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GAME BIRD STUDY

ENVIRONMENTAL INVESTIGATIONS PROPOSED HIGH ROSS RESERVOIR IN CANADA

CITY OF SEATTLE DEPARTMENT OF LIGHTING

1972

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F. F. SLANEY & COMPANY LIMITED VANCOUVER, B. C.

> PROPERTY OF SEATTLE CITY LIGHT CIVIL ENGINEERING DIVISION

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ABSTRACT

Thirty species of game birds were recorded and their status and habitat use determined. The probable effect of the High Ross Reservoir project was estimated for each species.

All species of game birds found within the proposed reservoir site are found elsewhere in the Skagit Valley and generally have widespread distribution. No unusual distribution records or densities were found.

Between 50 and 150 waterfowl are harvested annually in the Lower Skagit Valley. The potential for waterfowl hunting will remain approximately the same or possibly increased slightly with the proposed project.

Among the upland game birds, only ruffed grouse are hunted consistently. About 30 ruffed grouse were harvested on the proposed High Ross Reservoir Site in 1970 and about 45 in 1971.

The ruffed grouse population was estimated to be about 50 breeding birds in 1971. Approximately 60 percent of some 1100 acres of ruffed grouse breeding habitat would be lost through inundation, reducing the breeding populations to approximately 20 breeding birds. The potential annual harvest of ruffed grouse would be reduced from an estimated 50 to 70 birds to about 20 to 30 birds. Ruffed grouse populations are known to fluctuate widely and unexplicably.

The important blue grouse habitat is above elevation 1725 feet and as such these grouse are not expected to be significantly affected by the proposed project. A few Franklin (spruce) grouse and white-tailed ptarmigan are found in the Lower Skagit Valley. Neither species would incur measurable losses from the construction of High Ross Reservoir.

Approximately 200-300 waterfowl utilize Ross Lake and adjacent aquatic habitats during fall migrations. About 50 birds use beaver ponds within the reservoir site which would be lost unless some mitigation in creating small ponds is undertaken. The lake type habitat would be similar with the new reservoir.

The inundation of some 10 miles of river type habitat would result in a loss of about eight pairs of common mergansers and two pairs of harlequin ducks.

About two pairs of mallards that nest in beaver ponds within the reservoir site would be lost unless substitute ponds were created.

Proposed mitigation projects as part of the High Ross Reservoir development should result in a net gain of waterfowl use.

Common snipe and rails depend on wet meadow and marsh type habitat. This type of habitat would be reduced from 160 acres to about 60 acres. These birds would incur small losses with the proposed project. Neither species is important as a game bird. Both occur in low densities at the present time. Habitat development projects along the edge of the proposed lake could restore most of the lost habitat.

Band-tailed pigeons and American coots would not be adversely affected by the proposed project. Coots utilize the open water of the reservoir during migration. Band-tailed pigeons mostly utilize the semi-open mature forests along the slopes and are not dependent upon the valley bottomlands.

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PREFACE

1.1 SCOPE OF ENVIRONMENTAL STUDIES

The study of game birds is an integral part of a comprehensive study on the environmental consequences of the proposed High Ross Dam on the Skagit River system in Canada and the Skagit River system in Canada and the United States. Application for approval of the project has been submitted to the Federal Power Commission by Seattle City Light.

Some of the environmental studies are totally Canadian; others totally American. Most of the major studies are combined or co-operative Canadian-American efforts. Canadian studies are designed to provide the Federal Power Commission with the basic data required to understand the environmental consequences in Canada of the proposed High Ross project.

Other reports prepared on the environment of the Lower Skagir Valley in Canada include the following titles: "Deer," Small Mammals," "Large Carnivorous and Furbearing Mammals," "Habitat Development and Enhancement," "The Aquatic Environment, Fishes and Fishery, Ross Lake and the Canadian Skagit River," "Relocation of Public Road," "Shoreline Stability of Ross Lake Reservoir (Canada)," "Recreation: Present and Future Lower Skagit Valley in Canada," "Soil Survey," "Vegetation," "Climate," and "Estimated Cost of Clearing Proposed High Ross Reservoir Site in Canada".

