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The High Ross Dam
Wildlife and Fish in the
Skagit River Valley of British Columbia

by

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The Skagit River rises in the mountains of the Hozomeen range lying northwest of Allison Pass in the extreme southwest of British Columbia. It is a clear stream, fast-flowing over a gravelly and boulder-strewn bed. Of its total length of some 150 miles the first 24 lie in Canada. It was first dammed between 1919 and 1924 in Washington some 20 miles south of the border. Since that time other dams have appeared, the last of which was the Ross, begun in 1937. Subsequent modification of this structure created Ross Lake Reservoir which at full pool enters British Columbia for a short distance.

The main Skagit valley and the portion considered in this report begins near Skagit Bluffs at the confluence of the Skagit and Sumallo rivers and continues southward about 18 miles to the International Border and Ross Lake. From the Skagit Bluffs the first 7 or 8 miles of the valley is flat and seldom more than 1/4 mile wide. At the entrance of the Klesilkwa river the valley floor broadens to over one mile and maintains this width along most of the Skagit floodplain into Washington, U.S.A. The fall of the valley floor is gradual from an elevation of about 2,000 feet A.S.L. at the Skagit-Sumallo river junction, to 1,575 feet at the International Border (Slaney & Co., 1970). The western wall of the valley is steep and rocky. The eastern wall rises less abruptly in a series of benches but also becomes moderately steep

above 2,500 feet A.S.L. On either side of the valley rugged mountains rise generally to over 5,000 feet and in a few instances, to over 7,000 feet A.S.L.

The flat, relatively broad bottomland of the valley below the Klesilkwa river junction is unique in the Lower Mainland region both in form and size. It is also the only large valley in the area that does not contain a lake (Gates and Caverhill, 1970).

The valley lies in a zone transitional between the Coast Forest and the Dry Forest biotic areas and typical of such ecotones is rich in the variety of plant species present. Vegetation along the valley floor includes many shrubs such as salmonberry, devil's club, willow, alder, vine maple, Douglas maple, choke cherry, elderberry, cascara, dogwood, flowering currant, hazelnut and some rhododendron. On the lower valley slopes bearberry, false box, Oregon grape and juniper are common. Forest cover extends over the bottom lands and well up the sides of the surrounding mountains. Black cotton wood is present along the floodplain and western red cedar and hemlock occur adjacent to the river and lower slopes where seepage forms moist situations. Douglas fir is dominant on well-drained sites and balsam fir grows well in the lower valley. Lodgepole pine is present in pure stands near the north end of the reservoir and white pine occurs most often near the south end of the valley. A small isolated stand of mature Ponderosa pine is an unusual component of the forest near the old Witworth ranch. Western yew and spruce are also occasionally present (Slaney and Co., 1970).

The fauna of the region have not yet been completely enumerated but at least 20 species of recreationally important wildlife are known. Among these are mule deer, black bears, bobcats, cougars, beaver, otters, marten, blue and Franklin grouse and some waterfowl. Roosevelt elk have been reported within 10 miles of the Skagit basin and a single bull moose was seen here in the summer of 1970. (Gates and Caverhill, 1970).

The waters of the Skagit River contain resident populations of rainbow trout, cutthroat trout, Dolly Varden char and eastern brook trout and provides the best stream fishery of its type in the Lower Mainland (Whately, 1970).

The Skagit Valley Under the Existing Ross Dam Regime

The Nature of physical changes to the environment:

Man's early impact on the Skagit valley occurred with the establishment and development of the former Witworth ranch properties and appeared in the form of clearings for buildings and stock in an area within a few miles north of the International Border. The next major changes began in 1946 and continued until 1954. In this period both clear-cutting and selective logging removed most of the timber from the valley floor within the reservoir site (Slansy and Co., 1970). Regeneration has been relatively slow, particularly on the drier sites. The former large cedar stands are now dominated by cottonwood, maple and willows and lodgepole pine has become well established in a few burned-over areas (Gates and Caverhill, 1970).

