch personnel have legitimate reasons for being in the nesting areas during the hatching period.

PUBLIC RELATIONS ACTIVITIES

In addition to regular staff meetings, wildlife biologists attended and participated in meetings of British Columbia Waterfowl Society, Canada Land Inventory, Northwest Section of the Wildlife Society, British Columbia Wildlife Federation, Western Association of State Game and Fish Commissioners, and British Columbia Association of Foresters.

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Smith, I. D., R. A. Demarchi, and D. Eastman (1969). The Wildlife Livestock Interactions of the East Kootenay Region. *Wildlife Management Rept.* No. 8, 1-33.

Spalding, D. J., and J. N. Bone (1969). California Bighorn Sheep of the South Okanagan Valley. *Wildlife Management Publ.* No. 3, 1-45.

The Division wrote an information pamphlet on the mountain sheep for the Information and Education Section. Staff biologists also wrote numerous articles for publication in the popular press.

PERSONNEL

During the year there were three changes in personnel. Mr. D. A. Blood resigned his position in Nanaimo to assume duties as the Chief Wildlife Ecologist with the Saskatchewan Natural Resources Department. Mr. I. D. Smith assumed Mr. Blood's position as Regional Wildlife Biologist for Vancouver Island. Mr. R. A. Halladay assumed Mr. Smith's position as Project Biologist responsible for waterfowl in Victoria.

FISHERIES MANAGEMENT

Revenue from the sale of angling licences of all types exceeded \$1,000,000 for the first time in the 1968/69 fiscal year. The total revenue from the sale of angling licences for the preceding two years (1966/67 and 1967/68) was \$738,662 and \$763,204 respectively. The increase in revenue was due largely to the increase in licence fees which took place in 1968, but was also the result of a steady increase in the numbers of all types of licences sold. Sales of angling licences to residents of British Columbia have increased to 186,744 from 134,690 in 1959, while the numbers of anglers from other Canadian provinces have increased from 8,709 to 21,954 during the same period.

A total of 103 full lake surveys and 35 partial surveys was completed in 1969. The two-man crews travelled over 25,000 miles between May and October in surveying water in virtually all parts of the Province. Most of the lakes surveyed were in the Northern Region (53), while 35 were completed in the Okanagan, 20 on Vancouver Island, 15 in the Kootenays and 12 in the Mainland-Coast Region. Areas where no surveys had previously been carried out included Northern Vancouver Island, the Lillooet-Pemberton area, and the McBride Region of Northern British Columbia. In addition to mapping and sounding each lake, samples of water and plant and animal life were collected, and water temperatures and dissolved oxygen levels were determined. Collections of fish were also made from most lakes, and livers from most of these were preserved and forwarded to the Department of Geology, University of British Columbia, to assist in their studies of the distribution of heavy metals in the Province.

In the course of compiling Province-wide steelhead catch and angler-use information, questionnaires were sent to 22,968 of 39,775 licensed steelhead anglers in March of 1969. The response was excellent and replies were received from 10,239 people. Computer analysis of these provided a reliable indication of the extent and character of this almost unique fishery.

Results indicate that only 19,789 licensees actually went fishing for steelhead in 1968/69, and of these only 7,834 people were successful at landing a steelhead. However, those who were successful took a total of 41,672 of these large sea-run rainbow trout. It is estimated that anglers spent over 189,000 days in pursuit of steelhead in 252 rivers and streams of the Province. Top steelhead-producing rivers were the Vedder, with a catch of 3,677; the Thompson, 2,609; the Bella Coola,

1,499, and the Cowichan, 1,346. Information of this kind is a great aid to the Branch in managing and protecting the steelhead populations of the Province.

Through the courtesy of the Fisheries Service, Canada Department of Fisheries and Forestry, studies of the steelhead and the steelhead fishery of the Big Qualicum River continued through the 1968/69 season. Information gathered on the spawning activity of this species included time of spawning, distribution of "redds" or nests, and the depth, velocity, and temperature of the water at the redd sites. Age and growth studies based on scale measurements were continued. The 1969 fence count of steelhead was 531. Total catch both below and above the fence approximated 250 fish, some 40 fish less than the preceding year.

HABITAT PROTECTION

Surface mining continued to be of particular concern during much of 1969, because stream pollution is often the major adverse ecological effect of this industrial activity. The Branch participated directly in drafting of regulations under the *Mines Regulation Act* which require reclamation of lands and protection of watercourses affected by surface mining. The Branch is also represented on the Advisory Committee on Reclamation, a group of persons from several Departments who are responsible for administration of the reclamation regulations. The regulations require that mines using surface-mining methods must submit reports which include plans for reclamation and conservation of mined lands, considering the location of the land, live-stock grazing, wildlife, watercourses, farms, inhabited places in the vicinity, and aesthetics. To date, mining companies have generally complied well with these regulations.

Construction of roads and railroads to serve various industrial sites has caused some concern. In the Kootenay region, sloughing and siltation from two logging-roads near Kootenay Lake have resulted in degradation of fish habitat in Lardeau River and in the Meadow Creek spawning-channel. At both sites, interim corrective measures have been undertaken to alleviate the problem until more permanent solutions can be effected. Plans for highway construction from Williams Lake to Bella Coola (adjacent to Atnarko River) have been reviewed by the Branch and habitat protection measures recommended. Similar measures were recommended for a road planned to run adjacent to a fish-producing stream between Gold River and Tahsis. Two new railroad spur-lines are planned to service recently reopened coal fields in Elk Valley near Fernie; in both instances the constructing companies have agreed to undertake special fish habitat protection measures. Some channel "improvement" work to facilitate relocation of a railroad at St. Mary River was reviewed and approved.

Two major water-storage proposals were investigated. The Canadian portion of the future Libby Dam pondage was surveyed to determine the likely sport-fishing use of the area and to determine if steps might be taken to compensate for the loss of the sport fishery in lower Kootenay River. Production of sport fish will likely be poor in the reservoir because of extreme annual water-level fluctuations; therefore, compensation measures will be difficult to devise within the reservoir. A preliminary survey of the intended 125-foot water level increase at Ross Lake reservoir near Hope has shown that about 10 miles of excellent spawning-gravels and sport-fishing opportunity in the Skagit River will be lost through inundation. Substitute spawning-grounds could be developed in other tributaries to the reservoir, if necessary, but the high-quality stream sport fishery could not be replaced.

A co-operative study was begun with the Fisheries Service, Department of Fisheries and Forestry, of the ecological effects of a proposal by Greater Campbell

River Water District to obtain domestic water supplies from Quinsam River near Campbell River. The study will provide suggestions for alternative sources of supply and methods of preserving the valuable commercial and sport-fish populations of the lake and river system.

At Keenleyside (Arrow Lake) Dam, previously unforeseen problems of obstruction of fish runs have arisen at the dam itself, where runs of large rainbow trout and Dolly Varden char appear to congregate at spawning time. At Inonoaklin River, at Edgewood on Arrow Lake, approximately 22,000 kokanee were halted in their spawning migration from the lake by a waterfall which now, after flooding, is situated at the lakeshore. Previously, these fish spawned between the lake and the falls. Negotiations to correct these problems are in progress.

Control of "outfall" type industrial pollution is now the responsibility of the Pollution Control Branch. The Branch, and primarily the Habitat Protection Section, now serves as an adviser to the Pollution Control Branch in matters of protection of fish, wildlife, and recreation related to industrial pollution. This Branch reviews each application which the Pollution Control Branch receives for disposal of wastes. During the year, measures for protection of wildlife and recreation were included in several permits at our request. The most important of these were in permits for Utah Construction and Mining Company and Reeves MacDonald Mines Limited to discharge ore milling wastes to Rupert Inlet (west coast of Vancouver Island) and Pend-d'Oreille River (Kootenay Region) respectively, as well as for Hiram Walker and Sons Distillery to discharge cooling water effluent to Vernon Creek near Winfield, and for the Village of Houston to discharge sewage wastes to Bulkley River.

Monitoring surveys of the effects of waste discharges on aquatic organisms are undertaken as it appears appropriate, primarily to provide information to the Pollution Control Branch. During 1969 these surveys continued on Columbia and Kootenay Rivers to monitor effects of pulp-mill effluents, and on the Similkameen River to establish background data in the event of future mining development. A new survey was begun on the Elk River near Fernie to monitor the effects of nearby surface mining for coal. In other programmes, fish samples were analyzed for pesticide and heavy metal content.

At intervals, bioassays of materials which are suspected of being toxic to fish are conducted. To date, materials tested include pulp-mill wastes and various pesticides. These tests provide information for setting standards for treatment of industrial wastes and for other control measures. A serious limitation of the standard 96-hour bioassay is that it does not consider the long-term sublethal or disabling effects which a toxicant may inflict on fish without killing them directly. These disabling effects may limit the ability of a fish to compete for food, make fish more susceptible to attack by predators, or decrease reproductive success. Other subtle but harmful changes in physiology and normal response may also occur. Using a relatively unique technique, responses of salmonid fish to sublethal quantities of a toxicant are now being studied in our laboratory. An artificial stream with a cobble bottom and flowing water has been built to duplicate stream conditions as closely as possible. Activities and responses of fish in polluted and unpolluted conditions are compared. The results of these studies will aid in defining water quality standards to assure the safety of fish.

Some very worth-while relationships have been developed with other resource management agencies within Government and with representatives of some industries. As stated previously, the Branch has worked with the Department of Mines in drafting and administering surface mining regulations. Federal and Provincial fisheries agencies are developing arrangements with the Forest Service for involve-

ment in approval of logging plans. The Department of Highways provides this Branch with notice of most new road construction plans for advice on wildlife and recreation protection. Continuing contact is also maintained with several large mining and logging companies.

HABITAT IMPROVEMENT

A large number of proposals for improving trout waters have been reviewed during the two-year existence of this Section. Surveys have been made and project priorities established on the basis of developing the most angling opportunity for the least cost.

Construction in 1969 included the provision of shallow holding and rearing areas for cutthroat fry in the Ruby Lake spawning-channel on the Sechelt Peninsula. This type of desirable habitat in which the fry could hold and (or) develop had been unavailable in the natural stream course, or in the artificial spawning section.

At 83 Creek in the Cariboo, a study showed that large rainbow trout from Green Lake entered the creek to spawn during spring freshets, became stranded by subsequent low flows, and both they and their eggs were lost. During 1969, extensive channel improvements were made in the lower reaches of this stream and 900 square yards of gravel were provided for spawning trout. A small spring immediately above this improved section will provide enough cool water to sustain at least a small percentage of the adults and fry. Test wells were drilled to explore a possible groundwater supply to augment stream flows, but present indications do not justify a production well.

A proposal is being reviewed for the diversion of part of the flow of Mutton Creek into Alces Lake in the Kootenay Region. Stagnant water in this lake adversely affects the quality of the adult rainbow trout. An introduced stream would allow natural spawning to take place, thus obviating the necessity to stock the lake. Conditions for growth of trout in the lake would also be improved. A redirection of Alces Lake out-flow to nearby Whiteswan Lake would provide the adult rainbow there with a similar spawning opportunity. Experience gained on past projects indicates particular promise for spawning improvements such as this on streams situated between lakes. The upper lake acts as a buffer to reduce stream freshets which tend to erode gravels and wash out facilities, and the lower lake acts as a catch basin for fry which move downstream.

The largest run of Meadow Creek kokanee ever actually enumerated by the Branch moved into the stream from Kootenay Lake during the fall of 1969. A total of 250,500 adult fish were counted through the fence at the lower end of the spawning-channel, and 127,000 of these were allowed to pass through the upper fence to the upstream portions of the creek. Approximately 150,000 more kokanee spawned in the lower reaches of the stream between the Duncan River and the spawning-channel. An additional 8,400 fish spawned in John Creek, a small tributary to the channel. Studies of egg survival and fry emergence will be carried out to determine the relative efficiency of the natural and improved areas of the stream, with particular attention being paid to the progeny of the 123,000 adults which spawned in the channel.

The chemical treatment phase of the rehabilitation of Allison (One Mile) chain of lakes near Princeton was completed in early September. The Allison chain consists of five highly productive lakes adjacent to Highway No. 5 north of Princeton. They are Allison Lake, Dry Lake, Borgeson Lake, Laird Lake, and McCaffrey Lake, plus peripheral streams and swamps. Although easily accessible to the fishing public, this system has rated as a poor fishery for some time for the reason common to many Interior lakes. The presence of coarse fish—five species—resulted in slow

growth and poor survival of trout. During autumn of 1968, members of the Princeton Fish and Game Association, under the direction of the Fish and Wildlife Branch, completed a concrete coarse-fish barrier downstream from the lake system. In spring and summer of 1969, Branch fishery workers surveyed the lakes and the peripheral streams and swamps for water volume and fish species present, and organized men, material, and equipment for the rehabilitation project. This project was one of the largest rehabilitations undertaken by the Fish and Wildlife Branch in recent years. Eighteen Branch workers and 22 Princeton game club members actively assisted in the field. Eradication of coarse fish in all waters of the system required 4,860 gallons of liquid toxicant at an approximate cost of \$17,000.

FISH CULTURE

Permanent hatcheries at Abbotsford, Summerland, and Wardner are administered by a Fish and Wildlife Branch staff of 16 permanent and six to eight seasonal employees. A seasonal hatchery near Clinton, and, depending upon annual egg requirements, 10 to 15 egg-collecting stations, are operated in the spring and fall months. Species of fish cultured in 1969 included rainbow, coastal and Yellowstone cutthroat, eastern brook, lake trout, and kokanee. Public interest in our fish cultural activities remained high as over 16,000 people visited the three permanent hatcheries during the year.

Successful collections of rainbow, cutthroat, and kokanee eggs provided over 15 million eggs in 1969. More than 9 million rainbow trout eggs were obtained from tributary streams of Beaver (Swalwell), Bouleau, Niskonlith, Pennask, Premier, and Tunkwa Lakes. As a result of low numbers of spawning kokanee in the Eagle River in 1967 and 1968, alternate sites for collecting kokanee were selected in 1969. Another poor run occurred in the Eagle this year, but 5.7 million eggs were collected at other sites such as Lamb Creek (Moyie), Middle Shuswap River, Okanagan River, Upper Shuswap River, and Paleface Creek (Chilliwack). About 62 per cent of all eggs came from the Okanagan River near Penticton. Adequate numbers of Yellowstone cutthroat eggs (300,000) were collected from Kiakho Lake (Cranbrook), but additional sites were explored in 1969 for possible operation in 1970. About 6 million eggs were shipped to other fisheries agencies as part of an exchange programme for species which we are unable to collect at present in this Province.

A total of 405 lakes were planted with 4,707,000 (42,500 pounds) fish varying in age from two to 16 months, and in size from 1 to 11 inches. The numbers of lakes and fish stocked were less than in 1968, but the average size of fish planted in 1969 (111 per pound) was almost twice the 1968 average (202 per pound). Aircraft were used to release 1.3 million fish in about one-half of all lakes planted this year. The total number and weight of each species liberated or stocked were as follows:—

	Number	Pounds
Cutthroat	139,700	897
Eastern brook	679,300	2,124
Lake trout	97,500	3,225
Rainbow	<u>3,790,419</u>	<u>36,341</u>
	4,706,919	42,587

For the first time, small numbers of Yellowstone cutthroat were successfully raised to one year of age. Prior to 1969, this species was planted in lakes at a much smaller size owing to high mortality among fish held after two months. A second planting of 97,500 lake trout, 4 to 6 inches in length, was completed in 1969 in an attempt to establish this species in Alouette Lake in the Lower Mainland Region.

Construction of an aeration tower, started last year at Kootenay Hatchery, was completed and functional in December, 1969. Well water flowing through a series of wooden slats becomes saturated with oxygen before being conveyed into the hatchery troughs and ponds. Design of Fraser Valley Hatchery commenced in August, when a firm of consulting engineers was retained to prepare preliminary plans for development of a new hatchery to replace the one presently located at Abbotsford. Topographic and soil surveys have been completed and several wells have been drilled and tested. Groundwater exploration will continue in 1970 to assure the necessary minimum water requirements of 5 million gallons a day. An enlarged hatchery at Abbotsford will relieve the demand presently placed on existing facilities at Fraser Valley Hatchery, as well as reduce the strain placed on the restricted rearing capacity of Summerland Hatchery. New traps and a fence (weir) were built at Pennask Creek to replace facilities destroyed during high water in 1968. Staff residence at Pennask, site of a late-maturing run of spawning rainbow, was renewed along with minor changes to the water system supplying egg incubation troughs. Maintenance of Summerland Hatchery was absorbed in 1969 by the Department of Public Works, which in November stationed a staff member at this hatchery for maintenance purposes.

Late in 1969 a used 3,200-gallon trailer tank was purchased, which, after conversion for transporting fish, will be used for fish transfers between hatcheries and for specified fish plantings requiring large numbers of fish in highly accessible lakes. The Alouette stocking in 1968 and 1969 involved in each year six trucks and 12 men, whereas the new tank, pulled by a tractor truck, could transport the same weight of fish, with one fish culturist accompanying the driver.

Trout foods from two companies are being compared at Summerland and Kootenay hatcheries by feeding large numbers of rainbow on equal food rations of each food type. Growth and mortality of experimental lots will be compared, as will the pesticide residues in the food and fish. Marked members of fish raised on each food type will be released into the same lakes to evaluate survival to maturity.

A study of the effects of high and low temperatures on incubation of rainbow-trout eggs was started but had to be terminated when equipment designed to control water temperatures failed. Preliminary results indicated at least twice the mortality in eggs incubated at 38° and 62° F. compared with 42° and 58° F. This study will be repeated when suitable equipment is available.

Experimental rearing-ponds were constructed at Summerland to test the rearing capacities of circular and raceway type ponds. At Fraser Valley, fish are being held in groundwater, which is being pumped from the recently completed wells, in order to test the quality of this water for fish-culture purposes.

The biologist in the Fish Culture Section spent three weeks in Sweden gathering facts related to fish culture methods in that country.

Fisheries Research and Technical Services

Studies were continued at Loon Lake outlet on the factors which regulate juvenile trout production in rearing-streams. In spite of the large number and size of spawners in 1969 compared to 1968, numbers of fry entering the lake were lower than the former year (10,500 compared to 15,600), probably because of severe egg mortality caused by high stream temperatures and low subgravel oxygen levels. Yearlings and two-year-old juveniles did not appear to be severely affected, however, and production to the lake from these age-groups was above that in 1968. Effects of food supply on distribution and movement of juvenile trout have been examined experimentally.

Results of biochemical analysis of enzymes in trout populations living above and below waterfalls on a stream tributary to Kootenay Lake strongly suggest genetic differences between the two stocks. Differences in migratory behaviour are also appearing between these and other stocks tested in experimental flumes. Such evidence indicates that genetic differences may occur between specific strains which could be of profound importance in their use in fish culture and management.

Studies were continued to determine survival and growth of different sizes of hatchery-reared young trout stocked into Interior lakes. Fin-clipping appeared to have no significant effect on survival or growth of the young trout.

