

APPENDIX IX

SUMMARY OF WILDLIFE RESOURCES

**SUMMARY OF WILDLIFE RESOURCES OF THE
FRASER, HOMATHKO AND KINGCOME RIVERS
IN THE AREA OF TFL 43: SCOTT PAPER LIMITED**



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1.0 INTRODUCTION

The following sections provide background information on wildlife resources in the areas encompassed by Scott Paper Limited's Tree Farm License (TFL) 43. These areas incorporate tree farming lands for broadleaf trees, primarily black cottonwood (*Populus trichocarpa*), within the watersheds of the lower portions of the Fraser, Homathko and Kingcome rivers along the southern mainland coast of British Columbia (see Map Atlas).

The objective of the review is to provide an overview of available information on wildlife populations for inclusion in a five year Management Plan covering the period 1995-1999, and to evaluate the sensitivity of wildlife resources in each of the cutting blocks. The review focuses on key species, primarily Grizzly Bears (*Ursus arctos*) (Homathko and Kingcome), Black-tailed Deer (*Odocoileus hemionus*) Bald Eagles (*Haliaeetus leucocephalus*), hawks, ducks and Canada Geese (*Branta canadensis*).

The following sections are organized to include a summary of available information on wildlife species presence and use within the three areas of TFL 43. No quantitative information existed for any species except for Bald Eagles on the Fraser River, for which winter population summaries were available from B.C. Environment publications, and nesting summaries were provided by Scott Paper. Information on coastal grizzly bears was obtained from B.C. government publications. Other information was obtained from discussions with B.C. Environment staff, and from general sources for knowledge of species range, habitat and life history.

2.0 FRASER RIVER

2.1 Description of Study Area

The Lower Fraser Block of TFL 43 covers a portion of the islands in the gravel reach of the Fraser River in the vicinity of Chilliwack. The area extends from Yaalstrick Island upstream to Cheam View Siding, and encompasses five distinct tree farming areas (see Map Atlas):

- A. Islands north of Shefford Slough and several islands ("Cromarty Islands") north of Minto Landing
- B. Small islands near the mouth of Harrison River and a parcel of river margin land south of Bateson Slough.
- C. Several islands north of Greyell Slough, including the "Carey Islands".
- D. Several large islands and river margin lands extending upriver from the Highway 9 bridge (Agassiz-Rosedale), including Herrling Island (south and east of the Seabird Island Indian Reserve), to islands due west of Cheam View Siding.

- E. Two small islands mid channel, west of the outlet of Wahleach Creek and the community of Laidlaw.

2.2 Species Present

Appendix 1 lists the major species which are known or suspected to occur on the TFL lands or in the adjacent river. The species which have been of particular note to wildlife managers are Bald Eagles, Canada Geese and Black-tailed Deer, all of which are either resident or seasonally abundant. Eagle nesting has been recorded by both provincial and federal wildlife agencies and by Scott Paper.

The numbers of nesting eagles in the area have been recorded annually since 1986 by Scott Paper, BCE and CWS. B.C. Environment has conducted winter eagle surveys along the Fraser River during most winters since 1986. Parts of TFL 43 were covered by two reconnaissance level surveys of Fraser Valley wetlands instigated by CWS and BCE in 1989 and 1992. Herrling Island was identified as an important wildlife area. Notes for this area indicated "...migrating and wintering Bald Eagles; wintering waterfowl and some nesting in sloughs; eagles, Osprey and herons. Sport fishing and duck and Goose hunting in fall" (Ward *et al.*) 1992.

The portions of the Fraser River occupied by TFL 43 are rated by the Canada Land Inventory (CLI) as having moderately severe limitations to the production of waterfowl due to free-flowing water and inundation due to the freshet. No value is given for wintering use. For the gravel bars along the main river this rating is accurate, although upland areas and large trees with cavities have value, as potential nest sites for waterfowl. However, there are some areas encompassed within this CLI rating, such as ponded water, and sloughs adjacent to the TFL islands, which offer some moderately good habitat for waterfowl and other aquatic species.