1.2 SKAGIT RIVER WATERSHED AND HIGH ROSS RESERVOIR SITE IN CANADA

1.2.1 The Skagit River Watershed in Canada

The Skagit River drains an area of over 380 square miles in Canada (see Relief Map). The main Skagit Valley in Canada extends from the United States-Canadian border some 24 miles to the Hope-Princeton Highway and then turns eastward for some 10 miles as an increasingly steeper and narrower valley. The floor of the Skagit Valley in Canada is approximately 1575 feet in elevation at the International Border and the valley sides rise to over 7000 feet at the peaks of the larger mountains.

1.2.2 The Proposed High Ross Reservoir Site

The proposed High Ross Reservoir would attain a full pool level of 1725 feet and would extend about seven miles further north into the Skagit Valley, inundating an additional 4300 acres of land. The total area of High Ross Reservoir in Canada at full pond would be about 5200 acres.

The proposed High Ross Reservoir site represents about two percent of the Skagit River watershed in Canada. The environmental consequences of the proposed reservoir site would be confined primarily to the lowlands of the Lower Skagit Valley which include a total area of about 19,000 acres or eight percent of the watershed. The environmental effects of the proposed High Ross project on the remaining 92 percent of the Skagit River drainage in Canada are considered negligible.

Therefore, except for the studies of fish that are found in Ross Lake and the upper tributaries of the Skagit River and monitoring of the migrating herd of deer that utilize parts of the reservoir site for a period in the spring, the detailed environmental studies were confined mostly to a Two Part Study Area (see Key Map) comprising "Part A;" the proposed reservoir site of 5200 acres and "Part B;" the adjacent lowlands that could be indirectly affected, an area of some 13,800 acres. In this report, the terms Lower Skagit Valley and Two Part Study Area are used interchangeably. Both refer to the part of the Skagit Valley in Canada below 3000 feet in elevation on the east and 2000 feet on the west, and for a distance of about 12 miles north of the Canadian-United States border. This area coincides with the region of the Skagit Valley that is accessible by gravel and dirt roads and is utilized primarily for forestry, unorganized recreation and as an access route by Americans intent on comping and fishing on Ross Lake on the United States side of the border.

The upper part of the Skagit Valley is accessible by paved highway and utilized primarily as a transportation corridor (the Hope-Princeton Highway) and as an area of organized recreation within Manning Park where camping and fishing but no hunting are allowed. The Hope Slide and the Silvertip Mountain Ski Resort are also part of the recreation and tourism aspects of the Upper Skagit Valley region.

The alpine and sub-alpine regions of the Skagit River watershed are used primarily for such recreational pursuits as hiking and wilderness camping. These areas are generally over 4500 feet in elevation and would not be affected by raising the level of Ross Lake to elevation 1725 feet.





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COMPARATIVE AREAS SKAGIT RIVER DRAINAGE TWO PART STUDY AREA PROPOSED HIGH ROSS RESERVOIR SITE IN CANADA



GAME BIRDS

INTRODUCTION

Upland game birds, waterfowl and other game birds, although of primary interest to hunters, are also observed and enjoyed by the general recreationalist. Ruffed and blue grouse in particular are relatively tame and easily observed.

1.2 **OBJECTIVES OF STUDY**

- 1. Inventory the game birds present in the Two Part Study Area and indicate the abundance and status of each species.
- 2. Describe the distribution of each species according to the habitat type they occupy.
- 3. Assess the probable effects of raising Ross Lake to elevation 1725 feet.
- 4. Assess the possibilities of mitigating potential losses of game bird habitat.

1.3 METHOD OF STUDY

1.3.1 List of Species

A list of game birds occurring in the Two Part Study Area of the Lower Skagit Valley was compiled through direct observation and/or examination of birds killed by hunters during the 1970 and 1971 seasons. Studies were continued into 1972.

1.3.2 **Ruffed Grouse**

During the breeding season, a count of drumming males was recorded. Standard routes were run during which four-minute listening stops were made at

1.1

one-quarter mile intervals. Runs commenced about one-half hour before sunrise. This technique was adopted from the one used by the Manitoba Fish and Wildlife Branch and is a widely used method of censusing ruffed grouse. The locations of drumming male ruffed grouse were plotted on a map of the Valley.

In addition, field biologists plotted the location of all ruffed grouse sightings. During the winter of 1970-71, density figures for ruffed grouse were obtained by track counts and direct observations.

