



Province of British Columbia



Department of  
Recreation and Conservation  
**Annual Report 1972**

NW  
351.858  
B862  
1972  
c.3

PROVINCE OF BRITISH COLUMBIA  
DEPARTMENT OF RECREATION AND CONSERVATION  
HON. ROBERT A. WILLIAMS, *Minister*      LLOYD BROOKS, *Deputy Minister*

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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*

1972



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in right of the Province of British Columbia.

1973



VICTORIA, B.C., February, 1973

*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, 1972.

ROBERT A. WILLIAMS  
*Minister of Recreation and Conservation*

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VICTORIA, B.C., February, 1973

*The Honourable Robert A. Williams,  
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, 1972.

**LLOYD BROOKS**

*Deputy Minister of Recreation and Conservation*



## CONTENTS

|   | PAGE |
|---|------|
| Introduction by the Deputy Minister of Recreation and Conservation..... | 7    |
| General Administration.....   | 9    |
| Fish and Wildlife Branch.....   | 13   |
| Provincial Parks Branch.....  | 59   |
| British Columbia Provincial Museum.....                                 | 87   |
| Commercial Fisheries Branch.....  | 109  |

**COVER PHOTO**

Aquatic plants are part of our marine wealth.



# Report of the Department of Recreation and Conservation, 1972

LLOYD BROOKS, DEPUTY MINISTER AND COMMISSIONER OF FISHERIES

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## INTRODUCTION

The year 1972 was typified by continued increase in involvement of this Department with resource management and environmental matters, reflecting the steady growth of public concern over environmental quality and reflecting changing policy emphasis of a new Government. The Fish and Wildlife Branch has been the agency most affected by this changed and growing emphasis.

There was a continued high level of park development, mainly aimed at increasing facility standards, under the Accelerated Park Development Fund, and new directions on parkland evaluation, primarily related to the northern half of the Province. It is hoped new Provincial parks will result from this programme. The Parks Branch also undertook a careful re-evaluation of facility standards which could lead to modified park designs and new facilities to meet changing outdoor recreational demands.

The Commercial Fisheries Branch focused on an expanded programme of shared Federal-Provincial programmes, which, hopefully, will lead to opportunities for new industry related to ocean resources.

The Provincial Museum's year was highlighted by the opening of their first permanent exhibit, which earned enthusiastic comment and overwhelming visitation by the public. It is intended to move forward as quickly as possible on the other three-quarters of the Museum's exhibit space.

With hopes for continuing interest, and emphasis on the recreational and cultural resources of this Province, the Department now moves confidently into a new year, realizing that with such emphasis comes a broadened responsibility and new challenges which we are prepared to meet.



Report of the  
Department of Recreation and Conservation, 1972  
LLOYD BRADY, Director and Commissioner of Fisheries

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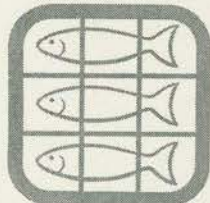
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**General Administration**



**Department of Recreation and Conservation**



## 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 work closely with all branches, and the Department of Travel Industry, in such Departmental matters as putting policy into effect, office and work facilities, personnel, and finance. General Administration is also responsible for the processing and handling of all subscriptions to *Wildlife Review*.

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.

## PERSONNEL SECTION

The year 1972 saw the formal establishment of a Personnel Section in the Department of Recreation and Conservation and the appointment of a full-time Personnel Officer. Work has commenced on the development of this function within the Department.

During 1972, classification reviews were carried out on the Conservation Officer series and Fish Culturist series in the Fish and Wildlife Branch. The Museum Curator series in the Provincial Museum was also reviewed.

Extensive recruitment of short-term employees was carried out through continuation of the Accelerated Parks Development Programme. In addition, a number of new professional and technically trained persons were taken on staff.

In 1972, two employees completed the Basic Public Administration Course. One employee from the Department commenced the 1972/73 Executive Development Training Plan, while two were admitted to the Basic Public Administration Course. In addition, a number of Departmental employees completed a Staff Management Course offered by the Civil Service Commission.

Ten employees in the Department received 25-year continuous service awards while two employees received gold watches for 40 years of continuous service.

Three awards of merit were presented to the Parks Branch by the British Columbia Safety Council for safety achievement in the following areas:

Manning Park Region, silver award.

Langford Workshop, bronze award.

Okanagan Region, gold award.

One hundred and twenty-three Civil Service Commission requisitions were processed through this Department for the Department of Travel Industry.

## PUBLIC INFORMATION

The interest of the public in the outdoors continued unabated in 1972. Perhaps the most significant change was that more requests were received from organized groups who displayed a growing tendency to become involved in decisions concerning the natural environment.

The Departmental Public Information Officer continued to be a member of the Resource Use Information Committee (a subcommittee of the Environment and Land Use Committee) and the Wildlife Review Advisory Board. He was also appointed information officer for the British Columbia Man and Resources Programme.

In September the Public Information Officer was relieved of duties with *Beautiful British Columbia* magazine, a quarterly publication of the Department of Travel Industry, after having served in various editorial capacities as his primary duty for more than seven years.

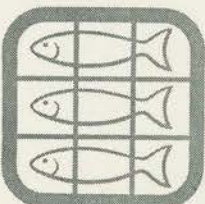
The Public Information Officer successfully completed an eight-week television and film production course at the Southern Alberta Institute of Technology in Calgary and the Banff Centre School of Fine Arts in Banff.

Toward the end of the year, meetings of public information officers in this and other departments were being held informally to determine the feasibility and advisability of clarifying and adhering to the qualifications and classifications of public information officers as a means to improve their services to the public. Concurrently, the information officers were in general agreement that the public demand for information about their Provincial Government was intensifying and they began working together on ways and means to impress upon their seniors the importance of establishing more effective public information policies and procedures.

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**Fish and  
Wildlife  
Branch**



**Department of Recreation and Conservation**



DEPARTMENT OF RECREATION AND CONSERVATION

## FISH AND WILDLIFE BRANCH

J. HATTER, DIRECTOR

Activities related to protection of fish and wildlife habitat continued to increase in 1972. Of particular note was the demand placed upon the Branch for resource data required for integration into forest management, including referral of cutting plans. A concern expressed over this growing emphasis on environmental matters is that recreational hunting and fishing is receiving less attention by the Branch, whose primary responsibilities have always been, like similar organizations, fish and wildlife management.

Unlike other years, the Branch received an amount of \$400,000 for expenditure on labour-intensive projects. This permitted a significant increase in fish and wildlife habitat improvement work, mainly stream clearance and winter-range rehabilitation.

Considerable study of head office organization took place and plans were initiated for some major restructuring in 1973 to accommodate the needs of environmental involvement, management, and administration.

The use of helicopters for transportation of hunters or game animals was prohibited. This was the outcome of several years of attention to the problem of helicopter use in hunting.

Once again the Province's marginal and semimarginal deer populations were at a lowered level following two winters of above-average severity. Grouse populations over most of the Province were not abundant, but this is an expected periodic phenomenon.

A \$1 firearms licence was instituted in 1972. It is required by all persons carrying firearms who are not in possession of a valid hunting licence.

A special allocation of \$100,000 was provided for the employment of auxiliary Conservation Officers. This increase in temporary enforcement staff was most helpful, but not a substitute for permanent staff. Prosecutions increased from 825 in 1971 to 1,175 in 1972.

The Branch participated in the introduction of 46 sea otters which were flown from Alaska by the Federal Department of the Environment and released near the Bunsby Islands on the west coast of Vancouver Island.

Increased attention was given to steelhead management, particularly planning for future propagation of this species.

Most regions report a continuing decline in game populations resulting primarily from poor land-management planning in the past. It is most gratifying, however, that increased public awareness of the necessity for preserving a quality environment is shifting the emphasis of resource development away from a short-term economic benefit principle toward an attitude of long-run benefit.



## REVENUE BY SOURCE

|   | 1967/68             | 1968/69             | 1969/70             | 1970/71         | 1971/72         |
|---|---------------------|---------------------|---------------------|-----------------|-----------------|
|   | \$                  | \$                  | \$                  | \$              | \$              |
| Resident hunting licence.....   | 572,084             | 579,412             | 604,906             | 623,988         | 615,745         |
|   | (\$4)               | (\$4)               | (\$4)               | (\$4)           | (\$4)           |
| Nonresident hunting licence (other than Canadian).....                      | 165,975             | 173,725             | 182,800             | 179,450         | 166,225         |
|   | (\$25)              | (\$25)              | (\$25)              | (\$25)          | (\$25)          |
| Nonresident hunting licence (Canadian).....                                 | 2,220               | 2,160               | 1,995               | 1,995           | 2,715           |
|   | (\$15)              | (\$15)              | (\$15)              | (\$15)          | (\$15)          |
| Deer-tag licence.....   | 98,704              | 179,387             | 173,544             | 177,581         | 162,451         |
|   | (50¢)               | (\$1)               | (\$1)               | (\$1)           | (\$1)           |
| Moose-tag licence.....  | 257,456             | 300,770             | 329,058             | 319,545         | 311,636         |
|   | (\$5 some \$6)      | (\$6 some \$5)      | (\$6)               | (\$6)           | (\$6)           |
| Elk-tag licence.....  | 26,712              | 55,680              | 56,080              | 51,090          | 44,380          |
|   | (\$2)               | (\$5)               | (\$5)               | (\$5)           | (\$5)           |
| Mountain goat-tag licence.....  | 15,344              | 15,420              | 14,938              | 14,751          | 12,976          |
|   | (\$2)               | (\$2)               | (\$2)               | (\$2)           | (\$2)           |
| Mountain sheep-tag licence.....   | 11,025              | 12,180              | 12,280              | 12,985          | 13,215          |
|   | (\$5)               | (\$5)               | (\$5)               | (\$5)           | (\$5)           |
| Caribou-tag licence.....  | 17,543              | 24,610              | 24,290              | 26,585          | 28,540          |
|   | (\$3)               | (\$5)               | (\$5)               | (\$5)           | (\$5)           |
| Grizzly bear-tag licence.....   | 15,295              | 28,460              | 26,545              | 28,160          | 22,670          |
|   | (\$5)               | (\$10)              | (\$10)              | (\$10)          | (\$10)          |
| Black bear-tag licence.....   | 6,227               | 7,882               | 8,136               | 8,970           | 10,677          |
|   | (50¢)               | (50¢)               | (50¢)               | (50¢)           | (50¢)           |
| Cougar-tag licence.....   |                     |                     |                     | 1,795           | 2,244           |
|   |                     |                     |                     | (\$5)           | (\$5)           |
| Nonresident game bird licence (Canadian).....                               | 438                 |                     |                     |                 |                 |
|   | (\$3)               |                     |                     |                 |                 |
| Big-game trophy fees (nonresident).....                                     | 317,205             | 321,760             | 328,436             | 324,570         | 298,820         |
| Resident angler's licence.....  | 367,934             | 550,667             | 610,128             | 639,552         | 642,651         |
|   | (\$2)               | (\$3 some \$2)      | (\$3)               | (\$3)           | (\$3)           |
| Resident steelhead angler's licence.....                                    | 9,707               | 9,462               | 10,856              | 10,700          | 48,717          |
|   | (25¢)               | (25¢)               | (25¢)               | (25¢)           | (\$2)           |
| Nonresident anglers.....  | 236,540             | 232,710             | 257,000             | 261,070         | 249,870         |
|   | (\$10)              | (\$10)              | (\$10)              | (\$10)          | (\$10)          |
| Nonresident angler's licence (Canadian).....                                | 53,506              | 65,862              | 67,986              | 72,486          | 78,753          |
|   | (\$3.50)            | (\$3)               | (\$3)               | (\$3)           | (\$3)           |
| Nonresident angler's (short term).....                                      | 68,712              | 138,298             | 165,882             | 168,151         | 163,103         |
|   | (\$2)               | (\$3.50 some \$2)   | (\$3.50)            | (\$3.50)        | (\$3.50)        |
| Nonresident steelhead angler's licence.....                                 | 8,450               | 9,635               | 11,995              | 10,495          | 9,620           |
|   | (\$5)               | (\$5)               | (\$5)               | (\$5)           | (\$5)           |
| Nonresident angler's licence (minor).....                                   | 18,180              | 17,883              | 20,731              | 20,908          | 19,388          |
|   | (\$1)               | (\$1)               | (\$1)               | (\$1)           | (\$1)           |
| Resident trapping licence.....  | 10,980              | 11,020              | 11,665              | 10,880          | 10,360          |
|   | (\$5)               | (\$5)               | (\$5)               | (\$5)           | (\$5)           |
| Guide - outfitter, registered guides and small game and angling guides..... | 12,050              | 12,185              | 12,405              | 29,400          | 29,136          |
|   | (\$15-\$10-\$5)     | (\$15-\$10-\$5)     | (\$15-\$10-\$5)     | (\$50-\$5-\$15) | (\$50-\$5-\$15) |
| Resident fur trader's licence and royalty on fur.....                       | 36,237              | 35,778              | 37,040              | 36,793          | 29,671.24       |
| Fines imposed under the <i>Wildlife Act</i> and <i>Firearms Act</i> .....   | 22,672              | 29,645              | 31,094              | 35,282          | 38,181          |
| Miscellaneous revenue.....  | 13,907 <sup>1</sup> | 23,079 <sup>1</sup> | 18,049 <sup>1</sup> | 8,132           | 6,916.50        |
| Subtotal.....   | 2,365,103           | 2,837,610           | 3,017,838           | 3,075,314       | 3,018,661.24    |
| Less commissions on sale of licences.....                                   | 88,702              | 132,675             | 109,347             | 157,972         | 142,912.91      |
| Totals.....   | 2,276,401           | 2,704,935           | 2,908,492           | 2,917,342       | 2,875,748.33    |

<sup>1</sup> Includes subscriptions to *Wildlife Review*.

## WILDLIFE MANAGEMENT

### INTRODUCTION

The 1972 hunting season will be remembered by most as a poor hunting year. Big game and upland game hunting success was much poorer than usual, although those seeking waterfowl enjoyed improved success over the previous year.

Big-game populations in most areas of the Province have suffered through two successive severe winters, which resulted in poor winter survival and production of young. This, coupled with unusually mild fall weather in 1972, contributed to reduced hunter success. Native grouse populations in the northern and Interior regions of the Province are presently at a low point in their periodic fluctuations in abundance. This is a normal condition. On Vancouver Island, blue grouse populations provided good hunting. Game-bird hunting continues to decline in urban areas, as private lands are closed to hunting and as more regional district and municipal closures come into effect. The closure of dyked lands in Delta Municipality to hunting in 1972 was a particularly unfortunate event in this regard.

Although in recent years many gains have been made in bringing about improved protection of wildlife habitat, much more needs to be done to improve the productive capability of wildlife lands in several areas of the Province, notably the East Kootenay, Vancouver Island, and the southern Interior. A major initiative in the management of wildlife in urban areas of the Province is a second requirement for the satisfaction of public demands for the use and enjoyment of wildlife. Declines in most game populations that have been observed in recent years relate primarily to the loss and deterioration of habitat through forage competition, urbanization, and industrial land uses, and not, as is commonly supposed, through hunting.

### PROTECTION

Engineering studies at Guelph and McMaster Universities aimed at the development and standardization of humane traps for use in the harvesting of the Canadian fur resource have received financial support from the Branch. The project, under the sponsorship of the Canadian Federation of Humane Societies, is an essential step in the trend toward the replacement for general use of the traditional leg-hold trap by an instrument of capture more acceptable to modern society.

Waterfowl management remains a co-operative Federal-Provincial activity. As with other wildlife, the protection of important habitat is being emphasized and joint land acquisition and development programmes are prime functions of both the Canadian Wildlife Service and the Fish and Wildlife Branch. A programme of wetland-habitat improvement for waterfowl is being done throughout the Province by Ducks Unlimited (Canada) in co-operation with the Fish and Wildlife Branch, the Canadian Wildlife Service, and private land-owners. Valley bottom and estuarine (river mouth) areas are prime targets for acquisition and improvement projects. These areas form the backbone of wetland habitat in British Columbia, yet this is where man's activity is most pronounced and in greatest conflict with the conservation and management of the resource.

Wildlife habitat-evaluation studies were continued as an important function of the Wildlife Management Division. Plant community evaluations were conducted for the Ashnola and the Chilcotin bighorn-sheep ranges. In most cases information was collected on the plant species present and the amount of use given each plant

community by bighorn sheep, mule deer, and cattle. In addition, multiple land-use projects were investigated in the Libby Reservoir basin and the Maxan Lake Community Pasture.

A symposium was held in Kamloops to discuss live stock/wildlife competition in the Pacific Northwest. The Canada Department of Agriculture Research Station at Kamloops hosted the meeting with the hopes of clarifying several aspects of forage competition by drawing different points of view from agrologists and wildlife biologists.

### Hunter Sample

### MANAGEMENT

Table 1 provides a summary of game-harvest statistics for the past six years obtained from the annually conducted game-harvest questionnaires. This sampling programme is a major source of statistical data about hunting, contributed voluntarily by those who participated in the sport. This contribution is gratefully acknowledged.

*Summary of Game Harvests by Residents of British Columbia, 1966-71*

| Species          | 1966    | 1967    | 1968    | 1969    | 1970    | 1971    |
|------------------|---------|---------|---------|---------|---------|---------|
| Deer             | 76,692  | 70,534  | 77,013  | 57,035  | 65,830  | 56,117  |
| Moose            | 19,940  | 19,397  | 22,469  | 15,205  | 16,450  | 17,379  |
| Elk              | 1,970   | 1,709   | 2,257   | 1,498   | 1,638   | 1,526   |
| Caribou          | 798     | 1,191   | 830     | 854     | 949     | 1,000   |
| Goat             | 1,762   | 1,577   | 1,661   | 1,557   | 1,386   | 921     |
| Sheep            | 225     | 221     | 267     | 227     | 248     | 223     |
| Grizzly bear     | 182     | 159     | 192     | 176     | 204     | 159     |
| Pheasant         | 29,207  | 32,324  | 23,531  | 23,634  | 25,267  | 24,017  |
| Grouse           | 508,514 | 978,485 | 623,979 | 807,229 | 948,142 | 691,585 |
| Licensed hunters | 134,351 | 143,048 | 145,052 | 151,653 | 153,424 | 150,615 |

### RESEARCH

The continued success of a Branch-assisted experimental programme to rear peregrine falcons in captivity is an outstanding achievement on the part of a private citizen who is conducting this work. For the fifth consecutive year these birds have reproduced successfully in captivity, representing the first such success in the 2,000-year history of falconry. The results of this programme are now being prepared for publication for the benefit of other researchers.

An economic study on the value of resident hunting in British Columbia was completed by Pearse Bowden Economic Consultants Limited in 1972, yielding an estimated net value from hunting of \$14,500,000 in the Provincial economy. This study completed a series of six such studies on sport fish and wildlife economics, the only such series ever done in North America. A final combined economic study will be concluded in 1973.



Removal of habitat by extensive logging left only an "island" of shelter for a group of Vancouver Island elk.



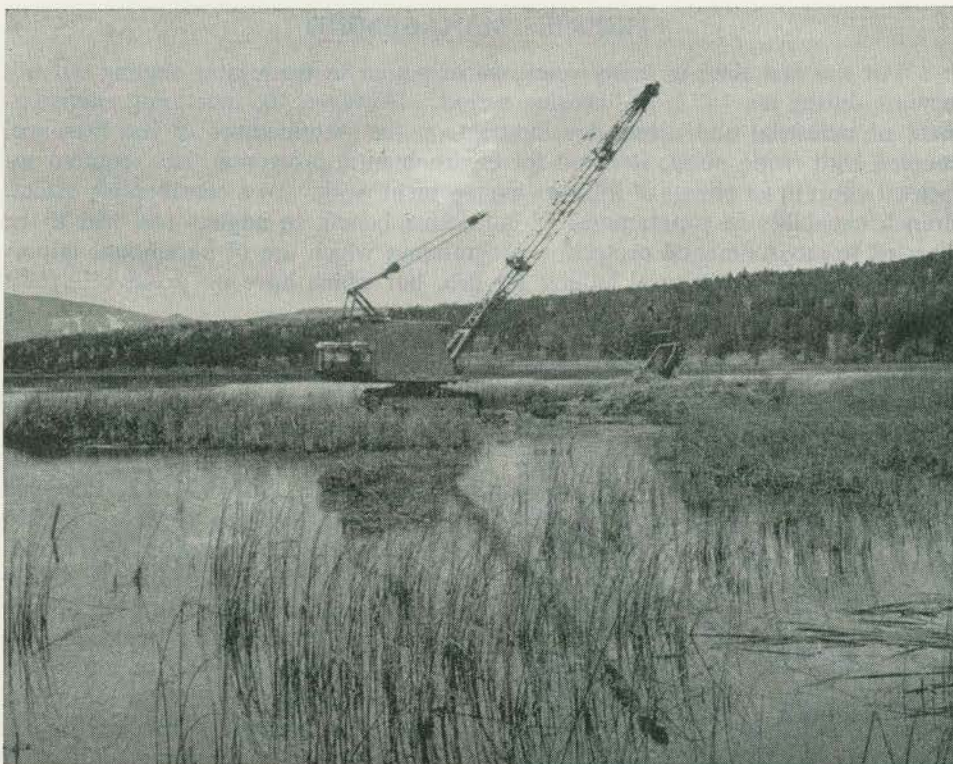
Elk have been introduced into areas of suitable habitat in the West Kootenays.



Wildlife are often in conflict with domestic stock for their living requirements. Land grazed heavily by cattle, right, presents a striking contrast in comparison to land grazed only by natural wildlife.



Conservation Officers, assisted by Royal Canadian Mounted Police, checking nonresident anglers at a Canada-United States border crossing.



Dragline being used to form nesting islands for ducks and geese at Elizabeth Lake near Cranbrook.



Surveys of moose on winter range are made from helicopters.

## FISHERIES MANAGEMENT

For the first time in many years, participation in freshwater angling did not increase during the 1971/72 licensing period. However, the increasing encroachment of industrial and urban development on the watercourses of the Province, coupled with rising public demand for environmental protection, has required increased effort in all phases of fisheries management work. To a considerable extent, Branch capability in programmes of immediate benefit to anglers had had to be diverted to environmental protection programmes which are of paramount importance in maintaining natural habitat for fish, but which have no positive benefits for anglers.



A steelheader, his equipment, and his prize.

The increased cost of a steelhead angler's licence (\$2) resulted in a considerable reduction in sales. This was anticipated because in the past less than half of the licensees actually went fishing for steelhead. In 1971/72, steelhead licence sales totalled 26,253 (23,526 residents of the Province, 803 other Canadians, and 1,924 non-Canadians). Questionnaire returns indicate that 18,270 licensees actually fished for steelhead, and of these 7,934 caught one or more fish. The total catch was 61,428, of which 24,724 were released. This was an increase from the previous year when 53,916 were taken with 19,939 released. Steelhead anglers spent approximately 185,000 days on the rivers in 1971/72. The Provincial average catch was one fish for each five days fished, but only 50 per cent of the anglers fished more than five days during the year. As in past years, the persistent and expert anglers took the bulk of the catch, as 5 per cent (916) of the anglers took 48 per cent of the fish killed during the year.

Most Branch fisheries management work is organized and conducted in the field by biologists and technical staff under the direction of Regional Supervisors in the seven management regions of the Province. Much of the fisheries activity is therefore outlined in reports of these regions. However, several Province-wide functions are administered or co-ordinated through the main office to provide services and support to regional management programmes, and these activities are outlined in the following sections.

## HABITAT PROTECTION

There were two significant progressive changes in the area of fish-habitat protection for the year. First, the several years of continuing conflict in philosophy and management of timber resources in relation to protection of fish, wildlife, and recreation resources culminated during the year in interagency discussions at senior levels. From these discussions it is hoped that means can be developed for better integrating the needs of forestry with those of fish and wildlife. Second, biologists

and many concerned citizens gained a much better appreciation of the importance of unspoiled estuaries in maintenance of the aquatic resources of estuarine areas and of the associated tributary streams. This concern has been meaningfully expressed in halting or modification of development plans for industries, transportation facilities, and other activities which would involve dredging and filling activities in these productive areas.

The following examples of involvement in specific habitat problems will illustrate the wide range of activities which impinge upon the habitat of sport fish in British Columbia.

#### *Liaison*

Meetings and negotiations with large and small development companies form the basis for mutual understanding of environmental problems. Some of the industrial concerns with which discussions with managers were held include pulp-mills such as Kamloops Pulp and Paper Ltd., Eurocan, Columbia Cellulose, and Crestbrook Pulp and Paper Company; mines such as Kaiser Resources, Fording Coal, Coalition Coal, H.B. Mine, and Granisle Copper Ltd., and most of the major logging companies in the Province. A better insight into current and potential problems for fisheries managers comes from a good relationship with other resource-management agencies and citizen groups. The section maintains a continuing liaison with all Provincial resource-management agencies and most groups concerned with the natural environment; national agencies such as the Department of Environment, National Research Council, and the (U.S.) Environmental Protection Agency; and international agencies such as the International Pacific Salmon Fisheries Commission.

Hearings are another useful means of making known the environmental requirements of outdoor recreational resources. During the year the Branch participated in hearings into a landfill proposal at Somenos Lake on Vancouver Island, a proposal to construct and operate a copper smelter near Clinton, and a hearing to set guidelines for disposal of wastes from the mining industry.

#### *Dredge and Fill Operations, Channelling*

A recent study of estuaries in British Columbia states that "Research has shown that tidal estuaries are among the most productive of the world's ecosystems. Because of their unique chemical and physical characteristics, they exhibit a truly outstanding capacity to convert basic nutrient sources into biological productivity." Exclusively freshwater shallows in lakes and rivers are similarly productive. In recognition of these values the Branch is directly increasing interest toward halting of unregulated landfilling and channelling in aquatic habitats. At Port Hardy three separate proposals to fill portions of Hardy Bay at the mouth of Quatsi River have been stopped; at Tahsis, at the mouth of Tahsis River, plans for filling of the estuary have been modified, and the Branch has objected to dredging for a marina at the mouth of Oyster River on Vancouver Island. There also has been a more minor involvement in major industrial developments planned for Nanaimo and Squamish Harbours. The Branch has been effective in halting filling of productive littoral zones at Somenos Lake on Vancouver Island and Alta Lake near Garibaldi Provincial Park. Proposals to channel, fill, and train rivers for flood-control and bank-protection purposes which conflicted with fisheries interests were resolved at Cowichan River, Kootenay River, and Bear River northwest of Prince George.





An important trout-spawning stream, before and after being cleared by Branch personnel.

### *Reservoirs*

In 1972 the Fish and Wildlife Branch began investigations of fish and wildlife habitat to be affected by future hydro-electric developments as outlined in the B.C. Energy Board report on Provincial energy requirements to 1990. Field work was concentrated on the 85-mile section of Columbia River between Revelstoke and Mica Creek; this section of river is slated to become impounded by one or more dams by 1980. Information obtained included quantification of fish and game species within the future reservoir-site, with descriptions of type, extent, and quality of habitats. Further surveys will be required before this programme is complete. Seven Mile (Pend d'Oreille River) and Cutoff Mountain (Skeena River) were also surveyed briefly in 1972. These and other potential hydro-electric sites will be studied more fully in coming years.

This Branch was successful last year in at least temporarily halting a proposal to construct a dam and domestic water-supply reservoirs on the Chemainus River. The dam would endanger an important summer steelhead population, destroy a vital deer winter range, and inundate a public recreation reserve.

During 1972 the Branch embarked upon a nitrogen supersaturation monitoring programme, concentrating mainly on the Kootenay-Columbia systems. This programme was precipitated by the massive fish kills experienced in Kootenai River in Montana, which were caused by excess nitrogen trapped in water released over the recently completed Libby Dam. With the acquisition of additional sampling equipment late in the year, it is hoped that the monitoring programme will be expanded to cover dam-sites throughout the Province.

### *Road Construction*

Referrals from the Locations Section, Department of Highways, continued to enable the Branch to advise on methods of minimizing damage to habitat as a result of highway construction. The section included protective regulations in a number of projects, including the Island Highway from Sayward to Nimpkish, Highway 401 from Chilliwack to Hope, Highway 3 south of Salmo, and Highway 16 near McBride.

### *Logging*

Excellent co-operation from Forest Engineering Division of the Forest Service has resulted in a number of forest road and bridge construction projects being completed with an absolute minimum of disturbance to the environment. Of special importance was a controversial crossing of the Babine River, completed during the early spring without apparent damage to the important steelhead spawning-grounds immediately downstream of the site.

Also, a committee consisting of two members from each agency has been, for the past year, engaged in the task of formulating methods of improving and increasing fish and wildlife input into planning processes associated with tree-farm licences and timber sales harvesting licences.

### *Research*

An important continuing function of the Section is in the field of research of newly emerging pollution problems and in monitoring of water quality in areas of major industrial activity. There were several of these programmes undertaken in 1972. In Elk Valley (Kootenay Region) a continuing study of changes in water quality and aquatic animal life related to use of adjacent lands for strip-mining was expanded to include a survey of the types and extent of recreational use of the valley.

On other river systems and in laboratory tests there were studies of the problem of tainting of fish flesh by pulp-mill effluents. At Castlegar and Babine Lake, scuba diving and underwater photography techniques were used to record the effect on bottom fauna of deposits of pulp-milling and ore-milling wastes. At Comox and Prince Rupert Harbours, the Section began study, with other Provincial Government agencies, of land use and waste-water disposal in these relatively confined embayments. The programme of collecting samples of fish, bird, and other animal flesh for analysis of pesticide content continued; in all, 154 wildlife samples were analysed.

### *Referral Systems*

Over 1,450 applications for water licences were processed by this Branch in 1972. The increasing number of water withdrawals is resulting in critically low flows on many streams throughout the Province. In many cases, this Branch has recommended minimum flows be established to ensure protection and maintenance of fish populations involved, for example, Similkameen, Nicomekl, and Koksilah Rivers and Mission, Tugwell, and de Mamiel Creeks. The number of applications involving construction of dams across small streams is an increasing cause for concern; in most cases these dams effectively obstruct fish passage. This Branch has, when necessary, objected to such dams when alternative methods or sources of water are available. (Travers Creek near Prospect Lake, Unnamed Creek near Courtenay, China Lake near Williams Lake, Beaver Creek near Quesnel, Skinner Creek near Chilko.)

