WILDLIFE SURVEY

OF

BAKER BAY - DONOHOE PROPERTY

by:

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submitted to:

H. A. Forest Management

Duncan, B.C.

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PART 1: BACKGROUND INFORMATION

1.1 Introduction

The wildlife survey of the Baker Bay Property was requested by property owners Francis and Helene Donohoe as part of the overall forest management plan carried out by H.A. Forest Management. The project has been funded in part by the Federal/Provincial Forest Resource Agreement (FRDA II). The wildlife survey was carried out on November 6 and 7, 1992 and consisted of randomly transecting the different habitat types as outlined in part on the accompanying forest cover type map and recording direct contacts with wildlife and indirect evidence of wildlife occurrence (i.e.,"sign" - droppings, tracks, trails, burrows, nests, and various types of feeding remains). All occurrences of wildlife were recorded and photographs were taken of the major habitat types where possible.

The Donohoe property of Baker Bay is diverse in terms of habitat types for supporting a variety of wildlife species, such as Mountain Goats, Black Bears, Bald Eagles, Chum Salmon, River Otters, Martins, numerous species of shore birds and waterfowl, just to name a few. The size and health of the wildlife population is largely determined by the resources available to it. The four basic components of an animal's habitat are: 1)food, 2)cover, 3)water and 4)space. Cover is used for many purposes, such as resting, hiding, escape and nesting; therefore taking on various forms for different species and uses. space, also called home range or territory, is the area occupied by an individual, family group or social group. On the Baker Bay property many of these basic requirements will be met for many of the species present, therefore any change in the habitat that takes place will have direct impact on the species present, whether it be positive or negative. For other species such as Mountain Goats and Black Bears, whose home range or territory are possibly larger and overlapping on to neighbouring property, all the basic habitat requirements cannot be met on the Donohoe property; making it more difficult to plan for species maintenance or enhancement.

The objectives of the wildlife survey for the Donohoes in Baker Bay, as understood from meeting with Francis Donohoe are as follows:

- Provide a brief description of broad habitat types
- Provide an account of the wildlife species present or possibly present on the property and outline briefly their habitat requirements as they are met on the property
- Provide suggestions on species habitat management if any harvesting of trees were to occur and outline the procedures to follow that are requested by government agencies
- Recommend suggestions on species enhancement and outline any of the procedures to follow if pertinent

The report is organized in the following format:

PART 1: BACKGROUND INFORMATION

This section briefly reviews the general habitat types and summarizes the biological significance and wildlife use of each type, taking into account the various species habitat requirements. The account of species present is limited due to the time of visit and the brevity of the visit, however comments will be made on the species that potential use the habitat types mentioned.

PART 2: HABITAT MANAGEMENT AND ENHANCEMENT

This section suggests management practices and reviews Government guidelines required to maintain or enhance wildlife populations on the Baker Bay property if any treatments were to occur.Recommendations for any further work pertinent to maintaining or enhancing wildlife on the property will be mentioned in this section.

1.2 Habitats

The Donohoe property in Baker Bay at the head of Hotham Sound is a long, relatively narrow strip of land buffeted on both the east and west sides by series of rocky bluffs, with the eastern boundary traversing across the lower bluffs of a mountain where mountain goats were observed, thus it's name "billy goat mountain". The front half of the property, where the wildlife assessment was concentrated is primarily floodplain with the higher sites (sites I,III and IV on the forest cover map) growing stands of 75 year old Western hemlock. Baker Creek (St. Francis Cr.) as it is called by Federal Fisheries, is split into two major channels and one intermittent channel in it's lower reaches and empties into a productive rocky estuary. The property lies within the Coastal Western Hemlock Biogeoclimatic zone, a zone differentiated from other areas by vegetation and soil. This zone on the coast is the most productive zone, with a large and diverse assemblage of wildlife species as a result of its cool, mild, maritime climate. Western Hemlock and Amabalis Fir are the climax species. For ease and simplicity of describing wildlife habitat the property can be divided into four basic habitat types: 1) the estuary and foreshore habitat, 2) the river, including the riparian zone (site II), 3) the Western Hemlock forests (sites I,III,IV) and 4) the rock bluffs (sites V and VIII)