Records of hunter success obtained from road-check stations operated in 1970 and 1971 provided a check on fall densities and basic data on the ruffed grouse harvest in Parts A and B of the Study Area.

1.3.3 Blue Grouse

The distribution of blue grouse was determined by the location of hooting males, direct visual observations of birds and sign. These data were recorded on field maps.

1.3.4 Waterfowl

Waterfowl in the Two Part Study Area were inventoried by several methods:

- 1. Direct counts of waterfowl during fall migration.
- Counts of broods by species during the late spring and early summer by habitat type.
- 3. Direct counts during boat trips on Ross Lake and the Skagit River.
- 4. Road check of hunters during the 1970 and 1971 season supplemented these data.

1.3.5 Other Game Birds

The occurrence of other game birds was recorded on field record sheets as observed during the study.

1.3.6 Habitat Use

The type of habitat and location of each bird sighted were recorded. Observations of waterfowl were related to the basic aquatic habitats available: reservoir, ponds, river and seepages on the drawdown. Observations of upland game birds were related to the various forest cover types. From observations during the study, the habitat of each species was determined and distributions of species plotted.

1.3.7 Amount of Habitat Available

Following identification of the preferred habitat type, the amount of habitat available to each species was determined from forest cover and habitat type maps. The acreages of each habitat type were compiled from the maps for Parts A and B of the Two Part Study Area. Various wildlife habitats were identified and mapped in the report entitled "The Vegetation Study."

Some waterfow! habitats varied with the season and level of Ross Reservoir. Aerial photographs taken at different seasons were used to estimate the amount of these habitats available at different times of the year.

1.3.8 Dependence on Habitat in Study Areas "A" and "B"

An appraisal of the relative quality of habitat in Study Areas "A" and "B" was necessary to determine the importance of this habitat to game birds in the valley.

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This appraisal was based on direct observations of density and distribution of the birds, experience of the investigator relating to the habitat requirements of game birds and a review of pertinent literature.

An assessment of the probable changes in numbers of game birds is based primarily on the knowledge of how much habitat will be lost or gained by each species and the degree to which they depend on that habitat.

1.3.9 Assessment of Game Bird Resource

Hunter success data on the game bird harvest in the Skagit Valley were collected by operating a check station during the 1970 and 1971 hunting seasons. Data for the years prior to 1970 were obtained from reports furnished by the B.C. Fish and Wildlife Branch. With these data an assessment was made of the contribution of these birds to the resource base of the Two Part Study Area of the Lower Skagit Valley.

1.4 RESULTS OF STUDIES

1.4.1 List of Game Birds

Appendix 101 presents a summarized list of the 30 species of game birds observed in the Two Part Study Area and their relative abundance, status and use of habitats. These data are based primarily on observations during the period of Outober, 1970 to November, 1971.

1.4.2 Ruffed Grouse

1.4.2.1 Winter Distribution and Density

Sightings and track observations of ruffed grouse ranged from the valley floor

to over 3000 feet in elevation. Observations were usually associated with openings in the forest such as patches of bare ground found in logged-over areas, by streams, along the Skagit River, and on rocky bluffs and road edges. The characteristic vegetation types used by ruffed grouse were mature Douglas fir or cedar-hemlock forest types with an understory of alder, vine maple and serviceberry.

An estimated 15-20 ruffed grouse spent most of the winter within Part "A" of the Study Area (the reservoir site). Approximately 50-60 ruffed grouse probably wintered in Part "B". Observations suggest that the 1970-71 wintering population averaged less than one bird per 300 acres over the entire Two Part Study Area. The winter distribution of ruffed grouse is shown in Appendix 102.

1.4.2.2 Spring and Summer Distribution

About 75 percent of the observations of ruffed grouse during the spring and early summer occurred on the valley floor. The first drumming male was recorded on April 24. No noticeable peak in drumming occurred throughout the spring.

Only 15 drumming males were located on the 19,000-acre Study Area using observations by field workers and the regular census routes. (See Appendix 103 for location of observations.) Ten grouse were within Part"A" and five were in Part "2". The low density of ruffed grouse reduced the effectiveness of the census routes. Most of the drumming males were recorded several times.

Fourteen observations of ruffed grouse hens with broods were recorded as shown in Appendix 103. Eight of the 14 brood observations occurred along roads. Most sightings were recorded near thick deciduous cover, however, two chicks were accidentally caught in small mammal traps in semi-open stands of Douglas fir.