Later changes to the valley followed the raising of the Ross Dam to a height of 1,615 feet in 1949. Now, at full-pool, the Ross Lake reservoir extends across the International Boundary for about 1/2 mile into British Columbia and floods some 480 acres of land. The peak water level of 1,602.5 feet usually occurs in late June and is maintained during the summer months. Maximum drawdown takes place after December and if maximum storage is utilized, reaches a minimum level of 1,475 feet in May. The drawdown of 127 feet causes the lake margin to recede about 8 miles south of the International Boundary (Slaney and Co., 1970). In normal years drawdown is about 1/3 of the possible maximum. Ice and snow covers the drained reservoir bed in late winter and early spring and on melting in May exposes a vast expanse of brown sand and stumps until the spring run-off again raises the lake level.

In British Columbia the effects of these man-made disturbances are most obvious in the changed physical appearance of the environment about the head of Ross Lake. The influence of these changes on both the fishery and wildlife are difficult to assess in relative terms since no data for either of these components are available for times prior to flooding. Populations of all wildlife no doubt have stabilized insofar as the influence of the present Ross Lake regime is concerned.

Present Status of Wildlife:

At the present time available information on wildlife in the Skagit Valley is limited to Fish and Wildlife Branch reports prepared by Dr. J. Hatter in 1951 and by B. R. Gates and P. A. Caverhill in 1970. Studies on animal species present, their distribution and numbers within the area have been initiated on behalf of F. F. Slaney and Co. Ltd. by Dr. J. F. Bendell of the University of British Columbia. The study will also consider other

ecological aspects as well as recreational use of the valley and on its completion in October, 1971, will have covered a period of one year.

Deer:

Two subspecies of deer, the Columbian blacktailed (Odocoileus hemionus columbianus) and the mule deer (O.h. hemionus) are found in the valley and intergradation between the two subspecies is common. In normal winters these animals seem to remain on the timbered slopes at elevations of 2,500 to 3,500 feet. In mild, snow-free winters they may also use the valley floor as they all do annually when winter snows melt and spring growth appears. Some remain in the bottoms throughout the year but most move upward with rising temperatures and improving forage conditions. During the summer and fall they may be found in the alpine and subalpine ranges of Manning Park, the Skagit-Chilliwack drainage and Washington's North Cascade National Park. Thus the Skagit Valley above the International Border is of vital importance to deer at a critical period in their seasonal movements. In late winter and early spring these animals are in their poorest physical condition and require large quantities of readily digested nutrients to make the transition from a subsistence to a growth phase diet. These nutritional elements, frequently in the form of shrubs, forbs and grasses, are more often found in the plant communities of the bottom lands than in those on the steep valley slopes (Gates and Caverhill, 1970).

A study of deer population numbers and seasonal distribution was undertaken in the years 1967-70 in the southern end of the valley where the main concentration of animals occurs. A program of capturing and marking deer during the spring months, plus subsequent recaptures and

sightings provided data on which spring population size was calculated. The total deer population for the valley from the Border to Shawatum Creek was estimated at about 500 animals. To this number could be added the June fawn crop which would raise the spring numbers by about 30% or some 150 animals to provide a huntable population of some 650 deer (Gates and Caverhill, 1970).

Fish and Wildlife Branch game check data indicated a harvest of 25 to 75 deer annually and suggest that the higher figure might be all that could be expected under a sustained annual harvest.

Black Bears:

It is estimated that between 5 and 15 black bears are harvested annually from the vicinity of the flood basin. This level of harvest could result from a minimum population of 35 to 40 bears. These animals depend greatly on the plant communities along the river and bottom lands during the spring and in some years during the fall. Once considered a pest and a nuisance the black bear, in recent years, is becoming more and more important as a game animal in the province (Gates and Caverhill, 1970).

Cougars:

The total population of cougars presently dependent upon the valley for some period of the year is believed to average about 10 - 15 animals. Of this number it is estimated that from one to five are taken each year by recreational hunters (Gates and Caverhill, 1970).