Excellent co-operation between the Department of Mines and Petroleum Resources and this Branch over the referral of placer-mining leases on the Fraser River drainage has resulted in either refusal of, or restrictions written into, leases along important fisheries rivers, including the Quesnel and the Cariboo. Fishery values, wildlife habitat, as well as recreation and aesthetics, are all taken into consideration when reviewing these applications.

More than 330 pollution control permit applications for waste discharges to land, water, and air were reviewed by this Branch in 1972. Of recent concern are problems associated with location and maintenance of refuse dumps and landfills, wood-waste leachates (Somenos Lake), bear problems at garbage dumps (Kootenays), and indiscriminate dumping of solid wastes (Canadian Cellulose at Castlegar).

## HABITAT IMPROVEMENT AND INVENTORY

### *Inventory*

From May to October 1972, a total of 99 lakes throughout the Province were fully or partially surveyed by a two-man crew. Provincial survey emphasis was shifted northward with 41 lakes between Prince George, Cassiar, and Hazelton and 37 lakes in the Cariboo-Coast Region. Information pertinent to fish management for 1,200 of the estimated 16,000 lakes in the Province is now available.

The stream-survey programme was modified in 1972 to accommodate requests for data relating to specific management problems in six different regions throughout the Province. A total of 41 drainage systems was surveyed, with heavy emphasis placed on baseline description of physical conditions and fish distribution. Pollution problems and potential stream improvement were also outlined.

Extensive aerial photograph interpretation, and overflights in some drainages, greatly reduced ground reconnaissance requirements. Limited use of helicopters provided excellent opportunities to assess remote sections of streams, particularly many headwater areas.

Regional fisheries inventory work concentrated on lakes and streams in watersheds to be affected by industrial development, including forest operations, railroads, highways, and mining activities. Agricultural development, creation of reservoirs, and urbanization also necessitated special surveys.

#### *Habitat Improvement*

During 1972, Branch involvement in improvement work increased dramatically over any similar period in the previous six years. Local crews were employed in most regions to carry out a wide range of activities, including stream clearance, diversion structure, fish barrier and channel construction, lake aeration and chemical rehabilitation, food organism (shrimp) transplants, access road, trail, and viewing-site development and lakeshore clearing.

Co-operative ventures with fish and game clubs, Parks Branch youth crews, Opportunities for Youth Crews, Fisheries Service personnel, and several logging companies were, for the most part, highly productive.

Engineering and biological assistance from headquarters was provided to most regions and several other agencies to help expedite both long- and short-term local fisheries projects.

The following table outlines the type and region of 77 improvement projects throughout the Province:

| Type of Project                      | Region                 | Number of Projects |
|--------------------------------------|------------------------|--------------------|
| Stream clearance .....               | Vancouver Island ..... | 1                  |
|                                      | Lower Mainland .....   | 1                  |
|                                      | Kamloops .....         | 9                  |
|                                      | Okanagan .....         | 3                  |
|                                      | Kootenays .....        | 2                  |
|                                      | Cariboo-Coast .....    | 8                  |
| Diversions, barriers, channels ..... | Northern .....         | 8                  |
|                                      | Lower Mainland .....   | 1                  |
|                                      | Kamloops .....         | 4                  |
|                                      | Okanagan .....         | 1                  |
|                                      | Kootenays .....        | 1                  |
| Lake aeration .....                  | Kamloops .....         | 3                  |
|                                      | Okanagan .....         | 1                  |
| Chemical rehabilitation .....        | Kamloops .....         | 3                  |
|                                      | Okanagan .....         | 1                  |
|                                      | Kootenays .....        | 3                  |
|                                      | Northern .....         | 1                  |
| Food transplants .....               | Vancouver Island ..... | 1                  |
|                                      | Kamloops .....         | 5                  |
| Access roads, trails .....           | Vancouver Island ..... | 1                  |
|                                      | Kamloops .....         | 14                 |
|                                      | Okanagan .....         | 1                  |
| Viewing-sites .....                  | Vancouver Island ..... | 2                  |
|                                      | Lower Mainland .....   | 1                  |
| Lakeshore clearing .....             | Okanagan .....         | 1                  |



A large (28 pounds) male rainbow trout which died after spawning; it is examined by a cautious admirer.



Some of the 600 people who viewed the spawning activities of several hundred large Kootenay Lake rainbow trout at Gerrard in May.

*Goldstream River*—A co-operative venture involving log-jam removal and rechanneling of several hundred yards of this important salmon-spawning and trout-rearing habitat near Victoria was undertaken by Fish and Wildlife Branch, Parks Branch, and Fisheries Service staff. Expertise and funding were shared and the work proved very useful in protecting and improving the fishery resource and integrity of this small stream in a Provincial park near Victoria.

*Alice Lake outlet*—A co-operative venture between the Fish and Wildlife Branch and Parks Branch resulted in improvement of an outlet spawning-stream in Alice Lake Provincial Park. The main purpose was to provide educational and viewing opportunities for the public by creation of a trail and sign system through a naturally degraded and improved stream system. Several thousand people viewed the partially completed project in 1972 and, on completion of the trail and sign system, it is anticipated that a substantial number of park visitors will view and enjoy the project in the future. In 1972 at least 125,000 persons visited this extremely small park near Squamish.

*Meadow Creek*—In 1972, progeny from the second (1968) kokanee spawning-run in the artificial channel returned to spawn in Meadow Creek (Kootenay Lake area). An estimated 529,000 fish entered the system, a population level double that of 1968.

As part of a continuing programme to increase fry survival, the whole channel was scarified in 1972, removing all bar formations and loosening and partially cleaning the gravel. With a controlled number of spawners in the channel and increased quality of spawning environment, fry production should show another moderate increase in the spring of 1973.

Assessment of alternatives to control sand, silt, and bed-load materials being deposited in the channel from a tributary stream has now been completed, initial engineering is being finalized, and remedial construction is planned for the summer of 1973.

*Steep Pass Fishways evaluation*—Small, portable fishways were installed at a major obstruction in an Arrow Lake tributary in the fall of 1972. Initial results indicate that a combination of reservoir-level control and comparatively inexpensive fishways can make 15 miles of excellent kokanee-spawning environment available to fish from Arrow Lakes.

*Lake rehabilitation*—Seven small lakes located near population centres throughout the Province were chemically treated to remove coarse fish. A number of permanent coarse-fish barriers were built before treatment to prevent reinvasion by undesirable species. Following detoxification and recolonization of food organisms, the lakes will be replanted with game fish.

| Lake    | Region   | Location   | Size (Acres) |
|---------|----------|------------|--------------|
| Gardom  | Kamloops | Salmon Arm | 180          |
| Forest  | Kamloops | Shuswap    | 64           |
| Horn    | Okanagan | Kaleden    | 80           |
| Edwards | Kootenay | Grasmere   | 82           |
| Loon    | Kootenay | Grasmere   | 79           |
| Edith   | Kootenay | Wardner    | 30           |
| Chubb   | Northern | Quesnel    | 166          |

One small lake, near Little Fort, was experimentally treated with a selective piscicide (squoxin) for squawfish, a serious competitor and predator of game fish in most areas of the Province. Further investigation will be required to determine

the value and drawbacks, if any, of this management procedure before considering further use.

#### FISH CULTURE

Permanent production hatcheries at Abbotsford, Summerland, and Wardner, one seasonal hatchery at Loon Creek, and various supporting egg-collecting stations are administered by the Fish Culture Section of the Fish and Wildlife Branch. Included in this section are the biologist in charge of fish culture and the Superintendent of Hatcheries, both in Victoria; field staff consisting of 13 fish culturists, a supervisor of construction, and 28 seasonal employees including fish culturists, carpenters, cooks, labourers, and watchmen. Fish species cultured included brook trout, cutthroat (coastal and Yellowstone), kokanee, lake trout, rainbow, and steelhead. Nine field stations were operated to collect eggs from all species except lake trout.

The release in 1972 of 3.4 million fish weighing 34,800 pounds was less than the five-year average. When compared to 1971, 1 million fewer rainbow trout were stocked in 1972, but they were twice the size. Of the 318 lakes planted with fish, 267 were planted with rainbow.

The number and weight of each species liberated were as follows:

|                       | Number    | Pounds |
|-----------------------|-----------|--------|
| Cutthroat trout ..... | 118,800   | 205    |
| Brook trout .....     | 349,500   | 2,539  |
| Lake trout .....      | 39,400    | 1,762  |
| Rainbow trout .....   | 2,911,230 | 29,500 |
| Steelhead .....       | 23,300    | 838    |
| Totals .....          | 3,442,230 | 34,844 |

A total of 23,300 fin-clipped 1-year-old steelhead was introduced into the rearing-pond adjacent to the Coquihalla River. This was the second year in which hatchery fish were planted in the seminatural pond for an additional year of rearing under more natural conditions.

Duncan River, Wilkie Creek, and Meadow Creek in the Kootenay Region were each planted with rainbow trout of Duncan River origin. All received marked fish of yearling age, with the Duncan also planted with tagged 2-year-olds. No eggs could be collected from the Duncan River in April because of the abnormally high discharge from Duncan Dam.

Approximately 10 million eggs were collected, most of which were taken from natural fish populations. However, a few hundred thousand eggs were obtained from a domesticated strain of rainbow trout at Fraser Valley and from brook trout and lake trout held at Kootenay Hatchery. Less than the required number of rainbow trout eggs were collected and no doubt the long, cold, spring weather, as well as the high water in May, contributed to the poor collections at Tunkwa and Pennask lakes. Low numbers of adult brook trout in Aylmer Lake has hindered the programme of rapid development of our own egg collections for this species. Sufficient kokanee and Yellowstone cutthroat eggs were obtained, but excessive unexplainable mortality during incubation reduced the number available for stocking in 1973. A natural stock of coastal cutthroat for developing an annual egg collection has not yet been found. However, a brood stock of cutthroat is being developed at Fraser Valley Hatchery to provide eggs in future years. A field evaluation of Fortress Lake as a potential source of brook trout eggs was undertaken during the fall months.

Several major construction projects and renovations were undertaken this year. A high-water by-pass channel with associated controls and fish facilities at Pennask Creek was the largest project undertaken at an egg-collection station. Staff living-quarters at Swalwell (Beaver) Lake were expanded and improved, while renovations to fish traps or egg-holding facilities at Swalwell, Tunkwa, and Pennask Lakes were other projects completed at temporary field stations.

Major improvements to the permanent hatcheries consisted of landscaping, paving, and replacement of the sewage-disposal field, as well as partial development of vacant land for a storage compound at Summerland Hatchery. At Fraser Valley Hatchery, two small ponds and several cages were incorporated into the water system for raising small specialized groups of fish which formerly occupied part of the main production ponds. Two large ponds of concrete-block construction were replaced with a cement structure of more usable design.

Under a contract with the Department of Public Works, B.C. Research completed construction of a pilot plant at Abbotsford and began testing methods of treating water which would be applicable to reuse of hatchery water. This work is preliminary to the design of a new hatchery to replace that which now exists in the Fraser Valley.

At Summerland Hatchery a co-operative experiment with the Fisheries Research Section tested the effects of low concentrations of ammonia on the growth and mortality of rainbow fry over a period of 40 days. A higher mortality of "swim-up" fry was observed with increasing concentrations of ammonia nitrogen. The control group (0.008 to 0.105 p.p.m.  $\text{NH}_3\text{N}$ ) experienced a 1.9-per-cent loss compared with 2.5, 2.9, and 3.3 per cent for fish raised in flowing water containing 0.25, 0.75, and 1.25 p.p.m. ammonia nitrogen. Oxygen consumption by fry was usually higher in the group subjected to little or no ammonia, compared to those receiving the higher ammonia concentrations. Preliminary examination of the data shows little or no difference in fish weight or gill morphology related to differences in ammonia concentration over the study period. Since ammonia is the principal excretory product of trout, its effects are especially important where water is to be recirculated for reuse in a hatchery.

Experiments to test fish food produced by two commercial manufacturers began in 1969. Groups of fish have been raised for three consecutive years in a hatchery, marked, and released at 1 year of age into one or two lakes. Evaluation of the mature adults returning to spawn at age 2 commenced in 1971 in Premier Lake and in 1972 in Swalwell Lake.

From 25,000 fish reared on each of the two diets and released into Premier Lake, 2,010 reared on an Ewos trout diet (F-32) and 1,733 raised on Clark's diet returned as 2- and 3-year-olds in 1971 and 1972. In the same lake in 1972, 227 fish returned at 2 years of age after being raised on an Ewos high-fat diet (F-139), while 129 fish were recovered from the group raised on Clark's; 25,000 of each experimental group had been planted in 1971 as 1-year-olds. In 1973, returns to the spawning-stream should include fish of age 2, 3, and 4 from the three annual liberations.

Angler creel census conducted between December 1971 and September 1972 at Premier Lake showed that 50 per cent of the fish checked were from the 1971 stocking, 24 per cent from the 1970 stocking, and 20 per cent from the 1972 liberation. Fish raised on the Ewos diet accounted for 233 of the 375 marked fish of various ages that were examined, while Clark's fish numbered 142.

A number of personnel changes took place in 1972. Early in the year, N. W. Green resigned and late in the year D. W. Campbell transferred to become a Con-



ervation Officer. Besides filling two staff vacancies, several promotions and transfers took place.

Four fish culturists were enrolled in the British Columbia Institute of Technology In-service Training Course and three attended the Police Academy.

#### FISHERIES RESEARCH

The main research projects in 1971 continued to focus on the environmental and biological factors that regulate the production of rainbow trout. In addition to normal research activities, there was a marked increase in technical services provided to other sections of Fisheries Management and to regional biologists throughout the Province.

After 14 years as head of the Research Section, Dr. T. G. Northcote left the Provincial Service to work for the University of British Columbia, where he is associated with the Faculty of Forestry, the Westwater Research Centre, and the Institute of Animal Resource Ecology. The Section continues to enjoy a profitable relationship with Dr. Northcote on some research projects that are co-operatively undertaken with UBC. Two new staff members filled vacancies during the year—one of them is an expert on salmonid reproductive behaviour and habitat requirements in streams, the other comes with experience in environmental protection work in fisheries problems associated with forest harvesting, pesticides, and urban development.

#### *Juvenile Trout Production, Loon Lake*

During 1972, several aspects of the stream production study reached final stages of data collection and analyses. Environmental factors appeared close to optimal and high production was obtained from both inlet and outlet streams. The year-end census indicated that, as in 1971, a large proportion of fry will overwinter in the outlet, and barring severe overwinter mortality, a large run of juveniles is expected to move to the lake in 1973. Total outlet stream production to the lake this year was 29,500 fish, of which 4,500 were fry and 25,000 were juveniles. This was an increase from a total of 18,800 in 1971 and 14,700 in 1970. Production from the inlet stream was also higher this year, with 130,000 to 140,000 fry produced compared to previous totals of about 100,000.

All fish emigrating from the outlet stream to the lake were marked by clipping a fin. These fish aided in studies of dispersal in the lake and will be used in future years to provide estimates of natural and fishing mortality of the outlet stock in the lake.

Distribution of fry and juveniles within the lake was traced by following the movement of the marked fish as they moved away from the stream along the shores of the lake. Fish-of-the-year first utilized the habitat closest to shore, but 1- and 2-year-old trout were further off shore this year than last. A pilot experiment was conducted to determine whether fry and yearling selected specific parts of the shoreline habitat. Although the data are preliminary, they suggest that the immediate onshore habitat is the most important rearing area for fry and that there they probably grow faster by avoiding competition from yearlings. However, yearling trout also grew better in the onshore habitat, although we had expected better growth offshore where this age class is normally found.

The feeding ecology of subadult fish was studied to see if food governed the selection of a specific portion of the available habitat. Limnological characteristics of the lake were determined to test whether the quality of the lake environment influenced movement of the fish.

Total angler catch was estimated this year as 41,115, which represents a 25-per-cent decrease from 1971.

#### *Fish Culture Research*

The effects of toxic constituents of recycled water on young trout in fish hatcheries were studied and results are reported under "Fish Culture." In conjunction with this experiment, some samples of lake water were analysed for ammonia. Ammonia was detected in samples from Okanagan and Kootenay Lakes, but these levels were about 25 times lower than those found in normal fish-hatchery water.

#### *Forest Harvesting and Fisheries Management*

The co-operative study involving the Fisheries Service of the Department of the Environment, the B.C. Forest Service, and a forest products company has continued in the Slim Creek watershed, 50 miles east of Prince George.

Stream studies concentrated on Centennial Creek, a tributary of Slim, where harvesting operations were first initiated. Measurements of suspended sediments, temperature, debris accumulation, stream basin and bank alterations, subgravel oxygen, total dissolved solids, and nutrients were made on logged and unlogged (control) sections of the stream. The survival, growth, and movement of planted fry and juvenile rainbow trout were assessed on Rosanne Creek, a tributary of Centennial; development and survival of planted trout eggs was also investigated in this creek. Results will be utilized to evaluate the effectiveness of protective measures currently incorporated in forest harvesting plans.

Limnological conditions of Shandy and Tumuch Lakes were monitored and the respective fish populations assessed. Possible changes in Tumuch Lake, induced by forest harvesting, will be compared to Shandy, the control lake. An interagency progress report is currently available from the Fish and Wildlife Branch, c/o Institute of Resource Ecology, University of British Columbia, Vancouver 8, B.C.

#### *Canada-British Columbia Okanagan Basin Study*

The Research Section assisted in the initial planning of the limnology programme for the study and has now completed its share of that programme; a report entitled "Fish as Indicators of Water Quality in the Okanagan Basin Lakes" was submitted to the Study Committee in 1972. Several attributes of the fish populations indicated that Skaha Lake is the most eutrophic, followed by Osoyoos, then Vaseux; Okanagan is even less eutrophic and Kalamalka is least eutrophic of all. Although Wood Lake ranks almost as low as Kalamalka, it has probably passed through a more eutrophic state at an earlier point in time. Changes in the fish populations indicated a marked increase in eutrophication of Skaha since 1948, but little change in Okanagan since 1935.

This year's field work for the study involved mapping the distribution of shore-spawning kokanee in Okanagan Lake and making detailed descriptions of the spawning habitat. Prediction of mortality will then be made according to the regulation of the lake level.

#### *Water Management Investigations, Ellison, Wood, and Kalamalka Lakes*

In co-operation with the Water Investigations Branch and B.C. Research, the Section conducted a survey of the fishery resources of the lakes and tributary streams; sports fish are nonexistent in Ellison; more kokanee were caught in Wood Lake this year than last. Surprisingly, kokanee migrated from Kalamalka Lake to

spawn on the shores of Wood Lake. These data will be incorporated in a watershed water management plan by the Water Investigations Branch.

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#### OKANAGAN REGION

The year 1972 was one of new hallmarks in fish and wildlife management in the Okanagan Region. The development of simple, but effective, land-management practices to rehabilitate overused deer winter ranges is our first effort at direct wildlife husbandry. The engagement of a corps of auxiliary Conservation Officers to assist in district duties had a marked impact on the public and the conduct of the regional work load. The consumptive user of wildlife found the harvest opportunities poor for most species, while the nonconsumer continued to emerge as a force growing to reshape the goals and values of wildlife management. Interagency liaison leading to co-operative resource protection and planning continued to evolve at a pace faster than the gains could be consolidated. This beneficial development has required a commitment by our staff which, however desirable, has placed considerable stress on our basic services to the public and regular management work with fish and wildlife stocks.

#### PROTECTION AND ENFORCEMENT

With the addition of nine auxiliary Conservation Officers to our permanent staff of five, surveillance over and direct contact with the outdoorsmen in the field was notably increased. As a result of that increased field activity, the apprehension of violators increased as did our awareness of ongoing environmental developments.

It was a gain in public service not without cost; the dominant stress being in the area of supervision and administrative servicing—sectors which have not increased in staff level.

A number of special enforcement patrols were conducted in response to regulatory needs or public concern. A special "blitz" programme was carried out in Management Area 8 in order to establish a higher level of law observance by hunters. Special protective regulations for deer stocks were invoked in 1972 in the Kettle watershed and a high degree of conformity to these controls was demanded. The programme was additionally beneficial in that it was an experiment in developing saturation techniques to monitor a population of hunters well dispersed in time and space. The annual open season on California bighorn sheep in Management Area 7 (Ashnola) was one in which we monitored the whole period of nine days by horse patrols in the alpine and subalpine locations of the hunt. Contact was made with every individual hunter and camp, with most gratifying response from the hunters.

#### WILDLIFE MANAGEMENT

A variety of changing managerial policies in the resource sectors of government has had a significant and beneficial effect on the conduct of wildlife management in the region. Many acres of ungulate winter range in the region have been recognized as critical to the survival of the herds which utilize these lands, and extensive cultural techniques have been initiated in order to enhance winter cover and native food supply, both in quantity and quality. About 950 man-days of labour-intensive work were applied to 1,000 acres of deer winter range. Seeding to preferred shrubs was done on 70 acres of mule deer range and about 100 acres were fertilized to accelerate new growth on pruned, native browse species. Additionally, about 200 acres of grass-shrub lands in the Shorts Creek basin were spring-burned in order to promote growth of forage for California bighorn sheep, while a similar spring-burning was applied to about 100 acres of the Byers range in the vicinity of Lumby to revitalize grasslands for domestic stock and mule deer. These latter two management programmes were conducted jointly with the local staff of the Forest Service.

An intensive study of the Ashnola bands of California bighorn sheep, now drawing to completion, has given us a great fund of information on the population dynamics of the sheep stocks, their seasonal migration patterns, and upon their food dependencies. The development of long-term forest and recreational management plans will be aided by this new understanding of sheep. Consistent with the growing trend of drawing the various resource sectors together to project management planning, our Fishery and Wildlife Sections have placed a considerable body of inventory information, with interpretations, into the planning councils of the regional districts of our area.

The 1972 hunting season was, as anticipated, not as fruitful as in former years. Regional deer stocks were depressed by the heavy winter snowfalls of 1970/71 and 1971/72 which resulted in quite severe restrictions in hunting opportunities. Moose and elk were not so affected and near normal harvest levels were enjoyed on these species. Native grouse, quail, and pheasant production was adversely affected by wet nesting months, with low hatches being the rule. Mountain sheep supported a very strong recreational hunt in 1972, with a good level of harvest of three-quarter-curl rams in the Ashnola, Vaseux, and Shorts Creek blocks.

We are happy to report that deliberations between the Fish and Wildlife Branch and the orchard and vineyard sectors of the agricultural industry are moving toward the description of problems of bird and wildlife depredations to these farming inter-

ests. It is the hope of those involved to bring forth recommendations to Government which will provide new mechanisms of agricultural crop protection on a cost-sharing basis consistent with the best protection of the varied wildlife values involved. The co-operative venture, initiated at Osoyoos in February 1972, has seen a deer-proof fence erected for the joint protection of orchards and whitetail deer.

#### FISHERIES MANAGEMENT

The development of the capability to design land and forest management to include fish and wildlife protection and use has created a heavy demand upon the Branch for up-to-date wildlife and fishery inventory. Accordingly, in two areas, the western portion of the Kettle River drainage (M.A. 8) and the Wap River system, the northern tributary to Mabel Lake, fishery inventories were commenced in 1972. Documentation of the existing fisheries and water-quality values was made and interpreted in such form as could be readily used by forest resource managers or regional districts. In both areas, information gathered by lengthy field evaluation was in ready demand by the Forest Service, Water Resources Branch, and other agencies. Under the labour-intensive programme of habitat improvements, several watercourses critical to the maintenance of high-use recreational fisheries were rehabilitated. Tributaries to Beaver lake near Kelowna and Hidden Lake near Enderby were systematically cleared of debris and eroded material, with parLOURING for pool-riffle effect.

Horne Lake, uppermost in the Twin Lake system near Penticton, was chemically treated to remove undesirable coarse fish as part of a two-year programme to restore the system to trout fisheries.

Yellow Lake, beside Highway 3 between Penticton and Keremeos, has been subject to manipulation in order to ensure the overwinter survival of trout. This has been accomplished by installing a power-driven aeration system which causes the level of oxygen in the lake's water to be increased immediately before the freeze-up. The project, completed in 1972, is a remarkable success. The lake, which has never supported any recreation heretofore, supported an estimated 11,000 angler-days during the year with a yield of about 30,000 trout. This elevates Yellow Lake to a very prominent position in the Okanagan fisheries and has been rated a benefit/cost ratio of 15:1, very good investment.

While no significant regulatory changes were brought down in 1972, special creel census studies continue to be conducted to describe the impact of ice-fishing pressures and harvests upon the productive capabilities of several key regional lakes.

Lake trout (*Salvelinus namaycush*) were stocked in Kalamalka Lake in 1970 in an attempt to complement the fishery of that lake to support summer fishing. The stocks were introduced at about 2 pounds fish weight and many had reached 8 pounds by the fall of 1972 and, from creel census studies, constituted the principal catch of sport fishermen in the lake. This constitutes a new addition to the recreational fisheries of the Okanagan basin and gives promise of a more intensive summer use for trophy angling.

A population of spawning steelhead trout was "discovered" for the first time in the middle reaches of Vaseux Creek, a tributary to the Lower Okanagan of the Columbia system. While this notation is of academic interest, it gives hope that the Columbia system, including the Similkameen River, with appropriate management, might in the future develop and sustain a fishable population of this migratory rainbow trout.

Intense inventory work on the kokanee spawning needs in the Okanagan basin tapered to a conclusion in 1972. Even as the data were being analysed, the native Indian people of the valley were increasing their resolve to be permitted to take this fish from its spawning waters for native food purposes. The relative inflexibility of present statutory and regulatory provisions for fish protection creates a conflict of interest with the avowed traditional fishing rights of the native people.

#### GENERAL DEVELOPMENTS

The tremendous increase in on-the-ground management has placed considerable stress on regional administrative services, with the result that such abilities to maintain administrative control now constitute the factor limiting how much field intensive work which can be undertaken.

The remarkable increase in social sensitivity of wildlife and environmental values created a new high in public requests for information and demands for protection of and from various wildlife species. Obversely, following the changing public favour to wildlife, we have retained considerable flexibility to respond to and service emerging groups and associations and have tried to constantly relate to these bodies in order to retain relevance with the shifting public mandate.

Nuisance and predatory animal control services enjoyed one of the lowest demands in many years due in part to lowered wildlife populations.

#### SUMMARY

With considerably increased resources, the regional staff was able, in 1972, to plan and complete a wider range of resource-protection services and wildlife and fishery production projects than ever before, and we are confident that the rapidly improving ability of Crown natural resource agencies to plan and manage together will further elevate the position of all wildlife values as a principal social resource in this region.

### LOWER MAINLAND AND COAST REGION

#### WILDLIFE MANAGEMENT

Prior to 1972, major efforts within this region were directed toward waterfowl and wetland conservation. This year saw a shift in priorities toward big-game conservation, a shift stimulated partly by neglect, but mainly by concern for declining big-game resources. The decline resulted from a series of harsh winters beginning in 1968/69, and from losses of critical habitat units through logging. The co-operative approach between Government resource agencies initiated in 1970 was expanded considerably, to the point where a realistic habitat-protection programme is now a possibility.

The co-operative referral system with the Vancouver and Kamloops Forest Districts has progressed to a point where a mutual understanding of resource needs is being reached. Some very important Class I game ranges are now being at least partially protected from disturbance by logging. As our knowledge of winter distribution increases, and as this information is passed on to the Forest Service and major logging companies, we can anticipate a greater degree of stability within deer, mountain goat, and moose populations. Expansion of the programme should result in fewer losses, by default, of localized game herds.

Staff limitations and prior commitments have undoubtedly hindered the efforts greatly, but the groundwork has been laid and desired staff allocations should soon make the programme a routine function.

A special project to increase production of winter deer foods on the north side of Carpenter Lake was undertaken in the summer. This labour-intensive programme employed four wildlife students for three months, and concentrated on stimulating browse regeneration in the yellow pine-Douglas fir forest between Marshall Creek and Goldbridge. The area has long been recognized as the primary winter range for the mule deer of the Bridge River drainage. Over 1,000 acres of low-elevation range were successfully treated, including 17 miles of British Columbia Hydro and Power Authority right-of-way. An agreement was reached with Hydro which prevented the use of chemical herbicides in this area, since herbicides often have a prolonged deleterious effect upon browse production. Hydro further cooperated by clearing the remaining 20 miles of right-of-way along the range with manual labour.

Additional information gathered by the special project workers included inventory of mammal, bird, and other vertebrate abundance, special study of a resident Canada goose flock, plant distribution, classification of deer forage species, mapping of public access routes to all parts of the valley, fishery potential in many of the systems' lakes and streams, and experimental design for range-fertilization trials. The project was continued throughout the winter of 1972/73 and is considered to be an unqualified success. A design is now established for similar special projects.

Waterfowl and wetland management were not completely ignored. Co-operation with Ducks Unlimited (Canada) and Douglas College resulted in further development of the 240-acre Serpentine Reserve. Negotiations continued with Richmond Municipality, the Canadian Wildlife Service, and the Greater Vancouver Regional District to secure portions of Sturgeon Bank, and to plan the development of the Duck, Barber, and Woodward Island complex, and Boundary Bay. Initial surveys were conducted at Oyster Bay (Pender Harbour) to determine the feasibility of establishing a permanent waterbird refuge there.

Other specific events and achievements in 1972 can be listed as follows:

Establishment of liaison with the Grazing Division, Kamloops, aimed at preventing serious competition between domestic stock and wild ungulates in the Lillooet District.

Inspection and inventory of wildlife potentials in the Elaho River (Squamish), the upper Powell River system, McNab Creek, Foley Creek, Indian River, Jervis Inlet, and Chapman Creek.

For the third consecutive year, big-game harvests were far below average. Restrictions in hunting seasons, very low overwinter survival, and poor autumn hunting weather were contributing factors. Waterfowl harvests were slightly above average, while pheasant and grouse abundance was far below average.

Mountain-goat and grizzly-bear inventory programmes were continued, as were routine spring deer counts.

#### FISHERIES MANAGEMENT

##### *Logging and Fisheries*

The management of the watersheds, and therefore forestry management, was still of concern to this office during the past calendar year. Attitudes and procedures change and are changing, but the crux of the problem still is that the watersheds are being managed to be logged instead of being managed to preserve and enhance all of those values that are intrinsically a part of the watershed.

Two concepts which this office feels should receive reconsideration by forest management agencies are—

- (a) that every watershed should be logged;
- (b) that every valley bottom must be logged.