1.4.2.3 Ruffed Grouse Habitat

The most important spring and early summer habitats for ruffed grouse observed were:

- 1. Areas dominated by cottonwood and willows, particularly road edges and the clearing near the top of Ross Reservoir.
- 2. Alder thickets along roads or in clearings associated with coniferous forest types.
- Areas of cottonwood-conifer regeneration following logging disturbances.

The areas of preferred spring-summer habitat for ruffed grouse are shown in Appendix 103. Forest types with predominantly deciduous species are the important grouse habitats. Lodgepole pine or Douglas fir stands were excluded as significant spring-summer habitat for grouse. In the fall and winter, young ruffed grouse disperse widely and are occasionally found in pure coniferous forests. These types were considered to be of little importance to grouse as spring and summer habitat.

1.4.3 Blue Grouse

Distribution

Blue grouse were fairly common on the higher slopes of the Study Area but are rare on the valley floor. Occasionally, blue grouse hens bring their broods to the lower elevations. One blue grouse chick was caught in a small mammal trap on July 15, 1971 near Shawatum Creek. Hunter success records over the past five years show that less than one blue grouse per year was shot over the entire Study Area.

The distribution of hooting males in the spring of 1971 is shown in Appendix 104. All important blue grouse habitat within the valley is associated with the semi-open mature Douglas fir stands above elevation 1,800 feet.

1.4.4 Franklin Grouse (Spruce Grouse)

Two observations of Franklin grouse were recorded within the Study Area during the wildlife survey. Hunter returns over the past two years indicate that no Franklin grouse were shot within the Study Area. Lodgepole pine stands with scattered spruce, most of which are above elevation 1,725 feet, provide small areas of suitable habitat for this species.

1.4.5 White-tailed Ptarmigan

Four white-tailed ptarmigan spent part of the winter of 1970-71 near the shore of Ross Lake. These birds were observed among clumps of willow and cottonwood near a beaver pond within the drawdown area of Ross Lake. These birds commonly winter at higher elevations. High winter densities in the Skagit Valley would be unusual for this species.

1.4.6 Migratory Game Birds

1.4.6.1 Waterfowl

Census

Waterfowl utilizing Ross Lake and the adjacent wetlands were observed during the fall of 1970 and 1971. Counts during 1971 showed that some 200-300 ducks and an occasional goose were associated with Ross Lake. About 50 surface feeding ducks utilized the beaver ponds within Part "A" of the Study Area.

The species observed included: Canada goose, mallard, widgeon, pintail, green-winged teal, ruddy duck, canvasback, scaup, ringnecks, shoveler, goldeneye, bufflehead, coots and mergansers.

The results of the census during the fall of 1971 are given in Appendix 105. The waterfowl populations during 1970 were essentially the same as the 1971 populations.

Habitat

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Waterfowl habitat in the Study Area was classified into four types: reservoir, beaver pond, seepages on the drawdown and on the river.

<u>Reservoir</u> - Over 500 acres of open water on Ross Lake are available to waterfowl in Canada from mid-June to October or November. This habitat is used primarily as a resting place by migrating waterfowl and a feeding area by diving ducks. In addition, about four miles of shallow water along an irregular shoreline provide feeding, nesting and brood rearing cover for waterfowl.

<u>Beaver Ponds</u> - Active and abandoned beaver ronds on the valley floor are used as feeding and brood raising areas by surface-feeding ducks. The ponds also serve as resting areas during migration. <u>Seepages</u> - Seepages maintain small flows and ponds on the drawdown area of Ross Lake through the fall, winter and early spring. This water provides approximately 40 acres of waterfowl habitat in the fall and about five acres of habitat throughout the winter. The seepages allow approximately 100 waterfowl (mostly mallards) and other water birds to overwinter in the Canadian Skagit Valley.

<u>River</u> – The Skagit River provides over 15 miles of river habitat within the Study Area during the fall and winter. At full pool, Ross Lake reduces the amount of river habitat by about one mile.

1.4.6.2 Other Migratory Game Birds

Common Snipe

During the season, these birds were observed near the fringes of the drawdown and around seepages and beaver ponds. About a dozen wintered along the seepages on the drawdown area of Ross Lake. There are approximately 115 acres of suitable habitat available to snipe within Part "A" of the Study Area. About 60 acres of marshy habitat exists in sedge meadows along the Klesilkwa River and near 26-Mile within Part "B" of the Study Area.