Estuary

An estuary is defined as a semi-enclosed body of water which has a free connection with the open ocean and within which sea water is measurably diluted with fresh water derived from land drainage. The high biological productivity of estuaries is tied to an interdependent and rather inflexible set of physical and chemical conditions to which a limited number of plants have adapted in specific and often intricate ways. The resulting food chains tend to be simple; consequently,an alteration of only one component can often have a significant effect on the productivity of the whole system. The estuary where Baker Creek flows into, encompasses virtually the entire head of Baker Bay (photos 1,2). The upper estuarine area, where the highest winter tides sometimes flood is vegetated with maple, hemlock seedlings,thickets of Pacific crabapple, salmonberry, willow and rose. This band of vegetation between the intertidal zone and the forest provides excellent nesting and feeding habitat for many small birds. The larger maple and hemlock in this area make excellent perching and roosting sites for some of the large raptors common to the area, such as the Bald Eagle or Osprey.

Photo 1 - upland habitat of the estuary, providing perching nesting and roosting habitat for raptors

The upper intertidal area is vegetated with numerous species of rushes, sedges and grasses. Cinquefoil and vetch, two species common to marsh habitat were observed during the survey. The intertidal area of this estuary is rocky covered with a few species of marine algae, such as Fucus and sea lettuce (Ulva sp.). These plants offer protection to intertidal fauna from sunlight and drying at low tide and shelter to a variety of fish and invertebrates. Invertebrates occupy a central position in the food chain, feeding on dendritus and algae, and making up a significant portion of the diet for estuarine and nearshore fish and birds. Some of the smaller invertebrate forms produced in this estuary are the key food items for young salmon. Some young salmonids feed heavily on mysids, isopods, and gammarids, which are produced in areas of intertidal or subtidal vegetation, or woody debris. Very small planktonic organisms such as copepods form the primary source of food for the small chum salmon fry. Oysters are abundant in the intertidal and shallow subtidal zone.