Fur bearers:

The current riparian habitat of the valley south of the Klesilkwa River junction supports a large beaver population and is closely associated with mink, river otters and raccoons. Estimates based on trap-line returns, road-check information and the opinions of Fish and Wildlife Branch personnel suggest the following range of annual harvest for particular species of fur-bearers:

Beaver	10 to 30	Mink	5 - 15
Raccoon	5 - 15	Ermine	5 - 25
Otter	0 - 5	Marten	0 - 5

The above figures are not estimates of potential annual sustained yield of each species (Gates and Caverhill, 1970).

Upland birds and Waterfowl:

Three species of upland game birds frequent the valley: ruffed (willow), Franklin and blue grouse. Of these ruffed grouse are most abundant and most closely associated with the bottom lands. No specific research into densities or distribution of grouse in this area has been conducted and species population size is at present unknown. Hunter check information places the annual harvest at between 25 and 200 birds from the areas currently accessible.

Waterfowl use of the valley is believed to be relatively limited and the wetlands present have been given the low production rating of Class 6 by the Canada Land Inventory survey. Recent reports of up to 100 ducks and geese present on shallow ponds in the reservoir site

suggest that a traditional migrational or wintering use of the area may have been established for some species. Fish and Wildlife Branch harvest surveys recorded 84 and 25 ducks during the check portion of the 1968 and 1969 seasons respectively and suggest that the total annual harvest may reach 150 ducks (Gates and Caverhill, 1970).

Present Hunter Use:

A survey of hunting made largely on weekends from September to December and during portions of the either-sex deer season showed 974 hunters checked in 1968 and 903 in 1969. The number of hunter days of effort involved for these years was 1,147 and 1,117 respectively. The area on which this activity occurred extended along the Skagit valley south of 26 Mile Bridge. An estimate based on these data suggest that during the entire open season the number of hunters using the valley was at least 1,597 in 1968 and 1,368 in 1969. Similarly minimum hunter-days of effort was 2,042 and 1,622 days respectively (Gates and Caverhill, 1970).

Present Status of the Fishery:

Anglers are attracted to the Skagit valley from large coastal population centres in British Columbia and Washington as well as from local communities. In the United States the lower Skagit River is well known for winter steelhead fishing and as an important producer of salmon. In British Columbia, particularly in that portion between Ross Lake and 26 Mile Bridge, this river provides one of the finest stream fisheries

for resident rainbow trout in the province. Dolly Varden char and eastern brook trout are also caught in these waters in an angling season that lasts from July to October (Whately, 1970).

The Canadian section of the Skagit River may be divided into 3 parts of almost equal length: (1) the small, swift, boulder-strewn portion between its source and confluence with the Sumallo River; (2) the slower, quiet-pooled reach from the Sumallo to the Silver Skagit Valley, and (3) the wide, meandering, unobstructed waters south of the mouth of Silvertipped Creek. Along the entire course it is joined by numerous tributaries.

Fishing in the headwaters section is attended by generally low success and is similarly limited in the Sumallo - Silver Skagit Valley area where access is restricted to foot travel. Heaviest fishing pressure occurs downstream from Silvertipped Creek to the International Border where access is high and fishing is good. Creel census surveys involving a total of 1,117 fishermen checked in the spring and summer months of 1962 and 1963 showed an average take of about one fish to each 2 hours of angling. The catch consisted largely (83%) of rainbow trout with Dolly Varden char (14%) and eastern brook trout (3%) as lesser components. About 30% of the rainbow trout taken were over 14 inches in length but most fish were in the 10 to 14 inch range. No survey of catch for anglers fishing Ross Lake was included in the Fish and Wildlife Branch study but reports would indicate that fishing here is good for rainbow and cutthroat trout, Dolly Varden char and brook trout. In the United States, Ross Lake is the only large waterbody not requiring artificial

stocking. The lake provides an excellent fishery for native rainbow trout (Whately, 1970).