2.2.1 Amphibians and Reptiles

Parts of the TFL which are flooded annually during the freshet are not good habitat for amphibians or reptiles, except for treefrogs which are able to survive in the deciduous canopy. On higher ground, Western Toads and garter snakes would be expected, and some salamanders may occur (Appendix 1).

2.2.2 Birds

Loons, Grebes and Herons

Loons would be expected in this part of the Fraser River. Western Grebes would make use of the river and some of the more open channels during spring and fall migration. During this time they would feed on any small fish which were available, including sculpins and young salmonids. Pied-billed Grebes could be expected in small numbers in some of the quieter sloughs where they may breed.

Bitterns would only be found in the few places where suitable emergent marsh vegetation is located. Green-backed Herons would be attracted to shoreline shrub along the quieter sloughs. Great Blue Herons are quite common throughout this area at all seasons. Larger trees provide some roosting and potential nest colony sites. A heron colony is located nearby on the Vedder River. Most use is by herons feeding along shallow shorelines, primarily for small fish and invertebrates.

Waterfowl

During the nonbreeding period, Canada Geese make extensive use of some of the gravel bars, primarily for roosting. At times, several hundred birds may be present. A small number of nesting pairs would occur in areas which are above the level of the spring freshet.

The inter island channels, where velocities are low, would provide wintering habitat for buffleheads and small numbers of other species of diving ducks (Appendix 1).

Most of the wetlands associated with the Fraser River portion of TFL 43 are riverine gravel bars. This habitat may be used by small numbers of roosting Mallards, or by Common Mergansers. Some adjoining sloughs, which occur between the islands of the TFL and the southern shore of the Fraser River, are suitable habitat for dabbling ducks (Appendix 1). Migrating and wintering birds and a small number of breeders would be expected. Wintering swans may also occur in the quieter channels where marsh vegetation has become established. If they do occur, their use of particular areas would be mostly traditional, although some casual use may occur, particularly when areas of adjacent upland habitat are frozen over.

Other Aquatic Birds

Where marsh vegetation has established along slough shorelines, rails (Virginia and Sora) may occur as breeders, and coots are potential wintering birds.

Small numbers of migrating and wintering shorebirds (Appendix 1) would use sand and mud flats. Killdeer would occur year around, nesting on the higher portions of gravel bars and other open areas not flooded by the spring freshet. Spotted sandpipers are also likely nesters along open sandy shorelines with sparse, low vegetation. Common Snipe would nest in wet open marshy areas which were not inundated during the freshet.

Several gull species (Appendix 1) can be expected to roost on the river bars and forage along the shorelines, particularly during the nonbreeding period.

Suitable nest sites for kingfishers to not occur within the TFL, however, birds feeding on small fish can be expected at any time of the year, particularly along tree lined sloughs where they can find suitable foraging perches.

Osprey, Eagles and Hawks

While several species of diurnal birds of prey likely occur on TFL 43 (Appendix 1), Bald Eagles and Red-tailed Hawks would be the most numerous and Ospreys would occur regularly. Ospreys could be expected at all times of the year and are a potential nesting species. Nests are placed near the top of dead or living trees or man made structures. Dead trees and large snags are preferred for nest sites (Campbell, *et al.* 1990). Nesting pairs of Red-tailed hawks would be present year round. The larger deciduous trees, particularly cottonwoods, are used for nest sites.

Bald Eagles are present year around. Records compiled by Scott Paper (Ken Stenerson *pers comm*), indicate that between 1986 and 1993 there were between two and four active eagle nests on TFL 43, with a total known production of two to four young per year. Two of these nests were on Herrling Island (both produced young in 1993), one on Carey Island (active but no young produced in 1993) and two on "Island 20" (Island 20 East nest produced young in 1993). The five nest sites represent 18% of the 28 nests which have been identified between the Ruskin in the west and Hope in the east (Stenerson *pers. comm.*).