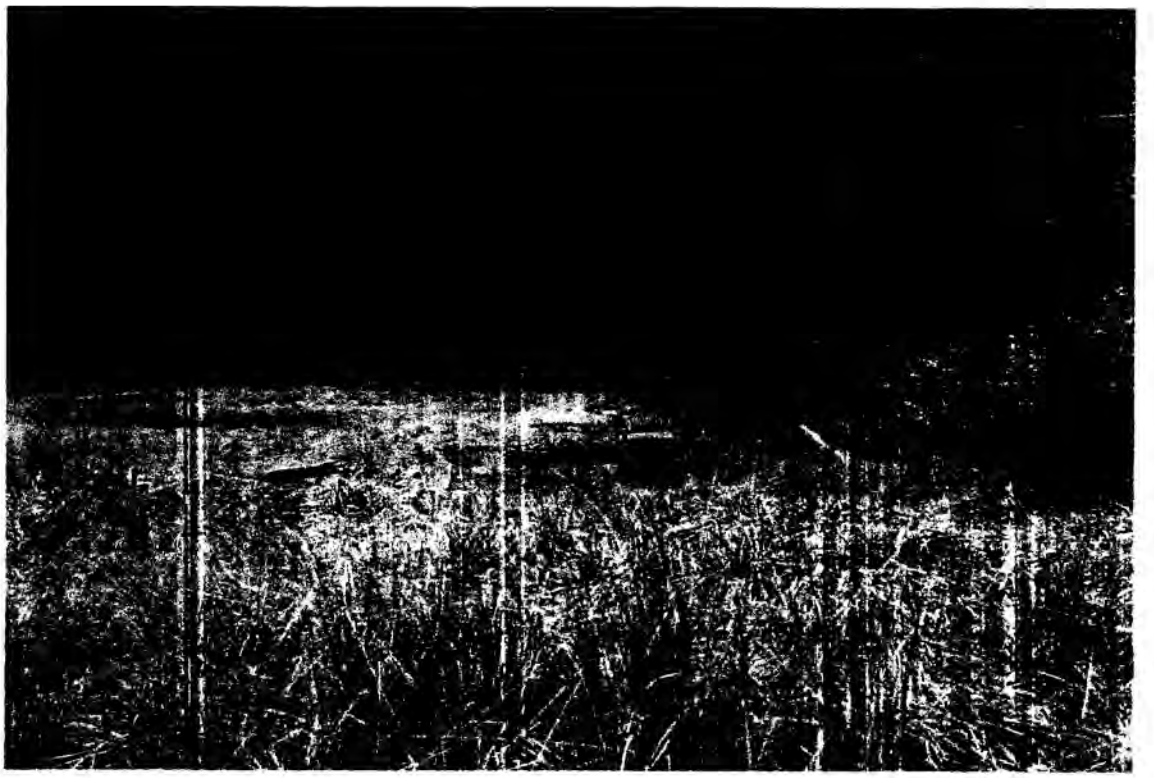

Photo 2 - upper intertidal habitat

The sheltered waters of this estuary provide wintering and staging habitat for large numbers of waterfowl, shorebirds and migrants on the Pacific Flyway. Use of an estuary such as this for these activities is highest during the period from October to April. Marine mammals, such as seals, sea-lions, river otters and possibly the occasional killer whale are also active users of an estuarine habitat such as Baker Bay (photo 3).

Photo 3 - Baker Creek flowing into the Baker Bay

River

Baker Creek is a typical small coastal river that is carved by high volume winter flows. The combination of steep slopes, heavy precipitation and limited water holding capacity result in unstable flows. The heavy rainfall during October, November, and December cause numerous floods which produce highly fluctuating flows.

Two small creeks flow down from Billy Goat Mt. increasing the flow and size of channels in the lower reaches. Above this sight the river is narrow and bouldery with very few pools. The river splits in two, as shown on the forest cover map just above the sight where the last creek flows down from Billy Goat Mt. The two channels below this sight are have a much lower gradient, creating more pools. The slower flows and greater pool to riffle ratio provide reasonable spawning habitat for chum salmon, making the lower reaches a Class 1 stream in accordance with the Coastal Fish Forestry Guidelines (1988). There are numerous small log jams and wind falls on both channels, producing barriers to adult chum salmon in lower water flows, however overhanging logs and logs within the creek can provide resting and cover habitat for spawning chum salmon. Plans for removal of any logs in and around these channels should be carried out under the guidance of a fisheries biologist. The channel flowing on the west side of the valley appears to have more suitable habitat for spawning salmon (photo 4). Another smaller channel flows into the bay further to the west, however it seems to be intermittent and not suitable for salmon spawning.

The riparian zone is the term for the area immediately adjacent to streams or water bodies, with particular reference to vegetation. The riparian zone along the lower channel of Baker Creek is comprised of large maples with an understory of primarily salmonberry; in certain spots the salmonberry overhangs the creek providing litterfall, insects, and cover for optimum fish habitat. Dense riparian zones along salmon spawning channels also provide valuable protective cover for fishing bears.

Photo 4 - chum spawning habitat in the lower reaches of Baker Creek

Forests

A detailed description of the forest cover types is outlined in the foresters report. From a biologists point of view these forests of the lower portion of the Baker Creek Watershed provide habitat for numerous species of birds, mammals, amphibians and reptiles. Two of the components of the older forest (sites I,III,IV) of this watershed that provide valuable wildlife habitat are snags and coarse woody debris (CWD); both are forms of dead or dying trees. An extraordinary variety of organisms are associated with dead trees, ranging from conspicuous, well known creatures such as squirrels and woodpeckers to huge numbers of invertebrates, fungi, lichens, mosses, vascular plants, and microorganisms that exploit this pool of organic matter and nutrients. Snags provide a substantial part of the life support system for many species, particularly cavity dwellers, providing a place to sleep, rest, and rear young that is secure, dry, and thermally buffered; thus a variety of animals compete to use them. Although birds dominate the list of cavity users, they are not alone. A variety of mammals, ranging

in size from bats and shrews to bears, and — some amphibians and reptiles, regularly use cavities too. Coarse woody debris (CWD) is another important component of a forest that provides valuable habitat for a number of species. The old stumps from past logging and the abundance of windfall in this valley provide cover for small mammals and their predators, for invertebrates and insectivorous species. CWD provides nesting and denning sites for birds and larger mammals and can be important in courtship rituals for grouse. CWD provides a sheltered micro-environment for reptiles and amphibians which cannot tolerate temperature extremes or drought (photos 5&6).