A recent subjective evaluation of unprocessed data suggests that most rainbow trout spawning occurs downstream of 26 Mile Bridge, although there are significant stretches of spawning area for 3 to 5 miles upstream from 26 Mile Bridge. The section from the Sumallo - Skagit confluence downstream for 4 to 6 miles appears relatively unproductive of fish (Swiatkiewicz, V. E., 1970). The Sumallo River for some 5 miles above its junction with the Skagit has good gravel and water-flow for spawning. Similar conditions prevail on the Skagit River for some 7 miles above its confluence with the Sumallo River. Tributary streams of the Skagit system also provide spawning facilities of poorer quality and relatively limited amount.

The future for Wildlife and Fish under present Ross Dam Regime:

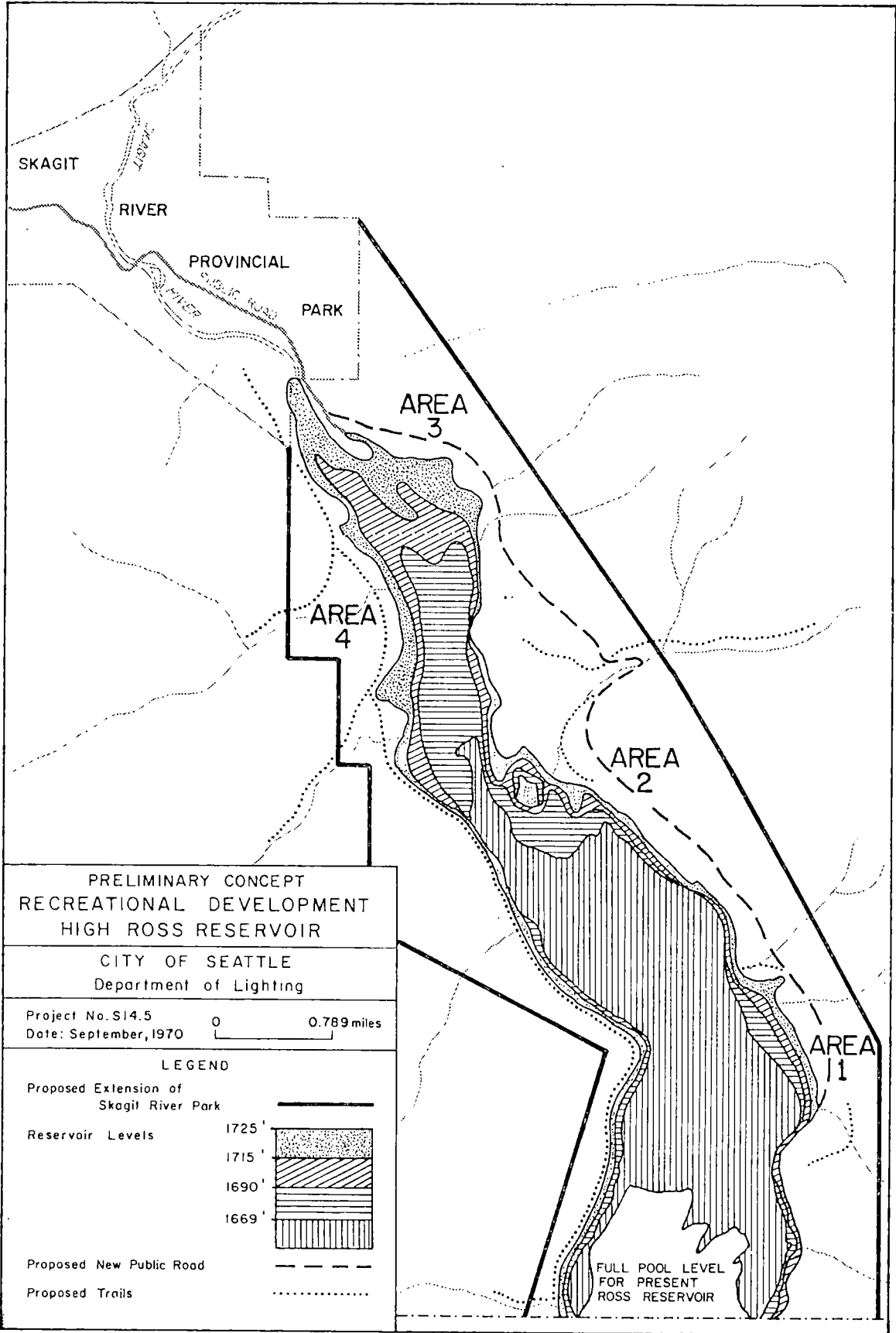
Approximately one square mile of land in the Canadian section of the Skagit valley has been affected by the flooding resulting from the last raising of the Ross Dam height in 1949. Since that time, wildlife and fish populations in the area seem to have adjusted to the environmental changes that followed. The future might be expected to continue unchanged from the present insofar as the wildlife resource is concerned, except for the ecological pressures which are a constant part of the environmental situation in this region.