Oxygen requirements of newly fertilized eggs developing at different temperatures were determined in experiments at Summerland Hatchery. Older eggs at higher temperatures used more oxygen than younger eggs at comparable temperatures. Deterioration of dead eggs used as much oxygen as live eggs. Oxygen requirements of developing kokanee eggs from Skaha Lake were determined at different temperatures. Consumption of oxygen by kokanee eggs was much lower at all temperatures than that of rainbow-trout eggs.

An experimental introduction of young rainbow and brook trout into Yellow Lake indicated that brook trout survived better than rainbow during severe summer conditions (high temperature, low oxygen, heavy algal blooms) and could reach catchable size by late summer. An attempt to artificially circulate the lake in order to increase its over-winter oxygen supply and permit year-round maintenance of trout populations proved unsuccessful. The survival and growth of brook trout stocked into several lakes where conditions are poor for maintaining populations of rainbow trout have been studied. Results to date indicate that this species survives better than rainbow under such marginal conditions.

Spatial distribution and feeding of cutthroat trout have been examined in coastal lakes where they either live alone or with Dolly Varden. In lakes where the species occur together, each occupies a distinct zone during the summer, cutthroat largely inhabiting shallow, near-shore regions, while Dolly Varden are most abundant in deeper, offshore areas. These differences in distribution markedly affect their catch by anglers and suggest special considerations for management. Distribution, feeding, and growth of rainbow trout adults were studied in several coastal lakes and reservoirs where they live with cutthroat trout and Dolly Varden. This work was conducted by Dr. Nils-Arvid Nilsson from the Institute of Freshwater Research, Sweden, as part of a co-operative research exchange programme.

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PUBLIC INFORMATION AND EDUCATION

The gradual increase in public interest in the wildlife resources of the Province is indicated by the increasing number of inquiries received each year by the Information and Education Section. During the past year, over 9,600 various types of mail inquiries were handled. The number of telephone inquiries and the number of people visiting the office have also shown a sharp increase. The majority of inquiries are related to hunting and fishing; however, it is pleasing to report a great increase in the number of school teachers and students seeking general and specific information on fish and wildlife, and general conservation topics.

Through the co-operation of the Department of Education, 8,000 copies of conservation posters and classroom lessons were sent to schools in the Province during National Wildlife Week (April 6th to 12th).

Several news releases were prepared each month covering Branch programmes, season openings, and other topics of current interest to outdoorsmen. These releases are sent to all radio and television stations and newspapers in the Province.

The Monthly Activity Report is a summary of the activities of the various sections of the Branch. It is sent to all staff members, all newspapers (both daily and weekly), radio and television stations, rod and gun clubs, other branches of Government, as well as to interested members of the general public. Circulation at the present time is 900 each month.

Two new pamphlets, "Trout Hatcheries in British Columbia," and "The Sheep of British Columbia," were completed and made available for general distribution.

The portable public information display panels and sample "skin" mounts of the upland game birds, migratory birds, hawks, owls, and eagles have been in continuous use at various sport shows and by conservation officers in the six regions of the Province.

Conservation officers in various districts throughout the Province continue to carry out more and more public information and education programmes. Assistance in the form of display materials, films, slides, and printed information is supplied by this section.

HUNTER-TRAINING PROGRAMME

The Hunter-training Programme is being accepted by British Columbia sportsmen, adult education, and other organizations with much interest and enthusiasm. Organizations represented in the programme are fish and game, rifle and pistol clubs, Armed Forces and Armed Forces Cadets, Girl Guides, Boy Scouts and Ventures, men's clubs (Kiwanis, Kinsmen, and Rotary), fire departments, Royal Canadian Mounted Police, Canadian Legion, junior chambers of commerce, conservation groups, ski patrol clubs, cruising clubs, Guides Association, British Columbia Teachers' Federation, Dominion of Canada Rifle Association, British Columbia Corporation of Land Surveyors, British Columbia Safety Council, British Columbia Workmen's Compensation Board, British Columbia Mining Association, Canadian Petroleum Association, and British Columbia Institute of Technology.

The first instructors' course was conducted in February at Victoria, using the new training manual. Fifteen instructors' courses were conducted in 1969, qualifying a total of 289 instructors. These courses were held in Victoria, Vancouver, Campbell River, Nanaimo, Duncan, Kimberley, Creston, Trail, Winfield, Kelowna, Vernon, Penticton, Vanderhoof, Chilliwack, and Richmond.

The qualified instructors to date have completed 20 student courses, qualifying a total of 258 students. There are 20 student courses in progress at the time of writing this report. Eighty-four per cent of the students passed the course.

ENFORCEMENT

The usual enforcement activities, road checks, patrols and special investigations produced about 100,000 contacts with hunters, fishermen, trappers, guides, etc. This resulted in 812 prosecutions, up slightly from the 762 prosecutions in 1968, while fines increased to \$31,094 from \$29,645.

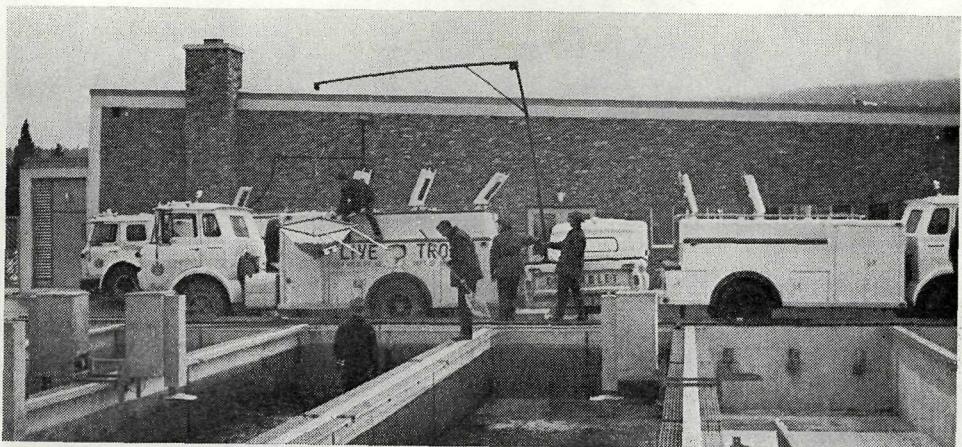
There were several projects aimed at improving the Branch's enforcement activities:—

Temporary conservation officers were used during peaking situations in the Cariboo, Kamloops, and North Okanagan Regions. Six ex-R.C.M.P. or conservation officers were used to increase surveillance on lakes of the Interior. Sheridan Lake, in particular, as well as Bridge, Loon, Heffley, Paul, Tunkwa, Lac Le Jeune, Niskonlith Lakes, and many others were checked repeatedly. Over 3,580 fishermen were contacted, leading to 42 prosecutions and 69 warnings. Three temporary conservation officers for special enforcement duties were used in the hunting season at Burns Lake and the East Kootenays.

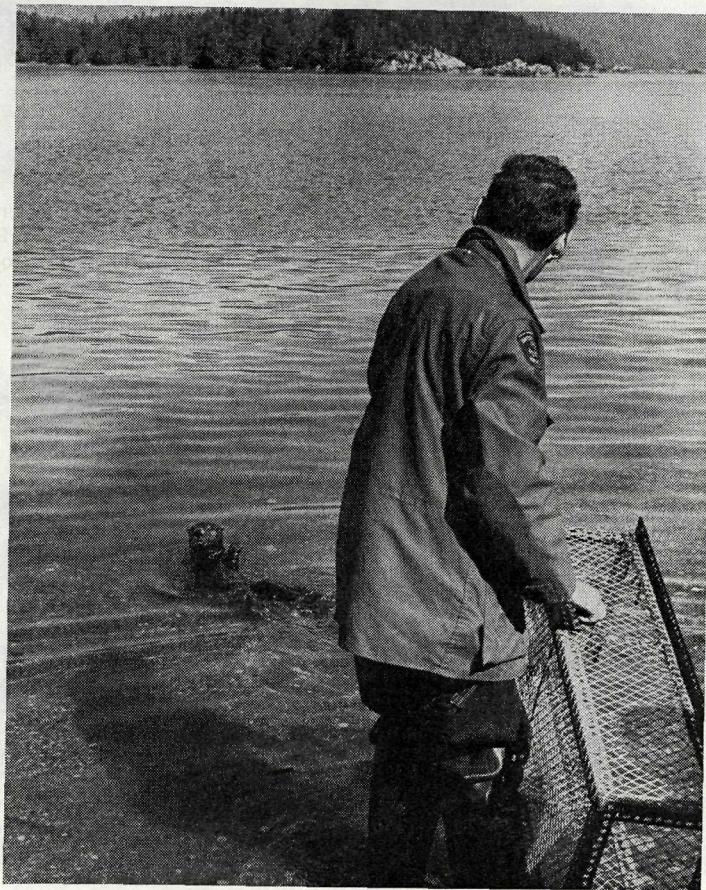
Kootenay Lake fishermen were subject to an enforcement study to measure the level of law observance by residents and non-residents. Local conservation officers, conservation officers from other areas, and R.C.M.P. checked fishermen by a set pattern so that results could be compared. The standards for the violation rate per 100 contacts will provide for better assessment of enforcement problems and how to handle them through better deployment of our staff.

The wildlife ticket was put into practice during the fall. It is similar to the traffic ticket under the *Motor-vehicle Act*, and provides a convenience to all concerned.

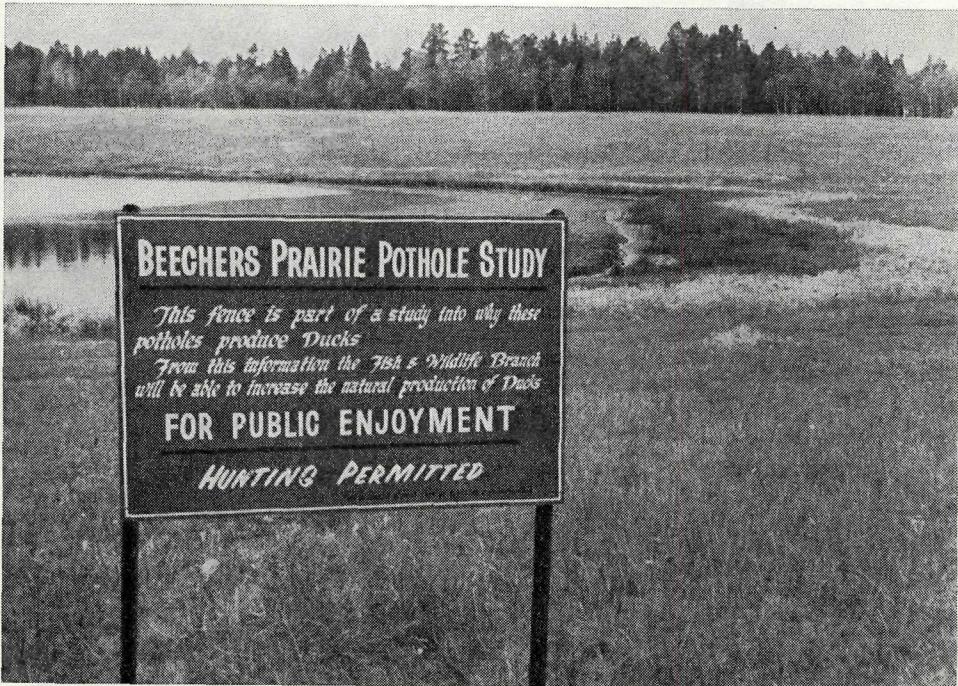
The addition of six more mobile radio communications sets brings added coverage to the previous 14 sets. Vehicles so equipped with these valuable aids to enforcement are located throughout the Lower Mainland, two on Vancouver Island, and others at Kamloops and Prince George.



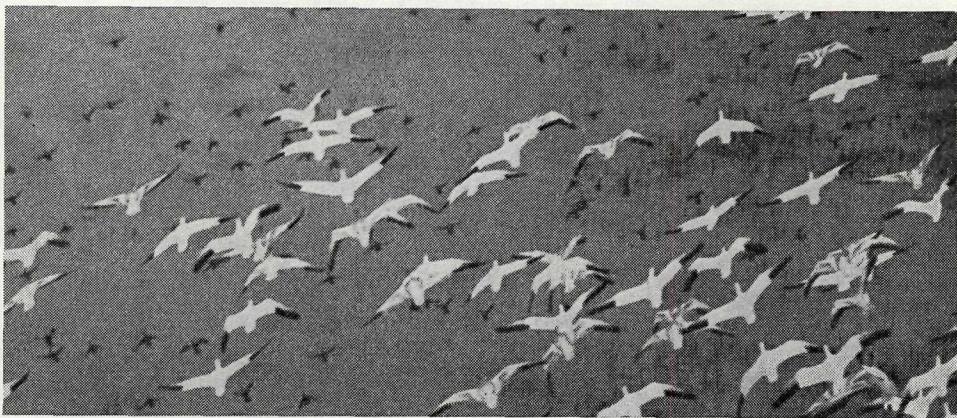
Hatchery tank trucks loading lake trout at Kootenay Hatchery for release in Alouette Lake.



The sea otter is released in British Columbia waters
after an absence of 40 years.



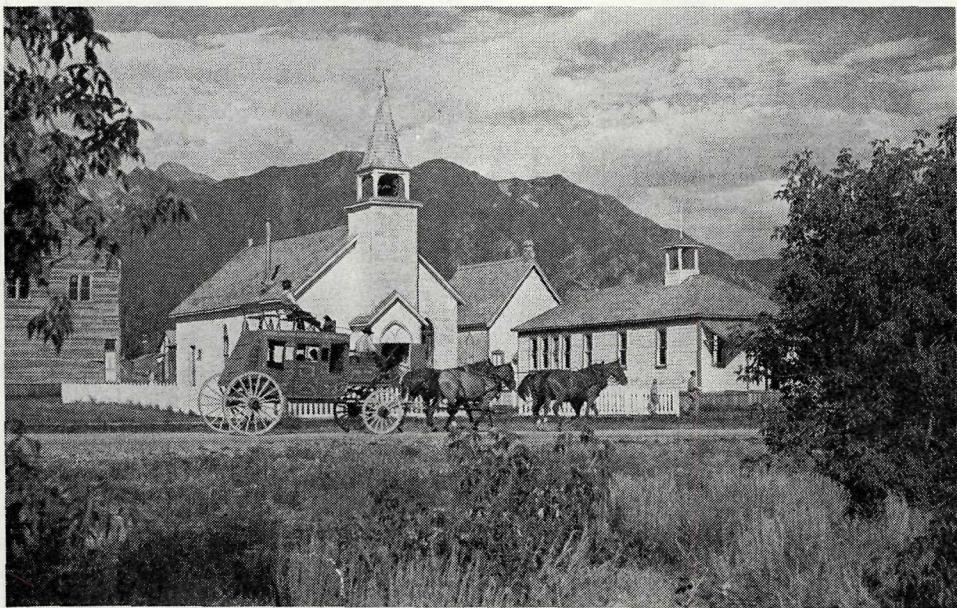
The disturbance by cattle of both the vegetation and the ducks while nesting is suspected as causing an area like this to produce fewer ducks than possible. The fence will keep the cattle away from the water and enable the Fish and Wildlife Branch to examine other natural factors which affect waterfowl production.



Snow geese (dark birds are young), produced in the Soviet Arctic, over the Reifel Refuge foreshore in British Columbia while migrating south to Oregon and California wintering areas.

PROVINCIAL PARKS BRANCH

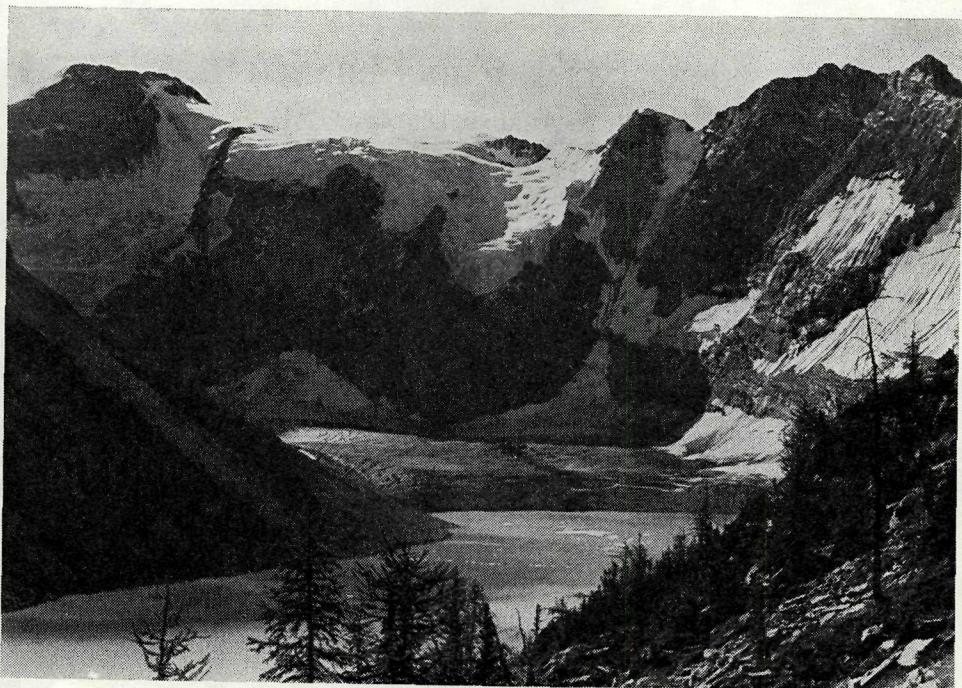




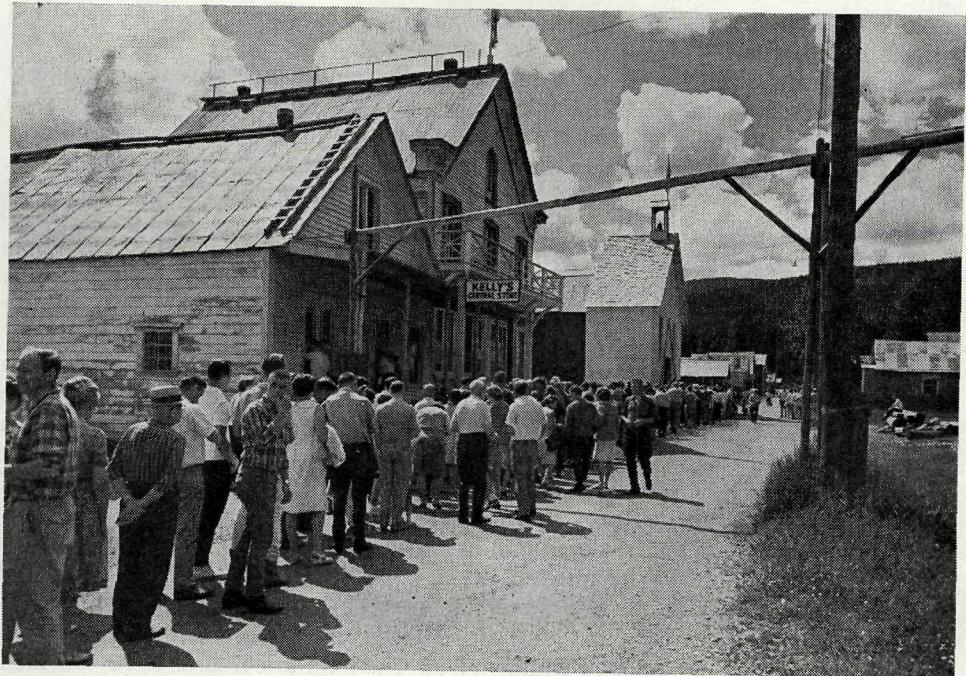
Passengers get a nostalgic view of restored buildings of Fort Steele as the stagecoach clatters along Riverside Avenue in this popular East Kootenay Park.