Unless these concepts are rethought, this office does not foresee any change in guidelines, because, in effect, the logging guidelines which are proposed for watersheds are basically, at the most critical stage, solely those of the logging companies.

More plausible forestry management can only come about when the logging of watershed areas conforms to guidelines set out by other resource agencies. Thus, the logging of watershed areas will be integrated to promote the best interests of all instead of, as at present, basically promoting a unilateral use concept of watershed management.

In the Lower Mainland, as in other parts of this Province, a concept other than that of "logging only for logging's sake" must become part of proper management philosophy.

#### *Habitat Protection*

In the Lower Mainland Region, 1972 was a fruitful and encouraging year in that concepts of instream and streamside protection were grasped by municipal agencies. Municipal planning departments, suddenly aware of the importance of protecting and maintaining their immediate environment, turned to fisheries agencies for assistance and guidance in how to protect streams, stream populations, and the watershed in general. The leading agency in this respect is the Municipality of North Vancouver, closely followed by Sunshine Coast Regional District, Municipality of Coquitlam, and Municipality of Surrey. Many of the legal loopholes in the *Fisheries Act*, in so far as protection of fisheries habitat is concerned, are being overcome by the concerted efforts and liaison of fisheries agencies and municipal authorities.

Much of the year 1972 has been passed in composing "educational reports" for the above agencies. Much time has been spent in just maintaining and keeping open the present lines of communication. Besides the office work entailed in promoting the concepts of stream protection, a highly disproportionate amount of time was spent in the field in collecting raw data information for the above agencies. The Lower Mainland Region was most successful to this end by having every stream south of the Fraser River east to Chilliwack surveyed to ascertain the relative merits of these streams. At present, this information is being compiled for presentation to the agencies concerned.

#### *Steelhead Management*

In one way or another, this aspect of fisheries management in the Lower Mainland now occupies 60 to 70 per cent of regional time.

Steelhead management is proceeding along four basic lines—

(a) *Habitat protection*—Fish and Wildlife Branch efforts in this area are concerned with protection and maintenance of present steelhead habitat. Liaison with the Forest Service, Pollution Control Branch, Water Rights Branch, and private industry is essential and is being maintained.

(b) *Inventory*—The last one to two years has seen a concerted effort to document steelhead habitat in major steelhead-producing areas. On-site stream surveys have been and still are the basic means of acquiring this information. Utilizing this technique, the following streams have been surveyed: Cheakamus River, Brohm



Creek, Seymour River, Capilano River, Lynne Creek, and Hastings Creek, and all of the streams to Chilliwack south of the Fraser River.

A technique gaining in popularity, but still only in its infancy, is the use of large-scale aerial photography to achieve the same ends as on-site stream surveys. Experimental work of this nature has now been carried out on the Seymour River, Silverhope Creek, and Coquihalla River.

(c) *Field work*—Much field work is oriented to ascertaining size of adult populations of steelhead (by means of counting fences), visual distribution of adults, and distribution of fry. From a more practical standpoint, field investigations have resulted in a steelhead rearing-pond being established on the Coquihalla River and has also resulted in studying attractive rearing-pond sites on the Vedder and Cheakamus Rivers.

#### *Coquihalla River Steelhead Rearing-pond*

In the summer of 1971 a one-third-acre pond near the Coquihalla River was stocked with 7,400 Qualicum River steelhead fingerlings. These fish grew extremely well and 2,200 survived to smolting. All the 580 smolts which left the pond voluntarily were marked by removal of the adipose fin. The remaining fish were captured and released in the river, following which the pond was restocked with 22,500 fingerling steelhead, again of Qualicum River origin.

The stocking of the Coquihalla River rearing-pond with Coquihalla River stock steelhead will commence in 1974 with progeny from Coquihalla adult steelhead presently being held in hatchery facilities.

(d) *Planning*—The basic premise that underlies Lower Mainland regional steelhead-management thinking is that a modern steelhead hatchery will be constructed in Abbotsford. Assuming this will become a reality, much of the past efforts and future efforts will be directed to ascertaining which streams to stock with introduced fish, which streams to utilize as egg-take sources, improving instream habitat for improved steelhead production, and, generally speaking, gathering as much useful information and data in order to put together as meaningful and organized a steelhead-management programme as is feasible under present limitations.

## KOOTENAY REGION

### GENERAL RESOURCE USE

The year 1972 has seen the development of several land-use problems involving branches of government, industry, and a wide array of citizens. The basis of increased land-use conflicts is obviously complex.

However, some of the principal elements in the problem are:

A history of pre-emptive commitments in some resource sectors with little input in the decisions from the public; and the expansion of industrial and agricultural use over more and more of the resource base. (Examples are the logging industry is spreading further into high-elevation drainages and drainages with difficult access; the situations with difficult access very often involve road construction that has general adverse effects on fisheries values; critical habitat remnants for grizzly, goat, and caribou are being threatened, high-quality recreation areas in and at the margin alpine areas are being affected.)

In addition, a growing awareness on the part of the public and an increasing public demand for participation in resource-use decisions has developed. This has stemmed from the general environmental awareness arising in North America and

in particular from meetings such as Earthwatch II at Golden and the Man and Resources sessions. This new public interest and concern has thrown many issues into sharp relief.

This new era of resource-management problems will demand a great measure of study and resource-use planning at all levels. Good will and co-operation at the field and technical level will continue to be a critical part of the solution, but will not suffice alone.

#### WILDLIFE RESOURCE PROTECTION

Kootenay Region wildlife resources continued their decline as a result of deteriorating habitat conditions. The loss of productive winter range from industrial expansion, hydro-electric reservoirs, uncontrolled urban sprawl, over-grazing, and conflicting resource uses, combined with severe winter conditions in 1971/72, resulted in high losses of deer and elk in the Arrow Lakes and Elk River basins and the Rocky Mountain Trench. Wildlife populations on productive winter ranges such as the MacDonald and Wigwam Ranges and Kootenay Lake basin suffered only minimal losses. Although considerable effort was made through the regional districts to control subdivisions, neither the Branch nor the regional districts have had much effect. Migration routes of big game have been disrupted and winter ranges have been displaced. Land-use planning appeared to be following development rather than preceding it, until the moratorium was placed on the subdivision of agricultural lands in December.

Although some gains were made toward integrated resource use via interdepartmental co-operation, basic differences in resource management objectives remain as a source of conflict in the region. A better understanding of basic ecological principles among all resource managers; access to economic, social, and physical capability data; plus integrated land-use legislation is required if the wildlife resources are to be properly protected and managed.

#### WILDLIFE MANAGEMENT

A thorough review of the management of mountain goat, caribou, and grizzly bear in the Kootenays was initiated. A study of access developments from 1952 to 1972 was included. Major reductions in mountain goat and caribou-hunting seasons and a continuation of the fall closure on grizzlies were imposed because of the rapid expansion of logging- and mining-roads into wilderness habitat.

#### HABITAT ACQUISITION AND MANAGEMENT

The Fish and Wildlife Branch received several offers of private land for wildlife and recreational purposes. Offers of land at nominal charges were received from seven individuals and private companies for land totalling more than 30,000 acres in the East and West Kootenays.

Several habitat-improvement projects were undertaken to serve as public demonstration areas as well as contributing toward the wildlife resource. These include protection of a relict sharptailed grouse population near Ta Ta Creek from livestock grazing, controlled burning of moose and elk habitat in the Columbia River marshes, fencing and clean-up of Branch properties at Bull River and Premier Ridge, and fencing of Cominco property on the Pend d'Oreille.

A pilot study to determine the feasibility of a joint Government and land-owner pheasant-management project was undertaken on the Creston Flats. The results were encouraging, with more than three-quarters of the farmers supporting the proposal of a pheasant-management co-operative.

Active co-operation and participation continued in assisting Ducks Unlimited (Canada) in their efforts to protect and manage several areas of importance to waterfowl, fur-bearers, and recreational values. Projects initiated or completed in 1972 include Elizabeth Lake, South Bummars Marsh, and Moberly Marsh.

#### INTERNATIONAL CO-OPERATION

Assistance was given in showing the Washington Department of Game a moose winter-range study area in the East Kootenay for comparison with moose winter range in Washington.

Successful completion of field studies of mountain caribou on the international Selkirk herd was assisted by co-operation and financial support by the Fish and Wildlife Branch. Increased co-operation in the management of wildlife along Provincial and international boundaries will be required in the future.

Twenty elk were transplanted from Jasper National Park to the Deer Park Wildlife Management Reserve in 1972, bringing the total number released to 56 at this site.

The preparation of a Provincial elk-management plan and detailed distribution map was initiated.

#### FISH-HABITAT PROTECTION

##### 1. Mining

Coal-mining in the Elk Valley continues to be the dominant problem for fisheries management. Increased utilization of tributary streams for settling-ponds or coal-mining areas at Kaiser Resources Ltd. and Fording Coal is having a subtle but accumulative effect on fish habitat. Loss of even one stream per year (this year it was Otto Creek and a portion of Erickson Creek) will eventually be reflected in poor-quality fishing in the Elk River.

Evaluation of effects of a new mine discharging effluent into the Salmo River has been conducted in co-operation with the Pollution Control Branch.

##### 2. Forestry and Fishery Co-operation

This aspect of fish-habitat protection was by far the most time-consuming and dominant consideration in the Kootenay Region. Meetings were held throughout the year with most logging companies operating in the Kootenays. The Fish and Wildlife Branch continues to press for long-term planning and discussion, generally centred around the possible effects of logging on fish and wildlife habitat.

With the Kootenay regional office moved to Nelson, the number of meetings held with the Forest Service increased some tenfold. These meetings have certainly helped to improve understanding of each department's problems, and numerous conflicts were avoided as a result of such meetings.

In 1971, just over 100 timber sales were reviewed by fisheries management. This figure doubled in 1972 as referral work increased to include tree-farm licence plans and five-year logging plans, as well as referral on all timber sale harvesting licences.

Public controversy over development of Fry-Carney Creeks for logging has been a key issue during 1972. The Fish and Wildlife Branch has opposed the construction of a road through the Fry Creek canyon.

##### 3. Reservoirs

Field investigation of the Kootenay Canal project was conducted during 1972.

Surveillance of the Arrow Lake fishery since the inception of the Arrow Dam continued in 1972.

Gas saturation, a problem first recognized at dams on the Lower Columbia River, was monitored on all major hydro-sites on the Kootenay-Columbia system. This programme is conducted in co-operation with Washington State Government agencies.

#### HABITAT IMPROVEMENT

Several fish improvement projects were completed during 1972.

*Loon Lake rehabilitation*—This lake, located near Grasmere, when restocked, will provide excellent fishing for residents of the Fernie-Cranbrook area.

*Edwards Lake rehabilitation*—This lake is very close to Loon Lake and it is heavily utilized by local residents. Known to produce big trout, this lake should provide tremendous fishing by 1974.

*Alces Lake diversion*—Located 15 miles east of Canal Flats, this lake was the site of construction of a stream-diversion structure. Stream diversion into Alces Lake should provide oxygenated water through the summer months and also provide spawning habitat to rainbow trout. This lake is presently stocked at a rate of 10,000 fish per year.

Vast improvement in fry production at the Meadow Creek spawning-channel occurred during 1972. As a result of gravel-cleaning operations (in 1971) within the channel, fry production increased from a low of 6 per cent (1971) to a much improved 17.5 per cent in 1972. Gravel-cleaning was conducted throughout the entire channel in 1972 (summer) and even higher production figures are anticipated for 1973.

The 1972 adult kokanee run into Meadow Creek moderately increased from that of four years ago—240,000 fish spawned in Meadow Creek in 1968 and 507,000 in 1972. Indications are that the entire spawning population of Meadow Creek is gradually increasing and that the objective of the spawning-channel will soon be achieved.

#### RIVER SURVEY

A two-man summer survey crew spent two months on the Upper Elk River investigating the fisheries values and recreational use of the area. This is the second year of investigation on this system.

#### KOOTENAY LAKE FISHING

Upward trends in catch of kokanee and burbuot were recorded during 1972. Total effort on Kootenay continues to increase and for the second year in a row catches exceeded 100,000 fish. Resident dissatisfaction of nonresident use of the popular Balfour fishing area continues to grow. During 1972, approximately 80 per cent of the anglers at Balfour were nonresidents.

#### ENFORCEMENT

In the Kootenay Region, 10 Conservation Officers and one regional Protection Officer normally comprise the enforcement staff. Due to one transfer and one resignation, the region was without Conservation Officers in Trail and Golden for several months. The Trail vacancy has been filled, a Conservation Officer will be transferred to Golden early in 1973. In addition, eight auxiliary Conservation Officers were employed during the summer and fall. This was the first time auxiliaries have been used in this region. It has proven to be quite a successful experiment and seemed to meet with the general approval of the public and has also made people much more aware of the existence of this Branch. However, in no way should auxiliaries be considered as a substitute for permanent personnel.

Conservation Officers were involved in three major co-ordinated group enforcement programmes in the region. These involved the Lardeau Valley Dolly Varden fishery, the Kootenay Lake ling fishery, and East Kootenay hunting.

#### HUNTING ACCIDENTS

There were three hunting accidents in the region during the year—one fatal accident in the Invermere district, one nonfatal accident in the Trail district, and one person in the Creston area reported being attacked by a grizzly bear while out hunting.

#### PREDATOR CONTROL

Conservation Officers spent considerable time on predator complaints and nuisance-animal control. In addition, four part-time nuisance-animal hunters were employed to assist with nuisance-bear control. A total of 752 complaints was received; 279 bears were live-trapped and released. We do not have a complete record of the number destroyed. This is not regarded as a solution to the problem but merely a temporary relief measure.

The nuisance-bear problem arises in a large part because bears feed on unmaintained garbage dumps. Such bears become familiar with people and trained to eat garbage. They consequently are a serious nuisance around homes where garbage is infrequently picked up or where it is stored open in back yards. The public must help the Branch solve this problem.

#### CONSERVATION OFFICER TRAINING

Several Kootenay Region Conservation Officers have attended training and education programmes at BCIT and the Police Academy in Vancouver. The field staff has shown ready willingness to advance their training.

### VANCOUVER ISLAND REGION

#### FISHERIES MANAGEMENT

Considerable time was spent undertaking a number of field surveys and projects during 1972. Of major importance was an extension of the stream-inventory programme initiated in 1971 on Vancouver Island lakes and streams. The information collected during this programme, useful in providing the basis of habitat-protection recommendations, is referred to such agencies as the Pollution Control Branch, Water Rights Branch, and the Forest Service.

A creel census programme was initiated on Sproat Lake to obtain information on the degree of exploitation on the large trophy-sized cutthroat trout. A questionnaire was mailed to all anglers checked during the survey to solicit their opinions and attitudes toward the Sproat Lake fishery and fishing in general.

A general management survey was carried out on lakes situated in the Victoria area. The survey included data on land status surrounding the lakes, fish population evaluation, available spawning habitat, angler use, and general limnological information. These lakes have a tremendous potential for recreational fishing; however, initial indications are that few have adequate access. Without this, the management alternatives become restricted and a balanced integrated programme impossible.

A detailed study on juvenile steelhead habitat was undertaken on the Big Qualicum River. The study provided basic information on juvenile steelhead habitat preference, which many researchers believe is the major factor limiting steelhead

production in streams. This information could prove valuable to future steelhead management throughout Vancouver Island.

Fisheries management has traditionally aligned itself with the consumptive resource-user; however, to achieve the maximum benefit from any resource, the nonconsumptive user must also be considered. With this as a goal, the Fish and Wildlife Branch undertook construction of a self-guiding nature trail along China Creek. The trail demonstrates the relationship between the flora, fauna, and physical environment of the area. Sproat Lake contains a unique race of trophy-sized cutthroat trout which ascend the Taylor River each spring to spawn. During this period, about 200 to 300 of these large fish congregate just above the Taylor River highway bridge. To provide a safe unobstructed view of these fish, the Fish and Wildlife Branch constructed a viewing platform adjacent to the river and erected a sign describing the life history of the various species found in the river.

Habitat-protection problems associated with the forest industry continue to rate high priority on Vancouver Island. An important function of regional personnel in combating the problems is the maintenance of liaison with the various forest companies operating within the region.

Channelization became rather widespread on Vancouver Island during the latter portion of the year. To combat this serious problem, an educational campaign was initiated to make all contractors and cat operators aware of the potential damage they could inflict and the possible consequences they face if prosecuted.

Hog-fuel disposal near water presented regional staff with habitat-protection problems during the spring. Wood wastes which come into contact with water produce leachates toxic to fish. The problem was overcome to some extent through the co-operation of the Pollution Control Branch.

#### WILDLIFE MANAGEMENT

The year 1972 was marked by apparent increasing progress toward major objectives of wildlife management, but because of insufficient funding, programmes during the year fell far short of those required for effective action. Increasing public sympathy for Fish and Wildlife Branch goals was manifested in improved relations with the Forest Service and other Government departments, who continue to show more willingness to consider the needs of wildlife, but progress to date is not yet satisfactory in this regard. However, further progress may be expected, since there are indications that the public is increasingly coming to regard current wildlife problems as failures of Government as a whole rather than the Fish and Wildlife Branch in particular. With this attitude, it may be expected that significant changes will be implemented in the future, but to date progress has scarcely passed beyond the "promises" stage.

Major problems during the year fell into four general areas, and none were satisfactorily resolved, although some progress was made in each area. These were:

1. *Habitat destruction*—Excessive low-elevation logging continues to destroy ungulate winter ranges at a rapid pace, and estuarial degradation is also proceeding at an alarming pace.

2. *Lack of information on wildlife*—Because of insufficient funding in 1972 and former years, we lack a great deal of information necessary to manage effectively the wildlife on Vancouver Island.

3. *Increased demands*—While the increasing interest in wildlife problems is welcomed, the resultant demands on our time for inter-resource consultation became overwhelming in 1972, resulting in only perfunctory looks being given to major problem areas.

4. *Public dissatisfaction*—While there seems to be an increasing awareness among members of the public regarding the relative inability of the Fish and Wildlife Branch to manage wildlife effectively because of inadequate legislation and funding, large segments of the public continue to be dissatisfied with specific Fish and Wildlife Branch programmes.

Important advances in wildlife management in this region in 1972 included the following:

- (1) The announcement by the Forest Service of their guidelines for coastal clearcutting operations, which include a policy of protecting wildlife range:
- (2) The acceptance by the Forest Service and logging companies of plans developed to protect wildlife along the White and Gold Rivers:
- (3) Continued research into deer ecology, with emphasis on winter range requirements; work in the Nimpkish Valley provided an indication of the importance of timber patches in overwinter survival, while a summer project in the White River indicated that deer populations are higher in unlogged areas than was previously believed:
- (4) Continued investigation of Roosevelt elk ecology, with emphasis on range requirements, there were four major areas of investigation—movements, inventory, food habits, and winter die-off—
  - (a) movements were monitored by use of three radio tags, the first such programme involving big-game animals in British Columbia; this programme helped indicate the importance of bogs to Vancouver Island elk populations;
  - (b) work continued in collating counts and reports from the public in an attempt to inventory the island population, with the result that the status of most herds is now believed known; a summer project provided specific information regarding elk usage of the White River;
  - (c) several rumens were analysed to determine food habits, and a write-up is in preparation;
  - (d) members of the public and Conservation Officers collected jaws from elk found dead throughout Vancouver Island, providing evidence of a major die-off in the north central part of the island, particularly in heavily logged areas:
- (5) Following protests by the Fish and Wildlife Branch, plans to construct a port at Hardy Bay were altered so as to cause much less habitat destruction:
- (6) The release of 46 sea otters at the Bunsby Islands, the largest group yet transplanted from Alaska to this Province, in a co-operative programme with the Federal Department of the Environment:
- (7) The release of 18 more Canada geese as part of a continuing programme to reintroduce the species to the Nimpkish Valley, and the apparent survival of most of the 22 birds released in 1971:
- (8) Continued refinement of the deer-hunting regulations, increasing the bucks-only areas from three to four; while such areas are used by only a small minority of hunters, public acceptance of the programme appears great:
- (9) The discovery of active colonies of Vancouver Island marmots near Nanaimo:

- (10) A programme to improve waterfowl reproduction on Vancouver Island by erecting nesting platforms for geese, mallards, and wood ducks:
- (11) Start of a programme designed to investigate cougar ecology on Vancouver Island, with emphasis on determination of population size:
- (12) A continued apparent increase in wolves on Vancouver Island, to the point where instead of being considered rare and endangered, they are considered a nuisance in some areas.

#### PROTECTION

A special enforcement programme was initiated for the 1972 hunting season. A directive was issued to all Conservation Officers that a minimum of two days per week was to be spent on enforcement in the more remote areas of their districts. A form was provided so that the following information could be provided:

- (1) Number of hunters checked:
- (2) Success:
- (3) Place of residence:
- (4) Violations.

This information will allow us to estimate the varying degrees of hunting intensity on week-days and week-ends and holidays. It will also be possible to compile the percentage of hunters who are at any given time not complying with the Acts or regulations.

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### PRINCE GEORGE REGION

#### RESOURCE PROTECTION

Public awareness of environmental issues associated with resource-development and land-use decisions has continued to increase, with the importance of fish and wildlife receiving greater recognition in the over-all field of resource management. All too frequently in the past these values have been largely ignored or, if recognized,



have been treated lightly in resource-development decisions. The result had been a reduction in both quantity and quality of habitat for fish and wildlife and, therefore, a reduction in associated outdoor recreational capability. It is encouraging that this increased public awareness of the necessity for preserving a quality environment is shifting the emphasis of resource development away from a short-term economic benefit principle and toward an attitude of long-term social benefit.

The priorities of the Fish and Wildlife Branch activities in the northern region have been aimed at protecting the resource base and in inventory of the existing fish and wildlife resources to the degree that funding has allowed. Timber harvesting has been the largest single activity affecting fish and wildlife habitat, and consequently it has received the greatest time and effort by our staff. The formal referral system established with both the Prince George and Prince Rupert Forest Districts in 1970 has continued to function and has provided considerable improvement over that which existed previously. The system provides some controls for habitat protection, particularly in the field of fisheries. However, it has some serious defects and its implementation is difficult.

First, logging operations are widespread throughout the region and the ability of our limited staff to make on-site examinations on which to base meaningful recommendations is limited. Second, the time limitations between submission and implementation of cutting plans compounds the problem of introducing the required restrictions. Third, cutting plans are often made without the benefit of adequate information, and consequently it may be necessary to completely revise cutting plans to take all resources into account. Finally, our staff's capability to inspect so many operations to enforce (and evaluate results of) our recommendations is so limited as to be almost nonexistent.

What seems to be required is a different form of planning based on a multidisciplinary approach to total resource management. Under this approach, all available resource information would be made available to those licensed to harvest timber, and their planners would then be held responsible for incorporating this information into harvesting plans to minimize environmental damage. To this end, considerable effort has been made by our staff and that of the Forest Service to develop a multidisciplinary approach to timber harvesting, and some pilot projects are under way.

In some other areas of resource development, considerable improvement has occurred. For example, seismic operations in the area east of the Rocky Mountains have been streamlined to some degree as a result of improved legislation, and environmental degradation has been reduced.

Liaison with major pipe-line contractors has been greatly improved now that they provide our offices with seasonal plans and time schedules. Areas of critical concern such as stream-crossings, etc., can thus be jointly inspected prior to construction, and protective measures can be imposed.

Three major oil spills have occurred in the Peace River area over the past two years, all caused by defective pipe. In all three cases the effect on fish and wildlife habitat has been minimal since the spills occurred at locations where fish and wildlife values were low. The companies involved have behaved in a responsible manner in containing and cleaning up the spills. The defective pipe responsible for these spills is only 8 to 10 years old. We have been informed that the Department of Transport has now ordered tests for the remainder of pipes of that vintage in the Peace River area.

Extensive coal exploration, much of its bulldozer stripping, along the east slope of the Rocky Mountains in the southern part of Management Area 28, caused wild-

life habitat loss as well as physically disturbing two mountain-goat populations. One coal mine in the Sukunka River Valley commenced operation late in 1972. Meetings have been held with company officials and some progress is being made in protecting the wildlife resource from needless activities associated with the mine. The mine is an underground operation and the conflict with wildlife is not great. However, other proposed mines may not be underground and are located in more critical wildlife areas necessitating continued surveillance of, and contact with, the mining people involved.

In the Cassiar region, the search for base metals is causing extensive damage to alpine areas. Significant wildlife habitat losses have occurred, as well as irreparable watershed damage.

#### WILDLIFE MANAGEMENT

Some detailed wildlife inventory took place in northwestern British Columbia. This work was partly financed by the Regional District of Kitimat-Stikine and was largely limited to the area within its boundaries. Two reports of the results, including management proposals and resource protection recommendations, have been prepared and are available for those involved in resource planning.

In addition, routine classified game counts were carried out throughout the northern region. In general, the wildlife populations are healthy, but continually increasing demand for wildlife, improved access, and the increased use of all-terrain vehicles has forced season reductions and will likely force further reductions in 1973.

Mountain-goat studies in the Nass Range in northwestern British Columbia and the McBride area of the Rocky Mountains were expanded to include some detailed surveillance of mountain goat and caribou populations in surrounding areas. This surveillance confirmed a suspected decline of these two species in some areas, and as a result two special closures were put into effect in September 1972. The closures will remain in effect until these populations return to normal.

#### FISHERIES MANAGEMENT

Routine measures of inventory, stocking, etc., continued. One rehabilitation programme was undertaken and completed on Chubb Lake between Prince George and Quesnel. The Kispiox River was studied in some detail to pinpoint spawning capability, and a report has been prepared. Additional work was done in collecting data to determine steelhead rearing-capacity of the Kispiox River. General assessment of steelhead populations throughout the Skeena system and part of the Nass system continues.

The proposed comprehensive study of the large inland lake systems could not be started due to lack of funds, but some preliminary work in stream-clearing and spawning-ground evaluation was started in the Fraser-François drainage. Some additional lake survey work was accomplished and these efforts were directed to the area of the Stewart-Cassiar Highway now nearing completion.

A brief assessment of the existing fishery on the Queen Charlotte Islands was made and a report is on file. The threat to fish on the Charlottes is not one of angling pressure but one of habitat destruction associated with poorly controlled logging operations.

#### ENFORCEMENT

The trend toward increased access to previously unexploited areas, coupled with increasing numbers of recreationists, placed a marked enforcement demand on the northern Conservation Officers. An example of this materialized with the unofficial opening of the Stewart-Cassiar Highway. This new secondary road now

provides summer and fall access through the northwest sector of the Province from Terrace to Watson Lake in the Yukon. This area is one of the last strongholds for grizzly bear, Stone's sheep, and caribou, which will all experience greater hunting pressure from highway access. Special patrols of the road in 1972 indicated a high interest and use even though the opening was not publicized. A special Conservation Officer stationed at Cassiar since August is documenting all aspects of fish and wildlife resource use in remote regions such as Dease Lake, Lower Post, and Atlin.

The year 1972 saw increased use of the Branch's leased aircraft stationed at Prince George. Areas which before were virtually uninspected were patrolled. Specific enforcement flights and general patrols provided an upgraded enforcement programme. Numerous activities were investigated, including resident hunters and anglers in inaccessible areas, guiding and trapping camps, and industrial operations. In future, aircraft-to-ground radio contact will provide an even more effective means of pinpointing, from the air, possible violations which may then be quickly investigated by ground units. In addition, winter activities of all-terrain vehicles where wildlife harassment could result can be kept under frequent surveillance. The present aircraft programme involves a float-equipped 185 Cessna with some additional time on wheels and skis for winter operations.

Other aspects of enforcement centred around roving ground and water patrols using conventional vehicles, "jet" powered river boats, and snowmobiles.

Added coverage by 10 auxiliary Conservation Officers in the Prince George Region made it possible to exert extra control over chronic problem areas. Even though the staff were used only four to six days per month, they were an effective enforcement aid.

Numerous complaints by nonresident hunters of poor or inadequate guiding services were investigated. Most of these incidents resulted in a stalemate, while some are pending civil action between guided hunter and guide outfitter.

Patrols of the Queen Charlotte Islands peregrine falcon nesting-sites were conducted to discourage illegal capture of this endangered species.

Road checks in the Fort St. John subregion gathered useful information on the use of snowmobiles in hunting. Results of a questionnaire completed by all hunters checked showed a growing opposition toward the use of the snowmobile in hunting. This attitude extended even to hunters who owned snowmobiles.

In 1972, enforcement personnel in the Prince George Region processed 286 prosecutions as compared to 196 in 1971.

#### CRESTON VALLEY WILDLIFE MANAGEMENT AREA

An administration centre, overlooking the Creston Valley, was completed by the Department of Public Works, and the official opening was held July 21. The platform party, made up of both Federal and Provincial Government officials and Cabinet Ministers, reflected the co-operative nature of the venture. Badly needed office, library, laboratory, workshop, and storage facilities are provided.

Under the *Accelerated Park Development Fund Act*, funds were again allocated for the continuing development of Summit Creek campground, on the western edge of the management area. Now approximately 80 per cent finished, the campground awaits further funds to complete construction. A suspension bridge crosses Summit Creek to a portion of the historic Dewdney Trail, within the campground. This structure, together with an observation tower at Duck Lake, several miles of boundary fencing, and a large number of artificial nesting structures and hunting blinds, were the product of a Federal Employment Incentives Programme which occupied the first quarter of the year.

In the Leach Lake unit, Ducks Unlimited (Canada) continued construction of water-level control structures. Half-finished at the present, this project is expected to become operable within a year's time.

The 850-acre nesting area built by B.C. Hydro for the management area within Duck Lake is now functioning and is being carefully watched. Results in the first year of its operation have been encouraging, and recreational capabilities of the compartment have been vastly expanded. Hunter participation and success were significantly higher than in previous years.

The addition of a management biologist brought the permanent staff to a total of four. He is currently assessing hunter activities and vegetative succession on the area. Additional work is being done on the water-sampling programme, now in its second year, and on the management area's herbarium.

Designs for the remaining marsh units of the management area have been completed by private engineering consultants under contract with the Canadian Wildlife Service. A conservation centre, to be constructed with Federal funds, is now in the planning stages by a committee of Provincial, Federal, and management area personnel.

Public interest in the activities of the management area continues to increase with visitors coming from many parts of Canada and the United States. The number of organized tours has been increased to satisfy this demand.