Band-tailed Pigeons

Scattered flocks of bund-tails were observed at various locations in the valley. Most sightings occurred in mature open fir types along the benches and slopes of the valley in Part "B" of the Study Area.

Virginia Rail

The Virginia rail was the only rail sighted in the Canadian Skagit Valley. Observed habitats for this species were about 40 acres of wetland near the Whitworth Ranch and a 10-acre swamp southeast of the Whitworth Ranch. The top end of the reservoir also provides suitable habitat. There are approximately 60 acres of sedge meadows along the Klesilkwa River and near the 26-Mile Bridge which may furnish suitable habitat for this species in Part "B" of the Study Area.

American Coot

Coots were observed only during migration. About 50 were recorded during fall migration in 1970 and 1971. Coots used the lake for feeding and resting. Suitable habitat for coots is furnished by the shallows around the edge of the reservoir.

1.4.7 Hunter Harvest of Game Birds in the Canadian Skagit Valley

During the fall hunting seasons of 1970 and 1971, check stations were maintained to collect data on the hunter harvest in the Lower Skagit Valley in Canada. Before 1970, the British Columbia Fish and Wildlife Branch maintained a check of hunters in the combined Skagit and Silver-Hope Valleys. During the fall hunting season of 1970 and 1971, the number of ruffed grouse checked was 29 and 43 respectively. The estimated total harvest of ruffed grouse for the two years was 50 for 1970 and 70 for 1971 (See Appendix 106).

An estimate of the total annual harvest from British Columbia, Game Management Area 2, the Two Part Study Area and the Reservoir Site is shown on Map 1. The mean annual harvest of ruffed grouse by hunting regions is shown in



Appendix 107. The major areas of harvest in British Columbia are shown in Appendix 108.

1.5 DISCUSSION - EFFECTS OF HIGH ROSS RESERVOIR

1.5.1 Upland Game Birds

1.5.1.1 Ruffed Grouse Habitat

Specific data on what constitutes good ruffed grouse habitat within the Pacific west coastal area of B.C. is not well documented. An understanding of the habitat requirements of ruffed grouse in the Study Area of the Skagit Valley was gained from the knowledge of the investigators and from direct observations in the field by a team of biologists.

<u>Winter Requirements</u> - Many investigators have demonstrated that a mixture of deciduous and coniferous trees play a key role in providing the winter habitat needs of ruffed grouse (Marshall, 1946; Bump <u>et al</u>, 1947; and Hungerford, 1953). Recent studies in Minnesota, however, suggest that mature stands of pines with little or no deciduous types may cause increased mortality because predators have more protective cover (Gullion, 1970). The areas of suitable winter habitat for ruffed grouse have been mapped within the Study Area (Appendix 102). <u>Spring-Summer Requirements</u> – The same researchers have shown that deciduous forests are the most important habitats for nesting, brood rearing and springsummer protective cover. A recent study in Alberta (Rusch and Keith, 1971) has demonstrated that ruffed grouse prefer aspen woods throughout the spring and summer months. In the Alberta study, the deciduous forest type (aspen) comprised 27 percent of the Study Area but contained over 90 percent of the birds flushed. These deciduous stands supported five to nine drumming males per 100 acres of woods.

Studies by Palmer (1963) in Michigan and Boag and Sumanik in Alberta (1969) have demonstrated that drumming males prefer deciduous woods (aspen) with a high density of stems and a sparse canopy of low shrubs.

The lack of low shrubs apparently provides better visibility of predators by drumming males, (Boag and Sumanik 1969). Rusch and Keith (1971) commented on a similar observation in their study, and suggest that hens are more readily attracted to open sites.

In summary, ruffed grouse prefer forest types in which deciduous species predominate. This is particularly ture in the spring and summer months. In the east, ruffed grouse habitat is dominated by aspens and birch, and grouse distribution is directly related to the occurrence of these species. In the Two Part Study Area, it is reasoned that ruffed grouse occurrence depends on the deciduous types. Willow, alder and cottonwood are the deciduous species available to grouse in the Study Area.