Recreational use of the area could be intensified throughout the valley and increased harvests of game mammals, game birds and some fur species could be sustained with careful management. The Slaney and Co.

1970 report states that "the ability of the existing river and reservoir system to maintain a productive fishery under increasing usage is questionable". Stenton's data collected in 1962 and 1963 show no great change in fishing success between these years. Comparison with that of subsequent years is not possible due to incomplete analysis of more recent data.

The Skagit Valley under the Proposed High Ross Regime:

The proposal to raise the Ross Dam to a nominal top elevation of 1,736 feet to provide a full pool elevation of 1,725 feet is the fourth and final stage of construction of this project. Flooding from this development will affect the Skagit valley for some 8.3 miles north of the International Border. Fluctuation in surface of the modified reservoir would drop from the present maximum drawdown level of 100 feet to a future drawdown of 57 feet. The reduction in maximum drawdown proposed for the High Ross regime would still result in the creation of a lake on the Canadian side of the Boundary varying from about 8.3 to 4.2 miles in length. Of the 10 miles of Skagit River that would be flooded 5.2 miles would be permanently inundated and 4.7 miles would be fully or partially exposed for a period of up to 8 months in years of maximum drawdown. During average water years drawdown would be approximately 30 feet and some 2.2 miles of river channel would be exposed. Potential storage of the Canadian portion of the reservoir would rise from the current 694 acres to 5,345.8 acres, perimeter would increase from 3.26 miles to 22.50 miles, maximum depth from 12.5 feet to 135.0 feet, and the area exposed at maximum drawdown from 694.0 acres to 2,999.3 acres under the new regime (Whately, 1970).



SKAGIT

RIVER

PROVINCIAL

PARK

AREA 3

AREA 4

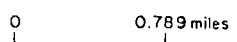
AREA 2

AREA 1

PRELIMINARY CONCEPT
RECREATIONAL DEVELOPMENT
HIGH ROSS RESERVOIR

CITY OF SEATTLE
Department of Lighting

Project No. S14.5
Date: September, 1970



LEGEND

- Proposed Extension of Skagit River Park
- Reservoir Levels
 - 1725'
 - 1715'
 - 1690'
 - 1669'
- Proposed New Public Road
- Proposed Trails

FULL POOL LEVEL
FOR PRESENT
ROSS RESERVOIR

Possible Status of Wildlife in the Skagit Valley
under the High Ross Regime:

Clearing of timber and ground cover within the proposed impoundment area would be taken to a maximum elevation of 1,727 feet. Between this elevation and the level of maximum drawdown (1,669 feet) all trees and brush would be removed to ground level on flat ground and slopes of less than 40%. All solid and dead and down timber would be removed. On slopes greater than 40% all trees would be removed to a stump height not exceeding 6 inches above ground surface. On areas below 1,669 feet all trees would be removed to a stump height not exceeding 12 inches or the top diameter of the stump, whichever is greater. All solid down timber larger than 4 inches in diameter at the butt and/or longer than 8 feet would be removed. In certain designated areas all wood material would be removed to a depth of 2 feet below ground level (Slaney and Co., 1970).