## KAMLOOPS AND CARIBOO REGIONS

### RESOURCE PROTECTION

Resource protection continues to be the primary activity of field staff, especially in areas of timber harvesting. Referrals of cutting plans and timber sale harvesting licences provide the opportunity to modify some of the timber-harvesting procedures to enhance wildlife management. Updating of winter-range maps to ameliorate resource planning is a continuous process and presently we are attempting to circumscribe known ranges of many species. Caribou, for example, have unique habitat requirements, being largely dependent upon climax forest, and conflicts of interest are pretty direct. By demarking Caribou winter ranges throughout the Interior, problems can be settled earlier in the planning process rather than reacting when a company submits a cutting plan.

Certainly there are and will continue to be difficulties in trying to effectively integrate resource use, but co-operation between natural resource base agencies is particularly good.

### WILDLIFE MANAGEMENT

Hunting season showed effect of two unfavourable winters, combining the impact of below-average survival of underyearlings and reduced seasons, as decline in harvest of both moose and deer was clearly evident in Cache Creek records.

Grouse populations were low in most areas as a result of cool and wet weather during the post-hatching period. Competition studies continued on the Dewdrop with close surveillance of feeding habits of five fawns obtained in May or June. Technique was interesting as the deer were allowed to graze but kept on a leash with the observer laboriously counting the bites and recording vegetation type consumed. As the fawns grew, and they changed from bottle-feeders to grazers, there were some interesting contests for control.

Additional funds allowed an expansion of field projects. Waterfowl nesting-boxes and platforms were constructed and located in a number of areas, with particular emphasis on Chilcotin potholes and along the Thompson River.

Range-improvement work was carried out on a prime moose wintering-site near McKinley Lake, consisting of cutting and piling large willow that had grown beyond the reach of moose in order to induce sprouting and thereby increase food supply. Similar work is in progress throughout this winter on Dewdrop deer range near Kamloops and in Wells Gray Park. Selected cutting will provide browse for animals during winter and the clearings should produce more food for wildlife in future.

Inventory of grizzly population in Management Area 17 continued by checking the main salmon streams during fall when grizzly tend to concentrate in salmon-spawning areas.

#### FISHERIES MANAGEMENT

Fishing was generally poor in stocked lakes in 1972 and this includes most of the favoured spots in the central Interior. Nettings and creel census revealed an almost total absence of the 1970-year class, which should have been the main contribution to fishing success in 1972. The furunculosis epidemic in our hatcheries during fall and winter of 1970/71 caused severe losses, and survival of those stocked was very low or almost *nil* in lakes sampled. Survival of yearlings released in 1971 was about average, which means fishing should be near "normal" in 1973, although there will be a shortage of large rainbow. No significant changes were noted in lakes with natural reproduction.

Staff and summer crews were active in a variety of field projects. Freshwater shrimp were transplanted into many lakes near Kamloops, especially in May and early June, when *Gammarus* were collected near the shoreline and readily caught with dip nets.

Public access was improved to many lakes, including Roche, Glimpse, Stake, McConnell, Walloper, and Plateau. In addition, financial assistance was given to the Kelowna Fish & Game Club, which constructed a good road to Hatheume Lake, located about 2 miles east of Pennask and reached via Peachland.

Stream-clearance crews operated in both Kamloops and other areas upon obstructions that would impede natural spawning. Many streams were improved and, hopefully, this will help fishing, and for some lakes, reduce the need for hatchery stocking.

Three lakes were rehabilitated, two with rotenone and one with squoxin. Rotenone-treated lakes were Gardom near Salmon Arm and Forest near Louis Creek. They will be left unstocked for one summer to allow food organisms a chance to multiply. Purpose was to eliminate undesirable species, and downstream barriers were constructed to prevent re-entry.

Phinetta Lake west of Little Fort was treated with squoxin to test this particular chemical, which is lethal only to squawfish. Breakdown takes place within 48 hours, but test cages and subsequent gill-netting indicated all squawfish were removed while trout and other species remained unaffected. Squoxin has limited application because there are few lakes with a combination of only squawfish and trout, although this combination is found throughout much of the Bonaparte Plateau.

Three lakes near Kamloops—Walloper, Bleeker, and Edith—were aerated during October and November in order to prevent winter-kill in the first two and develop a fishery in the latter. Oxygen levels were increased in all three prior to freeze-up, but testing will continue throughout the winter to determine effectiveness of technique on these particular lakes. Edith will be stocked next spring if oxygen levels are adequate to support trout prior to break-up.

## ENFORCEMENT

Addition of temporary enforcement staff throughout part of the summer and fall proved effective in providing better protection and elicited many favourable comments from people who felt enforcement of regulations and curtailment of abuses were sadly lacking in past years. Of particular value was having someone in the district, even for one or two days per week, to fill in for Conservation Officers away on holidays, sick leave, or training courses. Sickness and holidays can leave a district without a Conservation Officer for months at a time.

Regional differences were noted in effectiveness of temporary staff as they were really not trained for more than routine checking; hence, they could be best employed in areas where hunters and anglers are concentrated. Nevertheless, it was quite apparent that a cadre of part-time employees is no substitute for more Conservation Officers fully trained in all facets of resource involvement.

## GUIDING INDUSTRY

The acquisition of guide outfitter's certificates by guide outfitters progressed favourably during 1972. Since the issuance of the first certificate in 1971, 82 have now been issued.

These certificates grant the grantees the exclusive right to guide for certain big-game animals within a described territory for a period not exceeding 15 years.

Certificate-holders are assessed a royalty equal to 10 per cent of the nonresident trophy fee paid to the Province on each big-game animal taken.

Although the form of tenure granted in the certificate does not grant the holder any vested rights to the land nor to the animals, it does, however, protect the holder from the guiding operations of other guides. The certificates in substance are possessions of useful quality; deemed to be a part of the estate of the deceased guide outfitter, and subject to approval of the Director, it is transferable to a succeeding guide outfitter by the heirs or administrators of the deceased. This form of commitment is proving beneficial to the guiding industry.

The 1972 summary of guide hunter activity is not available at the time of writing, but the results for 1971 are compiled and compared to those of previous years.

*Summary of Guide Hunter Activity, 1967-71*

| Year | Guides | Assistants | Resident Hunters | Nonresident Hunters | Moose | Goat | Caribou | Deer | Sheep | Grizzly Bear | Black Bear | Elk | Cougar | Coyote | Wolf | Total Big-game Harvest | Per Cent Hunting Success |
|------|--------|------------|------------------|---------------------|-------|------|---------|------|-------|--------------|------------|-----|--------|--------|------|------------------------|--------------------------|
| 1967 | 696    | 722        | 195              | 5,976               | 3,328 | 569  | 492     | 417  | 392   | 181          | 152        | 182 | 21     | 9      | 31   | 5,774                  | 94                       |
| 1968 | 698    | 827        | 204              | 6,402               | 3,285 | 621  | 611     | 383  | 415   | 268          | 368        | 205 | 16     | 21     | 68   | 6,261                  | 95                       |
| 1969 | 652    | 874        | 190              | 6,518               | 3,158 | 695  | 681     | 333  | 465   | 246          | 306        | 231 | 29     | 5      | 48   | 6,197                  | 94                       |
| 1970 | 585    | 861        | 172              | 6,548               | 3,175 | 607  | 742     | 335  | 438   | 230          | 290        | 198 | 21     | 14     | 69   | 6,119                  | 91                       |
| 1971 | 566    | 842        | 156              | 5,670               | 2,780 | 559  | 673     | 324  | 429   | 232          | 384        | 200 | 30     | 14     | 64   | 5,689                  | 97                       |

## WILDLIFE LAW ENFORCEMENT

The year 1972 saw the introduction of a new \$1 licence to carry firearms; a pilot compulsory conservation and outdoor recreation education course on Vancouver Island for first licensees and all 14-year-olds; the Province-wide prohibition of helicopters to transport hunters or game.

## STAFF

As in 1971, 71 Conservation Officers, senior Conservation Officers, and regional Protection Officers of the six regions comprised the uniformed field staff most concerned with direct "people management." For varying time periods, a total of 65 persons hired as temporary Conservation Officers effectively assisted in seasonal and high-density enforcement application.

## STAFF TRAINING

Sixteen Conservation Officers graduated from Class III of the eight-day Basic Law Enforcement Course at Vancouver Police Training Academy. This valuable course has produced a marked improvement in staff confidence, ability, morale, and public appearance.

In addition, 23 Conservation Officers completed a certificate course provided by the British Columbia Institute of Technology. This is a home-study course, combined with some 20 days' attendance at BCIT, covering mathematics, statistics, report-writing, ecology, resource measurement, mapping, and photo interpretation.

## COMMUNICATIONS

Mobile radio communications (VHF) has proven a most valuable aid to our public service and efficiency, especially as our Conservation Officer staff is linked more closely with RCMP offices. Units are now installed in vehicles of all Conservation Officers of the Vancouver Island Region, Lower Mainland Region, Okanagan Region, four in the Kootenay Region, three in the Kamloops Region, four in the Prince George Region, and one in our leased floatplane. Base stations are located at Burnaby and Penticton regional headquarters.

## AIRCRAFT PATROL

The older Cessna 180 was replaced in June with a leased Cessna 185 floatplane. This aircraft, a great aid to our northern Conservation Officers, has improved our public relations and positively increased enforcement of angling-hunting-guiding regulations as well as providing surveillance patrols for pollution prevention and apprehension.

*Utilization of Branch Aircraft*

|                     |     |
|---------------------|-----|
| Flight days .....   | 68  |
| Total persons ..... | 845 |
| Anglers—            |     |
| Resident .....      | 139 |
| Nonresident .....   | 33  |
| Violations .....    | 8   |
| Warnings .....      | 7   |
| Fish .....          | 822 |
| Hunters—            |     |
| Resident .....      | 49  |
| Nonresident .....   | 20  |
| Violations .....    | 26  |
| Warnings .....      | 13  |
| Game .....          | 22  |
| Aircraft observed—  |     |
| Canadian .....      | 47  |
| United States ..... | 7   |

|                        |        |
|------------------------|--------|
| Aircraft checked—      |        |
| Canadian .....         | 39     |
| United States .....    | 4      |
| Guides .....           | 36     |
| Trappers .....         | 11     |
| Lodges and camps ..... | 42     |
| Total violations ..... | 34     |
| Total warnings .....   | 20     |
| Air time (hours) ..... | 180.25 |

#### WILDLIFE TICKET

Our ticket system under the *Wildlife and Firearms Act, 1966* is a valuable aid, not only to Conservation Officers, RCMP, and the Courts, but also as a convenience to the public. The form and internal audit procedure were modified slightly in order to provide regional field supervision and recording. Some 900 cases were concluded by ticket, being 75 per cent of the total 1972 prosecutions. The balance comprises those offences (mostly Federal) which lack statutory provision to utilize a ticket system.

One hundred and three tickets under the *Litter Act* were actioned by personnel of the Forest Service, Parks Branch, Fish and Wildlife Branch, and RCMP. Fines for these acknowledged prosecutions varied from \$10 to \$50 and totalled \$3,005, a definite increase from the 1971 total.

#### WILDLIFE SANCTUARIES AND "NO SHOOTING" AREAS

During 1972 three wildlife sanctuaries were created under the *Wildlife Act*, while five no shooting areas were provided by authority of the *Firearms Act, 1966*. One no shooting area, a completed hydro construction, was rescinded, having terminated its protective purpose.

#### LICENCE TO CARRY FIREARMS

Effective April 1, 1972, an amendment to the *Wildlife Act* created a new \$1 licence to carry firearms for nonhunting purposes. Thus, unless exempted as in the case of peace officers, a person who carries a rifle or shotgun without either a hunting licence or licence to carry firearms is in violation, and practical *preventive* action may be taken by the seizure of his firearm. The licence to carry may be cancelled or suspended for cause the same as a hunting licence. No such cancellations were actioned in 1972.

Approximately 7,020 licences to carry firearms were issued from April 1 to December 31, 1972.

#### Summary of Firearms Hunting Casualties, 1968-72

| Year | Fatal | Serious | Not Serious | Total | Rate per 100,000 Licences | Total Licences       |
|------|-------|---------|-------------|-------|---------------------------|----------------------|
| 1972 | 8     | 4       | 8           | 20    | 13.2                      | 151,200 <sup>1</sup> |
| 1971 | 11    | 6       | 1           | 18    | 11.2                      | 160,609              |
| 1970 | 5     | 3       | 9           | 17    | 10.4                      | 163,308              |
| 1969 | 8     | 11      | 12          | 31    | 19.5                      | 158,672              |
| 1968 | 8     | 4       | 11          | 23    | 15.1                      | 151,946              |

<sup>1</sup> Does not include licence to carry.

Comparison note—Idaho State reports its rate per 100,000 licences in 1970 was 22.7, in 1969 it was 24.



## LICENCE CANCELLATIONS

Hunting licences may be cancelled or suspended for cause under the *Wildlife Act*. Where the conservation and outdoor recreation education course is available, successful completion has generally been a condition of reinstatement in addition to a prohibition period of from one year to life. In 1972, 38 hunting licences were cancelled for violation, which 16 were cancelled arising out of firearms nonhunting as well as hunting situations. Fifteen hunting licences were reinstated.

## PROSECUTIONS

The total number of prosecutions is greatly increased from 1971, together with total fines. Average fines show a continuing annual rate of increase since 1969.

|      | Prosecutions   |                | Fines  |         | Most Frequent Violations              |                              |
|------|----------------|----------------|--------|---------|---------------------------------------|------------------------------|
|      | Con-<br>victed | Dis-<br>missed | Total  | Average | Loaded<br>Firearm in<br>Motor-vehicle | Lack of<br>Angler<br>Licence |
|      |                |                | \$     | \$      | Per Cent                              | Per Cent                     |
| 1972 | 1,175          | 15             | 58,012 | 48.70   | 23.4                                  | 25.3                         |
| 1971 | 825            | 14             | 38,181 | 46.78   | 33.3                                  | 21.0                         |
| 1970 | 834            | 12             | 35,282 | 42.30   | 27.9                                  | 29.4                         |
| 1969 | 812            | 15             | 31,094 | 38.29   | 27.0                                  | 24.2                         |
| 1968 | 762            | 9              | 29,645 | 38.90   | 35.0                                  | 19.0                         |

## INFORMATION AND EDUCATION

As in the past, the Fish and Wildlife Branch has this year been constantly at the centre of both wildlife and more general environmental issues. As concern is expressed in both of these areas, we are in the position of having to provide not simply current information on our activities but also ongoing educational programmes which will enable the public to analyse and evaluate these issues themselves. The Branch tradition of continuous public contact and service means that this process goes on not only through formal information and education activities but on a day-to-day basis through all our staff.

## INFORMATION ACTIVITIES

A number of Branch news events were covered by both local and network television news. These items were either filmed by television crews in consultation with Branch staff or, as on several occasions, filmed and distributed by Branch information personnel. This new activity received enthusiastic comment and will be greatly extended in the coming year.

In addition to specifically Branch-oriented publications, a number of communication projects (including reports and a poster campaign) were taken on jointly by Branch personnel and other resource agencies such as the Canadian Wildlife Service and the Forest Service.

## PROMOTIONAL ACTIVITIES

A distinctive Fish and Wildlife insignia was designed and is now being utilized as a means of identification on vehicles, offices, and field installations. In conjunction with this, a uniform design for signs, displays, and publications was established based on the new insignia and enabling recognition of Branch communications.

The book *Fish and Wildlife—The Recreational Resource* was published in two editions and offered for public sale through regular book-distribution channels. Originally written as a text for conservation and outdoor recreation education, the book received favourable comment and a large number of requests for purchase by the public. It is 96 pages of colour material and covers many wildlife conservation, environmental, and recreational topics.

“Wildlife Conservation Officer” was the title of a 30-minute film produced for the Branch and relating the activities of field staff through the four seasons. The film received enthusiastic comment upon its release and has been used extensively by both television and regional staff.

A series of television shows on a variety of fish and wildlife topics were prepared and used on several stations in various parts of the Province. Topics ranged from habitat requirements for fish and wildlife to the techniques of wildlife management.

#### CONSERVATION AND OUTDOOR RECREATION EDUCATION

The hunter-training programme has seen an extremely busy year with most of the excitement revolving about an experimental mandatory programme on Vancouver Island and related changes to the programme content and objectives. While the existing hunter-training, conservation, and outdoor recreation education programme continued on a voluntary basis throughout the rest of the Province, the results of the mandatory programme on Vancouver Island were carefully monitored for indications of what would be required to apply this mandatory requirement to other areas.

New visual and literative material was prepared in consultation with volunteer instructors, Branch personnel, and members of the general public. The result was the publication *Fish and Wildlife—The Recreational Resource*, which will serve as a basic text for the course.

In order to reflect these changes and the enlarged scope of the course, the programme has been renamed “Conservation and Outdoor Recreation Education” (CORE). The programme is now offered not only by volunteer instructors but also by a variety of educational institutions—schools, adult education, and colleges.

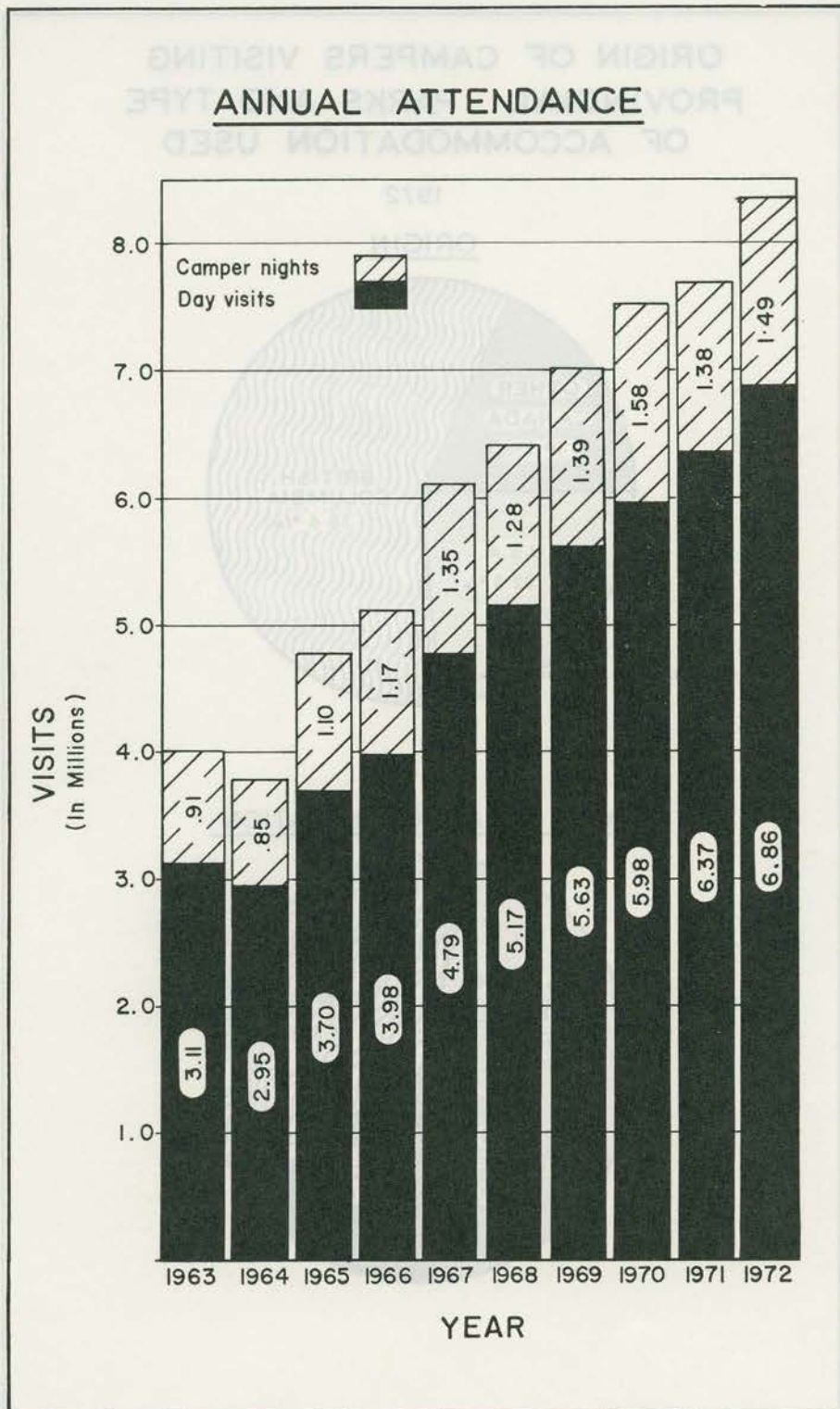




**Provincial  
Parks  
Branch**

**Department of Recreation and Conservation**

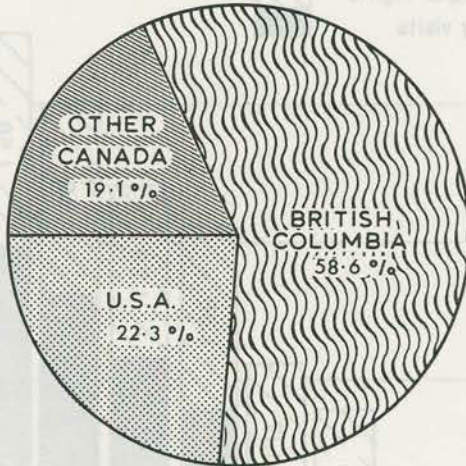




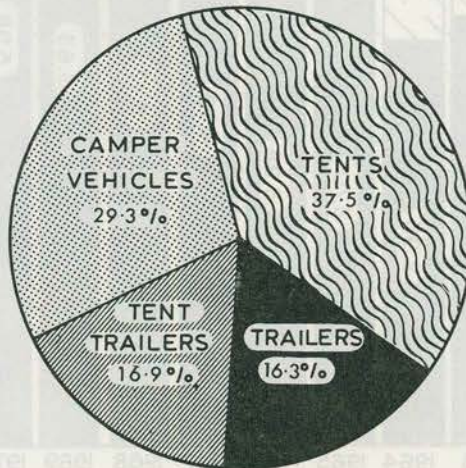
### ORIGIN OF CAMPERS VISITING PROVINCIAL PARKS AND TYPE OF ACCOMMODATION USED

1972

#### ORIGIN



#### TYPE OF ACCOMMODATION



## PROVINCIAL PARKS BRANCH

R. H. Ahrens, Director

The enactment by the Third Session of the Twenty-ninth Legislature of the Province of British Columbia of the *Accelerated Park Development Fund Act* ensured the continuation of the expansion and improvement of the Provincial parks system begun in 1971 under the *Accelerated Park Development Act*. The \$10 million provided under the Accelerated Park Development Fund was in addition to the regular Parks Branch budget and enabled the Branch to generate employment opportunities while at the same time renovating, rebuilding, and upgrading facilities, including the embarkation upon a programme of greatly improved water systems in the parks permitting the installation of flush-toilet buildings in many parks and the expansion of the sani-station programme throughout the system. At the peak of activity in the summer months more than 1,100 persons were employed in Accelerated Park Development Fund projects.

A significant milestone in the Provincial parks system was the creation in July of Mount Edziza Provincial Park and Recreation Area. By the establishment of this one Class A park, the fully protected park acreage increased by 9 per cent. Six years of legal deliberation culminated in the establishment of Discovery Island Provincial Marine Park, which had been willed to the people of British Columbia as a park by the late Captain E. G. Beaumont. Acquisition of suitable parklands continued throughout the Province and the announced programme of extensive park expansion for 1973 was greeted with great enthusiasm.

Opening of the new Manning Park Lodge Motel took place in June. This completely modern structure replaced units destroyed by fire in 1970. As a result of the need for better fire protection in Manning Provincial Park, a firehall was completed and fire truck ordered.

Park attendance moved upward again this year. The slight decline in camper use of parks registered in 1971 was regained, resulting, no doubt, from the reopening of parks and sections of campgrounds closed for reconstruction the previous year.

The following outline of activity of the Parks Branch in 1972 is at a level set during 1971 and sustained by the exceptional effort of all staff.

### PARK SYSTEM PLANNING SECTION

#### (a) PARKS BRANCH LIBRARY

This year, while awaiting the construction of new library premises, the Parks Branch Librarian has broadened the scope of the reference service to include the whole department and the settlement of a Departmental Librarian position. In the meantime, the library has been moved into a larger room than it formerly occupied, and the volume of work has been increased with the transfer of Ms. Gayle Dunstan from the general office to the library. Progress on the card catalogue and the vertical file has accompanied the increase in reference service, and about 650 items were added to the library's book and pamphlet collection.

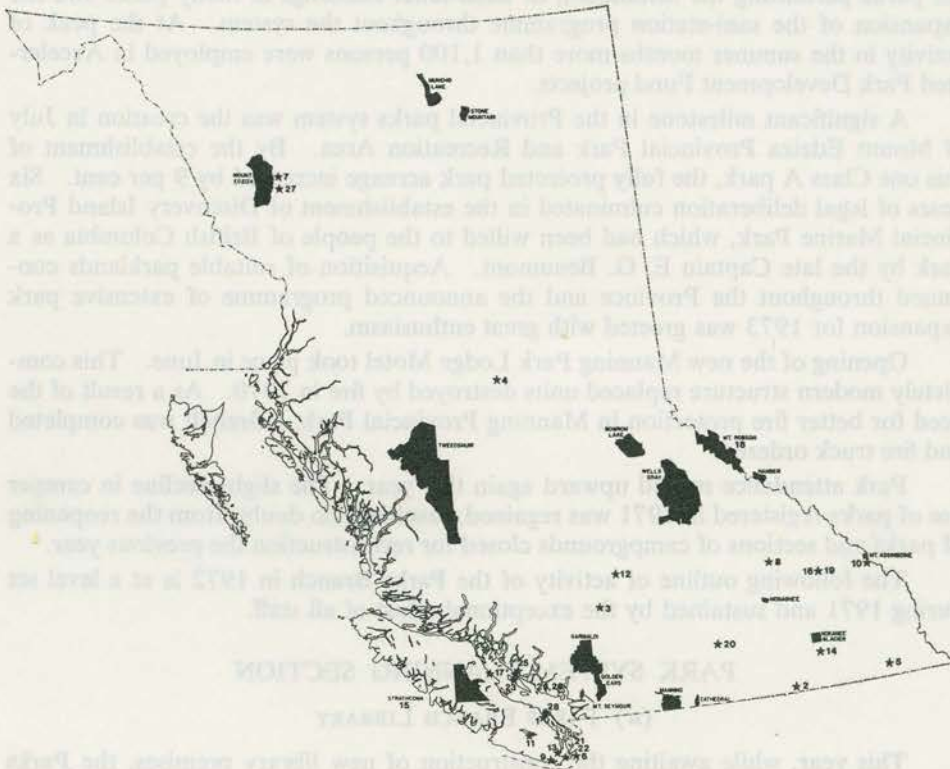
#### (b) LAND ACQUISITION PROGRAMME

Five major land acquisitions for Provincial park purposes were successfully concluded during 1972. These included purchase of a 6-acre parcel of land with 1,100 feet of frontage on the San Josef River which lies within the boundary pro-



posed for Cape Scott Park; a 40-acre area characterized by 800 feet of prime sand beach at Smelt Bay on Cortes Island; 14.8 acres of land having 1,650 feet of lake-frontage purchased at the north end of Chilliwack Lake; an inholding covering 6.5 acres within Bowron Lake Park which has approximately 900 feet of frontage on Bowron Lake plus 200 feet of frontage on Kibbee Creek; and, finally, the purchase of 17.6 acres of land at Harrison Mills for historic park purposes. Special recognition should also be made of the donation of 7.67 acres of land to the Crown by C. A. Gorby for park purposes. This property was recently added to Miracle Beach Park.

**PARK SYSTEM  
1972 ADDITIONS & DELETIONS**



- NEW PARKS CLASSIFIED**
- 1. BORDEN COLLEBY HISTORIC PARK
  - 2. NANCY GREENE PARK
  - 3. SIXTON PORTAGE HISTORIC PARK
  - 4. HARRIS BEACH PARK
  - 5. ANKORA CREEK PARK
  - 6. DOUGHERTY ISLAND MARINE PARK
  - 7. MOUNT EDZDA PARK
  - 8. COLUMBA VILLAGE HISTORIC PARK
  - 9. BEVLY PETHOLEY PARK

- ADDITION TO EXISTING**
- 10. MOUNT ASSEMBLY PARK
  - 11. GORDON BAY PARK
  - 12. BIG BAR LAKE PARK
  - 13. VOLSETRUCK PARK
  - 14. HORANEE CREEK PARK
  - 15. STUPHEDAS PARK
  - 16. BUNARDI BLACKER PARK
  - 17. WHALLE BEACH PARK
  - 18. MOUNT ROSSON PARK
  - 19. BUNARDI ALPINE RECREATION AREA
  - 20. WEST BARR PARK

- EXISTING PARKS**
- 21. SEWETAL PARK
  - 22. HEMLOCK CENTRAL PARK
  - 23. HANCOCK POINT PARK
  - 24. WHALLE BODLE PARK
  - 25. INSLAN LAKE PARK
  - 26. PULKA BEACH PARK
  - 27. MOUNT EDZDA RECREATION AREA
  - 28. GAMBOLA SANDS RECREATION AREA

**NEW RECREATION AREA**

The major land acquisition for Provincial park purposes was successfully concluded during 1972. These included purchase of a 6-acre parcel of land with 1,100 feet of frontage on the Sea West River which lies within the boundary pro-

## (c) ACCELERATED PARK DEVELOPMENT PROGRAMMES

Under the funding of the *Accelerated Park Development Fund Act*, three major park system planning projects were undertaken in 1972. These included a marine park study, a study of the main highway corridors in northern British Columbia, and a recreation reserves review pilot study.

(1) *Marine Park System Study*

During the summer of 1972 the portion of the British Columbia coast north from the Sechelt Peninsula to Toba Inlet was examined for its marine park potential. The objectives of this study included the determination of the best anchorages for small craft along this portion of the Coast, the selection of those areas having high recreational potential, the detection of ecologically significant areas (marine and terrestrial), and, finally, the cataloguing of historically significant sites such as abandoned Indian villages, early trading headquarters, and abandoned settlements.

Two university students were employed to undertake the necessary research and carry out the required reconnaissance of the coastal study area. Analysis and cataloguing of the accumulated data were completed in September 1972, when the programme was terminated.