The greatest amount of use of TFL lands by Bald Eagles occurs during the nonbreeding season, when eagles gather to feed on salmon during the fall and winter runs. During this time, they use the larger trees along the river shoreline and on the islands in the river for roosting. Eagles begin to gather in late October, reaching a peak between mid December and mid January, then falling off to a low by the first of March. The numbers observed in 1988, which are representative of the numbers to be expected most years (D. Dunbar, *pers. comm.*), ranged between 130 and 245 for Herrling Island, between 7 and 23 for Cromarty and Queens Islands and between 8 and 36 for Carey Island. During this time, the total eagle count between Nicomen Island and Agassiz (including Harrison Bay) was between almost 600 and almost 1500 birds (Farr 1988). During the midwinter count (January 10, 1988) the birds in and adjacent to the TFL comprised 19% of the birds between Nicomen Island and Agassiz, including Harrison Bay, or 45% of the birds on the Fraser River only through this same area (Farr 1988). Of all the eagles counted on the Fraser River between North Delta and Hope, 29% were in or adjacent to TFL 43 (Farr and Dunbar 1988).

Other hawks which would be expected include Accipiters, harriers and Merlins (Appendix 1).

Other Terrestrial Nonpasserines

Resident Ruffed Grouse occur in deciduous habitats of the TFL. Members of the pigeon family are likely visitors and Band-tailed Pigeons are potential nesters.

Several owl species are likely to occur (Appendix 1) of which Great Horned Owls and Long-eared Owls are potential nesters, while other species are most likely as migrant or wintering birds.

Any hollow snags in the TFL would provide potential roost and nest sites for the Vaux's Swift, although these islands do not otherwise provide optimum habitat. Rufous Hummingbirds are potential nesters where flowering shrubs or annual plants occur. Deciduous or coniferous trees are suitable for nesting.

Five species of woodpeckers are resident on the TFL islands (Appendix 1). The deciduous shrub and forest habitats are particularly attractive to Downy and Hairy Woodpeckers. Nesting would occur where there are dead or dying trees with sufficient diameter for the birds to excavate a cavity. Generally, trees of less than 20 cm diameter would probably not be suitable (Campbell *et al.* report an inner diameter of 11 cm for one Hairy Woodpecker nest cavity). Pileated Woodpeckers would only be attracted to groves of large trees.

Passerines

Many species of Passerines would occur (Appendix 1) as either breeders, migrants, winter birds or residents. Some of the more common residents include Steller's Jays, crows, Black-capped Chickadees, robins, Song Sparrows and juncos. The most common breeding birds (other than residents) in the deciduous forest would include Warbling and Red-eyed Vireos, Yellow, Orange-crowned and Yellow-rumped Warblers and Black-headed Grosbeaks.

2.2.3 Mammals

Marsupials and Insectivores

Opossums would occur on those islands which are connected to the south shore of the Fraser River, and would be present year around in areas which are above the freshet flooding. Several shrew species and the Coast Mole would also be expected in higher areas connected to the north or south shorelines of the river.

Bats

A number of bat species potentially feed over the TFL or the adjacent water areas. Seven of the 10 species listed in Appendix 1 will roost during the summer in trees, usually under the bark or in cavities of mature trees (Nagorsen *et al.* 1993).

Rodents

Creeping and Townsend's Voles and Deer Mice would be expected to occur on the higher, vegetated areas of the TFL, and would, with shrews and other small mammals provide food for Red-tailed Hawks and other raptors.

Muskrats would be found in the adjacent sloughs. Beavers lodge in the slough banks. These animals, and those moving along the river, come ashore to cut cottonwood trees and other deciduous trees and shrubs.

Carnivores

Coyotes are the only member of the dog family which would occur with any consistency. Coyotes regularly hunt the most accessible islands.

Small numbers of Mink and River Otters are to be expected along the shorelines, and would be most common during fish spawning runs. Other mustelids, such as skunks and ermine are likely visitors or residents of the larger islands with connections to the mainland.

Black Bears occur on these islands, although their status is unknown. Two sets of old tracks were observed in September 1992 on islands of area "C" of TFL 43 (report Section 2.1 of this report).