Winter Densities - Our surveys indicate the average density of ruffed grouse on the Two Part Study Area was approximately two birds per square mile. This is a low density but the birds are widely dispersed in the winter and much of the Study Area is poor ruffed grouse habitat.

In good ruffed grouse habitat in New York, Bump et al (1947) have reported densities up to 28 grouse per square mile.

<u>Spring-Summer Densities</u> - Accurate estimates of total ruffed grouse density in the Study Area during the spring of 1971 were difficult to obtain. There were simply too few birds present to use the King strip method of census effectively. Birds were often not flushed during a full day's time in apparently good habitat. The total of 15 drumming males counted on the entire 19,000acre Study Aree is an indication of the very low density.

Birds were observed to move to the valley floor in the spring. The relative density of birds in the lowlands probably increased in spring from the winter estimates to about four birds per square mile. Most of the ruffed grouse in the Lower Skagir Valley of Canada probably breed in the lowlands.

On the Cloquet Forest in Minnesota the stated management goals for ruffed grouse are one breeding pair per 100 acres (Gullion, 1970). In the Study Area of the Skagit Valley the average density of breeding pairs would be about one pair per 400 acres during the spring of 1971.

It is recognized that ruffed grouse populations show wide fluctuations in abundance and scarcity. Hunter bag checks, however, should reflect unusually low population levels by decreased hunter success. The 1971 fall harvest is similar to data from the previous three years (Appendix 106). The lack of good spring-summer habitat consisting of deciduous forests with a light understory of shrubs is probably a limiting factor for ruffed grouse in the Skagit Valley.

Effects of High Ross Reservoir on Ruffed Grouse - High Ross Reservoir would inundate about 1,800 acres of deciduous and mixed deciduous-coniferous forest. This type of forest constitutes the best spring-summer habitat for ruffed grouse. About 1,230 acres of this type of habitat would remain above elevation 1,725 feet.

Using current estimated population levels, this loss of habitat would remove about 30 breeding birds from the ruffed grouse population. About 20 breeding birds would remain on the Two Part Study Area.

The annual harvest of ruffed grouse from the Two Part Study Area would be reduced in proportion to the amount of habitat lost. The estimated total harvest of ruffed grouse was 50 in 1970 and 70 in 1971. The annual harvest with High Ross would be about 20-30 ruffed grouse per year.

1.5.1.2 Blue Grouse

All important blue grouse habitat occurs above the 1,725-foot contour. It is predicted that blue grouse would not be affected by the creation of High Ross Reservoir.

1.5.1.3 Franklin Grouse (Spruce Grouse)

Franklin grouse are a rare occurrence in the Study Area. Suitable habitat in lodgepole pine forests generally occurs above elevation 1,725 feet. The numbers of Franklin grouse available to hunters would not be adversely affected by the creation of High Ross Reservoir.

1.5.1.4 White-tailed Ptarmigan

The small number of white-tailed ptarmigan observed wintering in the Valley bottom is a reflection of overall low ptarmigan numbers rather than a lack of suitable winter habitat in the Valley. Although two biologists spent two weeks in the sub-alpine and alpine areas of Manning Provincial Park east of the Valley in August of 1971, no ptarmigan were observed. The new drawdown area would probably provide suitable winter habitat for ptarmigan, and, therefore, white-tailed ptarmigan would not be adversely affected by the creation of High Ross Reservoir.

1.5.2 Migratory Game Birds

The Silver-Hope and Skagit River drainages are a relatively minor component of the Pacific Flyway system. A variety of waterfowl do, however, utilize the route, especially in fall migration. During this period, the reservoir is receding slowly to expose large flats with considerable vegetative cover and numerous small ponds. These provide excellent resting and feeding places for waterfowl and shore birds.

. 1.5.2.1 Waterfowl Habitat

With High Ross Reservoir, the amount of open water available to waterfowl in the Study Area will increase about tenfold from about 500 to 5,200 acres. The additional water surface will not have a significant effect on the total number of waterfowl, as this type of habitat is rarely used to capacity. The fact that the body of water will remain in Canada throughout the year will have the effect of stabilizing the population in Canada. The amount of shallow shoreline available during the spring and summer will probably increase with the new reservoir. About 22 miles of irregular shoreline will be available with High Ross Reservoir. An increased amount of shoreline will be present through the winter months but this is of minor importance to most waterfowl. Under the present drawdown regime, there is no reservoir shoreline available in Canada from about November until May.