(2) *UBC Survey of Northern British Columbia Highway Corridors*

The Provincial Parks Branch engaged P. J. Dooling, Assistant Professor of the Faculty of Forestry, University of British Columbia, in a research programme upon which would be formulated a comprehensive highway-oriented park system plan for the northern half of the Province. This research project was confined to the 1,600-mile highway loop through Prince George, Fort St. John, Cassiar, and Terrace and set out its objectives (a) to identify a system of highway-oriented park areas objectively; (b) to permit a systematic park facility development programme within such a park system; and (c) to encourage the implementation of an integrated land-use management policy within these highway corridors which will enhance and maintain them as attractive tourist travel routes with diversified recreational opportunity.

Some 28 students were employed to carry out research and reconnaissance work. In addition, two planners from the Park System Planning Section were appointed to act as liaison and administrative advisers to Mr. Dooling and his staff.

The project's field operations extended from June 1 to September 1, 1972, during which time the study crews successfully covered the entire highway corridor considered for study. Analysis and compilation of the collected data are to be completed by the summer of 1973, when a comprehensive written report will be submitted to the Parks Branch and a computer programme will be established at UBC, based on the project's data.

(3) *The Recreation Reserves Review Programme*

The Park System Planning Section has, in the past, been designated the repository and clearing-house for Crown lands set aside for public recreational use as map reserves. The purpose of these recreational reserves is to hold Crown lands intact and unencumbered against the time when development for public recreational use is required.

In June 1969 the Forest Service was assigned administrative responsibility for public recreational requirements in established Provincial forests. As a consequence, the Provincial Parks Branch initiated a programme to reassess recreational map reserves to identify those reserves having obvious park potential. Those recreation

reserves not considered having park potential and being located within Provincial forests would be relinquished to the B.C. Forest Service for administration.

A pilot project for reassessing the recreational reserves was launched in June 1972, and covered the Nelson Park District. Two park system planners were appointed to co-ordinate the programme and supervise the four students hired to carry out the survey of the recreational reserves. Some 145 sites were examined during the three-month study. The success of this year's programme has prompted the recommendation for analysis and inventory of all public recreation reserves throughout the Province.

(d) SUMMARY OF PROVINCIAL PARKS AND RECREATION AREAS  
ESTABLISHED, ENLARGED, OR DELETED IN 1972

|  | Area (in Acres) |       |
|--|-----------------|-------|
|  | Land            | Water |
| (1) 10 new parks were established in 1972—               |                 |       |
| Columbia Village Historic Park (Class A, Category 2) ..  | 12.0            |       |
| Devil's Potholes Park (Class A, Category 6) .....        | 6.8             |       |
| Discovery Island Marine Park (Class A, Category 6) ....  | 151.0           |       |
| Kikomun Creek Park (Class A, Category 6) .....           | 1,384.0         |       |
| Mabel Lake Park (Class A, Category 6) .....              | 450.0           |       |
| Morden Colliery Historic Park (Class A, Category 2) .... | 10.45           |       |
| Mount Edziza Park (Class A, Category 6) .....            | 326,000.0       |       |
| Nancy Greene Park (Class A, Category 6) .....            | 381.0           | 70.0  |
| Parrens Beach Park (Class A, Category 4) .....           | 107.0           |       |
| Seton Portage Historic Park (Class A, Category 2) .....  | 1.69            |       |
| (2) Additions to existing parks—                         |                 |       |
| Big Bar Lake Park (Class A) .....                        | 160.0           |       |
| Bugaboo Glacier Park (Class A) .....                     | 240.0           |       |
| Goldstream Park (Class A) .....                          | 59.0            |       |
| Gordon Bay Park (Class A) .....                          | 54.5            |       |
| Kokanee Creek Park (Class A) .....                       |                 | 220.0 |
| Miracle Beach Park (Class A) .....                       | 7.67            |       |
| Mount Assiniboine Park (Class A) .....                   | 44.0            |       |
| Strathcona Park (Class B) .....                          | 72.0            |       |
| (3) Recreation areas established—                        |                 |       |
| Gabriola Sands Recreation Area .....                     |                 | 13.1  |
| Mount Edziza Recreation Area .....                       | 249,000.0       |       |
| (4) Deletions—   |                 |       |
| Bugaboo Alpine Recreation Area (Park addition) .....     | 240.0           |       |
| Harwood Point Park (Class C) (cancelled) .....           | 77.0            |       |
| Haslam Lake Park (Class C) (cancelled) .....             | 40.0            |       |
| Helmcken Centennial Park (Class C) (cancelled) .....     | 6.8             |       |
| Myrtle Rocks Park (Class C) (cancelled) .....            | 65.0            |       |
| Mount Robson Park (Class A) (r/w) .....                  | 3.8             |       |
| Newstead Park (Class C) (cancelled) .....                | 0.206           |       |
| Palm Beach Park (Class C) (cancelled) .....              | 8.0             |       |
| Westbank Park (Class C) (deletion) .....                 | 0.517           |       |



Eve Cone, an almost perfectly symmetrical volcanic cone, is one of the features of Mount Edziza Provincial Park, a significant addition to the park system in 1972.

Swan Lake Park and Premier Lake Park were reclassified from Class C to Class A. Clearwater Lake Park was reclassified from Class C to Class A and its name changed to "Nickel Plate Park." Also, the name Clearwater River Park was changed to "North Thompson River Park."

During 1972, 50 new recreational reserves were established on Crown land through the co-operation of the Lands Service and Forest Service of the Department of Lands, Forests, and Water Resources; 10 established recreational reserves were cancelled. British Columbia now has 2,722 areas designated for public recreational use (excluding Provincial parks), containing 531,743 acres.

#### WEST COAST NATIONAL PARK PROJECT

The land-acquisition programme for the fiscal year 1972 was based on a similar allotment to 1971 with the Provincial Government putting up \$2 million and being reimbursed by the Federal Government for 50 per cent of this amount on transfer of the lands concerned to Canada.

At the time of writing, 217 parcels have been acquired in the Part I boundary in the Long Beach area, 30 parcels are under negotiation, and 20 parcels have not yet been dealt with.

Although the acquisition programme had been planned to acquire all inholdings in the Part I and Part II boundaries by October 1, 1972, this was not feasible due to the cumbersome system insisted on by the Federal authorities before providing their share of acquisition funds.

The name established for the park by the Federal Government in May 1971, of Pacific Rim National Park, is still subject to a great deal of controversy and

dissatisfaction. It is hoped that this groundswell of public opinion will convince Federal authorities to consider a more suitable name. Two of the most prominent names proposed for the park are "Wickaninnish" and "Maquinna."

Discussion, proposals, and counter proposals of the boundary for Part III (the West Coast Trail area) continued throughout the year with no abatement of the public's interest. In December a further submission was presented to National Park officials for consideration.

The new system of establishing an accountable advance verbally accepted by the Federal Government after 14 months of negotiation in December 1971, formally commenced 11 months later, in November 1972, eliminating the complicated system which had hampered the Branch in its negotiations with the private owners for two and one-half years.

#### SITE PLANNING SECTION

This year, as in 1971, accelerated park development required site planning for numerous new facilities, as well as for reconstruction and expansion. Site plans for new facilities, including both campgrounds and day-use areas, were prepared for Birkenhead Lake, Mabel Lake, Whiskers Point, Purden Lake, Kettle River, Nancy Greene Lake, Norbury Lake, and Kikomun Creek. Plans for facilities at Summit Creek (Creston Valley Wildlife Management Area) were also prepared.

Plans for new day-use facilities were completed for Buntzen Lake near Port Moody, and Gordon Bay on Cowichan Lake; preliminary plans for five other day-use parks have been initiated.

Site plans were completed for several parks requiring reconstruction and expansion; among these are Little Qualicum Falls, Bamberton, Ellison, and Moyie Lake Parks, and Mule Deer Campground in Manning Park.

As well as the planning of campgrounds and day-use areas, Site Planning has been involved in landscape design for several park areas, including Mount Robson east portal, Wardner Community Park, and the Manning Park Motel grounds. The latter two designs will be implemented in 1973. The most extensive landscape design project completed in 1972 is that for Kikomun Creek Park in the East Kootenays, a project involving the design for reforestation and seeding of 14 acres of beach frontage.

Site Planning was also concerned with a diversity of other planning problems, some of these being:

(1) *Cypress Bowl*—Involvement here has been to work in conjunction with Master Planning in the location of ski-lifts, runs, and buildings, as well as to review the work presented by private consultants to the project.

(2) *Bowron Lake*—In order to keep up with the problems of increasing demand in this popular "wilderness park," Site Planning initiated interim planning guidelines for wilderness-area management.

(3) *Campgrounds for recreational vehicles*—The problems of accommodating the highly mobile tourist and his recreational vehicle were explored in order to come to terms with the accelerating growth rate of this mode of recreation. Six different land-use schemes for overnight transient campgrounds and highway rest areas were investigated and drawn up, then presented to Planning Division staff for review.

#### MASTER PLANNING SECTION

A research study was conducted with the help of 15 summer students to identify facility-use standards for future design of parks. Other useful information on

campground use was also collected at the same time. Six summer students assisted the Master Planning Section in a park objectives programme and a resource analysis programme.

### ENGINEERING DIVISION

The Accelerated Park Development Fund complemented and extended the prime responsibility of the Division—The programme implemented in 1971 under the *Accelerated Park Development Act*. Professional staff concentrated on project control and administration, retaining 15 architectural and engineering firms. The technical sections, in addition to routine housekeeping duties, provided designs and direction for both contract and own-force construction. The Department of Highways provided direct assistance on paving throughout the park system plus road construction at Mount Seymour Park and at Blanket Creek and Cypress Bowl.

Consulting assignments included the following: Manning Motel—staff accommodation, electrical system extension, waterworks replacement, and sewage-treatment plant; Mount Seymour—day-lodge and related buildings, ski school building services, and electric power revisions; Cypress—buildings, sewage disposal, water supply, ski-lifts, and electrical services were all tabled at the end-of-year pending planning review; Newcastle Island—wharf and power study; Rath Trevor Beach—water system and power study; Simpson River—suspension bridge and Atnarko River cable-car crossing; Mount Robson—electrical system and powerhouse; Northern District—sewerage and electrical study; Nelson District—power study; Goldstream—electrical service.

In summary, external agencies executed about one-third of Accelerated Park Development Fund construction with divisional means handling about one-quarter. Victoria office support was aided by a move to new quarters in May. Staff were increased to handle future commitments by two engineers and one technician by the end of 1972.

### WATERWORKS AND SANITATION SECTION

This Section provided guidance to consultants, conducted feasibility studies, and supplied specifications, working drawings, material requirements, field supervision, and maintenance instructions for waterworks and sewerage systems constructed by Parks Branch own force and subcontractors.

Many projects were completed that originated in the Accelerated Park Development Programme, new works were undertaken and many renovations were made. Exceeding 60 in number, these ranged from hand-pumps on drilled wells to those approaching municipal status with fire protection, domestic services, irrigation, and sewage disposal. Other projects were investigated for design preparation which may be initiated in the coming year. Ten sani-stations were commenced and seven completed. Nine hand-pumps were installed and several planned for future installation.

### BUILDINGS AND STRUCTURES SECTION

Plans, specifications, and contract documents were prepared, tenders called and construction carried out for 15 contracts. These contracts covered a total of 37 of the larger toilet buildings, toilet and change buildings, garage-workshops, and heavy-equipment sheds. In addition, a prototype toilet building/picnic shelter was erected.

A variety of alteration work, inspections, and reports were prepared under the building maintenance arm of the Section. Custom designs and working drawings were prepared for nine projects in addition to those contracted. These designs en-

compassed such structures as two large, year-round nature museums, toilet buildings, a medium-sized garage-workshop, a concession building, office-building alterations, and a tourist information centre.

#### DRAUGHTING SECTION

Plan production was increased greatly to cover the Accelerated Park Development Programme, with private draughting firms providing the extra work force to back up the five-member Draughting Section.

Status maps, land-use design, buildings, waterworks, sewerage, tourist maps, publicity assignments, consultant records, park standards amendments and circulation, report maps, and technical council on park proposal reports in close liaison with Systems Planning and the Queen's Printer were some of the projects undertaken this year.

A start was made on microfilming the 3,500 drawings on file, which, together with an "as constructed" programme of mapping, is hoped to eventually produce a more up-to-date and quick reference of all park facilities.

#### WORKSHOP SECTION

Under the Accelerated Park Development Programme, the production of park furniture kept the Workshop on a double shift for the first eight months of the year. At the summer peak, there were 32 employees on the payroll. Two trailers were added to the present buildings to house the work load imposed by a 13,000-unit production.

Maintenance and dispatching of the headquarters vehicle pool, distribution of finished products, and several off-year jobs were also an integral part of the Workshop operation.

#### EQUIPMENT SECTION

This Section's responsibilities included semiannual inspections with direction for repair and maintenance of all Parks Branch vehicles and equipment, specifications for new and replacement vehicles and machinery, and maintenance of an operating-cost record.

Comprehensive liaison with suppliers covering specification conformance and warranty administration was carried out. In addition, this Section provided liaison with consultants on ski-tows and electrical and mechanical applications.

#### SURVEY SECTION

Mapping projects were once again the primary concern of this Section, with 40 projects involving approximately 2,500 acres completed.

Major mapping was carried out at Kikomun Creek Park, Horsefly Lake, Mount Robson Park, Golden Ears Park, and Conkle Lake. Surveys work for basic control, road location, and design was carried out at White Crown Ridge. Earthworks, construction surveys, boundary locations, and layout work constituted the bulk of other works, with a good start being made on the updating of development plans through "as-built" surveys. Kikomun Creek earthwork was a key feature of the control function.

Summer staff reached a maximum of 10 crews, involving 36 men, and a minimum staff of 20 men were maintained throughout the year.

## CONSTRUCTION SECTION

Approximately 22 projects were undertaken during the year, 18 during the spring to fall months, with four being scheduled for the winter months. Maximum employment reached 350 by mid-summer, of which 160 were students. Four 50-man camps were established, one of which remained in operation until mid-winter.

The Superintendent's office provided guidance for Management Division projects as requested, distributed bulk materials, and supplemented the delivery of park furniture.

Specific field work executed by this Section included installation of water systems at Christina Lake, Syringa Creek, Kikomun Creek, Kokanee Creek, Lakelse Lake, Maclure Lake, and Spahats Creek Parks, and Clearwater Lake Campground. Sani-stations were constructed at Furlong Bay Campground and at Maclure Lake, Moyie Lake, and Champion Lakes Parks. Project completions included the 88-unit campground at Furlong Bay, the 53-unit campground at Maclure Lake, an 84-unit campground at Kokanee Creek, addition facilities within Alouette Lake Campground and reconstruction of a major portion of the day-use area, completion of the 64-unit campground at Blanket Creek, and reconstruction of 11 miles of Wells Gray Park road and minor works over the remaining 5 miles.

New projects constructed were seven parking-lots and a 50-unit campground at Kikomun Creek; a 45-unit campground and new access road at Moyie Lake; a day-use area and parking-lot, including beach sanding at Nancy Greene; construction of 3,200 feet of main access road, erection of a 40-foot log bridge, and clearing of campground roads and 50 sites at Purden Lake; and installation of 1,300 feet of main access road for the 49-unit campground at Kettle River.

## VANCOUVER MANAGEMENT DISTRICT

With the continuation of the Accelerated Park Development Programme, District staff, in addition to their regular duties of supervising the operations and maintenance of Provincial parks, assumed the responsibility for the implementation of 28 projects. While emphasis was placed on reconstruction and expansion of existing facilities, the construction of a 50-unit campground and boat-launching area commenced at Birkenhead Lake.

Mount Seymour Park, regardless of the fact that the access road was closed for a five-month period to facilitate parkway reconstruction completion, still remains the most popular Provincial park, with 739,000 visits recorded. Visitors to the park will find the facilities much improved inasmuch as the access road has now been completely rebuilt, hiking trails improved, toilet facilities expanded, and additional space provided for ski-rental, brown-bag room, ticket-selling, ski-school administration, and first-aid treatment.

At Manning Park the newly completed 40-unit motel-lodge complex was officially opened on June 21, 1972. This facility along with other structures that have been added to the Manning Park complex have necessitated improvement of the utilities systems. A sewage-treatment plant, diesel-electric generating station, and water supply and distribution system are in the latter stages of completion and will be fully operational by early 1973.

Camper use continues to show a slight increase and the opening of 50 units of a proposed 100-unit campground on Lightning Lakes assisted in alleviating a shortage of camp-sites during high-use periods. An extensive trail programme was undertaken and over 30 miles of trails were reconstructed and upgraded to a higher standard. Other projects completed at Manning Park were the reconstruction of



Mule Deer Campground, minor renovations to Hampton Creek Campground, landscaping of the motel grounds, paving motel access roads, minor improvements to the ski facilities at Gibson Pass, and kitchen and dining-room renovations to the lodge.

Early in the year, L. A. Campeau, Supervisor, Lac la Hache Region, was transferred to Vancouver District as Regional Supervisor, Alouette Lake Region.

Golden Ears Park in the Alouette Region had the most campers of any park in the Province, with 75,000 registrations. Its proximity to Vancouver makes it a popular camping retreat for residents of the Lower Mainland. Reconstruction work continued throughout 1972 with emphasis being placed on rehabilitation of the campground, construction of six flush-toilet buildings, expansion of the day-use parking area, and general landscaping improvements. The introduction of gate-house control for the collection of camper fees assisted considerably in reducing the incidence of vandalism and hoodlumism.

The major effort in the Cultus Lake Region was directed toward the rehabilitation of Clear Creek Campground, Greenpoint Picnic-ground, and provision of trails, parking-lots, toilet facilities, and picnic tables at Sumas Mountain Park. A general clean-up of the undeveloped campground at Chilliwack Lake was undertaken and an attempt was made to introduce traffic and camp-site control to the area in an effort to protect the remaining ground cover. Cultus Lake Park, one of our most heavily used parks, recorded 73,000 camper registrations and we are glad to report that the vandalism and hoodlumism that plagued this popular park for so many years is now under control, and we look forward to decreasing the number of occurrences further.

The Garibaldi Region commenced construction of a 50-unit campground and boat-launching area at Birkenhead Lake Park and when completed it will provide much needed recreational facilities in the Pemberton Valley. Reconstruction of the day-use area at Alice Lake Park continued and two flush-toilet buildings were completed in the campground area. A joint project with the Fish and Wildlife Branch was undertaken and resulted in stream improvements to the outlet creek of Alice Lake.

Regional staff continued to assist the Department of Rehabilitation and Social Improvement by providing the supervision and training programme for 30 work trainees. The programme was located at Buntzen Lake during the early part of the year and moved to the proposed Cypress Bowl Provincial Park in June. Instruction was given on the operation of power-saws, fire-fighting equipment, slash-burning, falling, bucking, tree-planting, and slope rehabilitation.

#### KAMLOOPS MANAGEMENT DISTRICT

The second phase of the Accelerated Park Development Programme saw District personnel concentrating on the continuation of projects initiated during 1971. The only new project was the virtual completion of the first stage of a campground in the Bella Coola Valley of Tweedsmuir Park near Stuie. Other accomplishments were generally refinements to existing developments such as paving, water and sewerage systems, camp-site renovation, the construction of concrete-block toilet buildings, and maintenance service buildings. Once again the regional office of the Department of Highways provided invaluable assistance with our paving programme. The park system is expanding in its complexity, rather than its basic facilities.

The effort in the Okanagan Region was concentrated on the reconstruction of basic facilities in Ellison Park, where the road system, camp-site pads, and park-

ing-spurs were brought up to standard. The water system in Okanagan Falls Park was updated and minor water-system improvements were also accomplished in Sun-Oka Beach, Okanagan Lake, and Kickinnee Parks. Trail work was continued in Cathedral Park, and Monashee Park was made accessible by a continuing trail programme. Haynes Point Park sustained heavy damage from spring floods, but was repaired and reopened to accept the usual heavy traffic.

The Shuswap Region was reduced to more reasonable administrative proportions by the establishment of the Thompson Region. Much of the work programme was concentrated in Shuswap Lake Park on reconstruction of camp-sites and parking-spurs, preparation of road beds for paving contracts, and the construction of sites for toilet buildings. A total of four concrete-block toilet buildings were completed and six brought to various stages of completion. Day-use parking was increased and will now accommodate 310 vehicles. The beach was improved by hauling sand and by grading and shaping the entire frontage. Trails and picnic-sites were also reconstructed.

The opening of Paul Lake Park coincided with the establishment of the Thompson Region. This park, limping along for four years without a day-use area or access to the beach, became an instant success. Emphasis throughout the region was placed on the second or final phase of works initiated in 1971. Concrete-block toilet buildings and paving programmes were completed in Skihist, Monck, and Paul Lake Parks. Additional moneys were required to repair flood damage to Gold Pan Park, which suffered from the rising waters of the Thompson River.

While no new projects were initiated in the Wells Gray Region, basic facilities were improved considerably. Engineering Division handled the bulk of the projects, leaving the trail programme, the North Thompson River Park water system,



The beach area at Paul Lake Provincial Park is man-made and provides swimming and sun-bathing opportunities at this recently opened day-use facility.

and the third phase of the construction of North Thompson River Park to regional staff. The Youth Crew Programme continued at Mahood Lake, doing useful work on construction and seasonal, rather than sanitation, maintenance. Extensive work was done on park-use permits in both field and office.

In the Cariboo Region the second phase of the Big Bar Lake development will see a fine campground and day-use area in operation for the 1973 season. Much effort was expended on the completion of buildings and reconstruction work begun in 1971. Beach improvement to Lac la Hache frontage has made the park more attractive. The first stage of the reconstruction of Bridge Lake Park was interrupted by inclement weather conditions. The Youth Crew Programme at Horsefly Lake simply involved the construction of a standard camp from which to operate in 1973.

Twenty-six camp-sites will be ready for occupancy near Stuie in Southern Tweedsmuir Park during 1973. In anticipation of the continued staffing of this area, and the introduction of a Youth Crew Programme, considerable work went into modifying and improving the buildings on the former King property. Work continued on the Stillwater-Turner Lake trail and materials were requisitioned to further the Atnarko River crossing.

#### NORTHERN MANAGEMENT DISTRICT

As a result of the continuation of the Accelerated Park Development Programme, the five regions comprising the Northern District again experienced a



Drilling-rig at Golden Ears Provincial Park—an example of a continuing programme to provide better water systems in the parks.

busy season in park development. The programme emphasis was placed on the renovation and completion of existing facilities, plus the addition of new facilities in the more important parks within the Northern District.

The major project undertaken in the Bear Lake Region was at Crooked River Park.

Two toilet/change-house buildings were constructed in the park's day-use areas. The camp-site total was increased by 28 units, and the water system extended to service them. All roads, parking-lots, and camp-sites were upgraded with a lift of crush gravel.

At Whiskers Point, the campground development was completed, bringing the total number of camping units to 42. An additional 35 sites have been roughed out. A boat-launching ramp and parking-lot were constructed, the picnic terrace renovated, and a pressure water system and sani-station installed. All roads and camping-sites were finished off with crushed gravel.

Accelerated Park Development Programme efforts at Beaumont and Ten Mile Lake Parks were concerned primarily with completing the reconstruction of both campgrounds. Both parks were finished off with crushed gravel. At Beaumont Park, the boat-launching parking-lot was expanded to accommodate an additional 15 cars.

In the Peace-Liard Region, programme efforts were concentrated along the Alaska Highway. Picnic shelters were erected at Hyland River and Kledo Creek Parks and Buckinghorse River wayside rest area. Hand-pumps were also installed at all of the road-side rest areas along the highway. Additional work included the completion and crush-gravelling of the Prophet River Wayside Rest Areas south of Fort Nelson and the crush-gravelling of Buckinghorse River Park Campground.

In the southern portion of the region, programme projects included the completion of the pressure water system at Moberly Lake and Charlie Lake Parks.

There were a number of major projects undertaken in the Lakelse Lake Region. At Furlong Bay, 88 camping-sites added to Lakelse Lake Park last season were completed. The water system was extended to service this expansion, and a sani-station installed. A 10-unit toilet/change-house building was constructed in the day-use area. A smaller but similar building was constructed in Lakelse Lake picnic-ground. A maintenance staff residence building and gate-house were also erected. The paving programme was continued, and the entrance road and three campground loop roads were paved.

In the Prince Rupert area, Oliver Lake Park was reconstructed and a staff building erected at Prudhomme Lake Park.

In the Smithers-Hazelton area, major projects were undertaken at Seeley Lake and MacLure Lake Parks. Seeley Lake Park campground was reconstructed and paved. At MacLure Lake, the campground development was completed, a water system installed, and boat-launching ramp and parking-lot added. A staff building and garage-workshop were also constructed.

Efforts in the Bowron Lake Region were confined to improvements to the por-tages. The Visitor Information Centre was completed and was operational during the summer.

One of the major projects in the Mount Robson Region was the installation of a pressue water system and sani-station in the Robson Meadows-Robson River campgrounds area. At the headquarters area, improvements to the water-supply system were completed, and a sewerage collection and disposal system installed.

The building programme in Mount Robson consisted of the construction of a standard garage-workshop, and two maintenance staff buildings at the headquar-

ters area. A new powerhouse was also erected, and new power-generating equipment installed. A staff cabin was erected at Berg Lake, and a summer office building constructed at Robson Meadows Campground.

Successful Youth Crew Programmes were operated in the Bear Lake and Mount Robson Regions. The main activities involved were camp-site renovation and trail construction and maintenance. In the Bear Lake Region, the tree-planting programme was continued. With the assistance of the Forest Service nursery at Red Rock, 8,000 seedlings were planted in Beaumont and Crooked River Parks.

Bowron Lake, Lakelse Lake, and Mount Robson Regions also received 2,000 seedlings each from the Red Rock Nursery.

### NELSON MANAGEMENT DISTRICT

The second year of the Accelerated Park Development Programme once again was handled with much enthusiasm and efficiency by regional staffs who already were committed to maintenance of numerous parks in the Kootenays. Through their concerted effort and willing contribution of many extra hours of their own time, most of the projects initiated during the 1971 programme were completed.

The district park system was extended to provide maintenance at the newly purchased park property at Conkle Lake and to provide some control over the heavy recreational use being made of the Nakusp Hot Springs Park. With the great increase in outdoor hiking, park rangers again were stationed in Mount Assiniboine and Kokanee Glacier Parks. Winter patrols were carried out in many parks to control vandalism, snowmobiling, etc., and to provide maintenance in those parks which remain open to public use. Patrols were initiated in Mount Assiniboine and Kokanee Glacier Parks, as cross-country ski-ing is now becoming very popular.

Major construction works under the direction of the Engineering Division were undertaken at Christina Lake, Nancy Greene, Syringa Creek, Kokanee Creek, Moyie Lake, and Kikomun Creek Parks and at Kettle River and Blanket Creek. The Blanket Creek access road constructed by the Department of Highways will open up the new 64-unit campground to public use in 1973. Another 9,000 yards of material were added to the fill placed on Athalmer Beach in 1971 to provide space for future parking-lots, toilet buildings, and picnic tables. The beach at Christina Lake Park was also improved with the addition of 5,000 yards of sand.

Water systems, including extensive irrigation works, were completed at Christina Lake, Syringa Creek, Kokanee Creek, Wasa Lake, Mount Fernie, Dry Gulch, and Yahk Parks. A pumphouse was erected at Beaver Creek Park in readiness for the completion of the irrigation system in 1973. The sani-station started at Champion Lakes in 1971 was completed and a new station constructed at Moyie Lake Park will be available for park-users in 1973.

The district building programme undertook the construction of toilet-change houses at Christina Lake, Syringa Creek, and Kokanee Creek Parks. Six- and four-unit toilet buildings were erected at Wasa Lake (three), Dry Gulch (one), Mount Fernie (two), Kokanee Creek (four), Champion Lakes (three), Syringa Creek (two). These buildings will be available for public use in 1973 if the disposal fields and power installations are completed early in the year.

As was the case in 1971, few paving projects were undertaken in the Kootenay Parks as the Department of Highways was totally committed to its very heavy paving programme. We were indeed fortunate to have Lockhart Beach and Erie Creek Parks paved.

The Trail and Bridge Programme again proved to be very successful with the help of former Youth Crew boys and high school graduates. Works were continued on the trails leading from the west into Mount Assiniboine Park. A suspension bridge was erected over the Simpson River to provide safe public access over the river during high-water periods. Our trail crews improved the main trail into Kokanee Glacier Park from the Keen Creek road, while several other trails to Joker Lakes, Paupo Basin, and Woodbury Creek were improved.

The Youth Crew Programme at Champion Lakes, Kokanee Creek, Wasa Lake, and Mount Assiniboine again were very successful. These crews were involved in many works from normal camp-site duties to trail-building, erection of toilets and tables, painting, wood-splitting, and clean-up of all tin, bottles, etc., which were flown out of Kokanee Glacier and Mount Assiniboine Parks. Their recreational periods generally focused around mountain-climbing, fishing, canoeing, swimming, and eating.

The park naturalist programme at Champion Lakes, Kokanee Creek, and Wasa Parks again met with much enthusiasm by park visitors. It wasn't uncommon to see 200 people listening to our naturalist at his evening talks at Wasa Park.

#### VANCOUVER ISLAND MANAGEMENT DISTRICT

Improvements to facilities in the Malahat Region were carried out under the *Accelerated Park Development Fund Act*. A new combination picnic shelter and toilet building was constructed in the picnic area, wood corrals were erected throughout the campground, a chain-link fence was installed, and the service area paved in Goldstream Provincial Park. The campground at Bamberton Provincial Park was rebuilt, including the paving of all roads, the water system was improved with the installation of pumping equipment and pumphouses at three automatically controlled wells, and the water tower and wood-stave water-storage tank were replaced. A water system was installed in the campground, a residence and a garage-workshop erected in the service area, and work was under way on a sani-station at Gordon Bay Provincial Park. At Ivy Green Provincial Park a sani-station was installed, a garage-workshop and a staff residence were built in the service area, and a concrete curb defining the picnic-table terrace was built. Devil's Potholes Provincial Park had parking facilities and trails built and picnic tables and toilets erected.