Photo 5 - old log skidder (CWD) in the upper vegetation zone of the estuary provides valuable habitat for many species, including a resting site for Francis

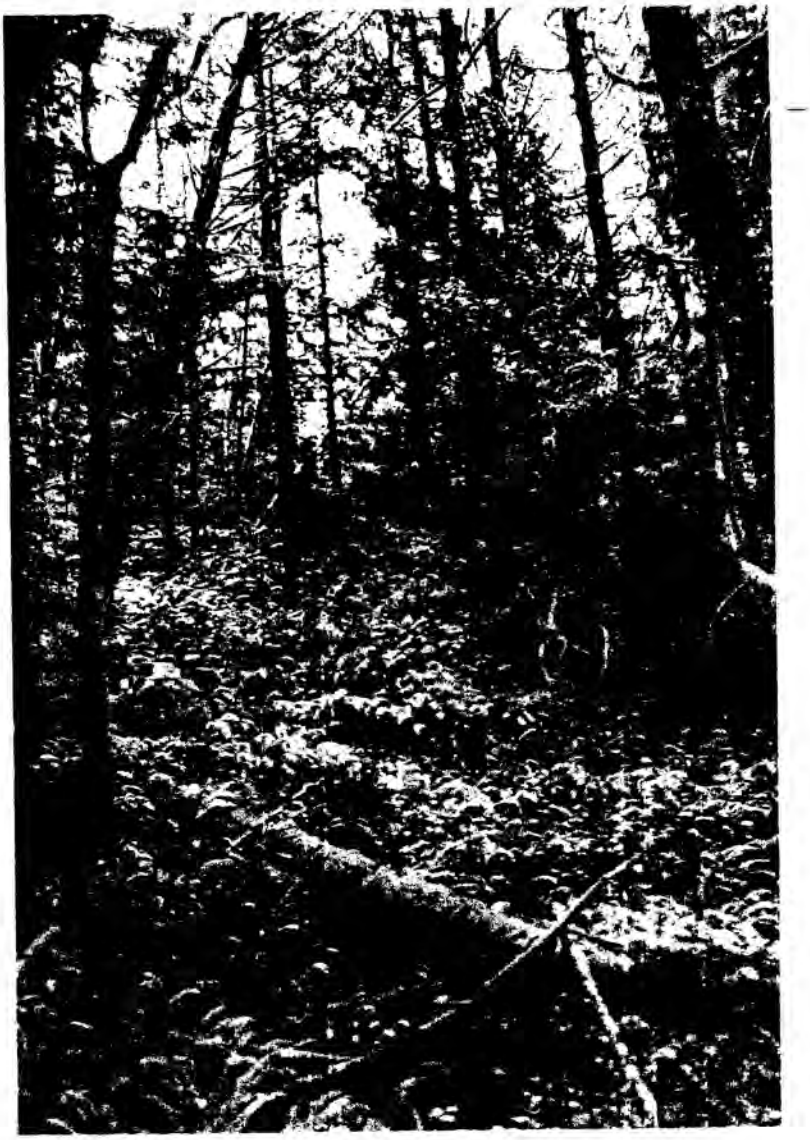

Photo 6 - downed trees and old stumps make up the Coarse Woody Debris component of the forest

Rock bluffs

The narrow Baker Creek watershed is enclosed on both the east and west sides by a series of steep rocky bluffs (site VIII). On the east the bluffs rise steeply from the forest floor to form Billy Goat Mountain. The lower bluffs (photo 7) are broken by valuable bands of forest, especially the southern exposed ones, providing thermal and protective shelter and forage for mountain goats in the harsh winter months.