Park naturalist David Stirling talks about plants and their berries with two visitors at Miracle Beach Provincial Park.



Lake of the Hanging Glacier, focal point of a park proposal in the Purcell Mountains.



Line-ups for the Theatre Royal's lively stage shows indicate the summer popularity of educational and entertaining Barkerville Historic Park.

PROVINCIAL PARKS BRANCH

R. H. AHRENS, DIRECTOR

In 1969, the Provincial Parks Branch moved its headquarters to new offices in the Dogwood Building, 1019 Wharf Street, Victoria.

Fine spring weather advanced the season for heaviest public use of the parks. Some parks were fully used early in May. This reinforced a discernible trend whereby people, increasingly, are using Provincial Parks earlier in the spring and later into the autumn than hitherto. Participation in winter sports also continues to climb. The advent of popular ownership of the camper and travel trailer, together with improved equipment for travel, has contributed to this. The ramifications for park maintenance costs are obvious.

The Parks Branch capital development budget was augmented early in the year, which enabled, amongst other things, an increase of 8 per cent this year in the camp-site capacity of the Provincial Park system. Groundwork was completed for a new chair-lift and T-bar in Gibson Pass Winter Recreation Zone, Manning Park.

The Vancouver Park District Office and the Peace River Regional Office were posted for full-time staffing. A new position, Public Safety Officer, was filled and a programme put in motion to improve park supervisor training in public security, rescue, and police liaison.

A Young Men's Conservation Programme was initiated late in 1969 to serve as a work-training programme for unemployed and unskilled young men 18 years old and over. Training is being coupled with development of Rathetrevor Beach Park. Separate from this programme was the now-familiar Youth Crew Programme, which was expanded this year to 180 boys in nine camps widely dispersed through the Province.

Significant additions to the Provincial Park system include purchased property for a multi-recreation park at Nisconlith Lake, near Kamloops; acquisition through land-for-timber exchange of some private inholdings in a proposed natural-area park of outstanding attractiveness and potential at Cape Scott, Vancouver Island; and a beauty spot at Kelly Lake in the Cariboo District donated to the people of British Columbia by Mr. C. S. Downing.

Park master plans preparation focused on Strathcona and Mount Assiniboine Parks this year, while attention to site and facilities design focused on Claybanks Beach and Rathetrevor Beach Provincial Parks, as well as the Gibson Pass Winter Recreation Zone, Manning Park.

In 1969, the Park Interpretation Programme was extended to the Northern Park District with assignment of a naturalist to Crooked River and Ten Mile Lake Parks. The Parks Branch also operated an in-service training course for its own summer staff.

Parks Branch Extension Services included contact, in connection with Regional Park System studies or area provision, with 14 out of the 27 regional districts, or regional park districts, in British Columbia. The Parks Branch contributed funds and advisory assistance to the work of the newly created North Vancouver Island Work Committee on Multiple Use Development. The committee is arranging provision of public recreational facilities by various agencies, public and private, north of Gold River. A programme of contacting all Class C Park Boards to review their position and activate, or assist, their efforts was begun. An inventory of non-urban recreation facilities in British Columbia was organized to be carried forward with ARDA support.

The Parks Branch in 1969 maintained its direct contact with the Canadian Council of Resource Ministers in laying plans for a 1973 National Conference on Outdoor Recreation in an Integrated Resource-use Context. The Branch also participated in the Eighth Federal-Provincial Parks Conference at Jasper, Alberta, where the theme embodied a position review of parks and outdoor recreation areas and agencies in Canadian society. As well, the Branch again contributed to the Fifth International Short Course on Administration of National Parks and Equivalent Reserves.

The Parks Branch was most fortunate in having a field staff willing and able to work long hours at a wide variety of tasks in a year when our construction forces were fully extended and organization changes were working themselves out.

PLANNING DIVISION

PARK SYSTEM PLANNING SECTION

Successful discussions between the Federal and Provincial Governments led to an agreement this year to create a national park on Vancouver Island's west coast. Extensive field studies and discussions were then undertaken to determine a boundary suitable to both Governments.

Land examinations were undertaken in the Lower Fraser, Squamish, and the Tchaikazan Valleys, and in the Sechelt Peninsula. Because of public interest in Vancouver Island's West Coast Trail, the Parks Branch, with assistance from the Department of Highways, undertook to begin reopening it from Port Renfrew northward.

Eight new Class A parks, containing 2,089 acres, and one Class C park, containing 31 acres, were created in 1969. An internationally known mountaineering area in the Purcell Range, consisting of 61,800 acres, was designated as the Bugaboo Alpine Recreation Area. International Ridge Recreation Area of 5,140 acres near Chilliwack and Nancy Greene Recreation Area of 19,980 acres near Rossland were also established during the year.

Seven Class A parks were enlarged by a total of 2,960 acres and two of these parks were reduced by a total of 28 acres. Strathcona Park and Muncho Lake Park of Class B were reduced by 120 acres and 139 acres respectively. Later in 1969, Strathcona Park was enlarged by 202 acres, which resulted in a net increase of 82 acres for this park. Within Strathcona Park, a 12,100-acre area on the eastern side of Buttle Lake was reclassified from Class B to Class A status. Tow Hill Park Class B and Tlell Park Class C on the Queen Charlotte Islands were both reclassified to Class A. A new Class C park of 31 acres at Kersey Lake, near Clinton, was created and two other Class C parks were enlarged by a total of one acre.

During 1969, the co-operation and assistance of other Governmental departments made it possible for 83 sites, containing 28,950 acres, to be reserved for public recreation. Meanwhile 19 recreational reserves, containing 7,550 acres, were cancelled. For its residents, British Columbia now has 2,524 reserves for public recreation, containing 439,280 acres.

The residents of British Columbia are indebted to the following people for their generous donations of land for park purposes, involving 108 acres:—

- (1) Mrs. H. Herold, a wayside park at Toms Lake, near Dawson Creek.
- (2) Mr. C. S. Downing, a potential lakeside park at Kelly Lake, near Clinton.

PARK MASTER PLANS SECTION

Two members of the planning staff worked on master plans during most of 1969. They were assisted during the summer by four university students employed for this purpose. Field work was carried out in Tweedsmuir Park, Strathcona Park, and Bowron Lake Park.

Park planners made a reconnaissance of the Atnarko Valley in Tweedsmuir Park, between Knot Lake and Young Creek, to assess the recreational potentiality of this area. This included a study of in-holdings and a selection of campgrounds along the projected Mackenzie Highway. Planners also traversed the route of this highway through the Hotnarko Valley to ensure that the location would not unduly impair recreational values. A master plan for Tweedsmuir Park was completed in 1969.

Planning staff sought solutions to the serious problems of grazing and trail erosion by horses in Mount Assiniboine Park. A similar problem was studied in Mount Robson Park, where horseback trips to Berg Lake have long been an established form of recreation. In both parks there is conflict when horses and hikers use the same trails.

A two-year survey aimed at the production of a master plan was started for Strathcona Park, but an interim plan for a minimum development of Forbidden Plateau in 1970 was a more immediate goal. Campgrounds and an integrated trail system will be part of the plans for the plateau.

The remarkable popularity of Bowron Lake Park for canoeing made it the subject of some master planning efforts in 1969. New plans called for a quota system, and possibly travel permits, to preserve the wilderness atmosphere in the face of heavy public use.

In the dying weeks of the year, planners assisted with the production of a park system plan for the Vancouver Island Region. This plan, which was being produced at the request of the Minister, was designed to inventory park land and put forth long-term requirements for the region.

SITE-PLANNING SECTION

The Parks Branch standard camping unit was redesigned for today's camper needs. This new design was established to accommodate more suitably the camping equipment in vogue today.

A revision of the parks standard furniture book was initiated, and publication in a new format is scheduled for April 1, 1970.

Particular attention was given by site planning to the northern area of British Columbia in 1969. The Alaska Highway at last received recognition, with facilities being developed at Charlie Lake, Buckinghorse River, Kledo Creek, Mile 115, Racing River, and Hyland River. A new design for facilities at these locations was drawn up, oriented to providing overnight accommodations, or merely a brief rest-over for the travelling tourist. This new concept was designated a "wayside rest area" in order to differentiate between it and our standard camp and picnic grounds.

Plans were drawn up for the varied stage developments in the following parks: Sudeten, Mount Robson, Pinnacles, Claybanks Beach, Alta Lake, Pitt Lake, Chilliwack Lake, Rathetrevor Beach, China Creek, Gordon Bay, Matheson Lake, and Paul Lake. A development plan for immediate expansion of the Gibson Pass Ski Area facilities was concluded. Technical advice and assistance on park planning matters was given to several agencies.

A mapping crew surveyed and mapped at the following places, where future park development is expected: Matheson Lake, Gordon Bay, China Creek, Mac-

Donald Park, Paul Lake, Gibsons Pass Ski Area, Summit Creek, Yahk, Princeton, Ganges Harbour, Mahood Lake, Pinnacles, and Sheep Lake.

A comprehensive survey was made of our marine parks with the intention of establishing a new policy for them that would result in a new sign system and govern the extent and type of facilities provided in these parks.

PUBLIC INFORMATION AND EDUCATION

During 1969 the need for more and better information and education materials was emphasized by the fact that written inquiries received were up by a third over the previous year. To help meet this ever-increasing demand, new brochures were prepared and printed for Golden Ears and Goldstream Parks, while completely revised editions of the Wells Gray and Garibaldi folders were sent to the printers and will be ready for distribution in 1970. In addition, Bowron Lake, Princess Louisa, Manning, Mount Seymour, Mount Assiniboine, Kokanee Glacier, Vancouver Island, Fraser Canyon-Okanagan, and Marine Park folders, as well as the Stop-of-interest booklet, were updated and reprinted. The 'Ksan folder was revised in preparation for the official opening of the project. At the request of the management of Manning Park Lodge, a place-mat and menu-cover were designed, and a ski-facilities map of the Gibsons Pass area produced.

In co-operation with the other branches of the Department of Recreation and Conservation, an informational insert was prepared for the Canadian Forestry Association's Resource Reader. This reader is being distributed to all schools in British Columbia.

To further provide information on Provincial Parks for the general public, displays were prepared, set up, and manned at Victoria, Vancouver, Revelstoke, and Vernon. In July, and again in August, a presentation was made on the British Columbia Television Broadcasting System Limited series, "Summertime," from Vancouver. Taped commentaries were made for Radio Station CKNW and an appearance made on the Radio Station CKWX afternoon "Open Line" show with Barrie Clark. Numerous news releases and speeches were prepared throughout the year.

As in previous years, a special presentation on parks was given to the annual Travel Counsellor's School in Vancouver. There were also a number of talks delivered to interested groups. In March, the Public Information Officer was seconded to the Department of Travel Industry as the Provincial representative for the North Country Adventures promotion of Western Airlines.

HISTORIC PARKS AND SITES DIVISION

BARKERVILLE HISTORIC PARK

The two most noticeable changes at Barkerville during the past year were the removal of the power poles and lines from the main street with the accompanying switch to underground wiring, and the enlarging of the Wake-Up-Jake Café by the addition of the J. H. Todd Store. With respect to the latter change, the store now houses the café's new kitchen and restrooms, while the original café building is now entirely dining area.

Seasonal-staff housing has been improved with the completion of the Nicol Hotel. Expansion and renovation of the bakery has enabled tripling the production of sour-dough bread, which is sold daily to tourists. Improvements were made to various service buildings, including the carpenter shop, the plumber's shop, the paint shop, and the lunchroom. A first-aid room has also been completed.

New exhibits were introduced to Barnard's Express, Denny Saloon, Cariboo Sentinel Office, Dr. Watt's kitchen, and additions were made to the J. P. Taylor Drug Store.

Attendance was estimated to be up about 15 per cent over 1968 for a total of about 115,000 visitor-days; however, still not up to the peak year of 1966.

COTTONWOOD HOUSE HISTORIC PARK

Foundations and wall log replacements have now been completed for all buildings and attention is now being given toward interior finishing and exhibits. Construction of a caretaker's residence has been postponed pending finalization of highway relocation, which will bypass the buildings. It is anticipated that the bypass will eliminate some of the "accidental" traffic which presently stops because of curiosity while driving between the buildings. However, this will be considerably offset by the removal of vehicular traffic from the building area, thereby enabling undisturbed enjoyment of the historic setting.

FORT STEELE HISTORIC PARK

The past year has been a very busy one at Fort Steele, with an estimated use of approximately 125,000 visitor-days. The museum was open seven days a week from May 1 to October 31, and nearly 94,000 visitors were tallied during that time. It was gratifying to note that during May and June school groups came from such distant places as Golden, Rossland, Salmo, Fernie, and from Montana in the United States.

The 120,000-gallon reinforced-concrete reservoir was put into service and the sash-and-door factory complex was completed. The latter comprises a number of exhibit areas which serve as false fronts for the project's workshop and storage areas for vehicles and construction materials.

The Fort Steele Railroad Station was constructed and officially opened at ceremonies on June 14 by the Provincial Secretary, the Honourable W. D. Black. A second-hand coach was acquired from the British Railways to replace the antique saloon car of the Duke of Sutherland's 1895 steam train. With the extra passenger space provided by the larger coach, 23,000 passengers were hauled by the *Dunrobin*, as compared with 19,000 in 1968. A 3,000-gallon wood-stave water tank was installed near the station as water supply for the *Dunrobin's* boiler.

A full-size replica of the Fort Steele Water Tower has been completed, overlooking the junction of the Kootenay and St. Mary Rivers. It serves as a spectacular viewpoint for those willing to climb the two storys to its observation platform.

Bleasdell's Drug Store was constructed and the interior finishing and exhibit installation will proceed in the coming year.

The museum's outside balcony was completed and has added immeasurably to the finished look of this popular building.

The mining exhibit on the main floor of the museum was completed. A start was made on the second-floor exhibit with introduction of cases showing the history of glass and bottle manufacture and uses.

An old log cabin was moved to the park from Wolf Creek, north of Wasa Lake. The building, reputed to have been used by William Fernie, required replacement of foundations and some wall logs.

STOP-OF-INTEREST MARKERS

Two new plaques were placed during the year, bringing the total in the Province to 106. Ten more are being readied for placement and will go out next

year. An acceleration of the programme is anticipated for 1971 in connection with the Centennial commemoration of British Columbia's entry into Canadian Confederation.

MANAGEMENT DIVISION

As in previous years, public use of Provincial parks showed a substantial increase in 1969. This is a trend which is having its effect on every park system in North America. In many aspects of operation and maintenance it is not possible to cope with the pressure put on the park organization by the increased demand for outdoor leisure-time activities.

Yearly, administration grows more complex as vehicles are developed to penetrate wild lands hitherto only accessible on foot. Numerous requests to open parklands to helicopter skiing/hiking, snowmobiles, tote goats, motor-cycles, skibobs, and four-wheel-drive vehicles are made annually. If such requests were freely granted, Provincial parks as originally conceived would soon cease to exist.

To cope with the increased administrative burden being placed on the organization, it has been necessary to appoint a District Park Officer, Mr. J. C. Leman, to administer the Vancouver District. Mr. Leman's similar position in Prince George will be filled at an early date.

The collection of camping fees continues as in the past, but in an effort to streamline collection practices and free men for maintenance work the experimental use of an automatic vending-machine to dispense camping tickets was tried at Bamberton Park, Vancouver Island. It came through a trouble-free summer and was well accepted by the public. Up to six more will be installed in Vancouver Island Parks in 1970. If successful in these more complicated situations, they will be used Province-wide.

VANCOUVER MANAGEMENT DISTRICT

With approximately 20 per cent of the Provincial park facilities located in the Vancouver District, this District sustains about 40 per cent of the Provincial day-use visitations and about 20 per cent of the camper use. Contributing heavily to day-use are Cultus Lake Park; Mount Seymour Park, which is the foremost day-use park in the Province; Golden Ears Park; Alice Lake Park; and Manning Park. Camper-use is heavy in Cultus Lake Park, second in this category in importance in the Province; Golden Ears Park, third in Provincial camper use; Manning Park; and Alice Lake Park.

The relative importance of the Vancouver District parks in the Provincial park organization is quite apparent from this summary and ties in with their strategic location in relation to the heaviest Provincial population concentration, the Lower Mainland.

Cultus Lake Park is a very popular lakeside retreat for both campers and picnickers. It has had a severe problem of hoodlumism from time to time which has initiated action in 1970 which it is hoped will abruptly terminate this behaviour.

Mount Seymour and Manning Parks have a common denominator, year-round recreational activity. No sooner does fall activity taper off than winter sets the stage for skiing and related winter sports. Mount Seymour Park has a notably complex winter sports operation with as many as 8,000 persons on the slopes in a single day on any week-end throughout the winter. Manning Park ski development is at Gibson Pass, six miles from Manning Park lodge. At the pass, a compactly planned development with new day lodge, chair-lift, and rope tows, all under Government management, caters to family groups numbering up to 1,400 persons on a winter Sunday. Additional facilities for use in 1970 are under construction.

Golden Ears Park near Haney is one of the major camping and day-use parks of the Lower Mainland. Situated on a rejuvenated section of a flooded stump-strewn lake, it commonly caters to a summer Sunday assembly of 3,000 to 4,000 sun-seekers. Throughout the summer the compact 300-unit camp-site, more often than not, wears a "camp-site full" sign.

Alice Lake Park, in the Squamish Valley, is well known to many Vancouverites. Its mountain lake attractions annually draw "park full" crowds. Attractive life-guards, here and at Cultus Lake, an innovation this year, add to the safety of the park user.

Garibaldi Park, the gem of the Provincial system, now easily accessible via the Black Tusk Meadows by well-graded trail, is in danger of over-use destruction of fragile alpine flora. This problem is receiving the best efforts of park experts in all phases of park management.

Peace Arch Park on the border near White Rock is one of the unique parks of this type in Canada. It memorializes the friendship and understanding which has always existed between the two neighbouring countries of Canada and the United States of America. This year, joint financing has made it possible to flood-light the symbol of this friendship, the Peace Arch, with banks of mercury-vapour lamps. The effect is striking.

VANCOUVER ISLAND MANAGEMENT DISTRICT

Vancouver Island Provincial Park facilities comprise just over one-quarter of the Provincial total, being edged out of first place by Kamloops District. In day-use visitations it ranks second, to tie with Kamloops District, both being less than half, however, of Vancouver District's total day use. In camp-site use, Vancouver Island vies with Kamloops District for first place Provincially, each receiving 28 per cent of total use.