To facilitate patrol and supervision of work in marine parks and parks located in the Gulf Islands, an 18-foot fibreglass cruiser was purchased and put into service. A pile-driving project was undertaken at Sidney Spit Provincial Marine Park in an attempt to reduce erosion of the spit. Toilet facilities and signs were installed, a dinghy float constructed, and mooring rings were located on one side of the anchorage at Pirates Cove Provincial Marine Park. Beaumont Provincial Marine Park was completely redeveloped, including expansion of the campground, building of trails, and installation of additional mooring-buoys. Roads in Montague Harbour Provincial Marine Park were paved, a water system installed, improvements made to the staff accommodation, and a pumphouse-workshop erected in the service area.

Attendance in parks in the Arrowsmith Region showed an increase, especially at Rath Trevor Beach and China Creek Provincial Parks, with the newly completed campground at Rath Trevor Beach being fully occupied during July and August and into September, while at China Creek space was at a premium from August 15 through September 15, which coincides with the height of the tyee salmon-fishing on Alberni Inlet.



New picnic shelter at Goldstream Provincial Park enables visitors to enjoy the park all year.



A park naturalist, explaining the mysteries of spawning salmon, captures the interest of school-children at Goldstream Provincial Park.

Group-camping facilities were under construction and a region office and information centre completed at Rath Trevor Beach Provincial Park. A water system was installed at China Creek Provincial Park and a residence erected at Sproat Lake Provincial Park during the year. The Youth Crew Programme was successful with trails, stone steps, and walls being constructed and general maintenance carried out. Reconstruction and upgrading of facilities at Little Qualicum Falls and Sproat Lake Provincial Parks commenced toward the end of the year with work expected to be complete in time for the high-use period in 1973.



These stone steps were constructed at Little Qualicum Falls Provincial Park picnic-ground in an effort to reduce erosion caused by heavy visitor use.

Strathcona Region parks registered increased visitor use during the year. Particularly heavy pressure was evidenced at Rebecca Spit Provincial Marine Park where line-ups occurred each morning for space. Increased use of Strathcona Provincial Park has accentuated the problems associated with introducing large numbers of people to a wilderness while retaining the area's natural state.

A two-year programme of rebuilding trails in the Forbidden Plateau area of Strathcona Provincial Park was completed during the year. At Miracle Beach Provincial Park the landscaping of the new change-house was completed, the seating in the amphitheatre was improved, repairs were made to both picnic shelters, and a gate-house was put into operation.

It is interesting to note that over 3,000 school-children made field trips to Miracle Beach Provincial Park during the school-year to study the ecology of the park.

#### PARK SECURITY

This year, gate-house registration, together with full-time patrolmen during the night hours, was operated in six parks, up from two in 1971. Results were good. In some parks, due to construction and black-top road programmes, it was not possible to get into operation as early as desired, but once the gate-houses took effect, long-lasting disturbances were eliminated, as were virtually all complaints of rowdiness from the camping public. Statistics compiled at Cultus Lake indicate a 96.2-per cent increase in evictions over 1971, which is indicative of stricter enforcement; in short, the patrolmen evicted trouble-makers at the start before a disturbance could grow to major proportions. This policy was adopted in the light of our 1971 experience when repeated warnings proved to be futile. Damage to park facilities dropped 16.6 per cent over 1971 and thefts went down 47 per cent. The revenue picture showed a great improvement. In 1969 there were 4,554 campers unaccounted for, or a revenue loss of \$9,108. In 1971 there were 134, and in 1972 all were accounted for. Revenue collection was 100 per cent.

Throughout the season minor problems cropped up now and again between campers and gate-house personnel and patrolmen. These were usually due to a combination of inexperienced employees and misunderstandings, and were settled



without too much difficulty. As personnel gain more experience in this type of operation, such incidents should gradually be eliminated.

### ACCIDENT PREVENTION

With one serious accident (automobile) and quite a few minor ones, the picture was not as good as in 1971. This is probably due to a great extent to the large number of inexperienced young people, mostly students, employed under the Accelerated Park Development Programme. On-the-job inspections were carried on all summer. Under way at present is an in-depth look at fire hazards throughout the park-establishment buildings, shops, etc., and a plan to qualify at least one employee in each region in industrial first aid.

### YOUTH CREW

This is a programme designed to give boys of 16 to 17 years of age a taste of outdoor living, and of being members of a group of other boys of the same age. The work required of them is scaled to their physical and emotional capabilities, and is liberally broken up with periods of sports and relaxation. A wage is paid, along with the provision of excellent board and all expenses.

On the whole, 1972 was quite a good year, although due to last-minute drop-outs we were unable to maintain our hoped-for 225 boys in the field. Camps were established at Little Qualicum Falls, Manning, Champion Lakes, Kokanee Creek, Wasa, Mount Robson, and Crooked River Parks as in previous years. Two alpine camps were operated at Black Tusk and Mount Assiniboine and were highly successful and much enjoyed by the boys. A considerable amount of trail-building and similar work was accomplished, and the new camp buildings at Mount Robson were completed. A new camp was built at Horsefly Lake. This was a new departure, the boys starting from the ground up, living under canvas and putting the buildings together themselves. They thoroughly enjoyed the experience and left with a real feeling of accomplishment.

### PUBLIC INFORMATION AND EDUCATION

The exponential curve of public interest in the environment and British Columbia's natural heritage was reflected once again in 1972 in the increased demand for information of and about the Provincial parks of the Province. Requests for information arrived by letter, telegram, telephone, and in person from nearly every corner of the globe. Inquiries that could be answered with folders or brochures increased by 26.7 per cent over 1971, while those requiring letters or memoranda in reply increased to an average of six per day from five per day in 1971.

In an effort to provide the best possible types of information to meet the ever-increasing demand, entirely new Mount Seymour, Alice Lake, and Tweedsmuir Provincial Park folders were prepared, printed, and distributed. All other information publications were revised and reprinted and preparations for new Kokanee Glacier, Mount Assiniboine, and Cathedral Provincial Parks' folders were well under way.

As a further means of presenting the study of parks to the public, the portable Parks Branch display was exhibited at the Vancouver Island Recreation Association annual meeting at Cedar, at the Vernon Outdoors Show, the Kamloops Kiwanis Outdoors Show, the National Parks and Recreation Association annual meeting in Vancouver, and at the Kami Days Exhibition in Kamloops. Arrange-

ments were made, in co-operation with the other branches of the Department of Recreation and Conservation and the Department of Industrial Development, Trade, and Commerce, for the refurbishing of the permanent departmental display in the British Columbia Building at the Pacific National Exhibition in Vancouver. This project is due for completion early in 1973.

The Public Information Officer delivered talks on Provincial parks to the annual Travel Counsellors' School in Vancouver, to a tourist advisors' course at Three Valley Gap, to University of Victoria recreation students, and to a number of other groups. He appeared on the cablevision stations in Victoria and Vancouver on several occasions and also on CHEK-TV and CJVI Radio in Victoria. Of special interest was the videotaping, in co-operation with the Department of Recreation and Conservation Public Information Officer, of the annual salmon-spawning in the Goldstream River in Goldstream Provincial Park. Park Naturalist Freeman King and Federal Fisheries Officer Lloyd Gudewill were featured in the taping, which was aired on Channel 10 Cablevision in Victoria. This electronic recording was a first for the Branch in this field.

Special projects carried out during 1972 included the design and production supervision of the Parks Branch cap badge, working with the Departmental Comptroller on the preparations for the official opening of the new Manning Park motel by the Premier, representing the Branch at the Boy Scouts of Canada plaque dedication of Discovery Island Provincial Marine Park, and attending the NRPA annual meeting in Vancouver.

Numerous news releases and feature articles on various Provincial Parks Branch activities were written and distributed to the media. An article on waterfalls was submitted to *Wildlife Review* and was featured in the summer edition.

Provincial parks on Vancouver Island, and in the Vancouver, Kamloops, and Nelson Districts, were visited during the year. Park developments and activities were recorded on film and in print.

## INTERPRETATION

The year 1972 was good for Interpretation. *The Accelerated Park Development Fund Act* enabled an expansion of naturalist programmes to new parks and offered the opportunity to gather valuable information on their natural features and wildlife.

Park naturalist programmes were conducted in 25 parks throughout the lower half of the Province, from Vancouver Island to the Rocky Mountains and from the United States border to Terrace. Forty seasonal naturalists staffed the programmes and provided natural history and park information to visitors.

Manning, Miracle Beach, and Shuswap Lake Parks, with long-established nature houses, carried the largest programmes, employed the most naturalists, and had the greatest number of visitors. Mount Robson's programme was managed from a temporary tent-frame nature house. Bowron Lake's new visitor information centre was in use only as an office for briefing canoeists, as the display room was not ready.

A total of 180,404 visitors was in touch with park naturalists in some way. Of these, 36,742 attended nature walks, 56,751 attended nature talks and slide shows, and 84,396 visited the nature houses. An additional 3,884 persons visited Mittenach Island Nature Park and talked with the naturalists stationed there. An estimated 54,000 persons visited Goldstream Provincial Park in November to watch the annual spectacle of the spawning salmon. Of these visitors, nearly 10,000 participated in naturalists' talks.

Again this year, schools participated in the naturalist programmes and 9,500 students were transported to parks during the school-year to take part in outdoor education workshops and to experience events in nature.

An experimental interpretive programme at Newcastle Island provided information on park visitors. The island's natural and human history values were also recorded and evaluated for master-planning purposes.

A naturalist guardian kept watch over the white pelican adults and young at Stum Lake (White Pelican Park), British Columbia's only known nesting area for these birds.

Naturalists, when not attending to the needs of the visitors, prepared and compiled reports on the flora and fauna of the parks. This natural history information helps to supply background for future programmes and park development plans.

At the beginning of the season, a workshop attended by 32 naturalists was held in Victoria. The workshop was intended to give new naturalists a thorough basic knowledge in nature interpretation as well as reviewing the summer's programme for both experienced and new naturalists. After the workshop the naturalists were sent to their respective parks where they continued their studies and gathered more information for the task of helping visitors understand and enjoy their parks.

For the display studio, this was a year of considerable emphasis on planning. Time was spent on plans for proposed nature houses at Golden Ears and Kokanee Creek Parks, and for a complete revision of Shuswap Lake nature-house displays. Plans were filed for 22 new displays.

Seventeen indoor and six outdoor displays were produced, as well as 13 campground maps. Five new pamphlets were brought into production, and several others were revised. One new manuscript for a major pamphlet was submitted. Fifty-two trail-card texts were printed. In addition to the foregoing there was normal production of the many lesser items for which the studio is responsible.

Systems for issue and receipt of naturalist kits, for pamphlet storage and distribution, and for storage and loan of valuable equipment were revised and upgraded.

Architectural plans were prepared for Golden Ears and Kokanee Creek nature houses, with specifications and contracts for construction expected in 1973.

Much of the success of the 1972 programme can be directly attributed to the quality, understanding, and ability of all the seasonal naturalists who devoted their best efforts to give service to the many thousands of park visitors.

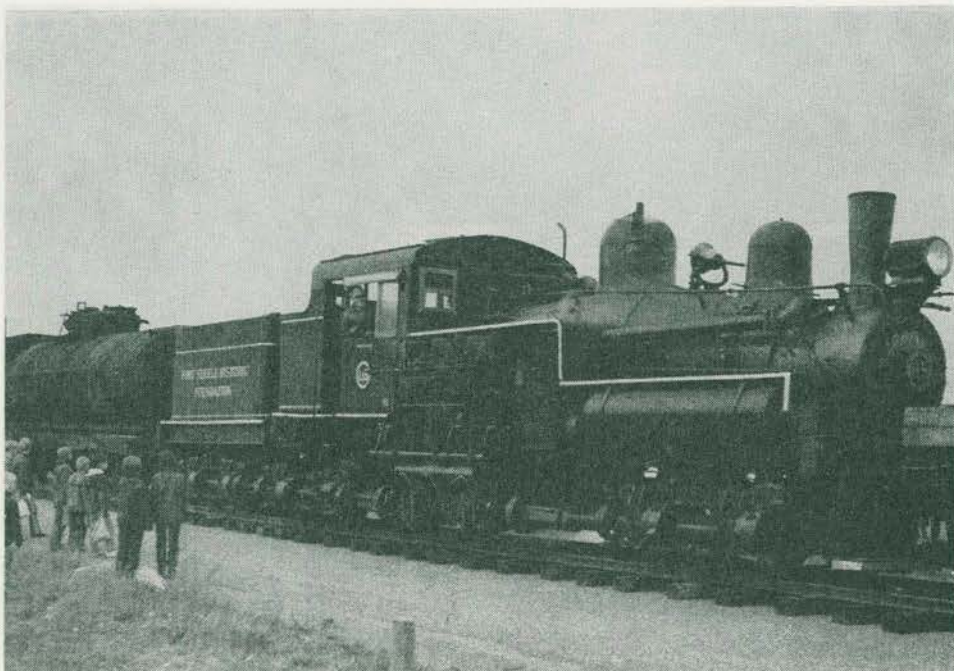
#### HISTORIC PARKS AND SITES DIVISION

As in 1971, regular historic parks and sites funds from the Provincial Secretary's Department were supplemented by funds provided under the *Accelerated Park Development Fund Act*. These supplementary funds amounting to \$150,000 permitted the Division to undertake the Kilby Museum and Historic Trail Reconnaissance Programmes, to accelerate development at Barkerville and Fort Steele, and to take on an office assistant at headquarters.

#### BARKERVILLE HISTORIC PARK

In spite of inconveniences caused by highway reconstruction between Quesnel and Barkerville, the historic park experienced a 10-per-cent increase in attendance, with a total exceeding 190,000 visitor-days. Completion of the highway next summer should result in an even greater increase in visitors.

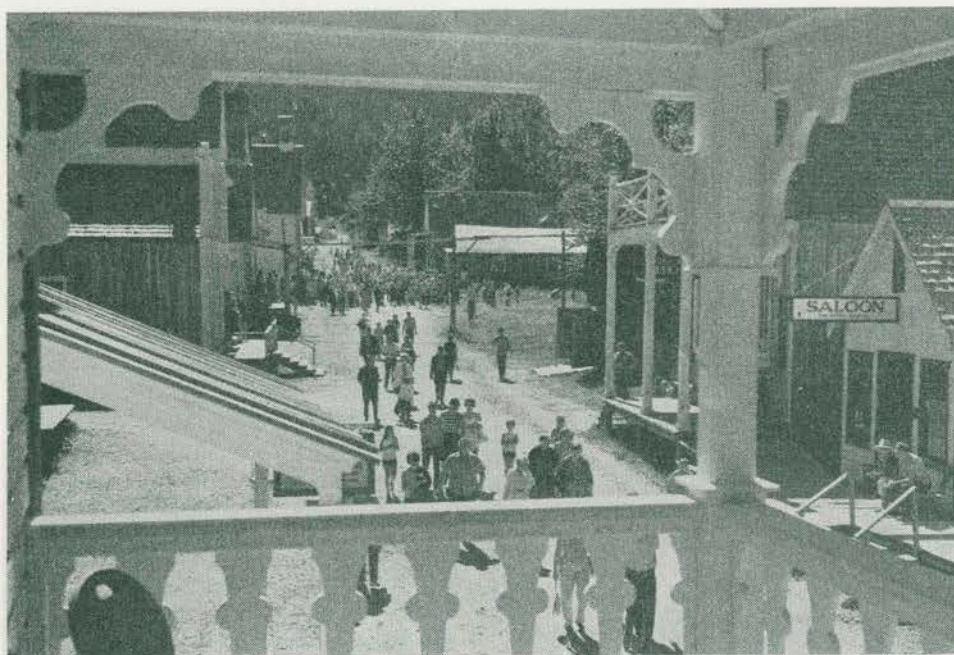
Fifty-five units of the 85-unit Lowhee Campground were completed. The remainder will be ready for full operation next summer, and plans are being made for



Young railroad buffs admire the Shay logging locomotive *Robert E. Swanson* as it steams into Fort Steele station.



Gay Nineties production "The Fishville Fling," starring Judy Armstrong and Dianne Stapley, was featured at the Wild Horse Theatre at Fort Steele.



Barkerville visitors leaving a matinée performance at the Theatre Royal.

an additional larger campground which should be completed during 1974/75. A supplementary water-supply system was constructed from Conklin Spring and will be connected into the park's main water system next summer.

The guiding programme of 1971 was continued, with more than 30 school groups involving nearly 2,000 students taken on tours during May and June. During July and August more than 4,000 visitors were guided through the restoration area.

The interiors of the Hudson's Bay Company store and butcher shop were finished and log work and exterior sheathing were done on the carriage shed. Materials were stockpiled for both the Chop Suey House in Chinatown and for the snackbar/souvenir shop/picnic-shelter complex, with the construction projects scheduled to start early next season.

#### COTTONWOOD HOUSE HISTORIC PARK

With the relocation of the Quesnel-Barkerville Highway to bypass the historic buildings at Cottonwood House, the site has regained much of its primitive atmosphere of 1864-1900 road-house days. Landscaping was started, the garage-workshop was completed, and an oil storage and implement shed constructed. It is expected that the number of visitors to the park will increase from this year's 22,000, perhaps even necessitating a campground as the atmosphere of the site increases its popularity as a stopping-place on the road to Barkerville.

#### FORT STEELE HISTORIC PARK

Under the supervision of Struan Robertson, appointed March 1, Fort Steele experienced its busiest year to date with over 200,000 visitors. Park staff completed construction of the new Wild Horse Theatre in time for the Wild Horse Players to premiere their production "The Fisherville Fling" at the opening of the summer

season on June 24. Sixteen thousand visitors paid a total of \$18,000 to view the twice-daily stage shows over the 10-week season.

Repairs to the *Dunrobin* locomotive necessitated use of the Shay, *Robert E. Swanson*, and receipts from the railway operation dropped for the first time in five years. Nevertheless, more than 26,000 passengers paid more than \$20,000 to ride the 2-mile standard-gauge line during the season. Reintroduced after a year's absence, the stage coach, drawn for the first time by Clydesdales, carried nearly 9,000 passengers for a revenue of \$5,000. To perpetuate the popular "Clydes," a pure-bred stallion "Dark Tide" was added to the herd during the summer, and it is expected that the presence of several foals each summer will add considerably to visitor interest.

Upon completion of the theatre, park staff turned to construction of the remaining buildings required to reproduce the 1887/88 North West Mounted Police post at Fort Steele. A 25 by 135-foot men's barracks, a 25 by 60-foot quartermaster's store and interior fitting out of the 25 by 140-foot stable were completed by year-end. The work will continue during 1973 in preparation for a ceremony on August 30 commemorating the formation of the NWMP in 1873.

#### KILBY MUSEUM

Acquired for park purposes in March 1972, the Kilby Museum at Harrison Mills houses in a 1904 general store building an incredible variety of once commonplace items which have now become collector's items. Two university students were employed during the summer cataloguing the extensive collection and assisting Mr. and Mrs. Kilby in guiding visitors through the museum.

#### HISTORIC TRAIL RECONNAISSANCE

During the summer, three students traced the route of sections of the 1865 Dewdney Trail between Fort Hope and the gold-rush diggings of Wild Horse Creek in East Kootenay. It is hoped that formal protection can be given to sections of this trail and also to others such as the Hope to Tulameen section of the Hudson's Bay Company Fur Brigade Trail. The long-range plan will be to develop and service a system of public recreational and historic trails with proper interpretive and other facilities, much along the same lines as the Klondike Gold Rush International Historic Park is being developed along the Chilkoot Trail of '98 between Dyea, Alaska, and Lake Bennett in British Columbia.

#### STOP-OF-INTEREST PROGRAMME

To the end of 1971, 128 stop-of-interest markers had been cast, largely based on historical themes and inspired by British Columbia's various centennial celebrations from 1958 to 1971. Only two plaques were cast in 1972, but plans are in hand for at least five in 1973, with emphasis to be placed on points of interest along newly opening travel routes in the Province.

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Kilby Museum

Acquired for part purposes in March 1972, the Kilby Museum at Hanson Hill houses a fine general store building an excellent variety of once common glass items which have now become collector's items. Two university students were employed during the summer cataloguing the extensive collection and assisting Mr. and Mrs. Kilby in guiding visitors through the museum.

HISTORIC TAIL RECONSTRUCTION

During the summer, three students traced the route of a section of the 1845 London Tail between Port Hope and the gold-rush diggings of White Lake Creek in East Vancouver. It is hoped that further excavation can be given to sections of the wall and also to others such as the Hope to Tahltan section of the London Tail. The long-range plan will be to develop and restore a system of public recreational and historic trails with greater interpretation and other facilities, much along the same lines as the Klondike Gold Rush International Historic Park is being developed along the Chilkoot Trail of the western coast of Alaska, and Lake Umbagog in British Columbia.

STOP-OVER-TRAVEL FACILITIES

To the end of 1971, 122 stop-over-travel notices had been sent, largely based on historical interest and inspired by British Columbia's various recreational centres. Only two notices were sent in 1972, but plans are in hand for at least five in 1973, with emphasis to be placed on points of interest along nearby opening travel routes in the Province.

84



British  
Columbia  
Provincial  
Museum

Department of Recreation and Conservation





**BRITISH COLUMBIA PROVINCIAL MUSEUM**

DR. J. B. FOSTER, DIRECTOR

The year 1972 was undoubtedly the most exciting in the 85-year history of the British Columbia Provincial Museum. Much was accomplished, largely due to the fact that we were able to double the size of our paid staff while volunteers from the Friends of the Provincial Museum, the Docents' Association, and the Heritage Court Society continued to give extremely valuable help.

In February the Federal Government's Local Initiative Project, Mamook, began under the very able leadership of Ewald Lemke. The project employed from 24 to 35 skilled and semiskilled people in all divisions of the Museum. As a result, the Curatorial Division recorded major advances in the organization and study of their collections, the Conservation Division in the care and repair of long-neglected objects, Education Services in the capability of close to doubling the attendance by school-children while greatly extending adult functions, and the Display Division, which, due to the Mamook personnel, was able to open the new History Galleries on schedule.

Toward the end of the year, 28 additional personnel were being hired on funds supplied by the National Museums Programme. This programme will eventually involve most of the museums and art galleries in Canada in the task of decentralizing their natural and human history collections so that the heritage of Canada will be more accessible to the people. As one of the first associate museums in the programme, our Museum will provide a focal point for activities in the Province, as it has done since a Museums Adviser joined the staff. The 28 people hired on the programme will be working in every division of the Museum, with their chief task being to help the Museums Adviser take the Museum to the people. The Adviser will have technicians and junior curators available to provide expert help to the smaller museums of the Province and to build and to handle a series of travelling exhibits originating both from within and out of our Museum.

The same programme will help the Education Officer to take the Museum to the schools. A Catalogue Assistance Fund will allow us to catalogue thoroughly our large anthropological collections; a training assistance programme will help us train the people so badly needed. Finally, National Museums Programme funds should enlarge our conservation staff in order to be able to handle the expanding volume of travelling exhibits.

The 52 additional personnel supplied by the Federal programmes came at a time when the demands by the public upon the Museum had become acute in every division. Not only had inquiries by people interested in totem poles, prehistoric middens, ecological reserves, marine fish, seabirds, design of museums, repairing furniture, etc., reached new heights, but our whole display programme was in danger of floundering due to the lack of skilled hands.

On July 7, 1970, we began constructing our first permanent exhibits—the Modern History Galleries. Schedules were set to complete the exhibit in two years. We would not have been able to keep to our opening date without Mamook personnel and financial help provided by various companies sponsoring exhibits.

On July 7, 1972, Premier W. A. C. Bennett opened the new History Galleries. Our attendance had been lagging somewhat until then, indicating that the public realized that nothing new had been put on display in the Museum for a long time.

However, in July and August we were over-run with visitors, 15,555 being recorded in a single day. August topped 216,000 people, and the year total reached 1,155,429 visitors, including 35,000 school-children in conducted classes (937,451 visitors and 20,000 children in 1971).

By autumn, plans were progressing well for the Natural History Floor. Construction will begin on one-half a floor in the spring of 1973 when funds become available. In the meantime, plans will be completed for the Ethnology Galleries in the hope that this half floor can also be started April 1, 1973.

In anticipation of major financial support for displays, the biologists were busy in the field collecting and preserving specimens while the ethnologists and conservators organized and restored the large ethnological collection.

Lest it be thought that the only significant staff changes during the year were at Federal expense, we should add that Yorke Edwards filled the Assistant Director's position after it had been vacant for 2½ years. Mr. Edwards' extensive experience in museums, interpretation, and display will be highly valued in the years ahead when our exhibit programmes will continue to be among our top priorities.

In 1972 the Provincial Museum was able to join in a growing number of activities outside Victoria. Particularly noteworthy was the co-operation with the Indian Bands at Hesquiat and Atlin on cultural recovery projects.

Thanks must be extended again to the Docents' Association, whose 73 members donated 4,550 hours of time to teaching children; to the Heritage Court Society, whose profits from a very successful year operating the sales desk helped to purchase many worth-while objects and much equipment for the Museum; and to the Friends of the Provincial Museum who kept all the volunteer services on an even keel.



*Ledum Græn Landicum*, a native plant featured in the sunken garden at Heritage Court.

## ARCHÆOLOGY

Archæology Division activities in 1972 were largely complementary to those of the previous year. In contrast to 1971, we were directly involved in relatively little field work, but enormous progress was made in organizing and processing collections and records; in the analysis of data previously recovered and in the preparation of reports upon these; and in assistance to other organizations to preserve or to recover important fragments of British Columbia's past.

Once again, these accomplishments were largely due to outside assistance. The Provincial Parks Branch subsidized the salaries of the Assistant Curator, senior researchers, and technicians responsible for the analysis of field data gathered in 1971 from the Archæology in Parks Programme. (In addition, University of Victoria archæologists have undertaken to write up certain of the 1971 parks excavations.) Part-time secretarial assistance was provided through the generosity of the First Citizens' Fund. During the summer months the National Museum of Man employed three students to work on our Provincial archæological-site files and begin transcribing these to a national computerized site inventory. Our participation in the Mamook Local Initiatives Programme provided the Archæology Division with from five to nine skilled and enthusiastic assistants by whose labours we have at last been able to catch up with many years' backlog of work. Finally, at the end of the year, the Division prepared for participation in the new National Museums Programme.

This assistance is expected to further this Division's role as the centre for systematic storage of data about British Columbia archæology and coincides with developments which tend to lessen the traditional museum emphasis upon collecting objects. Of course the collector's role will never disappear or we should cease to be a museum, but archæologists, like other museum scientists, have always insisted that it is much better to possess the relevant information about an object than the object itself without any reliable information (although having both is ideal). While an original object can rest in only one collection, information can easily be duplicated and shared.

As an example of this trend, the Division's close co-operation with the cultural recovery project of the Hesquiat Indian Band, to which we have contributed many hundreds of man-hours both in the field work at Hesquiat Harbour and in the laboratory, will not enrich this institution in terms of artifacts (which will be kept in a Band museum at Hesquiat), but is yielding much valuable information in archæology, ethnography, physical anthropology, and linguistics. This is not only significant for the Band in establishing its unique identity and heritage, but also most of it will become available as a rich and reliable source of primary data that can add greatly to our knowledge of British Columbia's past and of mankind's variability and potentials. Predictably, the success of the pioneering Hesquiat Project has aroused the interest of several other Indian Bands in the Province, at least six of whom have communicated with us regarding comparable programmes of their own. In connection with two of these proposals, Division staff members, with others, visited Atlin (twice) and Osoyoos.

Other archæological field work included a week-long salvage operation at a small inland site in Saanich. The Parks Branch assisted Division staff in recording several sites on Slocan Lake. A number of shorter trips were made from time to time in order to investigate and record archæological sites and finds. An Opportunity for Youth-funded excavation on National Historic Sites property at Esquimalt Lagoon, which was organized and supervised by Ernest Oliver, of the University of Victoria, was nominally under the Curator's direction.

At the request of Parks Branch, Museum staff constructed a full-scale replica of a Shuswap Indian pit house in Shuswap Lake Provincial Park in October. This project was researched and directed by Mrs. Nancy Condrashoff with assistance from John Smyly, of the Conservation Division, and with original information contributed by Isaac Willard, of Chase. A report on this has been supplied to the Interpretation Division of the Parks Branch, as was data necessary to prepare a prehistoric fishing-scene display at Clearwater Park.

Other extension activities carried out by members of the division in 1972 included several lectures and demonstrations to classes and other groups in Victoria, Atlin, and Nelson. J. C. Haggarty taught an introductory anthropology course at Camosun College. A small display on archaeological sites was prepared as a temporary exhibit in the Education Division and the Curators wrote the text for the general introduction of the Human History Galleries.

Mr. Haggarty organized and chaired seminars at both the Northwest Anthropology Conference and the B.C. Museums Association annual meeting. D. A. Abbott presented a paper at the Canadian Archaeological Association meetings in St. John's and represented the Museum at a seminar in Ottawa to discuss the new National Inventory Programme. In addition, staff attended the American Anthropological Association meetings in Toronto, and the International Conference on the Prehistory and Palaeocology of the Western Arctic and Subarctic in Calgary.

Great progress was made in putting the archaeology collections in order. The backlog of cataloguing was caught up and a start made in recataloguing earlier accessions into the system begun in 1966. Several large new accessions were catalogued as well as some privately owned collections loaned to the Museum for detailed recording and photographing. The reorganization and inventory of the Museum collection is now virtually complete. Additional cabinets necessary to store this material have been provided through the generosity of the Friends of the Provincial Museum. The human osteology collections have been cleaned and reorganized, and individual bones are being catalogued and inventoried. All faunal material from excavations stored in the Division was identified and recorded as to species.

Throughout the year a great deal of work has been accomplished in the Provincial archaeological-site file. During the summer, about one-quarter of the roughly 5,000 sites then recorded were updated and transcribed to standards required by the National Museum for a national file.

Numerous additional sites were recorded during the year. The Provincial Archaeologist's staff continued registering sites with Lands Branch, and the Museum maintained the exchange of site data with the University of British Columbia. Because of numerous inquiries about pictographs and petroglyphs, a separate duplicate file of these sites has been prepared.

In addition to several excavation project reports completed or in preparation, major research projects carried out in the Division include an initial programme of archaeological soils analysis, osteometric and nonmetric skeletal studies (in cooperation with the University of Victoria), inquiries into the uses of computers in archaeology, analysis of Hesquiatic osteometrics, and archival research to gather historical data in areas under investigation.

#### BIRDS AND MAMMALS

Two main areas of activity in this Division during 1972 centered around display and restoration of collections programmes. In both areas, five Mamook (LIP) personnel participated, accelerating both programmes.