Photo 7 - Rock bluffs interspersed with patches of trees providing winter range for mountain goats

1.3 Wildlife

Invertebrates

The diversity of habitats of the Baker Bay property afford nesting and foraging habitat for a variety of invertebrates, from those found in the estuarine environment, to those utilizing the creek and riparian zone, to those found in the forests in the dead and dying wood (snags and coarse woody debris). Insect life is the major food supply for stream fish and is generated from over-hanging riparian vegetation or water breeding insects. Numerous forms of invertebrates are found associated with the estuarine and marine environment, from the invertebrates that form the main food supply for young chum salmon (copepods, mysids, isopods, and gammarids), to clams, crabs and oysters found in the tidal and sub-tidal zones. The Pacific oyster grows most productively on the lower intertidal flats characterized by small stones and rocks upon which they anchor. Their reproductive cycle peaks

in late summer and the larvae drift passively in the ocean currents for a short period before actively selecting their individual growing sites.
Garter snakes, Pacific treefrog, salamanders and Boreal toads possibly frequent the estuarine and stream habitats.

Fish

Chum salmon, one of five species of salmon found on the British Columbia coast, spawn in Baker Creek. Four spawning chum salmon were found during the time of the survey (photo 8), one having been caught and partially eaten by a black bear. The local Federal fisheries officer from Pender Harbour, Ross Squire stated that the chum salmon runs in Jervis Inlet peak in late October, early November. The annual escapement records (included in report) or number of spawning salmon counted during the fall spawning for Baker Creek are very low, with the highest numbers recorded, showing in 1977 with 350. The last recorded run was in 1988 with two adult fish showing up.
Chum salmon utilize streams for adult migration and spawning (in late October), egg incubation and seaward migration of juveniles. The young or fry move downstream to the estuary or go out to sea to feed immediately after emerging from the gravel in the spring. The phases most vulnerable to the impacts of logging are the eggs and alevins (fish recently hatched from the egg and before absorption of the yolk sac and emergence from the spawning gravel) in the stream gravel (affected by sedimentation) although migration of adults or young could also be effected by debris or blockage. Some of the environmental requirements for spawning chum salmon are:

1) The spawning and nursery areas must be accessible to the adults migrating upstream, and to the fry seeking rearing habitat in the estuary.

2) The streamflow must remain stable without extreme freshets. A sufficent streamflow is required during the winter when embryos and alevins are in the gravel to prevent freezing.

3) For successful spawning, salmon require clean gravel, permitting an intragravel flow of water adequate to provide each embryo and alevin with a high concentration of dissolved oxygen and to remove wastes of carbon dioxide and ammonia.

4) Stream salmon require cover in the form of undercut banks, logs, rubble substrate, turbulence, overhanging streamside vegetation, and deep pools.

5) Salmon require stable stream temperatures of 12°C to 14°C (53.6°F to 57.2°F). An increased stream temperature means more oxygen is needed for increased metabolic rate of fish; however, warmer water holds less dissolved oxygen.

6) Stream salmon require high levels of dissolved oxygen in both the intragravel and surface waters.

7) Water in the stream must be clear enough to permit sunlight to reach the bottom where the food production of the stream occurs.

Cutthroat trout probably utilize the creek for spawning and rearing. It is unknown if herring utilize the estuary or the shoreline of the bay for spawning. Herring select intertidal and subtidal areas with seaweed upon which their adhesive egg mass cling. The eggs hatch in a few weeks and the young remain in nearshore marine environment for variable periods, feeding largely on plankton.