Miracle Beach Park leads Island parks in user-visits, ranking eighth in standing in the Province in number of day-visitors and seventh in camping-visits. Sproat Lake Park, Little Qualicum Falls, and Ivy Green Park follow closely behind Miracle Beach Park in Provincial day-use standing, while Goldstream Park outranks Miracle Beach Park in camper-use, being fifth in importance in the Province, closely followed by Wickaninnish Park and Rathetrevor Beach Park.

Two relatively undeveloped parks on Vancouver Island, Wickaninnish and Rathetrevor Beach, continue to absorb an undue amount of management effort. Both sprang into almost instantaneous popularity before development was initiated. Development is now proceeding at Rathetrevor Beach Park and will ease operation and maintenance problems when completed; the creation of a national park at Long Beach will ease the other difficulty.

In addition to the operation of an old and sophisticated park system on Vancouver Island proper, a marine park operation is also administered from the Vancouver Island office. The small number of service craft carrying out related maintenance duties has been augmented this year by the addition of the *Sea Wolf V*, a former 32-foot ferry, most kindly made available by the British Columbia Ferry Authority. Marine parks consist of Montague Harbour, Tent Island, Beaumont, Newcastle Island, Sidney Spit, and Rebecca Spit. A simple listing of their names pays poor service to their sparkling beauty and beach-combing allure. To keep them this way requires persistence, organization, dedicated personnel, and a sympathetic public.

KAMLOOPS MANAGEMENT DISTRICT

Emphasis continued during the 1969/70 fiscal year on the rehabilitation and modernization of our parks and their basic facilities, rather than on their expansion or the development of new parks. New projects were initiated at only two locations, Lac Le Jeune Park, near Kamloops, and Claybanks Beach Park, near Summerland. Claybanks Beach is an entirely new project that will open 2,000 feet of sand beach to public use for the 1970 season.

With the continued and excellent co-operation of the Royal Canadian Mounted Police, together with increased patrols by our own staff, rowdyism was held in check, and only two serious incidents were recorded.

Use patterns follow established trends, with the number of trailers and campers increasing steadily. Visitors still outnumber facilities, and, as an example, at Shuswap Lake Park with 265 camp-sites available, we have had to turn away as many as 400 vehicles in one day. An average of 200 cars are turned away every day during July and August.

NORTHERN MANAGEMENT DISTRICT

During 1969 an extensive capital development programme resulted in the establishment and development of several new parks, and the continued expansion and rehabilitation of existing parks.

In the recently created Peace River Region, new wayside parks were established and developed on the Alaska Highway at Buckinghorse River, 115 Creek, Racing River, and Hyland River. Continuing expansion of facilities at Charlie Lake Park, Sudeten Park, and Moberly Lake Park increased the available park facilities in this region to 405 units.

At Mount Robson Park, the entrance portal and picnic-site were completed at Portal Lake. In conjunction with our Youth Crew Programme, construction of the first phase of development of the Robson Meadows Campground was undertaken, and 47 camp-sites were completed.

Continuing expansion and redevelopment of facilities in the Lakelse Region resulted in additional camp-sites being completed at Furlong Bay Park, Exchamsiks River Park, and Maclure Lake Park.

In conjunction with our Youth Crew Programme at Crooked River Park, stage three of the rehabilitation programme was undertaken, with 36 camp-sites being completely renovated.

Bowron Lake Campground was developed to the extent of 22 camp-sites, toilet facilities, information shelter, parking-lot, and a trail to the canoe-dewatering terminus.

District personnel continue to provide advisory and consultive assistance to regional district planning committees and other public groups seeking advice on outdoor recreational matters.

During the year, maintenance and operational staff, in addition to their normal duties, assumed responsibility for numerous capital development projects. With these added responsibilities, plus the task of managing and operating a park system, the complexities of park management and operations continue to expand and demand the undivided attention of the District Park Officer.

NELSON MANAGEMENT DISTRICT

The Kootenays experienced a 5-per-cent increase above the Provincial average in park attendance in its 20-odd parks.

Although now new camp-site facilities were added to the established parks, the final phase of the four-year campground reconstruction programme was completed at Wasa Park. An extension of Champion Lakes picnic terrace along the beach was readied for completion next season.

A co-operative Summit Creek channelization project with the Duck Lake Waterfowl Management Area Authority was completed in preparation for the eventual development of a campground and picnic-ground. The main access road through the proposed park was constructed and prepared for final top dressing.

In Kokanee Glacier Park the Administration Cabin was completed and some alterations made to the public shelter. The Kokanee Creek Youth Crew completed the first phase in the long-range trail improvement programme for this wilderness park.

At Kokanee Creek Park the channelization of Kokanee Creek was undertaken to prevent any future flooding of the campground and further erosion of the site selected for the Nature Interpretation Centre. The first 14 camp-sites of the large campground planned for the Hamilton property, purchased 1961, were constructed and readied for installation of park furniture and flush-toilets for public use next season.

In an effort to meet the great need for improved water and sewage facilities, flush-toilets were installed in Boundary Creek Park and the second stage in the Moyie Lake Park water system was completed, allowing park visitors reasonable access to good water.

The 1969 season saw the introduction of a revitalized Youth Crew Programme at both the new camp in Kokanee Creek Park and at the old camp in Champion Lakes Park. It proved to be one of the most satisfying experiences for the staff as the boys adapted well and tackled every task with much enthusiasm. The programme was designed to help these young men discover and develop their own abilities by presenting circumstances in their work and recreation programmes whereby they were required to meet numerous challenges. Once the boys were brought into the outdoor atmosphere they were kept there through hunter-training courses, mountaineering classes, and sessions with trappers and naturalists.

The district staff continued to provide consultive services on matters of parks and land use to regional and municipal governments and to other Federal and Provincial agencies involved in management of natural resources.

INTERPRETATION

The 1969 Park Interpretation Programme served over 275,000 park visitors. Nature houses at Manning, Miracle Beach, and Shuswap Lake Parks recorded 70,000 visitors, while 44,000 more took part in morning walks and evening campfire talks. During July and August, 2,418 people braved the dangers of boating in Georgia Strait to visit remote Mitlenatch Island, a seabird colony, and one of British Columbia's two nature parks. The Goldstream salmon run, now a close second in terms of visitor interest to the Adams River run, brought 32,000 Vancouver Islanders to watch. Park Naturalist Freeman King guided 40 school classes and 4,000 others to a better understanding of the salmon's role in stream life at Goldstream Park.

Interpretation programmes were conducted for the first time in Ten Mile Lake and Crooked River Parks near Prince George.

On Vancouver Island, Rathetrevor Beach, Little Qualicum Falls, and Englishman River Falls Parks were surveyed for their interpretive potential. Pilot programmes were carried out in each of these parks.

In the Okanagan, once again a travelling naturalist conducted walks and talks in Ellison, Okanagan Lake, and Haynes Point Parks for 10,000 visitors. Near Nelson, at Kokanee Creek and Champion Lakes Parks, another travelling naturalist served park visitors in a pilot programme.

Fifteen naturalists were employed for the summer programmes. These fine, dedicated people included teachers, university students, and several people retired from other professions.

Park naturalist workshops were held at Miracle Beach and Manning Parks from June 2nd to June 8th to introduce park methods of interpretation to new naturalists. The Vancouver Centennial Museum and the Provincial Museum sent observers to the workshop to learn from and participate in interpretive techniques.

Wildlife protection in parks was advanced this year through co-operation with the Fish and Wildlife Branch in the designation of a protected area for grizzly bear in Tweedsmuir Park. This area includes the grizzly's main feeding areas along the Bella Coola and Talchako Rivers.

The Langford interpretation workshop planned and created 29 major displays for nature houses and outdoor information shelters throughout the Province.

New interpretive pamphlets designed to inform park visitors about commonly seen plants and animals include: "Some Mammals of Manning Provincial Park," "Some Insects of Manning Provincial Park," and for coastal parks, "Seaweeds of Miracle Beach Park." Two other pamphlets of general interest to park visitors are "Some Mosses of Provincial Parks," and "Moon Watching."

The success of the 1969 park interpretation programme depended upon the park naturalists' high standards of performance and upon the public's increasing support.

YOUTH CREW PROGRAMME

The Youth Crew Programme was more extensive this year than previously, with 180 boys employed in nine camps, as follows: Little Qualicum Falls Park, 30 boys; Green River Park, 15 boys; Garibaldi Park, 15 boys; Manning Park, 30 boys; Crooked River Park, 15 boys; Mount Robson Park, 15 boys; Kokanee Park, 15 boys; Champion Lakes Park, 15 boys; Wells Gray Park, 30 boys. The crews, each under the direction of a foreman and assistant foreman, carried out a variety of work, including camp-site reconstruction, trail construction, new park development, park maintenance, safety fencing, carpentry work, landscaping, footbridge construction, cement pouring and finishing, and firewood production. An extensive training programme to familiarize the boys with life in the outdoors is featured annually at each camp. In addition to this, safe working habits are stressed and some philosophy of the conservation movement is imparted. The entire programme is very popular with the boys and with participating park personnel.

For the first time this year, each boy was the recipient, at a closing ceremony, of a certificate of merit and a group photo. The presentations were made at the separate camps by very fine people—officials from the surrounding communities, members of the Legislative Assembly, or Government employees. Their presence contributed a great deal to the success of the ceremony.

ENGINEERING DIVISION

VANCOUVER ISLAND REGION

Rebecca Spit Park was converted to random camping, access and control were improved, and a summer residence added. A water system extension was prepared

for Quinsam Campground, Elk Falls Park, and the replacement programme continued at Miracle Beach Park. Initial work at Rathetrevor Beach included completion of the park entrance, sanitary services for the ticket office, installation of a temporary water service to the beach area, construction of a 30-man all-weather camp, design of an equipment shed, and commencement on the access roads and parking-lots in conjunction with the Young Men's Conservation Programme. Prefabricated bridges were designed and purchased to replace old structures at Englishman River Falls and Little Qualicum Falls Parks. The Goldstream Park sani-station was completed, and working plans begun for a new entrance bridge. China Creek Picnic Ground development continued, with parking-lot and table additions; a drilled-well test-hole failed, and a gravity water supply was selected. Gordon Bay Campground development began with a drilled-well installation, and winter construction was planned to include water service and a toilet building.

MOUNT SEYMOUR REGION

Princess Louisa Marine Park main float and ramp were replaced under contract and a flush-toilet system supplied for 1970 installation. At Mount Seymour Park, the road reconstruction was completed and paved from Mile 2 to Mile 3, road shoulders and drainage repaired over the first 2 miles, and a major equipment shed erected under contract. Maintenance and public safety was improved by modifications to ski tows and electrical service. A regional district water service was initiated for Roberts Creek Park.

GARIBALDI REGION

The Nairn Falls Campground was completed in conjunction with the Youth Crew Programme and a drilled well with handpump installed. At Alto Lake a picnic ground was established with a parking-lot and table layout.

ALOUETTE REGION

A major improvement of the picnic-ground water supply at Golden Ears Park was completed with the addition of a pumping-station to the 1968 drilled well. The campground sani-station was completed and a contract advertised for road-shoulder repairs on the park entrance road.

MANNING REGION

In Manning Park a 1-mile section of Blackwall Road was reconstructed, a permanent diversion dam installed on Lightning Lake, and traffic barriers fabricated for the beach parking-lot. An expansion of the Gibson Pass ski area required completion of the day-lodge contract, bus-parking extension, slope improvements, rope-tow modifications, auxiliary building renovation, and electrical service extension. A new T-bar installation is under way and an initial design and contract completed for a second chair-lift. At Manning Lodge, improvements were made to the cabin-colony, service-station, and main building. The annual electrical inspection led to maintenance improvements and a new generating station at the construction camp. The nature museum was served by a new water extension, a drilled well, and handpump installed at Coldspring Campground, and an irrigation design completed for Lighting Lake Picnic Ground. A prefabricated bridge for the Lightning Lake narrows was purchased for 1970 installation. Staff quarters were provided at Emory Creek Park with the erection of a prefabricated building.

CULTUS REGION

Entrance Bay, Cultus Lake Park, was converted from gravity water supply to well service with the addition of a pumping-station. Maple Bay was improved with a water extension to the picnic area, coupled with access and parking reconstruction. A boat-launching site was developed at Paleface Creek on Chilliwack Lake.

SHUSWAP REGION

The Lac Le Jeune Park redevelopment was implemented with access improvement, additional camp-sites, and new construction standards. Paul Lake Park was opened to camping and expansion work continued with beach improvement in conjunction with the Attorney-General's inmate programme. The first stage in converting the portable irrigation system at Shuswap Lake Park to permanent underground service was completed. Final work was completed for the sani-stations at Shuswap Lake and Yard Creek Parks. A new reservoir was added to Victor Lake Park in preparation for flush-toilets, sewage-disposal revisions were made at Mara Lake Park, and a picnic shelter was begun at Yard Creek Park. Lac la Hache Park service area was protected with a security fence.

OKANAGAN REGION

A utility building was completed at Okanagan Falls Park, along with improvements to the sewage disposal, and the addition of change-houses to Haynes Point Park commenced. Claybanks Beach Park development was initiated with security fence work and then expanded to include a full development, consisting of parking-lots, playground, toilet and change building, and picnic tables. Full irrigation and domestic water service, sewerage, and power supply are included along with extensive landscaping and planting. Soorimpt Picnic Ground pumping-station and irrigation system was installed, using the new drilled-well supply. At Okanagan Lake Park a new campground well supply was established and pumping revisions planned.

CARIBOO REGION

Skihist Park sani-station, with flush-toilet facilities, was added to the camp-ground, and in the picnic area interim flush-toilets were commenced. Plans are under way for a permanent installation.

WELLS GRAY REGION

The road approach near the Murtle River crossing in Wells Gray Park was improved with a major reduction in grade, plus improvement in width and alignment. An electric generating system was installed to serve the Mahood Lake Youth Crew camp.

BOWRON LAKE REGION

A workshop and warehouse were initiated at the Bowron Lake Park service area, and plans begun for staff quarters.

MOUNT ROBSON REGION

Sewerage improvements were planned for Mount Robson headquarters. An electric generating system was installed at Lucerne Lake Youth Crew camp and an electrical survey carried out for headquarters power.

LAKELSE REGION

Furlong Bay Park camping was expanded, the boat-launching ramp remodelled, and a lake-intake pumping-station installed. Drilled wells and hand-pumps were established at Oliver Lake, Exchamsiks River, and Prudhomme Lake Parks.

BEAR LAKE REGION

Parking, trails, and lookout were developed at the Pinnacles Viewpoint near Quesnel. The Ten Mile Lake Park sani-station was completed for 1969 use, along with two change-houses. The latter were also constructed at Bear Lake and Beaumont Parks.

PEACE RIVER REGION

Charlie Lake Park Campground was completed as planned and the water system installed. A workshop was erected under contract as a regional centre and the service area protected by security fence. Boat-launching facilities were added at the lakeshore. An Alaska Highway roadside rest-area system was developed with campground work at Buckinghorse Creek, Kledo Creek, 115 Creek, Racing River, and Hyland River. Moberly Lake Park facilities were expanded with campground additions, picnic improvements, and a boat-launching site, along with provision for change-houses and landscaping. A water system was designed and installed for Sudetan Park rest area and campground.

KOKANEE REGION

Boundary Creek Park hand-pump water service was converted to an automatic pressure system with flush-toilets. At Kokanee Creek Park the Sandspit campground development was begun with design continuing for water service and flush-toilets in 1970.

WASA REGION

The Wasa Lake Park service area water service was replaced for frost protection and design continued for future park service. A pumping-station was added to Moyie Lake Park to serve public outlets and the future expansion designed.

'KSAN (ARDA)

The trailer park, campground, and Indian village were completed with full water, power, and sewer services, including a toilet building contract. Training of maintenance and operation staff was included in the construction programme.

HISTORIC PARKS

An elevated water tank for train service, reinforced-concrete reservoir, and irrigation design were completed for Fort Steele Historic Park. Spring repairs, Wake-up-Jake sewerage counsel, and alternate water-supply survey were carried out for Barkerville Historic Park.

WORKSHOP SECTION

The Langford establishment manufactured and distributed more than 3,000 items in about 60 categories, ranging from major production of park tables, carved signs, marine buoys, number posts, and toilets, to unique items such as office furniture, carved entrance portals, and historic park displays. Traditional woodwork dominated output, but emphasis increased for fibreglass and steel products. A new

fireplace was developed. In addition, the workshop operated the Victoria headquarters' car pool and exported artisans to field projects, notably the Mount Robson portals and Fort Steele displays.

SURVEY SECTION

The primary work undertaken by this Section is classed under boundary surveys, topographic mapping, and engineering control of field projects. As such it was an integral part of the preceding capital works and created a substantial portion of the base plans used by Planning Division. Major control works were Mount Seymour, Manning, and Wells Gray roads. In addition, the Section played an increasing role in field investigations, feasibility surveys, estimates, road location, and hydraulic studies.

DRAUGHTING SECTION

More than 100 individual projects were completed for all sections of the Branch. These included park systems layouts, site-development plans, working drawings for construction, and publicity. Only 40 per cent were directly related to Engineering Division commitments. A major portion of park standards was revised in a new format. Topographic map production was enhanced with closer ties to the Survey Section. Eventual conversion to microfilm recording was augmented by adopting standard plan sizes coupled to photo reduction.

EQUIPMENT SECTION

High equipment maintenance and operation standards were achieved through continuing attention to in-service training, safety programmes, and prevention-repair schedules. Technical jurisdiction for all Branch mechanical equipment resides in this Section, and its technicians played key roles in support of aerial tramway and electrical projects.

CONSTRUCTION SECTION

This Section served as one of three basic means available to the Division for the execution of capital works, the others being regional forces and outside contracts. A policy of close liaison and project-sharing between all three was pursued with the Section handling 29 major projects representing about 50 per cent of the Branch work in terms of capital worth. In addition, it was responsible for the training and guidance of the Young Men's Conservation Programme at Rathetrevor Beach Park, which commenced in the fall of 1969.

DESIGN SECTION

This Victoria group formed the basic planning strength of the Division, with Draughting Section as an integral component. Its engineers and technicians were supplemented by the specialized skills of the Vancouver-based technicians in Equipment, Construction, and Survey Sections. Provincial commitments were centralized for design and supervision, but decentralized for execution. A shift from the traditional static pyramidal-organization was continued toward flexible project teams selected from the technician cadre and headed by an engineer co-ordinator. While primarily responsible for capital works, Engineering Division also supplied Management Division with technical support for its staff training and maintenance programme. A general policy of undermanned status was particularly noticeable in 1969, a heavy year. To maintain output, consulting engineers were retained on 14 projects, varying from feasibility studies through design services to complete field control.