The reduction of wildlife habitat that would accompany the proposed High Ross development would eliminate about 9 square miles of mixed riparian vegetation, including the grasses, forbs and shrubs upon which deer depend in spring and summer. The loss of this seasonal range would be of serious consequence to the deer of this region and a displacement of many of these animals to other areas is unlikely. Without the creation and maintenance of artificial spring range the loss of up to 80% of the deer herd can be anticipated (Gates and Caverhill, 1970). This would contribute to a reduction in cougar numbers since their dependence on deer as a prey species is well established. Similarly the elimination of most of the prime seasonal bear

habitat may be expected to result in a significant decline in the numbers of this species in the lower Skagit valley region.

Fur-bearer habitat will be greatly reduced with the loss of flood plain and stream habitat and would be particularly restrictive for beaver, mink, otter and raccoons. The unfavourable topography of the valley above full pool precludes the likelihood of a relocation of beaver in that area (Gates and Caverhill, 1970).

Some 7 square miles of good ruffed grouse habitat would be lost through flooding of the bottom lands and without the development or improvement of suitable flat lands above the 1,725 feet level and it is felt that the entire grouse population of the flood basin would be eliminated. Blue and Franklin grouse, since they are most often found above the flood plain, would not be greatly affected (Gates and Caverhill, 1970).

Traditional waterfowl use of the Silver Creek - Skagit River drainage systems is relatively light but some ducks rest and feed in the back eddies and ponds along these water-courses. Greatest use occurs on the shallow ponds and seepage areas left during drawdown of the existing Ross Lake impoundment. This habitat would be eliminated and few new ponds would be created by the reduced drawdown provided under the High Ross dams as initially proposed (Gates and Caverhill, 1970). Thurber Consultants Ltd. in a brief of 23 September, 1970, suggested that some of the objections raised by conservation and wildlife interests on this account might be overcome by the stabilization of water-levels on an area comprising a portion of the proposed reservoir at the new head of Ross Lake. This would be achieved by the construction

of a small fill dam some 40 feet high and 1,700 feet long, at a point about 4 miles north of the border. Waters in the lake upstream from this dam "could be controlled to within a few feet, thus presenting the opportunity to develop waterfowl breeding areas". It is doubtful that a stabilized water situation of this type would be accompanied by other components necessary to create waterfowl production habitat of significance. Such a lake might also present problems related to fish production in the main portion of Ross Lake below the fill dam. From other recreational points of view however, it would have the attractive features of most waterbodies.

Possible status of the Fishery in the Skagit Valley
under the High Ross Regime:

The present Ross Lake operation with its maximum drawdown of 100 feet does not seem to have greatly reduced the fish production capacity of the lake. During the first 4 years following the inundation of new land areas, there is a characteristic increase in fish growth rates due to increased biological activity by microbial utilization of flooded organic matter and nutrients released from the soil. The oxygen demand of these processes may cause temporary oxygen depletion in the deeper sections of the reservoir. Increased food supply from the production of invertebrate populations in the lake should encourage a large population of rapidly growing fish for about 5 years. The initial surge in productivity should then stabilize at a lower level, approximating conditions in the lake prior to the increase in storage levels. Thus no decrease in the abundance of sport fish in the new lake would be

expected providing spawning conditions were adequate to ensure a sufficient recruitment of young trout to the reservoir (Whately, 1970).

Under the proposed High Ross regime some 5 of the 10 river miles that would be flooded would be permanently under water and unusable for spawning. The remaining 4.7 miles of river channel would be fully or partially exposed for a period of about 8 months annually. Under maximum drawdown and the refilling of the reservoir commencing in April the likelihood of hatching success from rainbow trout which spawned in the exposed channel in May or June would be very small. Only the eggs deposited in the upper limits of the reservoir would have much chance of hatching before flooding in late July. In average water years, some 2.2 miles of river channel would be exposed and would be inundated again by the end of June. Under these conditions all spawn would be flooded with no chance of a successful hatch (Whately, 1970).