Field research and collecting for display purposes were carried out in the following regions: Hedley-Ashnola, Queen Charlotte Islands, Triangle Island, Barkley Sound, Swiftsure Bank, Newgate, Peace River, and the Stewart-Cassiar Highway. In addition, the Curator participated in ecological surveys to the Gitnadoix and Khutzeymateen watersheds.

A paper entitled *A List of Islands and Their Mammalian Faunas from the West Coast of Vancouver Island* has been prepared and awaits publication. Several short papers dealing mainly with birds were prepared and await publication. Library research has been carried out for the next bird handbook, *Diurnal Birds of Prey*.

Display planning and preparations were intensified this year. One hundred and five specimens of birds and mammals were mounted for future display. New floor plans, space allotments, and flow diagrams for the Natural History Floor were finally resolved, and construction will begin when funds become available.

Mamook personnel this year completed the restoration of the scientific study collection of birds and bird eggs. This involved the cleaning, repairing, housing, and storage labelling, cataloguing, and storage of some 2,400 eggs. Work continues in this area with old and new mammal skins, skulls, and skeletons. Two hundred and sixty-one scientific study specimens of mammals were prepared or restored by Mamook personnel. Miss Win Speechly has continued to assemble the bird and mammal location file, a large project now nearing completion.

## BOTANY

The Botany Division's most notable achievement was the completion of the *Flora of the Saanich Peninsula* (Annotated List of Vascular Plants) by Adam F. Szczawinski and Antony S. Harrison, which will be the Provincial Museum Occasional Paper No. 16. As well, Dr. T. M. C. Taylor completed the manuscript on *The Rose Family (Rosaceae) of British Columbia*, which will be handbook No. 30.

Botanical collecting was carried out in July in the Kootenay Valley south of Wardner, in the Crowsnest Pass area, and around Clinton.

Among the interesting features arising from this field work were (a) the finding at Osoyoos of a developing hybrid swarm of young trees derived from spontaneous cross-breeding of the local black cottonwood with at least two introduced exotic species of poplar. Because of the exceptionally high flood water, sampling of these trees was carried out by canoe; (b) the finding of an apparent hybrid between the black cottonwood and the narrowleaf cottonwood in the Crowsnest Pass area, though the latter parent species does not reach within 15 miles of the pass on the east; (c) an unusual and rare variety of the dwarf alpine willow *Salix cascadiensis*, found previously only in 1938, was discovered on Pavilion Mountain, near Clinton.

In addition to the collection of dried specimens, during this field trip many living plants were collected for introduction into cultivation in the Museum's native-plant garden.

Research on the catkin-bearing plants continues, the objects of special attention, including the *Salix cascadiensis* mentioned above, and the question of the identity and distribution of the sandbar willows on Vancouver Island. Papers are now in preparation for publication on both these subjects.

During June 1972, seven ecological reserve sites were examined—Sugar and Peter's Lakes alpine region; Hesquiat on the west coast of Vancouver Island; and Vance Creek, Otter Lake, Cougar Canyon, Bonneau Lake, and Rimrocks, all in the North Okanagan region; reports have been submitted to the Ecological Reserves Committee.

Significant progress was made on the preparation of the flora of British Columbia. Dr. Taylor completed a manuscript on the *Scrophulariaceae* family of British Columbia and is now working on a similar manuscript for the *Cyperaceae* family. Dr. T. C. Brayshaw continued working on the catkin-bearing species. Botanical illustrations numbering 155 were completed for the *Leguminosae* and *Scrophulariaceae* families.

The native-plant gardens on the Museum grounds are now, after three years, beginning to flower, several species for the first time this year. Ten species of the genus *Pentstemons* have been introduced into the garden with notable success. The collection of plants is continually being added to with material obtained in the field. V. W. Ahier, working on a contract basis, has collected much of the material, and has prepared and planted almost all of it. He has also begun to make the labels for the plants, so that the use of the garden for education and for the demonstration of native species to interested groups is now possible.

The herbarium collection consists of 58,183 sheets, which is an increase of 1,253 sheets over 11 months of 1972. As our herbarium is listed with other herbaria of the world in *Index Herbariorum*, there has been an increase in requests for loans of our material for study. This year a total of 511 plants was loaned out for scientific studies.

Herbarium exchange was continued with a number of institutions in Canada, the United States, and Europe. There is a rapidly growing list of institutions that are requesting exchange and study material, but unfortunately we are not able to oblige at the present time due to a shortage of technical staff. Various institutions, game biologists, foresters, agriculturists, naturalists, and other individuals have contributed a number of plant collections and individual plant specimens during 1972.

Staff members have presented lectures, demonstrations, and participated in field trips on numerous occasions throughout the year. The Curator participated in two television programmes and made a series of programmes for CBC International Service and the National Film Board featuring the flora of British Columbia, ecological reserves, and the Provincial Museum.

#### ETHNOLOGY

The Ethnology Division continued to make its facilities, services, and collections available to Indians, students, and the general public during 1972. Above all, the Division is committed to furthering and disseminating knowledge and understanding of British Columbia Indian history. Much of the year was spent in various housekeeping duties which ultimately will result in increased and more efficient services to those wishing to use the resources of the Ethnology Division.

The activities of the Division were greatly enhanced by the addition of personnel employed under a Local Initiatives Project grant. Various people were employed from February through December and these included Miss Ardyth Cooper, Miss Betty Fisher, Richard Goodacre, Miss Ann Mathers, Miss Linda Monks, Kevin Neary, Mrs. Celina Quock, Daniel Savard, and Miss Elizabeth Virolainen. In addition, John Sendey was on loan from the Archaeology Division for a period of three months. Mrs. Gerri Sylvester was employed half-time on a grant from the First Citizens' Fund.

The above staff undertook a number of projects, which, when completed, will be of considerable help to the Division. Included were the following:

Over 10,000 historic photographs were catalogued. These show Indian villages and other Indian subjects and date back as far as 1865. Photographs of this type are an invaluable research tool and source

of descriptive information about British Columbia Indian lifeways during the past century.

A complete inventory of the ethnological collection was undertaken, with the result that the collection is now systematically stored.

The Division's collection of ethnographic films, tape-recordings, and documents was catalogued during the past year.

These projects were undertaken by Mamook staff, who were supervised by members of the Division's permanent staff, who took part in the above-described activities as well as completing individual projects. Notable among these were Alan Hoover's survey of Haida totem poles and village-sites in June 1972. Through the generosity of Sam Simpson, of Masset, Mr. Hoover circumnavigated the Queen Charlotte Islands, making a photographic condition record of the remaining examples of Haida monumental sculpture. Peter Macnair made several trips to Alert Bay to record Kwakiutl potlatches and in August travelled to Rivers Inlet, where he and other members of the Museum staff gave advice on the salvage of ethnological specimens threatened by construction. Miss Barbara Routley completed a thorough preliminary indexing of the C. F. Newcombe notes held by the Provincial Archives.

The Thunderbird Park carving project continued with the main effort directed to the completion of a Kwakiutl Indian house which will be placed in the Museum exhibit building. Carving was directed by the senior carver, Henry Hunt. Ron Hamilton entered his second year as an apprentice carver. Oscar Matilpi and David Gladstone were each employed for six weeks. Tony Hunt resigned from his position as carver in order to pursue his carving interests independently. The Museum staff wish him well and are pleased to have been associated with him and to have seen his talents develop over the 10 years he was employed by the Museum.

The ethnological collections continued to grow in the past year. Significant additions to the collection included a Kwakiutl thunderbird mask carved by the late Mungo Martin; an Interior Salish (Lillooet) river canoe carved by Charlie Mack and Baptiste Ritchie, of Mount Currie; a significant northern bent-cornered wooden box and a bent-cornered wooden dish, both with painted designs, donated by Mr. and Mrs. R. J. Nation in memory of Harold T. Nation, a British Columbian from 1897-1967; a collection of largely Coast Salish material purchased from the estate of the late A. D. J. Pitts; and a collection of contemporary British Columbia Indian material presented by the Honourable John R. Nicholson, Lieutenant-Governor of British Columbia.

Members of the Ethnology Division staff gave several public lectures during the year. The staff participated in the Canadian Museums Association annual meeting held in Victoria in May and the B.C. Museums Association annual meeting held in Fort Langley in September.

The Museum was greatly saddened by the death, on July 20, 1972, of Mrs. Helen Hunt. Wife of the chief carver at Thunderbird Park, Henry Hunt, she had been associated with the Museum for over 20 years. She first arrived with her adoptive father, the late Chief Mungo Martin, and acted as his interpreter until his death. Helen Hunt was a warm, compassionate woman, knowledgeable in her own Kwakiutl culture, and one always ready to share her experiences and knowledge with others. Many communities mourn her loss—her family of 14 children, her own Kwakiutl community, the Victoria Indian community, the Museum community. She was a part of these and many other communities. Her loss is a universal loss to all of us interested in the life of British Columbia Indians.



## HISTORY

Collecting, registering, and cataloguing three-dimensional objects associated with the white man in British Columbia is the major aim of the History Division. We attempt to restrict our accessions to those of British Columbian significance and thus develop a strong knowledge of our heritage.

Despite the difficulties in pursuing such a course, the Division has recently placed more emphasis upon collection of objects relating to our industrial experience. Due to the fortunate availability of the Department of Highway's hangar at the airport, we have been able to accept large objects. In this way, we are slowly collecting machinery used in early industries as well as different modes of transportation. Industrial machinery, farm implements, automobiles, and even a rum-runner's boat have been collected.

With financial aid from British Columbia Hydro, we are restoring an old Victoria street-car. The Birney 400 Safety Car should be ready for exhibit by early 1973. It should not exemplify merely an interesting form of urban transit but also point out the increasing need British Columbians have for improved transportation facilities in our metropolitan centres.

July 7, 1972, was the date of the long-awaited opening of the Modern History Exhibit. As the first part of Project '70, it presented many unforeseen problems to overcome. But with the generous aid and co-operation from many Government departments, businesses, and labour, we were able to complete a successful pro-



A model of Fort Victoria, made by Museum model-maker John Smyly. The model, exhibited in the glassed-in display case, shows the fort as it was in 1848.

gramme. The Friends of the Provincial Museum purchased a number of fine artifacts to enhance the exhibit and provided funds for construction.

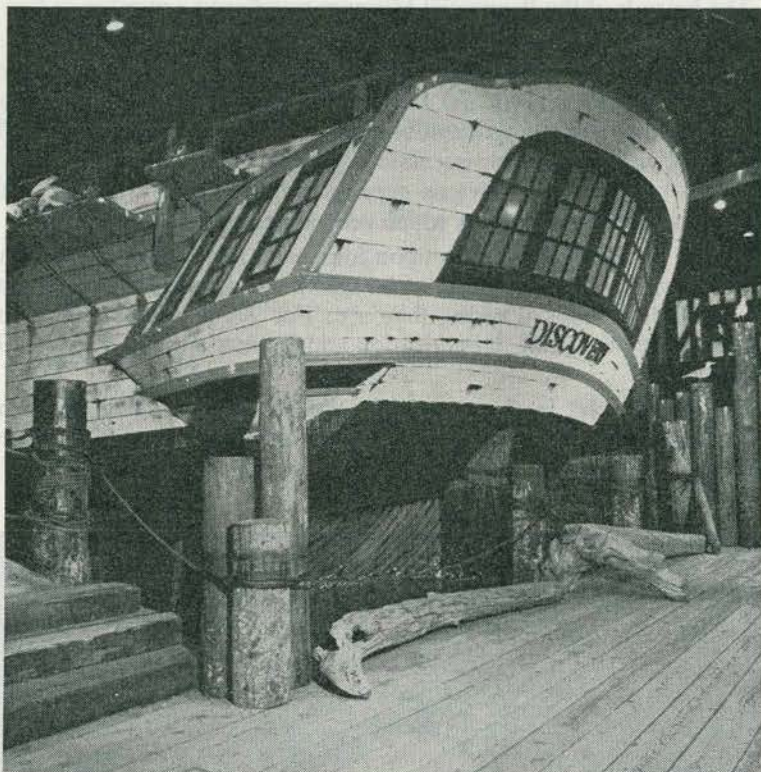
The response of the public has been tremendous. Not only has the exhibit heightened the public awareness and knowledge of our exciting history but also it has encouraged more public participation in our collection programme. The latter development was welcome as our accessions budget made little allowance for purchasing artifacts to fill in very obvious gaps in our collection. However, there are still many shortages in certain areas which only a larger budget can rectify.

The history exhibit concentrates upon four main historical trends, with emphasis upon portraying the technological, sociological, and ecological changes embodied in each era. In chronological order, they are: Fur Trade and Exploration, 1741–1860; Gold Rush, 1849–1900; Urbanization and Industrialization, 1871–1921; The Metropolis, 1921–71.

The very heavy work load presented by the History Exhibit programme forced the Division to seek an enlargement of the staff, and the Federal Government sponsored Local Initiatives Project, Mamook, provided the Division with much needed



A turn-of-the-century kitchen, complete to the last detail, in the Modern History Exhibit.



A replica of Captain Cook's ship *Discovery* with which he explored Nootka Sound. This display, in the Exploration Gallery of the Modern History Exhibit, also features sounds of the sea.

aid. Furthermore, the National Museums Programme will permit the Division to catalogue and photograph all artifacts in the collection and to increase our programme of aiding smaller museums in the Province.

In September the Curator left the Department to enter the University of British Columbia for a year's study and his place was taken by the Assistant Curator.

#### MARINE BIOLOGY

The Marine Biology Division has actively pursued display and research programmes during 1972. This involved several major field trips by the Curator, including very productive cruises for *benthic* fauna in February and for *bathypelagic organisms* during May, while the Curator was a guest observer aboard the Fisheries Research Board of Canada's research vessel *G. B. Reed*. He also collected inshore fishes and surveyed lakes containing an undescribed species of *sticklebacks* (*Gasterosteus*) on the Queen Charlotte Islands during June. As a result, many rare fishes and invertebrates were added to the Museum's collections. At least 15 of the fish species had not been found previously in British Columbia waters; consequently, reports on their capture were prepared for publication. The Queen Charlotte trip also provided data for the proposal of three reserves for the Ecological Reserves Committee in order to protect endangered stickleback populations in this area. In connection with the exhibit programme, many local field trips were taken in order to collect specimens for modelling by the Display Division.

In addition, reorganization and recataloguing of marine collections after their transfer from the old Museum quarters in the Parliament Buildings were major activities of the Marine Biology Division. The numbers of Pacific Northwestern collections, specimens, and species in the collections are estimated to be:

|                         | Species | Collections   | Specimens             |
|-------------------------|---------|---------------|-----------------------|
| Fishes.....             | 250     | 700           | 2,500                 |
| Reptiles.....           | 13      | 270           | 600 (?)               |
| Amphibians.....         | 19      | 300           | 800 (?)               |
| Invertebrates.....      | ?       | 500-600 (?)   | hundreds of thousands |
| Insects.....            | ?       | ?             | 75,000-80,000         |
| Dry mollusc shells..... | ?       | ?             | thousands             |
| Limnology samples.....  | ?       | more than 600 | ?                     |

The invertebrate total is inflated by large marine plankton samples.

Obviously, museum collections must be studied to provide maximum benefit, and to this end large series of several fish species were loaned to investigators in Ontario and California. Some reptile collections were sent to Oregon. In addition, studies on *cottid*, *agonid*, *liparid*, and *zoarcid* fishes as well as *polychaete errantia* and *reptant crustaceans* are in progress at the Museum.

Because only one employee, the Curator, constitutes the permanent staff of the Division, many activities received support from outside sources. Noteworthy is the Mamook project, which provided help in the sorting and cataloguing of the collections. The entomology, reptile, and polychaete collections under the Division's care were in part maintained and reorganized by Dr. Brian Ainscough, Kenneth Strong, and Mrs. K. D. Hobson respectively. Some field activity on the Queen Charlotte Islands had partial support through research grants awarded to Dr. G. E. E. Moodie, of the University of Winnipeg. Part of the space occupied by the Marine Biology Division includes a geological and paleontological collection which were sorted and catalogued by personnel from the Department of Mines and Petroleum Resources. Under the National Museums Programme, the Marine Biology Division acquired a temporary Assistant Curator and technician.

During the latter part of 1972 the Division became more deeply involved in the planning of public display programmes such as the Hall of the Seas.

## CONSERVATION

The year has been a memorable one for the Conservation Division.

The prolonged planning and development of previous years, together with the unexpected windfall of the Mamook programme, which in some measure alleviated our chronic staff deficiency, has allowed us, for the first time, to operate in a normal manner. Though still below strength, the volume of material passing through the laboratory has been impressive.

The emphasis has been on ethnology, and more than 150 objects have undergone major treatments, ranging from extensive cleaning to complete reconstruction, while many more have received minor attention. Many hundreds of objects, belonging to several divisions, have been fumigated, and during most of the year every new object acquired by the Museum has been systematically examined as a precaution against the introduction of insect pests.

Some impression of the scope of the Division's work may be gained from the following brief accounts of a few of the more interesting projects of the past year:

An antler tool, excavated from a moist site near Williams Lake, dried out in transit to the Museum and was disintegrating rapidly by the time it arrived. It was successfully consolidated.

A spruce-root hat, found squashed, sodden, and covered with growing moss, was successfully dried, cleaned, and reshaped.

A unique piece of bone plate-armour, excavated in more than 200 pieces in 1967, was reconstructed and valuable evidence of the method of manufacture was recovered.

A magnificent Athapascan head ornament, consisting of some hundreds of beads and dentalium shells, was dismantled, cleaned, and restrung.

A new vacuum technique was devised and successfully used in the examination of a complex body of fragile material brought in undisturbed from the field. Videotape was used for the first time to record this micro-excavation procedure.

For the first time, a visitor brought in a mammoth tusk, which he had found in a local gravel pit, quickly enough for us to consolidate it before disintegration began.

A leather wallet containing surgical instruments, cached on Dealey Island in the Canadian Arctic by Captain M. Kellett, R.N., during his search for Franklin in 1853, and recovered by the *St. Roch* in 1944, was cleaned and repaired and the instruments consolidated. A paper label and some newspaper used as interlining in the wallet were recovered, cleaned, and rendered legible, providing valuable information about the origin of the instruments.

A Niska screen collected at Angyadae in 1913 was repaired. While exhibited in the old Museum building, it had been vandalized by visitors, who had removed almost all of the inlays of opercula and abalone. Some unsatisfactory attempts had been made by a previous restorer to replace them with respectively plaster casts and painted paper. These were removed and replaced with the original materials.

Although their operating efficiency is still far from satisfactory, the fumigation chambers were finally brought into general use in time to deal with the greatly increased demand resulting from the adoption, in July, of a standard pest-control policy for all divisions. This was made possible largely by the development of a new approach to the problems of controlling insect pests resulting from studies made by the Chief Conservator during the previous year. The technical advance which has been achieved in this neglected field was made possible by the services of Mrs. Ann Krahn and Mrs. Josephine Hubler, who have been employed as research assistants under the Mamook programme. Mrs. Krahn has continued to serve the Division by producing drawings of insect pests for publication, and as a skilled conservation technician.

The Division has continued to be active in museum-training at all levels. Two three-hour workshops on pest control were given at the British Columbia Museums Association annual meeting at Fort Langley in September. All new employees in the Ethnology Division now receive instruction in the handling of collections by the staff of the Conservation Division. Maurice Mann, an experienced collections technician from the Manitoba Museum of Man and Nature at Winnipeg, studied conser-

vation procedures for three months as an intern in the conservation laboratory, and the Chief Conservator and C. A. Russell continued to teach the only Canadian university course on the Conservation of Antiquities at the University of Victoria. In all, some 50 lectures were given by members of the Division's staff.

The growth of public interest in museums and the concurrent increase in the concern of museums throughout British Columbia for the welfare of their collections is clearly reflected by the startling increase in outside requests for technical advice and assistance. No record is kept of verbal inquiries in person or by telephone, but such requests dealt with by correspondence alone during the past year are approximately equal in volume to the sum of those handled during the previous five years.

As the first museum in Western Canada to recognize the importance of conservation, it was inevitable that the Provincial Museum should play a prominent part in the creation of the first national conservation facility in the West. The Provincial Museum's Conservation Division was the first, and for six years has been the only museum conservation unit west of Toronto. In September the first steps were taken to establish in British Columbia a regional laboratory of the Canadian Conservation Institute as a part of the National Museums Programme, and the Chief Conservator, together with the Museums Adviser, was appointed to the Regional Advisory Committee which will support the laboratory's operations. The Pacific Region Conservation Laboratory will offer the services to other museums which the Conservation Division, with inadequate funds and insufficient staff, has so long sought to provide.

Another aspect of the growth of museum activity has been reflected by the increased demands upon the Division's services for the packing and shipping of valuable and fragile objects being sent on loan to other institutions. During two weeks in October, three small but valuable groups of objects were shipped to museums and art galleries in Ontario and Nova Scotia. These included six objects from the Museum's Legacy collection and eight paintings and drawings by Emily Carr. In most cases special fitted supports, often quite complex in nature, had to be designed and made and special boxes constructed. The coming year will certainly see a vast expansion in this function of the Conservation Division.

With so much activity at home, the Division's field work was again severely limited. The Chief Conservator and Mr. Russell visited Hazelton in March to study and record the collection of Gitksan material at 'Ksan, and in August, the Chief Conservator assisted the Provincial Archæologist and the Curator of Ethnology in the rescue of threatened material at Owikeno Lake. Also in August, the Chief Conservator and C. A. Russell visited Neah Bay, Wash., to study the methods used by the Washington State University Laboratory in preserving the unique material recovered during excavations at Ozette. As a member of the Executive Council of the Canadian Museums Association, the Chief Conservator made brief visits to Winnipeg and Calgary, and also visited Ottawa as an adviser to the Canadian Conservation Institute.

#### EDUCATION SERVICES

The children who participated in programmes offered by the Education Services Division during 1972 nearly doubled in number. A total of 35,000 children took part in the programmes, compared to a total of 20,000 children in 1971.

This dramatic increase is due to a combination of factors, but primarily to the assistance of two teachers and a technician hired through the Federal Government's Local Initiative Project Mamook, which began in February.

Miss Lyn Hobson, Miss Cecilia Navarro, and Bill Bowie each contributed imagination and energy in creating new and exciting programmes for children. Included among these are:

**MARCH AND APRIL:**

*Tuktu*—The films and artifacts of a Netsilik child (Saturday series).

*Explorations '72*—For kindergarten and pre-schoolers. (Special classes for the handicapped at Pearkes Clinic.)

**JUNE:**

Special classes—

For the blind at CNIB and Jericho Hill students.

For a retarded children's class.

For a special "remedial" class.

Willows School—35 Grade V students and teacher Barbara Harris spent a successful week at the Museum in a pilot project aimed at learning implications relative to the Museum and its environs.

Camp Thunderbird—in co-operation with the YM/YWCA and Family and Children's Service, a week-end with Indian children and their foster parents. Highlight of the camp was a programme prepared by Mrs. Emma Hunt.

**JULY AND AUGUST:**

*Crawly Creatures*—Instructions for using microscopes and setting up experiments.

*Kumtuks*—A course taught by Mrs. Emma Hunt to children aged 12 to 14 years. Other programmes included *Beachcombing*; *Micro-organisms*; *Discovery*, an art appreciation class at Emily Carr home; *Exploration*; *What's It?*; *Tales Totems Tell*; *Busy Bodies*; *Early Man*; *Fossil Fun*.

During the year the regular programmes designed by the Division to be correlated with the curriculum of the Department of Education included:

*Green Food Factory*—An outdoor/indoor botany lesson featuring the competition among plants, especially in a bog:

*Land of the Kekuli*—Under the direction of an Indian instructor, Len Souliere, students learned the history of the Interior Indian; they saw an actual sweat house and wore hand-tanned apparel of the early Indian:

*Son of Raven, Son of Deer*—A West Coast Indian, assisted by Museum docents, visited schools by appointment to help children in Kindergarten to Grade V dramatize stories from the book of fables by Dr. George Clutesi; the children had costumes and masks to wear and artifacts to handle in relation to the stories:

*The Link in Time*—Communications systems played an important role in the development of British Columbia, so students learned about the early telegraph, railroad, printing press, and computer systems in the Province;

*Beachcombing*, *People of the Potlatch*, *Safari*, and *Digging Up the Past* were programmed in the early part of the year.

Indian culture, past and present, was featured in many programmes, organized by education assistants Mrs. Jillian Laing and Len Souliere. Mr. Souliere was in charge of the programmes *People of the Potlatch* and *Land of Kekuli*, as well as travelling about the Province visiting schools. Mrs. Emma Hunt, assisted by do-

cents, visited schools on southern Vancouver Island dramatizing stories from *Son of Raven, Son of Deer*. She also took part in the potlatch programme.

Mrs. Laing prepared the following programmes for adults during February, March, and April:

*Indian Teacher's Workshop*—To aid the Indian people who are knowledgeable about their culture and who are teaching adult education programmes on their reserves to set up an effective class programme:

*Research Method and the Archives*—To demonstrate methods of simple research to find information in the Archives, especially pertaining to Indian people:

*Linguistics and the Preservation of Indian Languages*—To arouse awareness that the native languages are dying out and that people must work frantically to help the Indian people to save their languages:

*An Introduction to Coast Salish Weaving*—To re-establish the art of weaving among Indian people, where each participant worked on a loom under the instruction of a Salish weaver.

While making the Indian culture programme possible through financial assistance, the First Citizens' Fund also provided funds for three tour guides from May 1 to August 1. They were Miss Ardyth Cooper, Miss April Frank, and Percy Archie.

A successful experiment with Saanich School Division No. 63 was a "work experience" programme under the direction of Ken Buffam. Twelve students took on duties as projectionists and technical assistants for the children's programmes. Two other students worked for experience with the Thunderbird Park carvers and the birds and mammals taxidermist.

Four students from the Department of Education at the University of Victoria completed a three-week practicum teaching in the Museum during October. Four other students have volunteered for different work projects, such as cleaning bird specimens and identifying birds' eggs.

As well as giving 30 illustrated lectures during the year, the Education Officer was chairman of the Education Section of the Canadian Museums Association annual convention in Victoria, edited the Annual Report, co-edited a resource reader supplement for the Canadian Forestry Association, and planned and officiated at the following adult programmes:

*Heritage Court Presents*—A series of illustrated lectures free to the public:

*Music in the Museum*—A series of chamber concerts featuring music of the "turn of the century" and Canadian composers, free to the public:

*Memories*—A series of informal talks by well-known historians and by people who have lived the history exhibited in the Modern History galleries, Wednesdays and Fridays:

*Noon Hour Forum*—A series of informational topics discussed by community leaders, in co-operation with Camosun College.

Other adult events co-sponsored by the Division were films and talks about National Environment Week (with the Environmental Centre), October 8-12, and Wider World Around Us, a travel information series co-sponsored by Camosun College.

The Education Officer also taught a six-week course for teachers through the Continuing Education Division of the University of Victoria, "Using the Museum as a Resource Centre."



During the year, 73 docents worked a total of 4,550 man-hours as librarians, mailers, staplers, and instructors. The involvement of these volunteers shows the interest and support of the community for the British Columbia Provincial Museum.

#### MUSEUMS ADVISER

During 1972 the Division continued to function as a source of assistance and advice for community museums and galleries throughout the Province, with long-term objectives aimed at cultural and operational improvement.

Increased expansion in the Display Assistance Programme was made possible in September through the addition to staff of a qualified display technician. With a number of new projects under way, the design and production of an aluminum modular unit to house travelling exhibits formed one of the most interesting projects. The first of a series, it is scheduled to circulate to museums and communities throughout British Columbia.

Travel to outlying museums was curtailed somewhat during the year mainly due to involvement in programmes under the new National Museums Programme. Potential benefits to local museums and galleries indicated the need for participation, particularly in the initial stages of planning. Subsequently, a number of federally subsidized programmes evolved, among which are nationally sponsored travelling exhibits and the proposed establishment of National Exhibition Centres in the Province. Planned also is a British Columbia Regional Laboratory of the Canadian Conservation Institute.

A close liaison was maintained with related organizations through the Museums Adviser, who served on the executive and committees of the British Columbia Museums Association, the training committee of the Canadian Museums Association, the Friends of the Provincial Museum, and the advisory committee for the proposed British Columbia Regional Laboratory of the Canadian Conservation Institute.

Increasing demands on Museum services continued to outstrip available financial resources and hampered the completion of many community programmes. However, with four new museums opened during the year, the over-all picture generally projected a continuing upward trend in most aspects of Museum development and operation.

#### FRIENDS OF THE PROVINCIAL MUSEUM

This second year of the Friends of the Provincial Museum was again a busy and productive one with patterns of operating becoming established and an important change in structure. Two societies—the Vancouver Island Philatelic Society and the Victoria Numismatic Society—became members of the Friends early in the year, bringing total membership to 13 societies. Preparations have been made to admit individuals to membership in 1973.

The annual meeting of the Friends was held January 26, 1972, and at a meeting of the newly appointed directors held immediately afterward, the following officers were elected: President, Douglas Turnbull; Vice-President, Wes Bremner; Secretary, Miss Winnifred Speechly; Treasurer, Gordon T. German.

The Heritage Court Society was formed and duly registered under the *Societies Act* of British Columbia on September 27, 1972. Effective October 1, 1972, the Museum Gift Shop was sold by the Friends to the Heritage Court Society and from that date is being operated by it. The directors of the Friends are the directors of the Heritage Court Society, and the constitution of the Heritage Court Society provides that any funds surplus to the needs of the society shall be donated to the Friends of the Provincial Museum.

During the first nine months of the year the gift shop continued to be one of the major activities of the society. Under the able leadership of manager Mrs. D. A. Ross, and the very hard working and efficient group of some 55 volunteers, sales and profits increased significantly. Profit to September 30 amounted to about \$42,000.

During September the long-awaited remodelling of the gift shop was carried out. The contractor, under the supervision of the Department of Public Works, installed a new counter and a new display case, both with improved lighting.

A selection committee was set up under the chairmanship of Mrs. Harriet Esselmont to consider project proposals and make recommendations to the Board of Directors for their decision. This committee has considered numerous proposals and has recommended a total of 34 projects which will cost in total slightly over \$40,000.

Mrs. Dorothy Hanson, chairman of the St. Ann's Schoolhouse committee, reports that planning of the move is essentially complete, but the move has not yet started.