**SUMMARY OF ALL PROVINCIAL PARKS
TO DECEMBER 31, 1969**

Classification	Number	Total Acreage
Class A parks	190	1,817,729
Nature conservancy areas in B parks (5)		1,457,794
Total protected park acreage		3,275,523
Class B parks	8	4,632,971
Class C parks	77	28,959
Total parks	275	6,479,659
Recreation areas	5	102,266
Nature conservancy areas in A parks (1)—North Garibaldi (Garibaldi Park)		44,032
Nature conservancy areas in B parks (5)—		
Big Den (Strathcona Park)	29,784	
Central Strathcona (Strathcona Park)	215,000	
Comox Glacier (Strathcona Park)	58,010	
Eutsuk (Tweedsmuir Park)	629,300	
Murtle Lake (Wells Gray Park)	525,700	
		1,457,794
Total, nature conservancy areas (6)		1,501,826

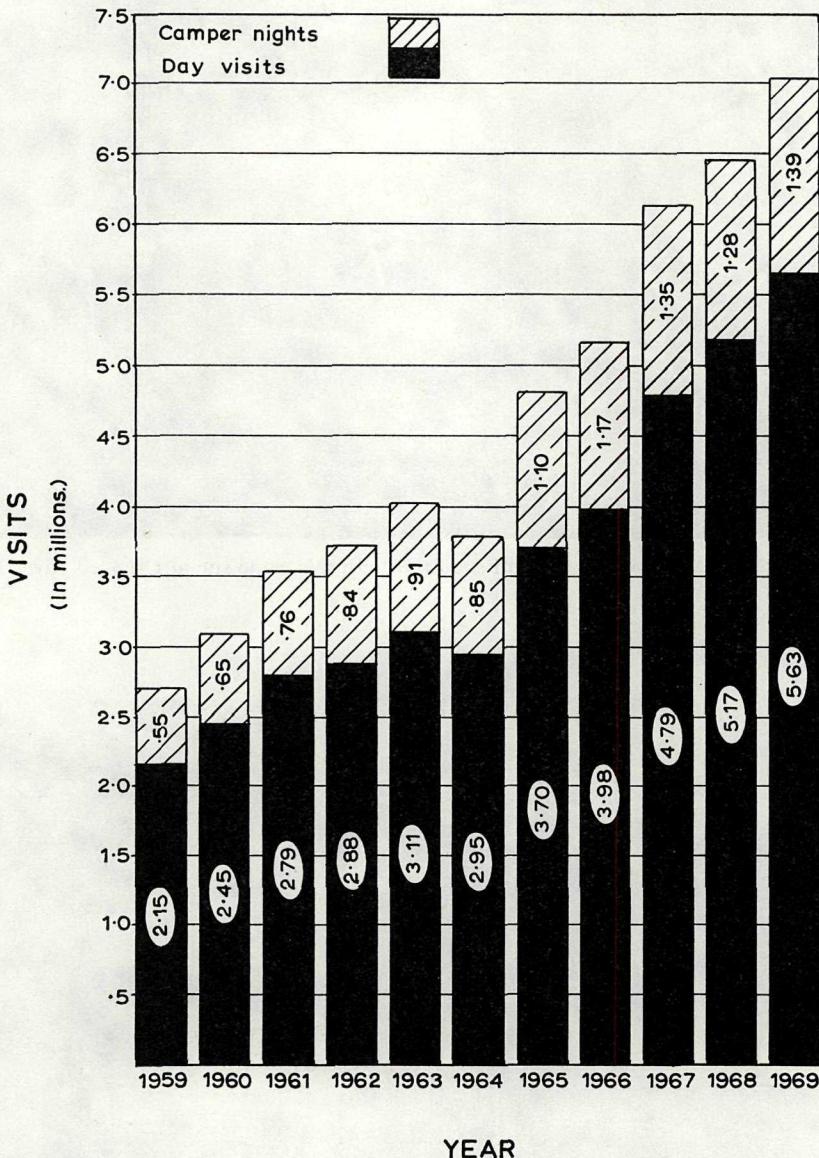


A load of gravel, and this youth crew will soon refurbish this camp-site at Crooked River Park.



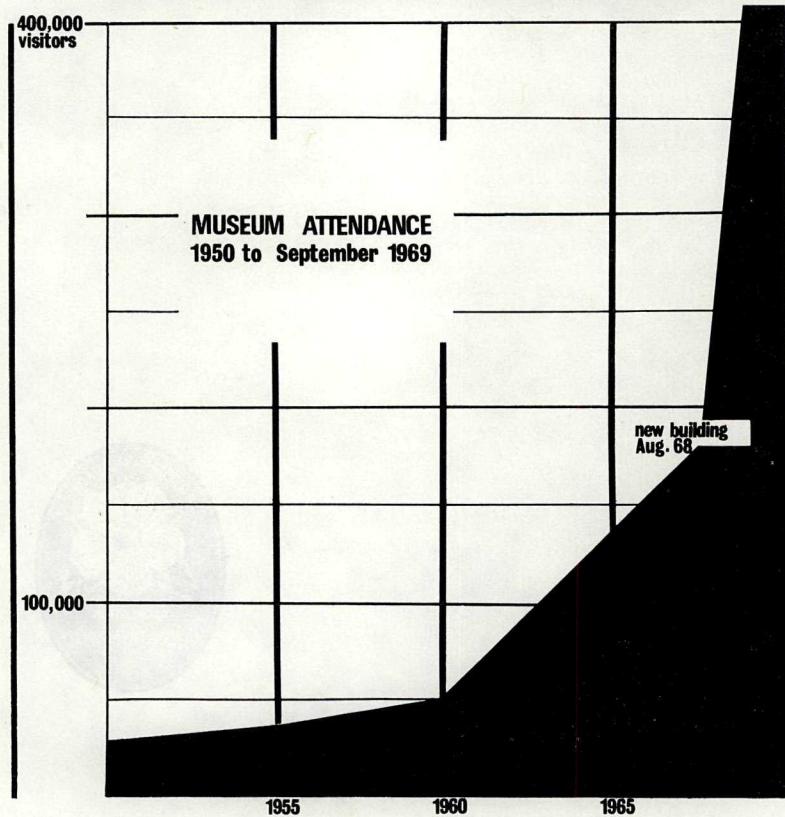
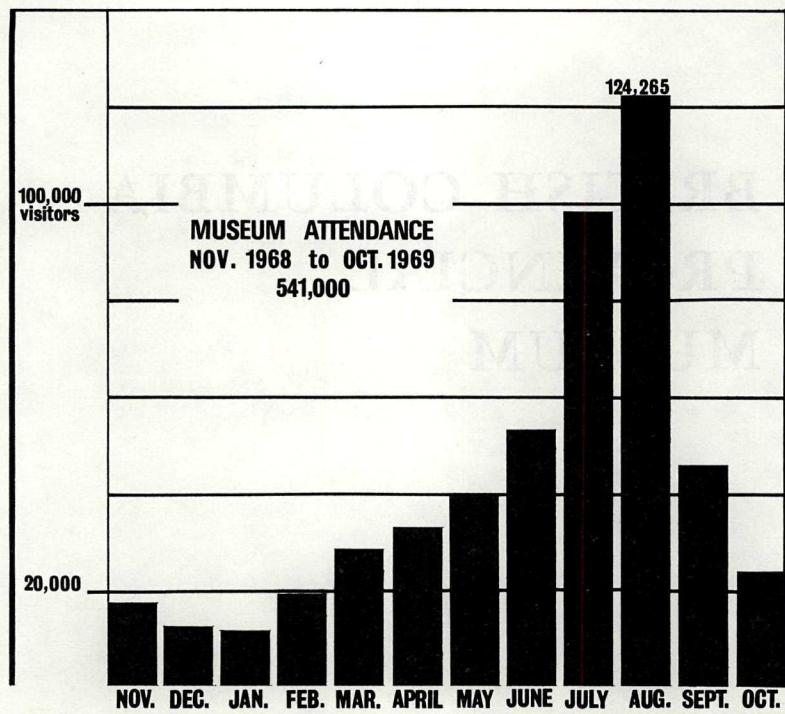
Youth crew members unload supplies at Garibaldi Lake in a setting of magnificent grandeur.

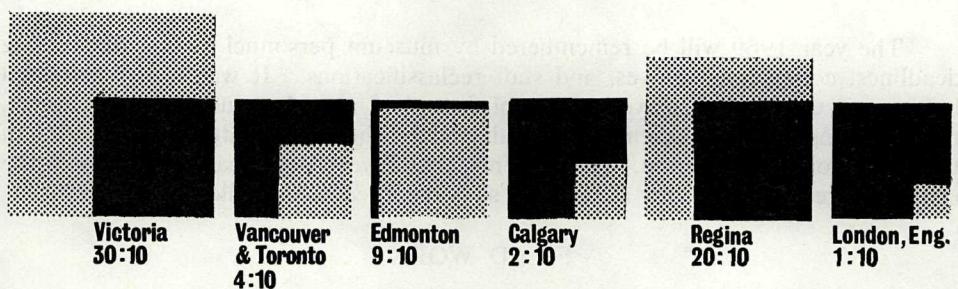
ANNUAL ATTENDANCE



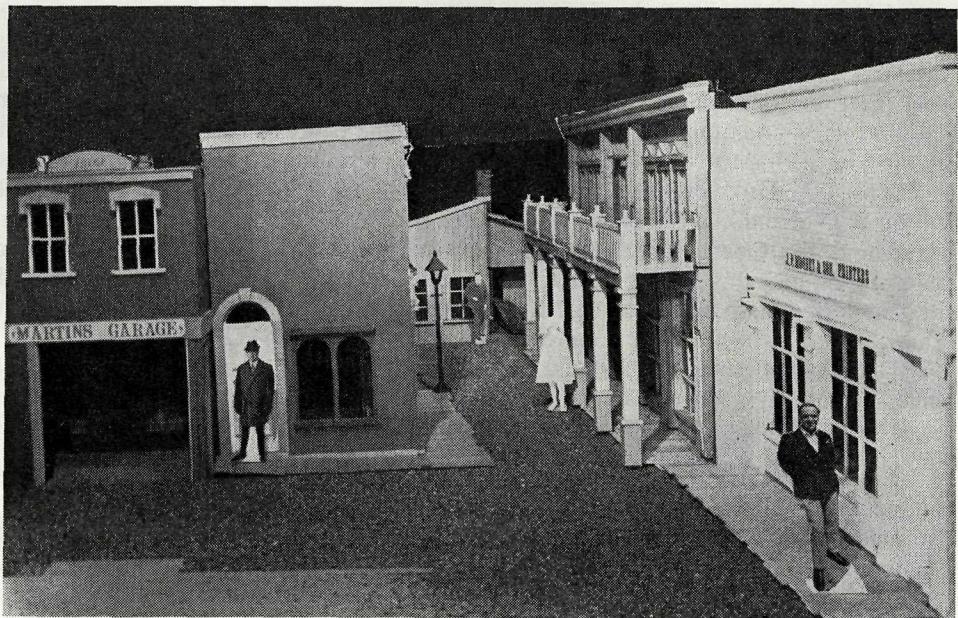
BRITISH COLUMBIA PROVINCIAL MUSEUM







Museum attendance (dotted area) in relation to metropolitan population (solid black),
based on data for 1968/69.



Model of part of "Historical Visit," in the planning stage.

REPORT OF THE BRITISH COLUMBIA PROVINCIAL MUSEUM

G. CLIFFORD CARL, DIRECTOR

The year 1969 will be remembered by museum personnel as one of pressing deadlines, complicated moves, and staff reclassifications. It was also highlighted by several successful displays, the establishment of a lively education programme, the launching of a new scientific journal, and by the highest attendance record in the history of the institution. These events, plus several significant additions to the staff, have resulted in a very active year as is recorded in the following pages.

FIELD WORK

Field work was somewhat curtailed during 1969, particularly in human history, because of the need to devote time and staff to organizing collections for an impending move into new quarters. Nevertheless, some important and fruitful work was carried on in the Hazelton area in connection with a totem pole restoration programme there, several archaeological sites in other areas were studied, and numerous routine field trips were made to various centres to collect specimens and other materials.

In the natural history field, fairly intensive small mammal and bird collecting was carried on around islands in Barkley Sound and botanical material was gathered from the Long Beach area, Mount Arrowsmith, Revelstoke National Park, Glacier National Park, and other parts of the Province. One trip was made to the Princeton area in late spring to collect two goats for use in a diorama in the planning stage. In late May the Director was a guest on board *M.V. G. B. Reed*, from the Biological Station at Nanaimo, on a marine collecting trip to the west coast of Vancouver Island and the Queen Charlotte Islands. During the season, Dr. J. B. Foster managed to make three short visits to the Queen Charlotte Islands to pursue sea-bird and small mammal studies, to visit falcon nesting areas on Langara Island, and to examine potential ecological reserves.

Details of these and other field collecting trips are on file in the Departmental office.

DISPLAY PREPARATION

Significant advances made in the exhibit galleries during 1969 included the completion of three dioramas and the installation of a "Hall of Vertebrates." Dioramas completed were the Dry Interior Biotic Area (bighorn sheep), Gulf Islands Biotic Area (Coast deer and cougar), and Northern Alplands (caribou). A fourth diorama showing a portion of the coast forest and featuring a group of wapiti in a clearing remains to be completed in 1970.

Of far-reaching importance, too, was the engagement of Mr. Jean André as Chief Designer in the Display Division. Under his guidance, newly installed displays have already taken on a "new look," and exciting plans for future installations have been developed. Chief among the latter is a detailed plan and a miniature scale model of an exhibit gallery designed to take the viewer back through time from the present to the prehistoric period by a series of exhibits highlighting significant eras in the history of British Columbia. To be included are full-size replicas and reconstructions of early-style buildings, a water wheel, lumber mill, copper mine, and a portion of a sailing ship. The proposed gallery is scheduled for completion and official opening in 1971 as part of the Province's Centennial celebration.

In April we were fortunate in having the services of Dr. Stephan Borhegyi, Director of the Milwaukee Public Museum, as a consultant and an adviser regarding our display programme. As an internationally recognized authority in the museum field, Dr. Borhegyi was able to instil new enthusiasm among all staff members involved and to recommend a course of action that has been most productive indeed. It was with great sadness that we learned of his sudden death as a result of a car accident on September 26.

Partly stemming from Dr. Borhegyi's visit was the decision to set up an interim exhibit to display "The Vertebrates of British Columbia," using the old mounted birds and mammals and the models of amphibians, reptiles, fish, and marine mammals formerly on view in the old building but displaying them in an entirely new environment. The project was designed and installed in record time and since its opening on August 7th it has received a great deal of praise from viewers.

Visitor enjoyment has also been enhanced by the addition of sound to certain portions of the public galleries. By the use of earphones, spectators may listen to taped commentaries plus natural sounds related to exhibits being viewed, and in the vertebrate hall bird song, wolf howls, wave action, and other sounds provide atmosphere appropriate to the displays.

TEMPORARY EXHIBITS

Following the policy of presenting a series of temporary shows, the following were on view during 1969:—

- "Art Is Fun," a collection of paintings by Indian children of Canada; held over from December, 1968, to February 17, 1969.
- "Wildlife Illustrated," a display featuring the work of several local wildlife artists; March to April.
- "Fine Arts Festival," a large show of art work, handicrafts, and other arts involving entries from all schools of the Greater Victoria area; May 1st to 22nd.
- "Annual Show," an exhibit of work of Victoria Sketch Club Members, celebrating their 50th anniversary; May 24th to June 14th.
- "Slide Show," a continuous showing of slides by the Victoria Pentax Club; summer season.
- "Spinning and Weaving," a display and demonstration sponsored and manned by members of the Victoria Weavers' Guild; July and August.
- "Victoria, British Columbia: Life Styles, Building Styles, and Urban Growth, 1843-1929," a display of pictures, postcards, and objects from several sources, arranged by Mr. E. Thorn and Mr. D. Gallacher, Curator of History; July to August 18th.
- "Wildlife Paintings, by Allan Brooks," a display of over 100 paintings and other items in commemoration of the 100th anniversary of the birth of Major Allan Brooks; August 23rd to Setpember 30th.
- "Canadian Artists," a survey of painting and graphics through 300 years, a collection of paintings, prints, and other objects from the National Gallery in Ottawa, the Victoria Art Gallery, the Provincial Archives, and private individuals; October 15th to November 30th.
- "National Print Show," an exhibition of outstanding work presented by the Professional Photographers of Canada; December 30th to January 11th, 1970.

For each show the local press has provided excellent coverage, and attendance has been good.

CURATORIAL ACTIVITIES

NATURAL HISTORY DIVISIONS

Activities under this heading have been far from routine this year because of the move to new quarters. Much time was spent by curators and assistants in preparing for this event and then in supervising the actual move of the collections.

As a preliminary operation, the entire old building and its contents were fumigated by local professionals, following which specimens which required special care were boxed or otherwise prepared for handling. At the time of the move, botanical material was transported directly to the new quarters in the Curatorial Building, but since other natural history floors were not yet ready for occupancy all other natural history collections had to be taken to temporary storage areas in the Exhibit Building. Likewise, staff members had to find temporary office space elsewhere until the contractors officially turned over the building to the Government in early December. Despite the disruptions caused by these moves, over 4,900 plant specimens were mounted during the year, bringing the total herbarium collection to 54,103 items.

HUMAN HISTORY DIVISIONS

Much the same situation was experienced by this Division as in the case of Natural History, but added problems because of the extremely varied nature of the objects involved. In most cases double moves have been necessary.

Early in the year most of the archaeological collections were transported to temporary work and storage space on the third floor of the Exhibit Building from which they were moved to their permanent location on the sixth floor of the Curatorial Building in October. In between times, staff have devoted their energies to bringing site files up to date, cleaning and cataloguing artifacts, and other routine activities.

Ethnological material for the most part has fared better. Collections formerly housed in the old building were removed after fumigation directly to the new building (seventh floor), although storage cases and shelving were still lacking. Other portions of the collections which have been in storage elsewhere have been left until facilities are available to take care of them.

Several important additions have been acquired during the year, including Kwakiutl dancing head-dresses with ermine skin trailers, an eulachon cooking tank, and several superb silver bracelets.

In general, historical material has presented more problems than have other collections because of the size of some individual items, because of a relatively fragile nature in some cases, or simply because there was no suitable storage area available. As a consequence, until permanent quarters are ready, objects are stored in a variety of places, including a warehouse some miles from the city. However, the problem of storage of extra large objects may shortly be solved; part of an old hangar will eventually be made available for this purpose, making it possible to actively encourage the acquisition of such items as aircraft, farm vehicles, and other bulky objects.

Noteworthy among additions to the collections is a 1929 "Pumper" fire truck, which gave long and heavy service at Essondale before its retirement. The vehicle was placed on view outside the Museum Building for some weeks before being stored; it forms the nucleus of what is expected to become a major collection of objects relating to the history of science and technology in British Columbia.

In October, Mr. Dan T. Gallacher, Curator of History, was honoured by being invited by the American Association of State and Local History to attend as their

guest a seminar on "Management of History Museums" presented in Albany, N.Y. He was the only British Columbian representative at the gathering and profited greatly from the experience.

CONSERVATION DIVISION

Mr. P. R. Ward, Chief Conservator, has had a busy time supervising the checking and testing of fumigation facilities within the Exhibit Building, followed by organizing the fumigating, packing, and removal of collections from the old building to new quarters. He was also assigned the time-consuming task of organizing a security system for both buildings, involving the hiring and training of guards (provided by the Department of Public Works) and working out a key combination for the new building.