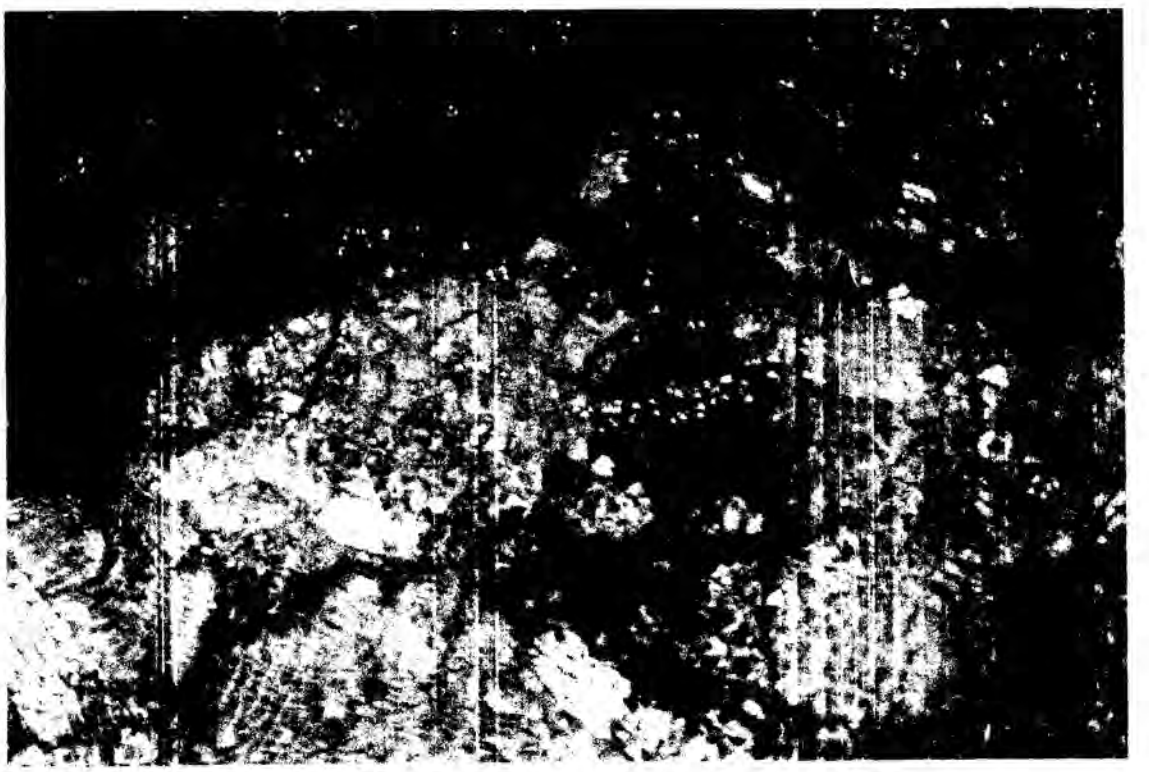

Photo 8 - spawning Chum Salmon in Baker Creek

Birds

With the diversity of habitats within the Donohoe property, one cannot begin to outline the varied use by the avian population. The estuary alone, including the upland, shoreline habitat is the visiting area for many regular groups and species. Some arrive in the spring to nest, rear young and depart in the fall, as other groups arrive to spend the winter. Many are spring and fall migrants and are seen only in passing. Some of the more common birds that frequent this protected estuarine habitat include divers (loons, grebes, cormorants, alcids), waterfowl (swans, geese, and ducks) and gulls. The marsh and shore bird group includes the long-legged, shallow-water waders (herons and possibly bitterns) and the smaller shorebirds (sandpipers, plovers and others). Generally, Great blue herons and smaller shorebirds utilize similar feeding habitat and are found most often on the broad intertidal areas or riparian meadows. The cheeky Kingfisher is a frequent user of this estuary, with numerous sightings made during the survey. Bald eagles are seen on a regular basis along the coast perched in a tree during salmon spawning. Raptors require abundant prey species, large open areas for easy hunting, and vegetation for perching, nesting and cover. For example, Peregrine falcons, Gyrfalcons, Goshawks, and Merlins are attracted by the large number of waterfowl and shorebirds. Other hawks, such as the Red-tailed hawk seen during the survey and owls are attracted by small rodents on the upper fringes of the foreshore.

The forests of the Baker Creek watershed, the adjacent rock bluffs, and the riparian zone of the creek itself support many bird species. Snags play a major role in providing a portion of the life support system for many species. In the Blue Mountains of Washington and Oregon 39 birds and 23 mammals use snags for resting and shelter. The species that use snags can be divided into two categories: those that excavate their own cavity, such as the Pileated woodpecker (primary users) and those that occupy existing cavities (secondary users). The dense cover of salmonberry along the creek edge provides excellent security cover and feeding sites for finches, sparrows and other berry eating species. The Rufous hummingbird would be attracted to the flowers of the salmonberry in the spring. The American dipper was observed in the creek. These exciting little wren like birds feed on aquatic invertebrates and small fishes by wading or diving into the water and then bobbing underneath. These birds are constantly bobbing up and down as if they were on

springs. Large flocks of pine siskins were observed during the survey flitting amongst the trees. The mixed stands of maple and hemlock provide excellent nesting habitat for many species of songbirds.