Ungulates

Black-tailed Deer are the only ungulates on the islands. Deer are resident on the islands (Forbes, *pers. comm.*), occurring throughout much of the TFL. There are no population estimates. Deer are browsers and would depend largely on shrubs for food. Plants on which browsing has been observed in TFL 43 include *Trifolium* sp., red-osier dogwood (*Cornus stolonifera*), Scouler's willow (*Salix scouleriana*) and rose (*Rosa nutkana* sp.) (*pers. obs*). Forested areas provide shelter and protection.

3.0 HOMATHKO RIVER

3.1 Description of Study Area

The Homathko River flows into Bute Inlet on the mainland coast of British Columbia, approximately 300 km northwest of Vancouver. The 5830 km² drainage basin is approximately 21% glaciated. The river drains headwaters and lakes on the Chilcotin Plateau, descending sharply down the coast Mountain Range, entering the lower Homathko Valley downstream from Waddington Canyon (Bengeyfield *in* Zallen and Faulkner, 1989). The Homathko portions of TFL 43 all occur in the lower valley, from the mouth of the valley, 35 km upstream to near Scar Creek (see Map Atlas). Cumsack Creek, a tributary to the Homathko, enters at the estuary, in TFL 43. The Homathko estuary is about 385 ha in size (Choromanski *et al.* 1989).

Because of the large proportion of glacially-fed tributaries, seasonal flows and suspended sediment loads in the river are highest between May and September, with peak flows in July of approximately 700 m³/s. Temperatures during the summer rarely exceed 10°C (Bengeyfield *et al.* *in* Zallen and Faulkner, 1989).

3.2 Species Present

Appendix 1 lists the major species which are known or suspected to occur on the TFL lands or in the adjacent river and estuary. The species of particular concern in the

Homathko watershed is the grizzly bear. The upper reaches of the TFL would be used by a variety of deciduous forest dwelling birds and mammals. The river itself may not receive much wildlife use in summer because of the speed, and the murkiness caused by the sediment laden glacial waters. At other times, species such as mink, otters and dippers would be expected.

The estuary immediately adjacent to TFL 43 has values for wintering and migrating waterfowl and eagles, Mink and River Otters, in addition to Grizzly Bears. The mouth of the Cumsack is used by Beavers and geese (Forbes, *pers. comm.*).

The river and estuary would probably receive its highest wildlife use during spawning runs of salmon and eulachons. In the fall and early winter, spawning salmon would be present. In the spring, young salmon moving downstream to the sea and spawning eulachons would attract predators. During these times, species such as loons, Horned, Red-necked and Western Grebes, Double-crested and Pelagic Cormorants, Great Blue Herons, murrelets and other alcids, Mallards, mergansers, Bald Eagles, gulls, kingfishers, dippers, bears, mink and River Otters would respond to this abundant supply of food, feeding on live and decaying fish and on eggs.

3.2.1 Amphibians and Reptiles

Parts of the TFL which are flooded annually during the freshet are not good habitat for amphibians or reptiles, except for treefrogs which are able to survive in the deciduous canopy. Away from the floodplain, Western Toads and garter snakes would be expected, and some salamanders may occur (Appendix 1).

3.2.2 Birds

Loons, Grebes and Herons

Members of these species groups would occur entirely on the estuary or lowest reaches of the river. Common and Pacific Loons would occur mainly as spring and fall migrants.

A few Horned Grebes would winter here, with numbers peaking during spring and fall migration. Western Grebes occur in the inlet from fall through spring, and 300 were recorded at the estuary on 31 October 1979 (Coastal Waterbird Inventory File (CWIF)). They may enter the lower reaches of the river.

Great Blue Herons would not be abundant here, but small numbers regularly use the estuaries in the coastal inlets. A heron was recorded on 2 out of 6 aerial surveys (during winter, spring and fall) of the Homathko Estuary (CWIF). Herons may also forage up the river, particularly during times when flows and silt content are low.