On two occasions during the year Mr. Ward made out-of-Province visits as a guest of other institutions. In early April he attended a conference in Whitehorse under the auspices of the Alaska State Museum and in June he travelled to Ottawa to confer with officials at the National Museum of Man and to make a brief study of their storage facilities.

The last month or so of the year was devoted to overseeing installation of equipment in the new conservation laboratory and in settling into the new quarters.

RESEARCH

Apart from a certain amount of field collecting and routine or casual office research, the following special projects were carried on:—

Human History.—Inquiries into the nature, use, and value of historical objects; preparation of story-line for proposed exhibits; sources of material for articles being prepared for publication; Salishan social organization and "spirit" dances; dating of materials from middens.

Natural History.—Taxonomy of Rosaceæ and catkin-bearing plants; flora of Saanich peninsula.

Conservation.—Identification of adhesives by ultra-violet fluorescence; effects of fluctuating environment conditions on antique furniture; native methods of totem pole preservation.

Display.—Preserving methods for vegetation; application of fire-resisting substances to artificial or preserved vegetation.

THUNDERBIRD PARK

The time of our two carvers, Mr. Henry Hunt and Mr. Tony Hunt, has been completely occupied in producing poles and other carvings as well as original two-dimensional designs. Major items were two totem poles, one for erection at the World's Fair in Osaka, Japan, and another for the J. Alsford Company, Timber Importers, in London, England. After removal of the latter pole, the carving area was cleared of chips and readied for projects planned for 1970.

Although the Kwakiutl house under construction on the third floor of the Exhibit Building was incomplete, a dedication ceremony was observed by Chief Jonathan Hunt and Mrs. Hunt on May 30th, a necessary formality since the building will eventually house ceremonial objects obtained from the Hunt family. Certain carvings and two-dimensional designs remain to be provided to complete the structure.

EDUCATIONAL SERVICES

The newly established Educational Services Division has experienced rapid growth under the energetic encouragement of Mrs. Wilma Wood. Commencing in January, an intensive course of instruction was given to about 30 persons aspiring to be volunteer docents (museum guides), and from this group a work corps was selected to take on subsequent assignments. A similar course repeated in the fall produced another group of willing and talented people, augmenting the number of volunteer workers to 45.

Thanks largely to these helpers, a large number of school classes were given tours of the Museum, some of them under special headings such as "Trapper's Cabin" and "Seashore Life." In addition, two summer activity programmes called "Kumtuks" and "Discovery" were carried on in July and August. Over 11,500 children took part in these combined programmes during the year.

The docents are now organized into an association, with Mrs. Dorothy Hanson as chairman, and consideration is being given to enlarging the group to include other organizations affiliated with the Museum, for mutual advantage.

The facilities of Newcombe Auditorium have been used extensively during the year, both by outside organizations and Government agencies. The following Museum-sponsored programmes have been offered:—

- "Noon Hour Concerts," a series extending through January.
- "Heritage Court Presents" series:—
 - "Eagle Research," Mr. David Hancock, January 17th.
 - "Arctic Adventure," Mr. Clarence Tillenius, January 21st.
 - "Wolves," Mr. John Theberge, February 14th.
 - "Victoria, Day Before Yesterday," Mr. Ainslie Helmcken, February 28th.
 - "Charles Edenshaw, Haida Artist," Mr. Wilson Duff, March 14th.
 - "Are Salmon Obsolete?," Dr. John McInerney, November 7th.
 - "Reindeer in Newfoundland," Dr. Arthur T. Bergerud, November 21st.
 - "Wanderings of a Naturalist with a Camera," Miss Enid K. Lemon, November 28th.
 - "Seashore Smorgasbord," Mr. Wayne Campbell, December 12th.
- "Chilkat Dancers" (with British Columbia Arts and Welfare Society), Major Carl Heinmiller and Company from Haynes, Alaska, March 18th.
- "School Bands" (with Greater Victoria School Board), concert and opening ceremonies in connection with the Fine Arts Festival, May 1st.
- "Swiftsure Film Festival" (with National Film Board), May 30th, 31st, and June 1st.
- "Salad Days" (with Bastion Theatre), nightly except Sundays, June 30th to August 22nd.
- "On the Track of the White Bear," Mr. Clarence Tillenius, December 7th.
- "A Christmas Special," Films for children of all ages (sponsored by the National Film Board), December 17th.

A short course in palaeontology, called "Fun With Fossils" was also offered to youngsters under the direction of Mr. Gary Green, Museum Apprentice.

EXTENSION SERVICE

With the appointment of Mr. John Kyte to the Museum's Adviser post on January 1st, a new programme of service to the museums of the Province got under way. Since the effectiveness of the service depends to a very large extent upon personal contact, Mr. Kyte's first objective was to visit as many museums and

sponsoring bodies as possible. By the year's end he had covered all areas of the Province, except a few of the more isolated communities, and had visited about 90 museums.

He also instituted a newsletter, which is being mailed to every museum of the Province of which we have a record. Five issues, plus several information supplements, have been produced to date.

In September, Mr. Kyte took an active part in the meetings of the British Columbia Museums Association held in Vancouver at the Centennial Museum, where he was able to make further contacts with museum people.

OTHER SERVICES

In April, the concession to operate the Tea Room was awarded to Mr. Bud French, of Victoria. The service has been well patronized right from the start, especially on week-ends, and on all days during the tourist season. The staff also provided catering for special group meetings on several occasions during the year.

Starting in June, and continuing through the summer months, the sales counter in the main lounge was operated as a special service to visitors. The counter was staffed largely by volunteers from the British Columbia Indian Arts and Welfare Society, through the efforts of Mrs. Harriet Esselmont, President of the organization. Besides museum publications, articles offered for sale included a variety of handicrafts by Indians of the Province. Sales in general were good.

PUBLICATIONS

The following contributions to literature have appeared in 1969:—

- Abbott, Donald N. Recording Archaeological Data in British Columbia. *British Columbia Provincial Museum Ann. Rept.*, 1968.
- Brayshaw, T. C. Review of "Flora of Queen Charlotte Islands" by Calder, Taylor, and Mulligan. *Syesis*, Vol. 2, Parts 1 and 2, 1969.
- Carl, G. Clifford. Foreword. *Syesis*, Vol. 1, Parts 1 and 2, 1-3, 1968 (1969).
- _____. "Your Future in Museums" (review). *Museum Round-up*, No. 34, p. 42.
- _____. Watch Out For This One. *Victoria Naturalist*, Vol. 26, No. 3, p. 31.
- _____. Survival. *Victoria Naturalist*, Vol. 26, No. 4, 37-38.
- _____. Treasures from the Northwest Coast. *Canadian Antiques Collector*, Vol. 4, No. 11, November 1969, 42-43.
- _____. Review "Year of the Whale" by V. B. Scheffer. *Victoria Daily Times*, December 6, 1969.
- Gallacher, Daniel T. First Thoughts on the Albany Seminar, 1969. *Museum Round-up*, No. 36, 37-38.
- _____. The Secret Visit of R.M.S. *Queen Elizabeth* to Esquimalt in 1942—The Last in a Series of Notable Events in the Area. *Report of the British Columbia Provincial Museum for 1968*.
- Kyte, John. John Kyte's Notebook. *Museum Round-up*, No. 33, p. 20; *Museum Round-up*, No. 34, p. 37.
- Schofield, W. B. Some Common Mosses of British Columbia. *Provincial Museum Handbook*, No. 23, 1-262.
- Szczawinski, Adam F. Arbutus—the Tree that Sheds its Skin. *Beautiful British Columbia* magazine, Fall, 1969, p. 46.
- _____. The Garry Oak. *Beautiful British Columbia* magazine, Winter, 1969, p. 47.

- Thorn, Erik. Review of "Help for the Small Museum" by A. Neal. *Museum Round-up*, No. 34, 38-39.
- _____. Making Artificial Plants for Museums. *Museum Round-up*, No. 36, 20-26.
- Ward, Philip. Indian Act Has Teeth. *Museum Round-up*, No. 35, 56-57.
- _____. Mipofolie and Booklon, an Evaluation of the Physical Properties of Two Self-adhesive Plastic Films. *Museum Round-up*, No. 36, 69-71.
- Wood, Wilma. Docent Program at the Provincial Museum. *Museum Round-up*, No. 34, 14-15.

In addition to the above, two publications, "Guide to Marine Life" (Handbook No. 21), and "Grasses of British Columbia" (Handbook No. 9), were reprinted; a general information pamphlet was produced, numerous lesson outlines were distributed by the Education Division, and five newsletters were issued by the Museum's Adviser.

Of special significance in this field of activity was the appearance of the first volume of *Syesis*, a journal designed to act as a vehicle for technical articles in both human and natural history related to British Columbia. Copies of the first issue have been distributed to institutions and professionals on a complimentary basis. Subsequent numbers will be available through subscription.

The demand for museum publications has been steadily rising in recent years and was exceptionally heavy in 1969, possibly as a result of an unusually high attendance this year. As a result, stock has become depleted and many publications are actually out-of-print. To remedy this situation, permission has been obtained to reprint those in greatest demand, and these are expected to be available early in 1970.

STAFF CHANGES

First of several additions to the Museum staff made in 1969 was Mr. John Kyte, who commenced duties as Museum's Adviser on January 2nd. As an active associate of the Campbell River Museum during its formative period, he brings with him several years of practical experience dealing with problems connected with local institutions, which should be of great value in his new field.

In April, Mr. Daniel T. Gallacher joined the staff as Curator of History, a position which was vacant since Miss Carolyn Case left in early 1968. After a number of years in the R.C.A.F., Mr. Gallacher returned to the University of Victoria, from which institution he obtained a bachelor's degree with honours in history, followed by a master's degree in 1969. His thesis, a history of the depression period in Victoria, was given the Leon Ladner Award for the best master's thesis in Canadian history for 1969. Since assuming office he has been busy acquiring additional historical material, supervising the cataloguing and removal of the collections, and assisting in the planning of a new gallery projected for 1971 opening.

About the same time we were fortunate in obtaining the services of Mr. Jean André, who was given the responsibility of directing the display programme. Mr. André is a professional designer with a well-established reputation; his special flair is already evident in the newly installed Vertebrate Hall on the second floor and in the plans for the gallery scheduled for installation in 1970.

Other recent appointees include Mr. Douglas Lockhart as Clerk 5, a newly created post to take care of office business and personnel affairs; Mrs. Margaret Billings, General Office staff; Mr. Ewald Lemke, Taxidermist and Preparator in the Bird and Mammal Division; Mrs. Flo Scaplen, Office Assistant in the Educational Services Division; Mr. David Gillett, Assistant in History; Mrs. Susan Douglass, Assistant in Ethnology; Mr. Phillip Nott, Technician in Biology; Mr.

Monte Wright, Technician in History; Miss Kathy Jamieson, Assistant in Archaeology; and Mr. C. A. Russell, Assistant Conservator.

Student assistants for the summer months included Mr. John Hall, Miss Susan Barré, Miss Kathy Jamieson, and Miss Toni Kirkpatrick.

In September, Mr. Alan Hoover, Assistant Curator in Ethnology, left on a year's leave of absence in order to complete university training. His post is being temporarily filled by Mrs. Susan Douglass.

After more than 35 years in the Government employ, Miss Margaret Crummy retired on March 31st. Miss Crummy entered the Service in 1934 as an Instructor, Elementary Correspondence School, and transferred to the Museum in 1936 when Mr. Francis Kermode was Director. Associates and friends attended a luncheon served in the museum to honour her as the senior staff member in terms of service, and at this time she was presented with a meritorious service diploma and with mementos from fellow staff members.

The Museum has again been fortunate in receiving help from a number of volunteers during the year. High on the list is the hard-working band of persons who have acted as docents in our educational programmes and without whose help it would have been impossible to function. Their contribution of time and knowledge has been greatly appreciated.

Of special note is the assistance of Mrs. Dorothy Hanson and Mrs. Joan Ruskowski, who have acted as Chairman and First Assistant, respectively, for the newly formed British Columbia Provincial Museum Docents' Association. On December 5th, each received charter certificates after one-year apprenticeships in the organization. Thanks are also due to Mr. David Young, who so ably supervised the summer programme, "Kumtuks."

Grateful acknowledgment is also made of the volunteer assistance given in the archaeological field by Alan Carl, Dennis St. Claire, Box Cox, and John Pollitt.

On December 31st, another significant event took place when Dr. Carl stepped out of the Directorship of the Museum, a post which he had held since 1940. In January, 1970, he will take over the position of Curator of Marine Biology, with fewer administrative responsibilities.

ATTENDANCE

A considerable increase in attendance was experienced following the opening of the new building in August, 1968. An increase was anticipated, but the attendance figures have continued to mount through 1969 beyond all expectations. In fact, an all-time record of well over half-a-million visitors has been established, distributed over the year, as follows:—

January	11,661	August	124,265
February	19,808	September	47,423
March	28,201	October	26,113
April	33,357	November	24,072
May	39,714	December	17,391
June	52,867		
July	99,761	Total	524,633

It will be noted that peak attendance occurred in August, which is the usual pattern. On some days during this month more than 5,000 persons passed through the building.

It should also be noted that the total shown does not include the many persons who attended programmes in the Auditorium or meetings in the classroom of which no record was kept, nor does it include about 30,000 school children served by the Education Division.

Beyond the fact that the attendance figures are surprisingly high, another interesting fact came to light when they were closely examined. When compared with the resident population of Greater Victoria, the proportion of visitors is many times higher than is the case with other leading museums for which we have figures. In other words, more persons visited the Provincial Museum in proportion to the local population than in the case of any of the other five museums used in the survey. The reason for this, of course, is that tourist traffic through the City of Victoria is exceedingly heavy and the Museum is located in an exceedingly attractive area.

Despite the high public response, at no time was the building overly crowded; the escalators and the flow pattern through the galleries seemed to take care of the crowds adequately.

BUILDING CONSTRUCTION

The Curatorial Building, the third unit in the Museum-Archives Complex, called "Heritage Court," was completed and turned over to the British Columbia Government by Burns and Dutton, Contractors, on December 4th. Actually, the second, sixth, and seventh floors had been finished in October and had been occupied by Museum staff on a more or less temporary basis. Following Government acceptance of the building, staff members were able to move themselves and collections into permanent locations.

As economy measures, certain items have been omitted; these include a freight elevator, partitions between certain offices, washroom fixtures, and other plumbing on some floors, and some scientific equipment. Hopefully, these structures and services can be added later.

As the name implies, the Curatorial Building has been planned to accommodate the scientific and technical services of the Museum, and consequently it is unique in design. The basement area, which is continuous with the Archives Building, will house shared services such as a photographic division; the Central Microfilm Bureau is also located here.

On the ground floor is a large preparation room for biological specimens, including a taxidermy shop, cold room, and other facilities. Adjacent to this is a modern laboratory equipped for the conservation and restoration of historical material. Offices are also provided.

The remaining six floors are each devoted to a division or discipline in the Museum's field of activities in the following ascending order: Botany, Birds and Mammals, Marine (including lower vertebrates, insects, and fossils), Biology, History, Archaeology and Ethnology. Each of these floors is also provided with a mezzanine for additional storage and office space. A combined illustration studio and workshop is located on the second floor.

Architecturally, the building fits the site admirably, its tall, rectangular shape neatly complimenting the two other structures forming the complex. The use of the same Haddington Island sandstone and Italian marble on the exterior and the same designs in doors and other fixtures as used in the other buildings also enhances the feeling of unity. A landscaping programme using native shrubs and trees provides a pleasing setting for the whole concept.

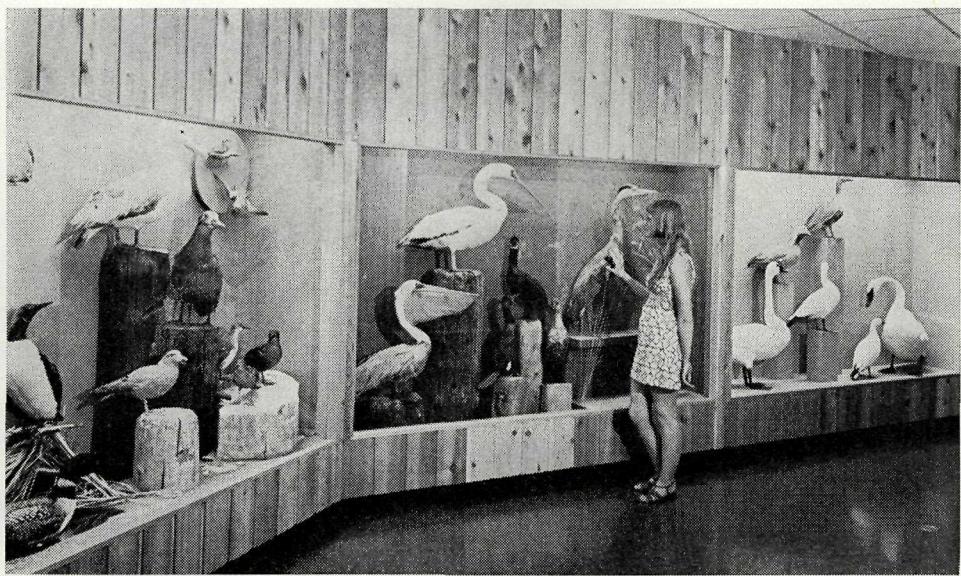
OBITUARIES

- Regretfully we record here the passing of the following persons:—
- Professor C. W. Lowe—botanist and long-time staff member of the University of Manitoba; Past President of the Victoria Natural History Society. April 18th.
- Mr. Claude G. Briggs—former attendant of the Provincial Museum; retired in 1968. April 26th.
- Inspector George C. Stevenson—formerly of the British Columbia Fish and Wildlife Branch and panel member on "Outdoors with the Experts" radio programme. June 7th.
- Dr. Stephan F. Borhegyi—Director of the Milwaukee Museum and Technical Consultant for the British Columbia Provincial Museum. September 26th.



(Photo—Department of Travel Industry.)

Curatorial Building, completed in December, 1969.