Spring and summer pond habitat associated with the river and beaver ponds will be reduced on the average from 50 acres to 25 acres. Ponds vary considerably in size depending on the season and rainfall.

The reduced amount of pond habitat may result in the loss of one or two broods of mallards. Two broods were known to be raised in ponds within the proposed reservoir site during 1971.

Although the present seepages in the drawdown area will be inundated, similar seepages are anticipated in the new drawdown area. Seepages will probably develop at the mouth of St. Alice Creek, McNaught Creek, Shawatum Creek and numerous smaller unnamed drainages. The potential for retaining this type of habitat with High Ross Reservoir appears favourable.

There would be a substantial loss of river waterfowl habitat within the Two Part Study Area. At full pool, approximately ten miles of river-type habitat would be lost. This will amount to a loss of seven miles of the summer breeding habitat of harlequin ducks and common mergansers. Within the Study Area, about three miles of river habitat suitable for these birds will be available at full pool with High Ross Dam. An estimated eight pairs of common mergansers and two pairs of harlequins nested and raised broods along the Skagit River within the flood lot in 1971. The chance for nesting and brood raising would be reduced to about 25 percent of precent capacity.

1.5.2.2 Waterfowl Harvest

The potential for hunting waterfowl in the Study Area will remain approximately the same. Most hunting currently takes place in the impoundment area following autumn drawdown. This type of hunting area would be available with the proposed High Ross Reservoir.

1.5.2.3 Other Migratory Game Birds

Common Snipe and Virginia Rail

The Virginia rail and common snipe depend on marshy or wet meadow habitat. This kind of habitat will be reduced from about 160 acres to approximately 60 acres with High Ross Reservoir. Both species of birds would probably show a corresponding 60 percent decline in numbers directly related to the reduced amount of habitat, unless additional marsh habitat were created along the shore of the reservoir.

Band-tailed Pigeon

Although occasional flocks of band-tails were sometimes seen in forests on the valley bottom, most sightings were in habitat above the 1,725-foot contour. The pigeons utilize a variety of forest types and are very mobile. They would probably not be affected by the proposed High Ross Reservoir.

-

American Coot

Coots are not residents in the Lower Skagit Valley. They utilize the reservoir only as a resting and feeding place in autumn and would not be affected by creating High Ross Reservoir.

Effects of High Ross Reservoir on the Harvest of Other Migratory Game Birds

Although an estimated 5 to 10 snipe and 15 to 20 coots are harvested by hunters in the Study Area, neither are important game birds. The reduced amount of habitat for snipe and Virginia rails may decrease the harvest to 3 to 6 birds while the number of coots shot will probably not change. The harvest of band-tailed pigeons will probably remain at a very low level.

1.5.3 Possible Mitigation

Studies were initiated in 1970 to develop methods to create additional waterfowl habitat and replace any that may be lost. It appears feasible to develop shallow marshes in connection with clearing operations for the proposed higher reservoir. Further details are given in the report on habitat development and enhancement.

FIGURE 1 - GOOD RUFFED GROUSE HABITAT

- a) Immature cottonwood near top of drawdown early spring.

b) Immature cottonwood in mid-summer.





Mixed deciduous-coniferous regeneration following logging disturbance.



FIGURE 3 - MARGINAL FRANKLIN GROUSE HABITAT

Open Lodgepole pine stand near edge of proposed reservoir.

FIGURE 4 - BLUE GROUSE HABITAT

Open fir and Ponderosa pines on ecological reserve.



FIGURE 5 - BEAVER POND WATERFOWL HABITAT



Beaver ponds in Part "A" frequented by mallard and green-winged teal,



FIGURE 6 - ROSS RESERVOIR HABITAT



a. Open Lake - good habitat for loons and diving ducks.

b. Lake Edge – partially submerged stumps and associated vegetation provide protection (Sandhill crane in foreground).



FIGURE 7 - SEEPAGE PONDS

Seepage ponds at drawdown edge - good nesting and feeding areas for waterfowl and shorebirds.



FIGURE 8 - RIVER HABITAT

River habitat provide nesting habitat for common mergansers and harlequin ducks.