Waterfowl

During six aerial inventories conducted in the late winter, spring or fall between 1976 and 1980 (CWIF) the following maximum numbers of birds were recorded at the Homathko Estuary (estuary front to lower river):

Swans	88		21 February 1980
Canada Geese	300		6 February 1976
Dabblers	715	(689 Mallards, 26 Pintails)	1 April 1980
Scaup sp.	2		6 February 1976
Goldeneye sp.	2		21 November 1977
Merganser sp.	12		1 April 1980

The highest period of use by waterfowl would be during the migration and wintering period. Breeding birds would include a few Canada Geese and Mallards. The large number of Mallards and the highest recorded number of mergansers both occurred on 1 April 1980. These birds may have been responding to an event such as the eulachon spawn (Zallen and Faulkner, 1989).

Wintering swans would be Trumpeter Swans. Swans were recorded at the head of Bute Inlet on all six surveys, and on the Homathko estuary during four of these.

Canada Geese are present both as breeders and migrating/wintering birds. During the summer, numbers would be low. Breeding is possible in association with isolated ponds or Beaver ponds of the lower Cumsack River and similar areas occurring along the Homathko.

Mallards, Wigeon, Pintails and Green-winged Teal have all been recorded at the head of Bute Inlet (CWIF), and all of these dabbling duck species likely occur on the Homathko Estuary.

Similarly, of the diving ducks, scaup sp., Bufflehead, goldeneye sp., scoters (3 species) and merganser sp. have been recorded at the head of Bute Inlet and would use the Homathko estuary. During winter low flows, Buffleheads and Common Goldeneye would use ponds or backwaters and side channels occurring within TFL 43.

Other Aquatic Birds

Gull species likely to occur on the Homathko Estuary and River are listed in Appendix 1. Gulls would be most abundant on migration, with winter numbers being lower. During the summer, few gulls would be expected. On six aerial surveys of the Homathko estuary, a peak of 145 gulls on 1 April 1980 (CWIF), coincided with the peak of dabbling ducks and mergansers, perhaps in response to the eulachon spawn.

Small numbers of migrating shorebirds would stop here, although few, if any, of these would winter on the estuary. Breeding sandpipers would include Killdeer, Spotted Sandpipers and Common Snipe in appropriate habitats (see Fraser River).

A small number of kingfishers would be expected at any time of the year. For breeding birds to be present, cutbanks would have to occur near the TFL. Kingfishers would be associated with the estuary all year, moving up the river during periods when the turbidity was lowest (late fall through early spring).

Dippers would probably not occur during the breeding season because the Homathko and its major tributaries are fed by glaciers, resulting in high turbidity during the summer. Wintering birds may be attracted to the area, particularly during the fish spawning periods, when they would feed on dislodged eggs.

Osprey, Eagles and Hawks

Ospreys are present in small numbers along the coast and have been recorded at the head of Bute Inlet (Campbell *et al.* 1990). Little use would likely occur upstream from Homathko IR 1.

Bald Eagles may use trees of the lower part of TFL 43 for perching or, potentially, for nesting (in spruce or other conifers). Their presence in the area would be associated with the estuary, and their numbers would be highest during the spring and fall salmon and eulachon spawning seasons (Johnston *pers. comm.*). No seasonal concentration of eagles has been recorded here (Campbell *et al.* 1990).

Red-tailed Hawks and all three accipiter species are potential residents of TFL 43 deciduous forest.

Other Terrestrial Nonpasserines

Ruffed Grouse would be resident in the deciduous woodlands of the valley bottom, encompassed by TFL 43. Blue Grouse from adjacent coniferous hillsides may occasionally stray through.

Band-tailed pigeons have been recorded in the Bute Inlet area between June and August (Campbell *et al.* 1990), although there are no breeding records at this latitude. Their presence in the TFL during the summer would not be unexpected. Mourning Doves are unlikely to occur here, although they are present as nonbreeders this latitude on the coast, particularly during the fall and winter.

Several owl species are likely to occur (Appendix 1) and Great Horned Owls and Long-eared Owls are potential nesters, while other species are most likely as migrant or wintering birds. Western Screech Owls (resident), Northern Saw-whet Owls (resident) and Northern Pygmy-owls (nonbreeding in TFL) are all likely to be present year around in the vicinity, and potentially in the TFL, although pygmy owl habitat is probably restricted to coniferous forest during the breeding season.