Mammals

Mountain goats were observed high on the bluffs overhanging Baker Bay. These facing south bluffs are the winter habitat for the goats in this area. They can move out on the bluffs to feed and warm themselves and then move into the protection of the trees when the adverse winter weather hits. The hemlock stands (type III) interspersed with the lower rock bluffs on the east side of the valley provide winter shelter and food for mountain goats. The summer range of the these animals is high in the alpine on steep rocky craggs where they can find protection from predators such as wolves, bears and possibly cougars. As stated in Doug Chadwick's book A Beast the Colour of Winter " In North America there is one large animal that belongs almost entirely to the realm of towering rock and unmelting snow. Pressing hard against the upper limits of life's possibilities, it exists higher and steeper throughout the year than any other big beast of the continent. It is possibly the best and most complete mountaineer that ever existed on the continent."

Another large mammal that was observed fishing chum salmon in Baker Creek is the Black bear (photo 9). Numerous other signs of use, including well trodden trails with distinct paw prints in the moss of the valley floor (type III), day beds on the east slopes over looking the valley and trees marked with deep scratches (mark trees) were observed in the lower section of the property. Grizzly bears have not been sited in the valley by The Donohoes or other local residence, however, if the chum salmon was larger it would not be surprising if the odd grizzly would frequent the lower reaches of the creek for fishing.

Other mammals utilizing the forest habitat are squirrels, martins, possibly lynx, cougar, wolves. Bats can be expected utilizing any trees or snags in the forest habitat that provide cavities for nesting and roosting. Other species the shoreline and the waters in the bay are mink, river otters, harbour seal, sea-lions and possibly killer whales.