The loss of spawning grounds in this lower section of the Skagit River might be mitigated in part through tributary streams and the river above 26 Mile Bridge.

Within the reservoir site Nepopckum Creek supports a small run of brook trout in the fall but the possible spring run of rainbow trout in this stream would be rendered ineffective by the seasonal heavy run-off. The Klesilkwa River and Silvertipped Creek have very restricted spawning facilities. The Sumallo River however, could support a substantial spawning run.

In addition to the loss of spawning grounds in the reservoir site on the lower Skagit River would be the loss of an excellent and unique

stream fishery, which could never be replaced by other less used portions on the upper reaches.

Subjective comments on the High Ross and its relation to recreational use:

From the fish and wildlife viewpoint there are a number of criticisms that can be raised against the proposed High Ross reservoir in British Columbia. These are not concerned with the value of this development as a lasting solution to Seattle's power problem, nor are they concerned with the degree of economic success accompanying the exploitation of a natural resource of this province. Rather, they are subjective criticisms relating to the environment changes which will follow and the rationale proposed for recreational development which seems aimed at making these changes more palatable.

First, the Slaney report makes much of the fact that High Ross will give British Columbia a new lake some 4 to 8 miles long (depending on time of year and drawdown), which will be within a few hours drive of a large regional population. New beaches will indeed be welcome for future recreational use but they are hardly justification enough for the proposed new lake. The lower Fraser Valley has at least 9 lakes ranging from 5 to 40 miles in length plus numerous small water-bodies. Most of these are more accessible and have as much (or more) recreational potential as the Ross reservoir. There are, in fact, more good lakes in the Lower Mainland region than there are good valleys. In the rugged, mountainous terrain of the area valleys are typically short and narrow. South of the Fraser River and west of the Hope-Princeton Highway there

are only two valleys having access, size and features attractive to recreationists. Of these, the smaller Chilliwack River Valley is somewhat restricted in use by the presence of three Provincial Game Service camps at different points close to the main road. The other is the Skagit Valley, which is generally longer, broader and less given to settlement.

The Skagit Valley is rather unusual in that it does not contain a natural lake. It does contain however, a fine, clear swift-flowing river which from the 26 Mile Bridge to the International Boundary provides some of the best stream fishing water in the lower Fraser Valley. To lose any of this relatively scarce and valuable type of environment by augmenting the existing number of lakes with a reservoir varying seasonally in size and appearance would be an abuse of the land resource. It should be remembered that the most noticeable area of disturbance resulting from such an operation will occur in British Columbia, where an exposure of some 3 or more miles of reservoir bottom will be evident at maximum drawdown. In Washington the lake will be permanent from the border to Ross Dam but here too, shoreline exposure will be a seasonal occurrence in the operation of the dam.

Some statements appearing in the Slaney report seem to typify a common attitude in resource development of the day. That is, that land to be useful must be developed and development must be intensive to accommodate an expanding demand which must be stimulated to ensure continuing resource use. The fact that the Skagit Valley (B.C.) is not "officially managed" in the recreational sense and lacks camping

facilities may not be well regarded by some developers. But it could well be that this lack of organization and the absence of certain amenities are part of the real attraction that the area has for many people.

The Skagit River has a good quality-type fishery. It should not be replaced with a quantity-type fishery such as one which might be developed to justify, in part, the creation of a reservoir for another purpose. Nor would the loss of the present spawning grounds to reservoir development be absorbed entirely by other sections of the river system, contrary to some opinion.

It is difficult to refute the implication that the Skagit Valley is but a small hunting area contributing but a small amount of game to the provincial harvest. But it should be remembered that a great deal of the total harvest of British Columbia game comes from a great number of valleys similar to the Skagit. To say that hunting in this area is inconsequential and incompatible with other recreational use and will probably be phased out is further evidence for a limited appreciation of multi-resource management.

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