Hollow snags of the TFL provide potential roost and nest sites for the Vaux's Swift, although the old-growth coniferous forest of adjacent hillsides would be optimum

habitat. Rufous Hummingbirds are potential nesters where flowering shrubs or annual plants occur. Deciduous or coniferous trees are suitable for nesting.

Five species of woodpeckers would be resident in the TFL forest (Appendix 1). The deciduous shrub and forest habitats are particularly attractive to Downy and Hairy Woodpeckers. Nesting requirements would be the same as discussed for the Fraser. Pileated Woodpeckers would likely be attracted only to areas with mature trees.

Passerines

Many species of Passerines would occur (Appendix 1) as either breeders, migrants, winter birds or residents. Some of the more common residents to be expected include Steller's Jays, Northwestern Crows, Black-capped Chickadees, Winter Wrens, robins, Song Sparrows and juncos. The most common breeding birds (other than residents) would include Swainson's Thrushes, Warbling and Red-eyed Vireos, Yellow, Orange-crowned and Yellow-rumped Warblers, Common Yellowthroats and Black-headed Grosbeaks. Finches, mostly associated with adjacent coniferous forest would include Pinesiskins, Red Crossbills and Evening Grosbeaks. The finches would not likely breed in the deciduous forest areas of TFL 43, but some species would feed here during the nonbreeding period.

3.2.3 Mammals

Insectivores

Three or four shrew species (Appendix 1) would occur in the TFL 43 forest.

Bats

Several Bat species (Appendix 1) would feed over the TFL or over adjacent water. Most of these may find summer roosts in those trees which are large enough to have loose bark or cavities (Nagorsen *et al.* 1993).

Rabbits and Rodents

Snowshoe Hares would be present in the watershed, and are expected in TFL 43.

Creeping Voles and Deer Mice would be expected in this area, with the latter probably being quite abundant. Squirrels would range into the TFL lands from the adjacent coniferous forest mountainsides, particularly where spruce or other conifers are present.

Beavers would occur in backwater areas, particularly at the mouth of the Cumsack River. Where present, they would cut adjacent cottonwoods for food and for dam construction. Beaver ponds provide habitat for other species such as nesting waterfowl.

Carnivores

Wolves are the only canid occurring on this part of the coast. Due to the low ungulate populations, wolf numbers would probably be low. Cougar numbers would also be expected to be low as a result of the small ungulate populations.

Mustelids presence in TFL 43 deciduous forest would depend on the availability of small mammals or fish for food. Ermine, mink and otters would occur at any time of the year. Marten prefer higher elevation coniferous habitats but may be present in the valley bottom floodplain mixed deciduous/spruce forests, particularly during the nonbreeding period (Cowan & Guiguet 1965). Both black and grizzly bears occur in the Homathko Valley. The grizzly population is about eight bears. A history of shooting problem bears in nearby areas has kept the population at the current level (Forbes *pers. comm.*).

Grizzly Bears

McLellan (1990) has identified three ways that forest management can affect grizzly bear populations, namely: 1) displacement, 2) habitat alteration, and 3) increasing mortality rates directly or indirectly by improving access for hunters, poachers, other resource users, and settlers. The issues of displacement and access do not apply to TFL 43 because harvesting takes place during the winter (when bears are denning) and primary access is by water or aircraft only. To address the effects of habitat alteration, some knowledge of grizzly bear biology is necessary. The life history and habitat requirements of coastal Grizzlies has been the subject of several years of study, the results of which apply generally to the bears using the Homathko estuary.

Grizzly Bears have large home ranges which take them well beyond the boundaries of TFL 43 for parts of the year. Their home ranges in the Kluane valley ranged from a minimum of 22.5 km² for an adult female to 134.5 km² for an adult male (n = 22 bear years for 16 bears) (MacHutchon *et al.* 1993). The average sizes were similar to those in other coastal studies. This fact has important implications for bear habitat management, particularly when there is multiple tenure of small parcels (Hamilton *pers. comm.*). Consequently, effective management must take place at three or four landscape scales (Hamilton and Bunnell *in press*). For the purpose of this report, those aspects which can be addressed at the smallest management level are of particular importance. These have to do primarily with habitat modifications and food production.