LIST OF GAME BIRDS OBSERVED ON THE TWO-PART STUDY AREA: LOWER SKAGIT VALLEY IN CANADA

Legend

A - Abundant, recorded almost daily

R - Rare, present but seldom seen

F - Frequent, seen regularly but in fewer numbers C - Casual, recorded once or twice SPECIES **ABUNDANCE AND STATUS** HABITAT USED IN TWO-PART STUDY AREA Waterfow Fall Winter Reservoir Ponds Spring Summer Breeder River Seepages Geese and Surface-Feeding Ducks Canada Goose R X Mallard Α F R R R Х Х Х Х R Pintail R Х Х Green-winged Teal R F R R R Х Х Х Х **Cinnamon Teal** С Х С Blue-winged Teal R R Х Х Х American Widgeon С С X Х С Shoveler Х Х Wood Duck С Х Diving Ducks Ring-necked Duck С Х Х Canvasback С Х Х С Greater Scaup С С Х Х Lesser Scaup С С С Х Х Common Goldeneye R F R R R Х Х Х Х **Barrow's Goldeneye** С Х С Х Х Х Х F F **Bufflehead** X R R Harlequin Х С White-winged Scoter С Х Ruddy Duck Mergansers С **Hooded Mergansers** R Х Х Х F R Х Х Х R R **Common Mergansers** С **Red-breasted** Mergansers Х **Upland** Game Birds F F F Higher slopes, semi-open Douglas fir forest Blue Grouse С С Lodgepole pine-spruce forest type Spruce Grouse R Immature deciduous forest type & mixed deciduous Fringe of Ross Lake in willows F F F **Ruffed Grouse** Fringe of Ross Lake in willows White-tailed Ptarmigan C Other Game Birds Seepages, mud flats and marshes Common Snipe R R R R R **Band-tailed** Pigeon R С R R Semi-open fir stands along sidehills С **American Coot** A Open water on Ross Lake

С

R

Associated with seepage areas and marshes

1

Virginia Rail

С







WATERFOWL COUNTS ON ROSS LAKE IN CANADA, SEPTEMBER AND OCTOBER, 1971

÷	NUMBERS OBSERVED BY DATES					•	
Species	Sept.30	Oct.1	Oct.2	Oct.3	Oct.4	Oct.8	
Canada Goose	1	1	1	1	1	1	
Mallard	70+	20+	27	20+	. 47	56+	
Widgeon	35	37	13	23	33	1+	
Pintail	5	15	6	8+	7		
Green-winged Teal	30+	50	25		15	30+	
Ruddy Duck	-	1	6	-	3		
Canvasback	7	1	5	11	4		
Scaup and Ringnecks	65		38	36+	53+	7+	
Shoveler	5				6		
Goldeneye	5		3		5	3+	
Bufflehead	2		2	-	2	8+	
Coots		50				50+	
Mergansers		2	3	7	6	1	
Unidentified		Bill det ma		-		50+	
Estimated Totals	230-300	180-225	130-200	110-150	190-250	210-250	

· APPENDIX 106

HUNTER HARVEST OF GAME BIRDS ON THE LOWER SKAGIT VALLEY IN CANADA

(Data for 1970 and 1971 are from a road check operated by F.F. Slaney & Company Ltd. Records prior to 1970 are from B.C. Fish and Wildlife Branch records)

Year	No. of Hunters Checked	No. of Hunter Days	Ruffed Grouse	Blue Grouse	Franklin Grouse	Ducks	Geese	, Coots	Snipe	Rail
1965			3	1.						
1966			7	0	0		'			
1967	94	101	7	10.: 		- -				
1968	974	1147	28	1	0	84	1			
1969	512	664	23	2	0	25				
1970	1470	1780	29	2	0	79	1	8	4	1
1971	597	714	43	0	0	22	1	0	3	0

ESTIMATED TOTAL HARVEST

	Hunters		Ruffed Grouse		Blue Grouse		Waterfowl	
Year	Checked	Est. Tótal	Checked	Estimated Total Harvest	Checked	Estimated Total Harvest	Checked	Est. Total <u>Harves</u> t
1970	1470	2600	29	50	2	5	79	140
1971	597	1000	43	70	0	0	20	50

(Total hunters based on actual checking and estimated number of hunters on days not checked)

Weekday - average 11.1 hunters per day; based on 14 random checks made on weekdays - 1971/72.

Weekends and Holidays - average 24.2 hunters per day; based on 24 checks made in 1971.





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