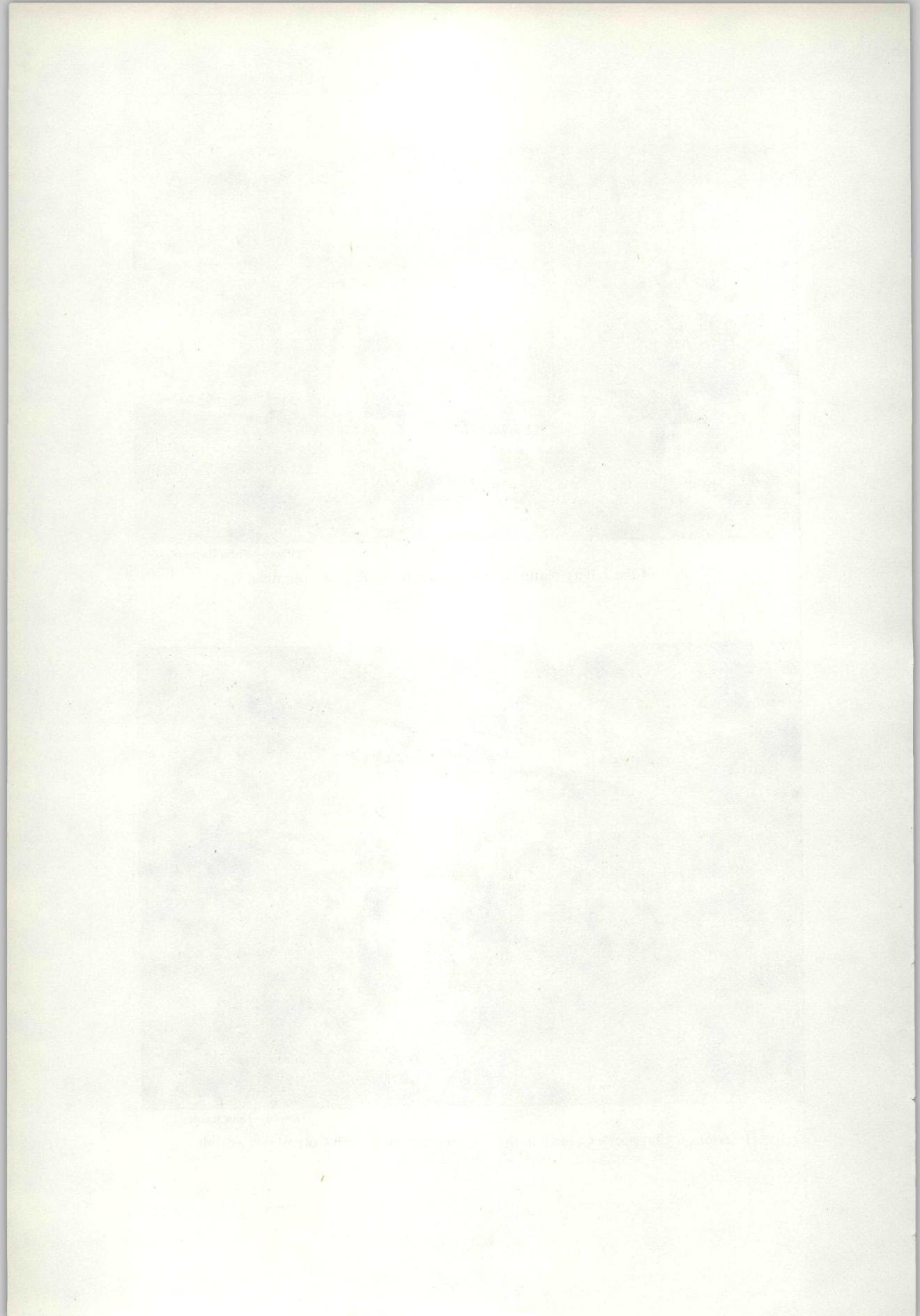
(Photo—John Barnard.)

Part of the gallery featuring the vertebrates of British Columbia.



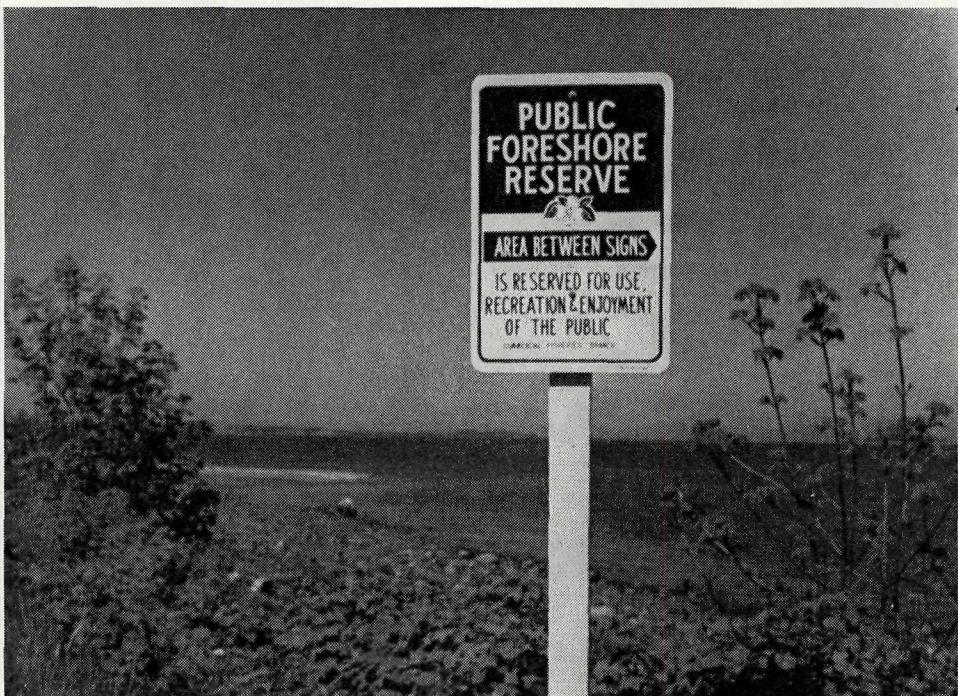
(Photo—John Barnard.)

Interior of "Trapper's Cabin" in the "Vertebrates of British Columbia" exhibit.

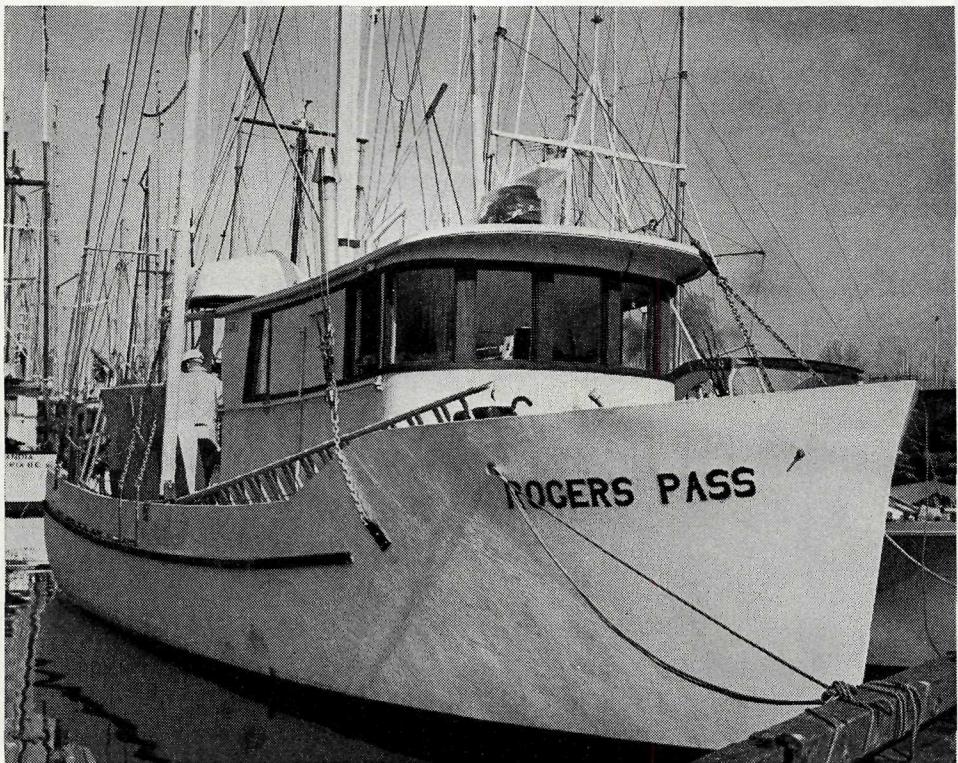


COMMERCIAL FISHERIES BRANCH





Public foreshore reserve, between Union Bay and Buckley Bay on Vancouver Island, is for recreational use by the public, where primary attraction is gathering of shellfish.



Ferro-cement salmon troller, relatively new on the British Columbia coast.

COMMERCIAL FISHERIES BRANCH

R. G. McMENN, DIRECTOR

GENERAL

1969 was an interesting as well as satisfying year for the Commercial Fisheries Branch. This was especially true because of our involvement in the management of the marine resources of British Columbia from both a commercial and a recreational viewpoint. This involvement in the recreational use of the Province's marine resources is somewhat handicapped, however, by the Branch's name "Commercial Fisheries Branch." Nevertheless, our policy of dealing with both commercial and recreational aspects has been well received. Increasingly, we are finding other Provincial Government departments, which may be involved in the administration and development of the Province's natural resources, contacting the Commercial Fisheries Branch concerning potential resource-use conflicts. Further improvements are still anticipated. Perhaps it is our own objectivity, together with the fact that the Director serves as a member of the Pollution Control Board, that has fostered this inter-discipline approach. Whatever the reason, it is evident that a "total environmental viewpoint" in resource-use development is becoming more and more evident in the Branch's daily relationship with other resource users. Along the same lines, it is very gratifying to find the Branch's participation and advice in both national and international fishery matters being more and more recognized and called upon by Federal and international fishery agencies.

Some of the more important activities and developments occurring in 1969 are outlined briefly below.

1. Increased oyster patrol and enforcement activity was permitted through improvements to the M.V. *Marten*. Due to heavy recreational demands, coupled with the decreasing availability of wild oysters in southern gulf waters south of Nanaimo, the Branch prohibited the commercial taking of all oysters in that area from vacant Crown foreshore after June 1, 1969. This policy is reviewed periodically.

2. Successful results in the depuration (cleansing) of oysters at the Ladysmith experimental plant were achieved in the late fall and winter of 1969. Oysters polluted by high faecal bacterial counts were completely cleansed within a 24-hour period by ultra-violet irradiation. If the process can be proven to be economical, and this looks rather promising at this stage, then all oysters produced in polluted areas should be acceptable for market purposes without the expensive process of having to be first relayed or transferred to oyster leases located in areas of approved water quality. This would give a new lease on life for the commercial oyster growers who still hold leases in such bacterially contaminated areas as Ladysmith Harbour, Sooke Harbour, Esquimalt Lagoon, Pender Harbour, Comox Harbour, and Deep Bay. There is a distinct possibility that several strategically located depuration plants, together with a legal requirement that all oysters must pass through such a plant prior to marketing, could eliminate the expensive administrative and enforcement activities that should be associated with relaying oysters to approved leases.

3. A significant increase in inquiries from high schools and university students concerning various aspects of fisheries and other marine resources was noted in 1969. Over 4,000 copies of the Branch's publication, *British Columbia Ocean Harvest*, 7,000 bulletins, and 4,000 *Harvest Beneath the Sea* were requested and

distributed. These important public information activities are increasingly time-consuming for the staff.

4. The first half of a shared \$200,000 industry-government (Federal, Provincial, Fisheries Council of Canada) Fishery Product Marketing Study was completed by Stevenson and Kellogg Limited in 1969. The purpose of the two-year study is to study consumer tastes, requirements, and attitudes with respect to fish and fish products, so that recommendations for increasing the present low *per capita* fish consumption—some 12 to 13 pounds per person per year—can be made to the fishing industry.

5. The development of a kelp harvester and a kelp dryer by Inter-Tidal Industries Ltd. progressed in 1969 to the stage where some 1,000 tons of *Nereocystis* (bull kelp) was cut and dried off the coast of British Columbia. The drying apparatus was not entirely satisfactory, thus delaying large-scale cutting. One of the largest of the four companies currently holding aquatic-plant cutting-areas proceeded in its production schedule by building a large processing plant at Masset, Queen Charlotte Islands, as well as a harvesting vessel in North Vancouver. Two prospective companies holding licences in 1968 did not receive renewals of their licences in 1969 because of their inactivity in the production of seaweed products.

Some initial plans were made in 1969 by a large and well-established seaweed processing company to explore some of the British Columbia coast with the view in mind of establishing a red-algæ industry on this coast.

6. The oyster industry was subjected to an economic analysis, commencing in September and to be completed by April, 1970. This study, by Western Consultants, followed the more general study made in 1968 by C. Planta. The Planta Report, financed solely by the Federal Government, has been received, but the results have not been made public. The present study is being jointly financed by Government (Federal-Provincial) and the British Columbia Oyster Growers Association. This latter study should result in some concrete recommendations concerning the marketing and production problems confronting the growers.

<i>Wholesale Value of Fish and Fish Products</i>		<i>Number of Licensed Fishermen</i>	
1964	\$92,117,000	1962	15,060
1965	84,666,000	1963	15,370
1966	118,000,000	1966	11,977
1967	99,800,000	1967	12,117
1968	119,255,000	1968	12,133
<i>Value of Gear</i>		<i>Number of Licensed Boats</i>	
1964	\$10,711,000	1963	9,745
1965	12,281,000	1964	9,343
1966	11,414,000	1966	7,435
1967	11,637,000	1967	7,639
1968	13,032,000	1968	7,548

BRITISH COLUMBIA SALMON-CANNING INDUSTRY

The canned-salmon pack for 1969 was 621,856 48-pound cases, 1,125,133 less than the 1968 pack of 1,746,989 cases. This was the smallest production since 1960, when 631,150 cases were packed.

Fifteen salmon canneries were licensed to operate in 1969. The locations were as follows: Skeena River and Prince Rupert, 5; Central Area, 1; Vancouver Island, 2; Fraser River and Lower Mainland, 7. In 1968, 21 canneries were licensed; this year saw the permanent closing of two canneries on the Skeena River, one in the Central Area, and one on the Fraser River, due to cessation of operations by two old-established canning companies and consolidation of operations by another. A cannery in West Vancouver has been razed, but the company is still active and expects to rebuild at a future date. A new cannery was built at Westview on the Lower Mainland coast, but did not start operating until late in the season.

COMPARATIVE PACK BY SPECIES (48-POUND CASES)

	1968	1969
Sockeye -----	611,011	358,505
Chinook -----	7,416	5,300
Steelhead -----	933	584
Blueback -----	10,389	2,146
Coho -----	177,205	55,566
Pink -----	669,347	153,386
Chum -----	270,688	46,369

HERRING PRODUCTION

Once again the herring fishery was closed for reduction purposes. Herring stocks in southern areas are showing signs of recovery, but surveys indicate they are not yet large enough to reopen the fishery. During 1970 there will be no change in the current closure.

HALIBUT FISHERY

According to a preliminary report from the International Pacific Halibut Commission, the total Pacific halibut catch of 1969 was nearly 9,000,000 pounds more than that of 1968.

Halibut landings by British Columbia fishermen amounted to 32,882,000 pounds, compared to 29,467,000 pounds in 1968. United States fishermen took 24,632,000 pounds, compared to 19,372,000 pounds last year.

Area 3A showed the best landings with a total of 30,424,000 pounds, compared to 27,215,000 in 1968.

PACIFIC OYSTER BREEDING, 1969

Pacific oyster breeding in British Columbia in 1969 was a commercial failure as it was in the State of Washington. Production in Japan was considerably less than average.

PENDRELL SOUND

As early as May 24th the water temperature in Pendrell Sound exceeded 68° F. to a depth of 10 feet, and in mid-June it was as high as 75° F. The salinity at this time was satisfactory in Pendrell Sound itself (20 per cent), but outside in Waddington Channel it was down to 10 per cent. As a result of a small spawning on June 15th, there were early-stage larvae in the water. Plankton on June 24th indicated another small spawning had occurred, and from the total number of larvae a modest commercial set was predicted. Partly because the industry was still in preparation and major spawnings were yet to come, the advice was against cultching for this set.

By June 30th, larvæ from the earliest spawning were up to 250 microns in length or five-sixths grown. Test cultch exposed July 8th had collected six spat per shell by July 14th and 36 spat per shell by July 17th, indicating a relatively long larval period. Salinity during the period July 1st to 17th had dropped from 15 per cent to 12 per cent, for on July 14th a considerable amount of white glacier water from Toba Inlet was observed in Waddington Channel and a large cloud inside the entrance to the sound. It wasn't until about July 24th that salinity had increased to 16 per cent.

By July 21st the larvæ from the early spawnings had disappeared from the plankton, but there were 1,000 per gallon of early-stage larvæ spawned about July 15th. The industry was advised to cultch, for all conditions appeared satisfactory. However, by August 7th, larval numbers were reduced considerably but there were still enough for a commercial set. They were slightly more than two-thirds grown at this time. By August 13th, however, there were few larvæ remaining in the plankton and only a very few spat were collected. From this time on the weather deteriorated and no further spawning occurred. Thus, there was a complete commercial failure.

The early set which amounted to 50 spat per shell had reached a diameter of only one-eighth inch by the end of summer, when normally it would have been at least 1 inch. This indicates the possibility of a food problem. Associated with the fresh-water influx was a significant phytoplankton bloom, an abnormal situation in Pendrell Sound in summer. This bloom may have inhibited the production of the particular food organisms required by advanced-stage larvæ and small spat. There is little doubt the influx of fresh water in the sound was in some way responsible for the failure.

LADYSMITH HARBOUR

There was no significant setting in Ladysmith Harbour, in spite of several good spawnings.

It is doubtful if British Columbia growers will be seriously affected by the lack of seed in 1969, but there may be an impact on the export market, particularly to Europe.

SPORT-CAUGHT FISH CANNERRIES

Four canneries designed to custom-can sport-caught fish operated during 1969. They were located at Brentwood, Campbell River, Nanaimo, and Quadra Island. Production to the end of December, 1969, was 90,495 cans, a decrease of 53,068 cans from the previous year's total. This figure reflects the comparatively poor sports-fishery in the northern Vancouver Island region; another factor was the closure of the cannery located in Madeira Park. A total of 3,120 sportsmen used these facilities, of whom 2,432 were residents and 688 non-residents. The following number and species of fish were canned: Coho, 3,884; chinook, 3,788; pinks, 858; sockeye, 316; trout, 107; steelhead, 40; chum, 12. In addition, the canneries smoke-cured a total of 2,246 pounds of sport-caught fish.

REVIEW OF FISHERIES PRODUCTION, 1968

The total wholesale value of the fisheries of British Columbia for 1968 amounted to a record high of \$119,300,000, and was \$20,200,000 above the 1967 returns. Salmon landings of 18,200,000 pounds were the highest since 1953. Salmon products accounted for 83.8 per cent of the total wholesale value for the Province. Halibut landings amounted to 29,400,000 pounds. The wholesale value of halibut landed at British Columbia ports was up 1 million dollars. Due to the

low level of herring stocks, the reduction fishery was closed in 1968. Production was limited to bait and experimental fishing, with the value of landings amounting to only \$331,000.

As marketed wholesale, the principal species were salmon, with a value of \$99,956,000; and halibut, with a value of \$8,385,000.

The landed value of the 1968 halibut catch was \$5,768,000, as compared to \$5,068,000 in 1967.

In 1968 the total wholesale value of shellfish amounted to \$3,343,000. The value of the clam production was \$222,000; oyster production, \$743,000; crab and shrimp production, \$2,378,000.

GEAR AND EQUIPMENT

The 1968 inventory of fishing-gear included 11,470 salmon gill-nets, 493 salmon purse-seines, 12 salmon drag-seines, 129 herring gill-nets, 97 herring purse-seines, and 16 herring trawl-nets, with a total value of \$8,830,000. Wire, cotton, and nylon trolling-lines were valued at \$581,000.