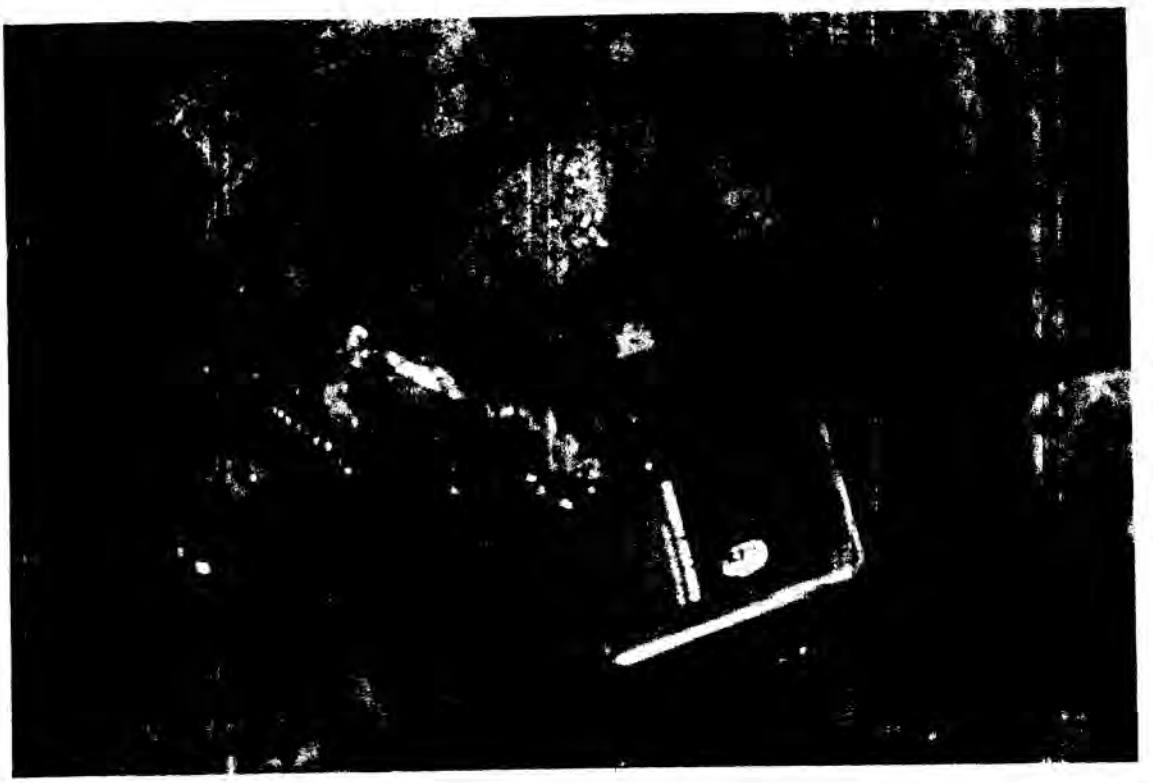

Photo 9 - Remains of a Chum salmon from a fishing black bear

PART 2 : HABITAT MANAGEMENT

2.1 Management Considerations and Recommendations

Log Dump and Storage Facilities

The preliminary location for log dumping facilities is situated on the west side of Baker Bay as shown on the forest cover map. The impacts of log dumping are most profound in intertidal areas or shallow waters. Log dumping can result in the introduction of bark and debris which can accumulate and physically smother marine organisms and their habitat. The decomposition of accumulated bark and wood releases wood leachates which reacts with the available oxygen further impairing the natural productivity of the

environment. Where log handling activities occur in shallow waters and intertidal areas, marine plants and animal communities may be affected by shading. Marine benthic invertebrates and oysters in Baker Bay could be affected by bark and debris from log dumping. Chum salmon fry in the bay could also be adversely affected by such facilities, if the operations were not carried out correctly and during the right time of year.

Procedures

Approval for log dumping and storage of logs on the British Columbia coast is administered by the Coastal Log Handling Application Guidelines under the mandate of the Ministry of Forests. An application is submitted and it is then referred to respective branches of the government for review.

Recommendations

1) Extent of oyster bed be determined and any lease holders be identified
2)Determine if herring utilize proposed log dumping or storage site

Road and bridge construction

The construction, presence and maintenance of forest roads and bridge construction can have a number of effects on aquatic systems. To be extremely brief they can result in erosion and mass wasting if not carried out correctly.

Aquatic protection measures:

- locate roads far enough back from main stream to avoid interference with stream and siltation of the water

- avoid contact with the estuary, landslides, steep narrow canyons and natural drainage channels

- minimize the number of stream crossings

Procedures

Because this is private property approval for road construction is not necessary, however because the creek bottom is Crown Land approval for bridge construction is required from Ministry of Lands, who in tern will refer the application to Ministry of Environment and Dept. of Fisheries and Oceans.

Recommendations

1) determine for sure if creek bottom is Crown Land
2) contact local Fisheries Officer re the road location and bridge design during preliminary stages
3) time of road and bridge construction is a critical consideration for not impacting on the fisheries resource

Logging

Areas to avoid in the lay out of tree removal in the valley are:

1) avoid any removal of trees along or near any of the channels bearing fish or running into fish streams

2) the timber adjacent to the rock bluffs on the east side of the valley should be maintained for mountain goat winter range

3) all snags and old stumps should be maintained for cavity users and coarse woody debris users

4) a band of vegetation should be maintain along the stream channel for the maintenance of bear habitat

Procedures

Plans for logging should be submitted to the Forest Service where they will in tarn be submitted to other resource agencies

2.2 Enhancement

Baker Creek appears to have a very low count of fish returns, according to the escapement Records and a telephone conversation with the local Fisheries Officer from Pender Harbour. However with the 1977 returns of 350 fish , the area has the potential for enhancing the chum salmon habitat to increase the returns. Further work should be carried out to look into the possibility of enhancement.

ESCAPENT RECORDS: BAKER CREEK (HOTHAM SOUND)

10 92 09:20 ☎882 DFO MALASPINA PARK 001

1965	
1966	
1968	
1969	
1974	
1975	
1976	
1977	350
1978	60
1979	
1980	
1981	
1982	
1983	
1984	

INDIVIDUAL STREAM SALMON S[illegible]

AREA 16

NAME OF STREAM BAKER CREEK

LOCATION HOTHAM SOUND

YEAR	SOCKEYE	SPAWNING DENSITY COHO	PINKS	CHUMS	[illegible]S	Steel Head
1985				100		
1986		10		1		
1987		N/I		N/I		
1988				2		
1989		I		N/I		
1990		N/I		N/I		
1991		N/O		N/O		
1992						
1993						
1994						
1995						
1996						
1997						