The G. Clifford Carl Memorial Fund, Dr. D. B. Sparling, Chairman, was assisted by three benefit programmes in the Newcombe Auditorium:

January 29: A musical concert by the Village Squires and Reg Stone at the organ.

February 20: "Victoria Harbour—Port of Call," by Ainslie Helmcken, sponsored by the Victoria Branch, B.C. Historical Society.

March 25: A film showing "Roving Two Continents," by Dr. J. Bristol Foster, sponsored by the Victoria Natural History Society.

In June the Memorial Fund received a grant of \$1,000 from the Leon and Thea Koerner Foundation.

The Fund was closed at mid-year and at the year-end the residue in the Fund, amounting to \$3,000, was presented to the University of Victoria to establish the G. Clifford Carl Memorial collection of books to be housed in the Department of Biology.

The first recipient of the G. Clifford Carl Memorial Bursary of \$300 was Bruce D. Runyan, of Victoria, for the 1972/73 academic year.

One of the highlights of the year was the opening by the Museum of its Modern History Galleries to which the Friends had made a substantial contribution. With the co-operation of the Education Services Division, the Friends sponsored a pre-view July 6, 1972, to which was invited all of those who had contributed to the galleries, including volunteers, docents, donors, Museum and Archives staff, directors of the Friends, and presidents of member organizations. A large number of people attended this successful occasion.

The society again accepted a number of substantial donations on behalf of the Museum. These were as follows:

Bank of Montreal—\$10,000 for an agricultural gallery;

Peter Pollen Ford—\$315.26;

McGill and Orme Ltd.—\$500 for a drug-store gallery (second instalment of a gift to total \$2,500);

Hudson's Bay Company—\$2,000 for a fur-trade gallery (second instalment of a gift to total \$10,000);

International Business Machines—\$2,500;

B.C. Federation of Labour—\$2,000;

The Council of Forest Industries—\$5,000;

Inexco Oil Co. (Canada) Ltd.—\$1,000;

- The Royal Trust Co.—\$10,000 for a Fleet 2 Aircraft;  
 The Royal Bank of Canada—\$15,000 for exhibit of Captain Vancouver's ship *Discovery*;  
 British Columbia Hydro and Power Authority—\$9,191.25, part payment for restoration of a street-car;  
 The Canadian Imperial Bank of Commerce—\$5,000 for gold-rush gallery (second instalment of a gift to total \$15,000).

In addition to these major donations, Museum visitors donated over \$250 to the Friends for the work of the Museum by way of a donation box which was provided in early August, just outside the gift shop.

Most of the funds donated were used in the completion of the Modern History Galleries.

The continued success of the Friends was due to the enthusiastic co-operation and hard work of many people. The gift shop volunteers and staff deserve special mention.

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**Commercial  
Fisheries  
Branch**

**Department of Recreation and Conservation**



BRITISH  
FISHING  
COMMISSION

Department of Recreation and Conservation

## COMMERCIAL FISHERIES BRANCH

R. G. McMYNN, DIRECTOR

### GENERAL

For the Commercial Fisheries Branch, 1972 was characterized by heavy demands for advice and assistance from the fishing industry, general public, school-children, recreationists, and prospective aquaculturists, fish-processors, and aquatic-plant harvesters. In addition, the Branch's increased participation in Federal-Provincial cost-sharing fishery projects and in spearheading or taking an active part in numerous committees, task forces, and international fishery meetings have all contributed to severely taxing the resources of the Branch. The evolving functions are "marine resource" orientated and are not artificially circumscribed by the appellation, "Commercial Fisheries Branch."

### AQUATIC PLANTS

An annual crop of several million tons of brown marine algæ, *Macrocystis* and *Nereocystis*, still await harvest and processing for valuable by-products. Several companies are still trying to initiate a profitable business, while an equal number have gone bankrupt in their attempts. One of the larger companies is, however, close to starting up a plant for processing kelp on the Queen Charlotte Islands. In 1972, some 210 wet tons of kelp and other seaweeds were harvested; of this total, 50 tons were used for research purposes by the Fisheries Research Board of Canada.

Two companies use small quantities of aquatic plants in their respective businesses in British Columbia, one of them using rock weed (*Fucus* sp.), together with an imported seaweed extract, for the manufacture of Alginure, a plant fertilizer; the other imports some seaweed, which is then incorporated into a fir-bark mixture for use as a soil conditioner.

The Branch, in conjunction with the Federal Fisheries Service and University of Victoria, during 1972 obtained some interesting and potentially valuable information on red algæ. This information is related to aerial surveys, using natural-colour or infrared film of red algæ beds in an attempt to estimate absolute and relative abundances and the physical conditions which are associated with the occurrence of this group of algæ. This study is continuing.

### COST-SHARING FISHERY PROJECTS

Several interesting and potentially productive cost-sharing fishery projects were initiated or continued by the Commercial Fisheries Branch in 1972. The majority of these were based on 25 per cent Provincial and 75 per cent Federal funding. A brief outline of each of these follows:

1. *Evaluation of the commercial operation of an oyster-purification plant*—This study was completed in May of 1972. It proved that the ultraviolet method of purifying flowing sea water in which oysters, contaminated by faecal bacteria, were held for 48 hours was effective in producing a "clean" oyster. Costs of purification, excluding capital expenditures, averaged about 50 cents per bushel (three-quarters of a gallon). This cost is probably not any greater than the alternate costs associated with relaying and surveillance. Capital costs, however, are high and the industry will require some assistance financially if artificial purification becomes mandatory.



2. *Mechanical harvesting of razor clams*—The mechanical digger produced, when operating, up to 1,200 pounds of razor clams per hour. The operation was plagued, however, with mechanical breakdowns, miring-down of the machine, and excessive breakages of undersized clams. All of these difficulties are soluble, but will depend upon whether or not British Columbia Packers (party to the cost-sharing project) wish to expend further funds on the necessary research and modifications. In any case, the project was successful in that it has been demonstrated that the valuable and extremely mobile razor clam can be mechanically harvested.

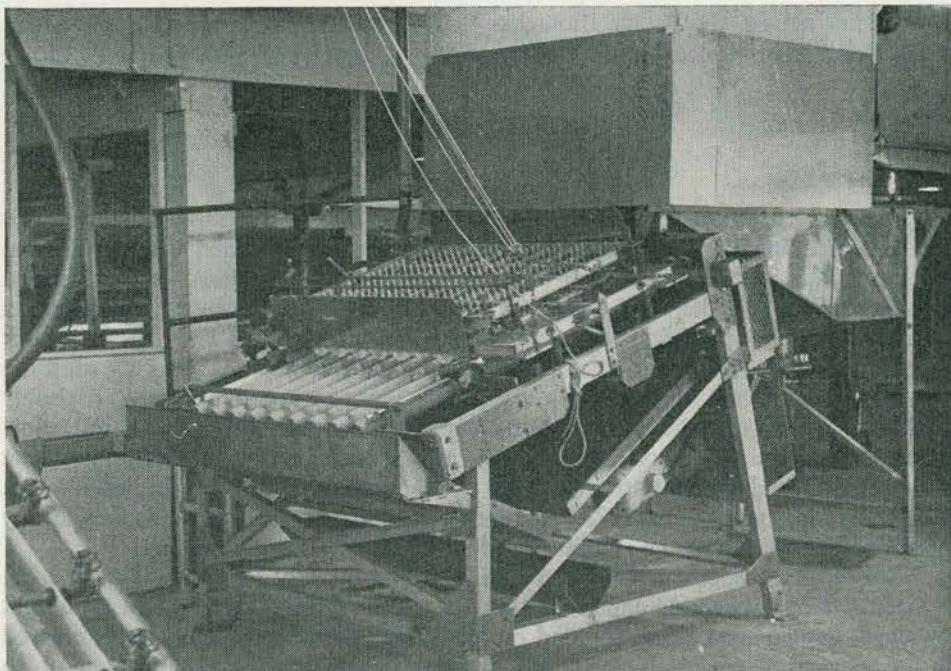
3. *Red algæ survey methodology*—The 1972 programme involved aerial photography (natural colour and infrared) of ground plots of red algæ which had been carefully sampled and measured by scuba divers. An attempt is being made to correlate the aerial photographs with plant species and densities in such a manner that a rapid but accurate method of inventorying may be developed. Initial results look promising indeed.

4. *Raft culture of oysters*—High-quality oysters were produced in raft-culture experiments in 1972. Taste panel evaluations rated the product very highly in respect to all features evaluated—taste, texture, appearance, and aroma. The product is expensive to produce (labour-intensive) and cannot compete in the same markets as the shore-grown variety. As a specialty product, i.e., half shell, however, it may do well, but will require advertising and market exposure.

B.C. Research Council's artificial oyster cultch (seed-collecting material) experiments were not successful in 1972 and a promising project may be prematurely dropped because of the difficulties encountered in the production efforts of the Research Council. The Commercial Fisheries Branch is not financially involved in



Sampling red algæ, *Iridæa cordata*, in a test area.



Automatic shrimp-peeling machine, an example of the increasing use of automation in the fish-processing industry.

this particular project, but is disappointed that the Federal Government appears to be dropping it.

5. *Utilization of waste oyster shells*—Lime, identical to that derived from limestone deposits, has been produced in a cost-sharing project's evaluation of waste oyster shells. This lime source has been tested successfully in the kraft pulp process and in the manufacture of glass. A large glass company is now anxious to purchase some 7,000 tons annually from the oyster industry and, if a satisfactory price can be negotiated, both industries will benefit.

6. *Shrimp processing*—If shrimp could be successfully cooked aboard the fishing-vessel, a higher quality product than that produced ashore would result. In 1972, Federal and Provincial fishery agencies initiated a project to design and construct an experimental shrimp-cooker. The cooker would then be tested aboard a shrimp fishing-vessel. The cooker has been completed, and testing will continue through 1973. Should this project prove successful, then the Government may have to take a look at its fish-processing legislation which currently prohibits processing at sea.

## OYSTERS

Production for 1972 exceeded 115,000 gallons (about \$750,000 wholesale value), an increase of some 35 per cent over the 1971 production of 84,000 gallons. Unfortunately for the oyster industry's seed collectors, Pendrell Sound was a failure and no commercial set was obtained by the six companies involved in that increasingly important segment of the industry. Approximately 30,000 (1,100 tons) oysters were collected by permittees from Crown foreshore during the year and sold to leaseholders.

As in the past, the Pacific Biological Station monitored the breeding of oysters in 1972 and have reported as follows:

### PACIFIC OYSTER-BREEDING, 1972

#### *Pendrell Sound*

Physical conditions during the summer of 1972 were generally favourable for Pacific oyster-breeding; however, only one light set was recorded with no general commercial set being obtained. Water temperatures and salinities were monitored at four locations—at the head of the sound (Station 2), in the central area (Station 4), near the narrows (Station 6), and near the mouth (Station 8). Surface water temperatures of 20°C or higher were recorded from the first week in July until the end of August, except for a week in mid-July. This short, cooling period probably resulted from unusually heavy rainfall in early July. Salinities occasionally fell below 15 per cent at the mouth of the sound and at Station 6, but were above this value in the central and upper parts of the sound throughout the breeding period. An interesting phenomenon in 1972 was the periodic occurrence of unusually heavy plankton blooms during the summer.

Spawning of Pacific oysters was first observed on July 14, but was quite local in extent. Small spawning continued through to July 21 and these produced a light set which commenced about the end of July. Extensive spawnings were observed during the period August 8 to 21 and straight-hinge larvæ at concentrations up to 227 per gallon were observed at Station 2 on August 15 and 262 per gallon on August 21 at Station 4. However, larvæ from these spawnings disappeared from the plankton during the course of their development and no significant spatfall resulted from them.

Spatfall was monitored at two locations, Stations 2 and 4, although cultch strings were also exposed at other locations in the sound. Significant spatfall was only recorded at Stations 2 and 4, and began during the last few days of July and continued through the first week in August. All cultch was removed and examined on September 27. At Station 2, cultch exposed on July 24 had spat counts which ranged from 7–44 per shell, mean 23.4; cultch exposed on July 31 had counts ranging from 5–25, mean of 15.2. At Station 4, cultch exposed on July 24 had spat counts which ranged from 4–31 per shell, mean of 9; and cultch exposed on July 31 had counts which ranged from 0–12, mean of 5.4. Mean shell length of the largest spat on September 27 was 9.5 mm. at Station 2 and 10.5 mm. at Station 4.

As noted in previous years, there was a difference in setting intensity at the two locations. However, unlike last year, settlement in 1972 was heavier at Station 2 than at Station 4. On commercial cultch, there were noticeable variations in setting between strings and between rafts.

About 120,000 strings of shell or the equivalent in the form of artificial cultch, cemented veneer, and cement disks were exposed in 1972 by six companies.

A newsletter, designed to inform the British Columbia oyster industry of Pacific oyster-breeding in the Province and assist it with seed-collection operations, was inaugurated and seven issues published.

#### *Ladysmith Harbour*

No commercial set of Pacific oysters was recorded in Ladysmith Harbour. Surface water temperatures of 20°C or above occurred from the latter part of July until mid-August. Surface plankton tows taken during the last week in July and

first week in August showed some spawning had occurred and straight-hinge and early umbone larvæ were observed. However, no setting was recorded on cultch exposed at the sampling station.

| <i>Wholesale Value of Fish and Fish Products</i> |             | <i>Number of Licensed Fishermen</i> |        |
|--|-------------|-------------------------------------|--------|
| \$   |             |                                     |        |
| 1967.....  | 99,800,000  | 1967.....                           | 12,117 |
| 1968.....  | 119,255,000 | 1968.....                           | 12,133 |
| 1969.....  | 83,000,000  | 1969.....                           | 10,942 |
| 1970.....  | 123,280,000 | 1970.....                           | 11,647 |
| 1971.....  | 120,100,000 | 1971.....                           | 11,015 |

| <i>Value of Gear</i> |            | <i>Number of Licensed Boats</i> |       |
|----------------------|------------|---------------------------------|-------|
| \$                   |            |                                 |       |
| 1967.....            | 11,637,000 | 1967.....                       | 7,639 |
| 1968.....            | 13,032,000 | 1968.....                       | 7,548 |
| 1969.....            | 13,394,000 | 1969.....                       | 7,181 |
| 1970.....            | 14,195,000 | 1970.....                       | 6,975 |
| 1971.....            | 17,442,000 | 1971.....                       | 6,698 |

**BRITISH COLUMBIA SALMON-CANNING INDUSTRY**

The canned-salmon pack for 1972 was 1,170,536 48-pound cases, 233,469 less than the 1971 pack of 1,404,005 cases. Adding to the current total was the large run of chums to the Nitinat late in the season.

Fifteen salmon canneries were licensed to operate in 1972. The locations were as follows: Skeena River and Prince Rupert, five; Central Area, one; Vancouver Island, three; Fraser River and Lower Mainland, six.

*Comparative Pack by Species (48-pound Cases)*

|                 | 1971    | 1972    |
|-----------------|---------|---------|
| Sockeye .....   | 568,756 | 312,308 |
| Chinook .....   | 11,653  | 11,535  |
| Steelhead ..... | 1,301   | 866     |
| Blueback .....  | 5,608   | —       |
| Coho .....      | 215,855 | 83,413  |
| Pink .....      | 502,324 | 482,933 |
| Chum .....      | 98,508  | 279,481 |

**HERRING PRODUCTION**

The original Coast-wide quota set by the Fisheries Service was 105,000 tons—the predicted safe excess of mature herring over spawning needs. The fishery took only about 50,000 tons, however, as the Fisheries Service decided to exercise extreme caution and closed each subarea short of its quota. Most of the herring caught were used for processed roe, a very popular product in Japan and England. The rest of the catch was utilized for freezing, fillets, pickling, and canning; by-products were used for reduction to oil and meal. Several dozen gillnetters and 97 seine boats were engaged in this fishery, with a return to the fishermen of between \$4 and \$5 million and provided more than 2,500 new jobs of approximately six weeks' duration during the period of seasonally low employment.

## HALIBUT FISHERY

All of Halibut Area 2, the waters south of Cape Spencer, Alaska, were closed for the season on August 10. The quota for this area was 15,000,000 pounds. Total catch for all areas to August 19 was 35,265,100 pounds, compared to 34,896,400 pounds to the same date in 1971. Areas 2 and 3 had a total quota of 40,000,000 pounds, one of the lowest quotas ever allotted.

Catches were down from last year, but prices broke record highs; for example, prices to fishermen at Vancouver were 77 cents per pound for medium and 76 cents per pound for large halibut.

## SPORT-CAUGHT FISH CANNERIES

Three canneries designed to custom-can sport-caught fish operated during 1972. They were located at Brentwood, Nanaimo, and Quadra Island. Production to the end of December 1972 was 109,968 cans, a decrease of 107,061 cans from the previous year's total. A total of 3,192 sportsmen used these facilities, of whom 2,616 were residents and 576 nonresident. The following number and species of fish were canned: Chinook, 6,010; coho, 5,496; pink, 123; chum, 236; sockeye, 200; steelhead, 114; trout, 104. The low pack figures reflect the disappointing coho sport-fishery of 1972. In 1971, 22,035 coho were canned; this year only 5,496.

## REVIEW OF FISHERIES PRODUCTION, 1971

The total wholesale value of the fisheries of British Columbia for 1971 amounted to \$120,100,000, which was \$3,200,000 less than the record 1970 value. Salmon accounted for 75.9 per cent of the total landed value and 80.7 per cent of the total wholesale value. British Columbia fishermen delivered 25,300,000 pounds of halibut valued at \$8,100,000 to both Canadian and American ports, compared to 29,500,000 pounds worth \$10,600,000 in 1970. Halibut landings by Canadian fishermen in British Columbia ports in 1971 were down 4,000,000 pounds from 1970 and totalled 16,000,000 pounds. The value of British Columbia landings was \$8,400,000, compared to \$10,700,000 in 1970.

As marketed wholesale, the principal species were salmon, with a value of \$96,926,000; and halibut, with a value of \$11,366,967.

The herring fishery remained closed for reduction purposes. Landings totalled 11,104 tons, with a wholesale value of \$556,000; a portion of the landings, or 672,000 pounds, was frozen for food. The wholesale value of all herring products was \$2,256,000, almost up to the total of 1967, the last year when herring was used for reduction to oil and meal.

In 1971 the total wholesale value of shellfish amounted to \$2,381,000. The value of the clam production was \$503,000; oyster production, \$575,000; crab and shrimp production, \$1,303,000.

Tuna landings of 4,000,000 pounds, with a wholesale value of \$1,500,000, were the highest on record.

## GEAR AND EQUIPMENT

The 1971 inventory of fishing-gear included 13,903 salmon gillnets, 458 salmon purse-seines, 8 salmon drag-seines, 129 herring gillnets, 101 herring purse-seines, and 14 herring trawl-nets, with a total value of \$11,774,000. Wire, cotton, and nylon trolling-lines were valued at \$740,000.

## SALMON-CANNERY OPERATIONS

Fourteen salmon canneries were licensed to operate in 1971. The locations were as follows: Skeena River and Prince Rupert, five; Central Area, none; Vancouver Island, three; Fraser River and Lower Mainland, six.

The total canned-salmon pack for British Columbia, according to the annual returns submitted to this Branch by canners licensed to operate in 1971, amounted to 1,404,005 cases, 19,857 less than the 1970 pack of 1,423,882 cases.

## SOCKEYE SALMON

The 1971 sockeye pack was 568,756 cases. This was an increase of 173,150 cases over 1970's total of 395,606 cases.

Sockeye had the best production since 1968 and the highest landed value on record. The 37,600,000 pounds were worth almost \$16,000,000. Total catch was 6,305,000 sockeye.

## PINK SALMON

It was an average year for pinks, although the pack of 502,324 cases was down from the previous year's pack of 660,777 cases. The wholesale value dropped \$6,000,000 from 1970, but was a big increase from the very poor 1969 season, when pinks had a wholesale value of only \$6,800,000.

## CHUM SALMON

The chum pack was down to 98,508 cases, worth \$3,168,631. It was a very poor year for chums, which had a market value of only \$5,100,000, a third of the 1970 value of \$15,900,000.

## COHO SALMON

The 1971 coho pack was 221,463 cases, more than double that of 1970, when 114,555 cases were packed. The landed weight for 1971 was up by 977,000 pounds but, because of a lower average price per pound, the landed value was down by nearly \$2,000,000 and the wholesale value of coho was slightly lower than the previous year.

## CHINOOK SALMON

Chinooks reached record heights on the wholesale markets with a value of \$13,895,605, a sizeable jump from the 1970 mark of \$11,577,379, the previous high. The canned pack was up slightly to 11,653 cases, worth \$387,386. Again, the majority of the catch, 11,080,500 pounds, was marketed as frozen dressed, worth \$10,278,555.

## STEELHEAD

The 1971 steelhead pack amounted to 1,301 cases. Although steelhead are not salmon, some are canned each year, principally those caught incidental to fishing other species.

## OTHER CANNERIES

*Shellfish canneries*—In 1971, seven shellfish canneries were licensed to operate in British Columbia and produced the following packs: Clams, 9,590 cases; crabs, 2,571 cases; abalone, 61 cases; clam chowder, 18,981 cases.

*Specialty products*—Sundry processing plants produced the following: Fish spreads, 42,718 cases, assorted-size containers; fish and chips, 211,145 cases, various

weights; kippered herring snacks, 12,000 pounds; creamed salmon, 21,075 cases; creamed tuna, 7,099 cases; oyster stew, 7,534 cases; salmon chowder, 11,294 cases.

#### FISH-CURING

Twenty-one smoke-houses processed the following: Herring (kippers, 44,100 pounds; kipper fillets, 40,000 pounds; bloaters, 300 pounds); cod, 481,982 pounds; salmon, 729,000 pounds; kippered salmon, 21,194 pounds; oysters, 100 cases 24/6-ounce jars, 576/4-ounce jars, 200/6-ounce jars, 2 gallons; steelhead, 700 pounds; mackerel, 6,000 pounds; eels, 1,500 pounds; Winnipeg goldeye, 14,700 pounds.

#### PICKLED HERRING

Pickled-herring production in 1971 amounted to 12,785 cases of 12/12-ounce jars; 4,382 cases of 12/16-ounce jars; 347 cases of 12/32-ounce jars; 3,732 128-ounce jars; 604 25-pound kits; 128 gallons; 628 20-pound pails; 102 50-pound pails.

#### MISCELLANEOUS PRODUCTION

Frozen herring bait, 4,279,000 pounds; mild-cured salmon, 2,022 hundred-weight; salmon eggs and caviar, 2,765,000 pounds. Fish-offal reduction, 1,682 tons of meal; 1,043,505 pounds of oil.

The small processing plant founded in 1970 to prepare sea-urchin roe for human consumption continued to operate through 1971 and a significant amount of roe worth several thousand dollars was shipped.

### STATISTICAL TABLES

Table 1—Licences Issued and Revenue Collected, 1968 to 1972, Inclusive

| Licence                               | 1968       |               | 1969         |               | 1970       |               | 1971       |               | 1972       |               |
|---------------------------------------|------------|---------------|--------------|---------------|------------|---------------|------------|---------------|------------|---------------|
|                                       | Number     | Revenue       | Number       | Revenue       | Number     | Revenue       | Number     | Revenue       | Number     | Revenue       |
| Salmon cannery                        | 21         | \$ 8,400      | 15           | \$ 6,000      | 17         | \$ 6,800      | 14         | \$ 5,600      | 15         | \$ 6,000      |
| Herring cannery                       |            |               |              |               |            |               |            |               | 1          | 25            |
| Herring reduction                     | 1          | 400           |              |               |            |               |            |               | 2          | 800           |
| Tierced salmon                        | 3          | 300           | 3            | 300           | 3          | 300           | 3          | 300           | 3          | 300           |
| Fish cold storage                     | 19         | 3,275         | 21           | 3,325         | 19         | 3,275         | 23         | 3,550         | 27         | 3,825         |
| Fish-processing                       | 65         | 2,130         | 61           | 2,300         | 64         | 2,320         | 63         | 2,500         | 67         | 2,900         |
| Shellfish cannery                     | 5          | 500           | 7            | 700           | 7          | 700           | 6          | 600           | 7          | 700           |
| Tuna-fish cannery                     | 1          | 100           | 2            | 200           | 3          | 300           | 1          | 100           | 2          | 200           |
| Fish-offal reduction                  | 9          | 450           | 5            | 250           | 5          | 250           | 5          | 250           | 4          | 200           |
| Herring dry-saltery                   |            |               |              |               | 2          | 50            | 1          | 25            |            |               |
| Fish buyers                           | 363        | 18,125        | 295          | 14,750        | 358        | 17,900        | 300        | 15,000        | 324        | 16,200        |
| Pickled-herring plant                 | 1          | 25            | 2            | 50            | 2          | 50            | 2          | 50            | 2          | 50            |
| Province of British Columbia receipts | 97         | 2,278         | 1048         | 4,001         | 309        | 2,313         | 250        | 3,014         | 153        | 1,751         |
| Sport-caught fish cannery             | 5          | 125           | 4            | 100           | 3          | 75            | 3          | 75            | 3          | 75            |
| Aquatic-plant harvesting              | 44         | 2,200         | 31           | 1,550         | 51         | 2,550         | 51         | 2,550         | 25         | 1,250         |
| Oyster-picking permits                | 133        | 1,330         | 103          | 1,030         | 107        | 1,070         | 131        | 1,310         | 94         | 940           |
| Aquatic-plant processing              | 3          | 600           | 3            | 600           | 1          | 200           |            |               |            |               |
| <b>Totals</b>                         | <b>770</b> | <b>40,238</b> | <b>1,600</b> | <b>35,156</b> | <b>951</b> | <b>38,153</b> | <b>853</b> | <b>34,924</b> | <b>729</b> | <b>35,216</b> |

Table 2—Species and Value of Fish Caught in British Columbia, 1967 to 1971, Inclusive

|                   | 1967       | 1968        | 1969       | 1970        | 1971        |
|-------------------|------------|-------------|------------|-------------|-------------|
|                   | \$         | \$          | \$         | \$          | \$          |
| Salmon            | 79,747,000 | 99,956,000  | 57,982,000 | 99,597,000  | 96,926,000  |
| Herring           | 2,638,000  | 331,000     | 559,000    | 682,000     | 2,256,000   |
| Halibut           | 7,353,000  | 8,385,000   | 13,814,000 | 14,025,000  | 11,367,000  |
| Crabs and shrimps | 2,469,000  | 2,378,000   | 2,460,000  | 1,775,000   | 1,303,000   |
| Lingcod           | 801,000    | 995,000     | 920,000    | 1,038,000   | 1,003,000   |
| Grey cod          | 972,000    | 1,122,000   | 937,000    | 752,000     | 1,299,000   |
| Oysters           | 765,000    | 743,000     | 856,000    | 590,000     | 575,000     |
| Sole              | 1,023,000  | 1,183,000   | 1,352,000  | 1,819,000   | 1,829,000   |
| Black cod         | 347,000    | 349,000     | 275,000    | 226,000     | 219,000     |
| Clams             | 421,000    | 222,000     | 226,000    | 457,000     | 503,000     |
| Tuna              |            |             | 1,090,000  | 984,000     | 1,499,000   |
| Other species     | 3,117,000  | 3,591,000   | 2,488,000  | 1,335,000   | 1,310,000   |
| Totals            | 99,653,000 | 119,255,000 | 82,959,000 | 123,280,000 | 120,089,000 |

Table 3—British Columbia Salmon Pack, 1967 to 1971, Inclusive, Showing Areas Where Canned

(48-pound cases)

| Species      | Area                        |             | Total      |
|--------------|-----------------------------|-------------|------------|
|              | Fraser Area and South Coast | North Coast |            |
| 1967         |                             |             |            |
| Sockeye      | 355,583½                    | 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         | 30,587½                     | 73,435      | 94,022½    |
| Totals       | 983,030½                    | 482,678     | 1,465,708½ |
| 1968         |                             |             |            |
| 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 |



Table 3—British Columbia Salmon Pack, 1967 to 1971, Inclusive,  
Showing Areas Where Canned—Continued

(48-pound cases)

| Species      | Area                              |             | Total    |
|--------------|-----------------------------------|-------------|----------|
|              | Fraser Area<br>and<br>South Coast | North Coast |          |
| 1969         |                                   |             |          |
| Sockeye      | 253,458                           | 106,149½    | 359,607½ |
| Red spring   | 1,402                             | 573½        | 1,975½   |
| Pink spring  | 1,446½                            | 823½        | 2,270    |
| White spring | 656                               | 400         | 1,056    |
| Steelhead    | 295½                              | 289½        | 585      |
| Blueback     | 2,146                             | —           | 2,146    |
| Coho         | 39,046½                           | 16,754½     | 55,801   |
| Pink         | 109,830                           | 44,358      | 154,188  |
| Chum         | 36,212                            | 10,312      | 46,524   |
| Totals       | 444,492½                          | 179,660½    | 624,153  |

|              |          |          |            |
|--------------|----------|----------|------------|
| 1970         |          |          |            |
| Sockeye      | 279,009½ | 116,596½ | 395,606    |
| Red spring   | 826      | 348      | 1,174      |
| Pink spring  | 4,966    | 1,037    | 6,003      |
| White spring | 2,205½   | 641½     | 2,847      |
| Steelhead    | 225      | 306      | 531        |
| Blueback     | 2,881    | —        | 2,881      |
| Coho         | 62,489   | 49,185   | 111,674    |
| Pink         | 212,996  | 447,781  | 660,777    |
| Chum         | 100,411  | 141,978½ | 242,389½   |
| Totals       | 666,009  | 757,873½ | 1,423,882½ |

|              |           |          |            |
|--------------|-----------|----------|------------|
| 1971         |           |          |            |
| Sockeye      | 439,031   | 129,725  | 568,756    |
| Red spring   | 521½      | 506½     | 1,028      |
| Pink spring  | 5,571     | 1,630½   | 7,201½     |
| White spring | 2,802½    | 621½     | 3,424      |
| Steelhead    | 727       | 574      | 1,301      |
| Blueback     | 5,608     | —        | 5,608      |
| Coho         | 174,640   | 41,215   | 215,855    |
| Pink         | 359,041½  | 143,282½ | 502,324    |
| Chum         | 24,207½   | 74,300½  | 98,508     |
| Totals       | 1,012,150 | 391,855½ | 1,404,005½ |

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Set 2