SALMON-CANNERY OPERATIONS

Twenty-one salmon canneries were licensed to operate in 1968. The locations were as follows: Skeena River and Prince Rupert, 7; Central Area, 3; Vancouver Island, 2; Fraser River and Lower Mainland, 9. For the first time in many years the plant on the Queen Charlotte Islands did not operate as a salmon cannery.

The total canned-salmon pack for British Columbia, according to the annual returns submitted to this Branch by canners licensed to operate in 1968, amounted to 1,746,989 cases, 281,281 more than the 1967 pack and worth a record \$67,400,000. This pack was 31-per-cent greater than the 1959-68 average of 1,333,444 cases.

SOCKEYE SALMON

The 1968 sockeye pack was 611,011 cases. This was an increase of 52,120 cases over 1967 and was the largest since 1958. The sockeye pack was worth \$30,600,000, the highest ever.

PINK SALMON

Although pink-salmon fishermen delivered 55,600,000 pounds of round fish, the pack was only 669,347 cases, due to abnormally small fish. The pink pack had a wholesale value of \$22,000,000, far below the big years of 1966 and 1962 when it was worth \$28,100,000 and \$30,600,000 respectively.

COHO SALMON

There was an excellent coho run in 1968 and the pack, worth \$7,700,000, was 187,594 cases, 40,917 more than 1967. Again, most of the coho was marketed in frozen form, with the total wholesale value of the species being \$19,700,000, about \$1,000,000 under the record year of 1966.

CHINOOK SALMON

The canned pack of chinook salmon in 1968 was 7,416 cases, 7,263 less than the 1967 pack. Here again, main utilization of this species was in the frozen dressed form, with a value of \$7,254,710 as compared with the 1967 total of \$6,374,850.

STEELHEAD

The 1968 steelhead pack amounted to 933 cases, 363 less than the 1967 pack of 1,296 cases. Although steelhead are not salmon, some are canned each year, principally those caught incidental to fishing other species.

OTHER CANNERIES

Shellfish Canneries.—In 1968, six shellfish canneries were licensed to operate in British Columbia and produced the following pack: Clams, 7,532 cases; crabs, 4,441½ cases; smoked oyster stew, 9,656 24/10-ounce cases; oysters, 195 cases.

Specialty Products.—Sundry processing plants produced the following: Fish spreads, 44,579 24/2½-ounce cases and 140 12/2-ounce cases; smoked oysters, 75 gallons; creamed salmon, 6,150 cases; creamed tuna, 2,987 cases; sliced salmon in oil, 8,908 2½-ounce tins; pickled salmon, 4 24/8-ounce cases; smoked sliced salmon, 330 60/2½-ounce cases; pickled salmon, 4 24/8-ounce cases.

FISH-CURING

Sixteen smoke-houses process the following: Herring (kippers, 47,837 pounds; bloaters, 4,900 pounds); cod, 412,239 pounds; salmon, 362,428 pounds; sable sole, 51,960 pounds; mackerel, 6,540 pounds; eels, 6,000 pounds; eulachons, 2,500 pounds; snox, 2,540 pounds; steelhead, 647 pounds.

PICKLED HERRING

Three plants put up the following: 7,043 cases of 12/12-ounce jars; 4,230 cases of 12/16-ounce jars; 650 cases of 12/32-ounce jars; 399 cases of 4/128-ounce jars; 15 cases of 24/8-ounce jars; 505 25-pound kits; and 2,665 100-ounce tins.

FROZEN HERRING BAIT

Seven firms reported a total production of 933,900 pounds of frozen bait in 1968.

MILD-CURED SALMON

Three plants were licensed to operate in 1968 and produced 466 tierces, for a total of 3,775 hundredweight. In 1967, three plants were licensed and produced 427 tierces for a total of 3,618 hundredweight.

SALMON ROE

Eight plants reported the following production for 1968: 159,477 pounds; 144,000 3-ounce jars; 7,860 24-jar cartons; and 2,950 26-pound kegs of salmon-roe caviar; 386,171 pounds of salted salmon roe; 3,650 pounds of salmon-roe bait; 386,171 pounds of salted salmon roe; and 1,286,200 pounds of salmon roe, use not specified.

HALIBUT

Because of poor prices and a scarcity of fish, the 1968 halibut fishery remained depressed; in spite of this there was some improvement over 1967. British Columbia fishermen landed 60.7 per cent of the total Pacific catch of 48,400,000 pounds. The wholesale value of halibut landed at British Columbia ports was \$8,400,000, compared with \$7,400,000 in 1967.

FISH OIL AND MEAL

There was no herring fishery for reduction purposes and a negligible amount was taken for bait purposes. The fishery is not expected to be opened for seining before 1971, and possibly the closure will extend beyond this point.

Fish-offal Reduction.—During the 1968 season, nine plants were licensed to operate and they produced 2,378 tons of meal and 171,127 gallons of oil. In addition, 23,424 pounds of salmon oil were produced. In 1967, nine plants produced 1,408 tons of meal and 170,886 gallons of oil.

STATISTICAL TABLES

TABLE I.—LICENCES ISSUED AND REVENUE COLLECTED, 1965 TO 1969, INCLUSIVE

Licence	1965		1966		1967		1968		1969	
	Number	Revenue								
Salmon cannery.....	22	\$4,400	23	\$4,600	22	\$4,400	21	\$8,400	15	\$6,000
Herring cannery.....										
Herring reduction.....	12	1,200	9	900	8	800	1	400		
Tierced salmon.....	5	500	4	400	3	300	3	300	3	300
Fish cold storage.....	21	2,100	19	1,900	19	1,900	19	3,275	21	3,325
Fish-processing.....	54	54	59	59	86	86	65	2,130	61	2,300
Shellfish cannery.....	9	9	11	11	11	11	5	500	7	700
Tuna-fish cannery.....	3	3	3	3	1	1	1	100	2	200
Fish-offal reduction.....	9	9	9	9	9	9	9	450	5	250
Fish-liver reduction.....	3	3	3	3	1	1				
Whale reduction.....	1	100	1	100	1	100				
Herring dry-saltery.....			1	100						
Fish-buyers.....	404	10,100	400	10,000	387	9,675	363	18,125	295	14,750
Pickled-herring plant.....			1	100			1	25	2	50
Province of British Columbia receipts.....	5	72	10	363	145	2,375	97	2,278	1,048	4,001
Custom canneries.....			3	75	4	100	5	125	4	100
Aquatic-plant harvesting.....			26	260	44	440	44		31	1,550
Oyster-picking permits.....			19	190	189	1,890	133	1,330	103	1,030
Aquatic-plant processing.....					2	20	3	600	3	600
Totals.....	548	\$18,550	601	\$19,073	932	\$22,108	770	\$38,038	1,600	\$35,156

TABLE II.—SPECIES AND VALUE OF FISH CAUGHT IN BRITISH COLUMBIA, 1964 TO 1968, INCLUSIVE

	1964	1965	1966	1967	1968
Salmon.....	\$63,103,000	\$52,071,000	\$86,572,000	\$79,747,000	\$99,956,000
Herring.....	11,561,000	11,752,000	8,305,000	2,638,000	331,000
Halibut.....	8,056,000	10,191,000	10,741,000	7,353,000	8,385,000
Crabs and shrimps.....	1,751,000	1,740,000	2,079,000	2,469,000	2,378,000
Lingcod.....	549,000	723,000	797,000	801,000	995,000
Grey cod.....	1,160,000	1,800,000	1,837,000	972,000	1,122,000
Oysters.....	647,000	708,000	964,000	765,000	743,000
Sole.....	662,000	661,000	1,126,000	1,023,000	1,183,000
Black cod.....	273,000	321,000	451,000	347,000	349,000
Clams.....	190,000	296,000	383,000	421,000	222,000
Miscellaneous.....	4,110,000	4,197,000	4,704,000	3,117,000	3,591,000
Totals.....	\$92,117,000	\$84,475,000	\$117,984,000	\$96,536,000	\$119,255,000

TABLE III.—BRITISH COLUMBIA SALMON PACK, 1964 TO 1968, INCLUSIVE,
SHOWING AREAS WHERE CANNED
(48-pound cases.)

1964

Species	Area		Total
	Districts Nos. 1 and 3	District No. 2	
Sockeye.....	200,203	143,155½	343,358½
Red spring.....	1,823	777	2,600
Pink spring.....	953½	2,076½	3,030
White spring.....	1,906	1,591½	3,497½
Steelhead.....	438	824	1,262
Blueback.....	36,259	—	36,259
Coho.....	90,665	77,808½	168,473½
Pink.....	140,475½	323,631	464,106½
Chum.....	76,990	155,731½	232,721½
Totals.....	549,713	705,595½	1,255,308½

1965

Species	Area		Total
	Fraser Area and South Coast	North Coast	
Sockeye.....	165,095½	80,702	245,797½
Red spring.....	4,682	1,718	6,400
Pink spring.....	1,567½	3,003½	4,571
White spring.....	5,998	1,922½	7,920½
Steelhead.....	337½	506	843½
Blueback.....	19,522	1,778	21,300
Coho.....	172,748½	101,235	273,983½
Pink.....	121,543	166,382	287,925
Chum.....	17,161	48,054½	65,215½
Totals.....	508,655	405,301½	913,956½

1966

Sockeye.....	287,319½	120,629½	407,949
Red spring.....	4,254½	1,743½	5,998
Pink spring.....	1,583	2,905	4,488
White spring.....	2,054	2,045	4,099
Steelhead.....	457½	2,022½	2,480
Blueback.....	20,989	98	21,087
Coho.....	136,750½	123,785½	260,536
Pink.....	252,773	699,021	951,794
Chum.....	36,078	124,706	160,784
Totals.....	742,259	1,076,956	1,819,215

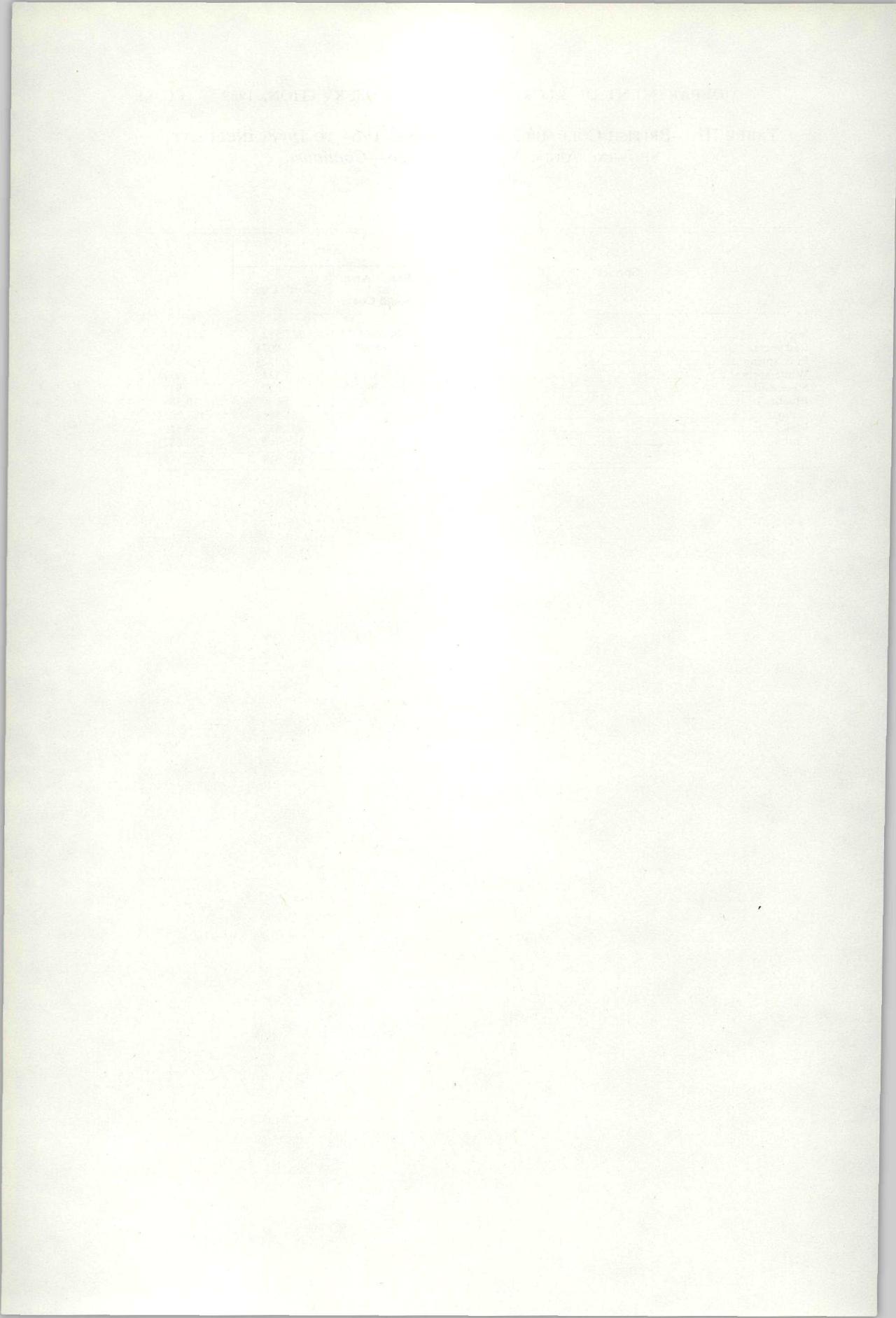
1967

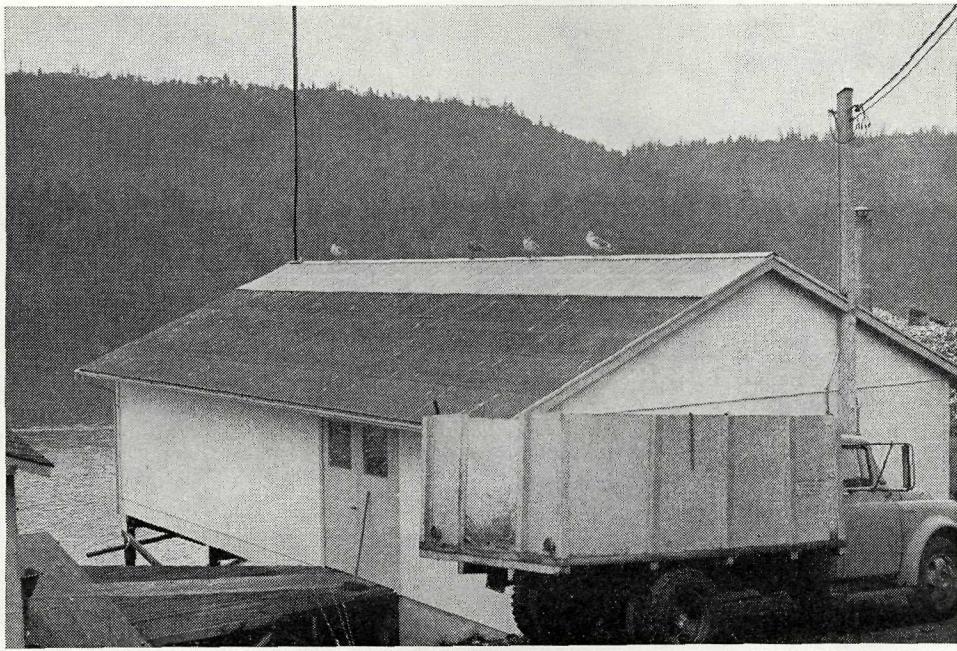
Sockeye.....	355,683½	203,208	558,891½
Red spring.....	3,445½	2,404	5,849½
Pink spring.....	1,843	3,304	5,147
White spring.....	1,988	1,695	3,683
Steelhead.....	322	974	1,296
Blueback.....	7,799	—	7,799
Coho.....	87,892	50,986	138,878
Pink.....	503,470	146,672	650,142
Chum.....	20,587½	73,435	94,022½
Totals.....	983,030½	482,678	1,465,708½

TABLE III.—BRITISH COLUMBIA SALMON PACK, 1964 TO 1968, INCLUSIVE,
SHOWING AREAS WHERE CANNED—*Continued*
(48-pound cases.)

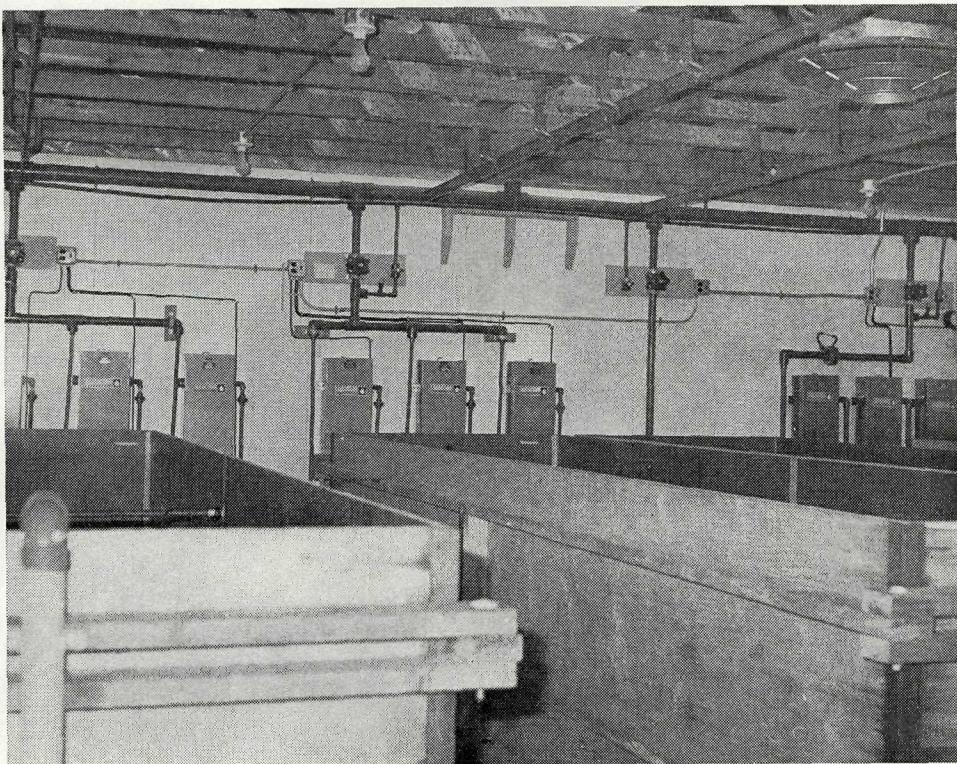
1968

Species	Area		Total
	Fraser Area and South Coast	North Coast	
Sockeye.....	398,438	212,573	611,011
Red spring.....	852½	802½	1,655
Pink spring.....	1,471	2,332½	3,803½
White spring.....	823½	1,134	1,957½
Steelhead.....	263	670	933
Blueback.....	10,389	—	10,389
Coho.....	92,619	84,586½	177,205½
Pink.....	227,893½	441,453	669,346½
Chum.....	79,225	191,462½	270,687½
Totals.....	811,974½	935,014	1,746,988½





Exterior of the oyster-depuration plant at Ladysmith, a joint Federal-Provincial pilot project. Interior is seen below.



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1970