During the winter months, Grizzlies are inactive. Their active period has been divided into seasons, as defined by their diet and foraging locations. These seasons are essentially defined as forb use, berry use and salmon use periods (Table 1).

Grizzlies eat a variety of food items including plants, terrestrial and marine invertebrates, fish and mammals (Appendix 2). Essential items include salmon and a variety of plants. Bear researchers have prioritized plants of importance to bears (Hamilton *et al.* 1991, MacHutchon 1993) such that they can be placed into three groups of primary and secondary and tertiary importance. The latter group would include species, such as those which are listed in Appendix 2, but which do not appear in the following list. The most important plant foods include:

Primary Importance

Devil's club	<i>Oplopanax horridus</i>
Skunk cabbage	<i>Lysichitum americanum</i>
Cow parsnip	<i>Heracleum spondylium</i>
White angelica	<i>Angelica</i> spp.
Red elderberry	<i>Sambucus racemosa</i>
Red raspberry	<i>Rubus idaeus</i>
Salmonberry	<i>Rubus spectabilis</i>
<i>Vaccinium</i> spp.	<i>Vaccinium</i> spp.
<i>Ribes</i> spp.	<i>Ribes</i> spp.
Black twinberry	<i>Lonicera involucrata</i>
Highbush-cranberry	<i>Viburnum edule</i>

Secondary Importance

Lady-fern	<i>Athyrium felix-femina</i>
Water parsley	<i>Oenanthe sarmentosa</i>
Hemlock Parsley	<i>Conioselinum pacificum</i>
Red-osier dogwood	<i>Cornus sericea</i>
Thimble berry	<i>Rubus parviflorus</i>

Table 1. Seasons of coastal grizzly bear activity.

Season (MacHutchon <i>et al.</i> 1993)	Definition	Season (Weaver <i>et al.</i> in Hamilton <i>et al.</i> 1991)	Start	Definition
1	Lasts from den emergence until berries are the major food item in the diet. During this season grizzly bears eat a variety of herbaceous plants.	1	Early April	• Den emergence to valley floor leaf flush to avalanche chute green-up
		2	Late May	• Avalanche chute green-up to berry availability (includes use of estuary)
2	Lasts from the end of season 1 until salmon becomes the major grizzly bear food item. During this season, bears eat a variety of berries as well as several different forbs.	3	Late June	Berry availability to salmon availability
3	Lasts from the end of season 2 until grizzly bears enter winter dens. During this season, grizzly bears feed primarily on spawning salmon and their spawned-out carcasses. In the late fall, when salmon become scarce, bears also feed on a variety of forbs, especially skunk cabbage	4	Late August	• Salmon availability to den entrance
		5	Early Nov	• Denning

Preferred forest harvest and silviculture techniques are those which minimize the impact on food species. This would involve ensuring the salmon producing capability of the river, and encouraging suitable plant communities. These practices, as they address such subjects as tree spacing and use of herbicides (particularly glyphosate), are outlined in Hamilton *et al.* 1991, 1992 and in press. In short, tree canopy closure (particularly in coniferous forests) is the greatest detriment to the production of berries

and other foods used by bears. At the same time, adjacent shelter stands of mature forest are also necessary.

Ungulates

Ungulates are not common in the Homathko valley. Moose are rare (one once recorded) because of the absence of suitable passes to the interior. The black-tailed deer population is low. Mountain Goats (about 30) occur on the adjacent ranges, but would not likely enter the valley floor (Forbs *pers. comm.*).

4.0 KINGCOME RIVER

4.1 Description of Study Area

Kingcome River flows south into Kingcome Inlet, approximately 400 km northwest of Vancouver (see Map Atlas). Like the Homathko River, the Kingcome River receives a large amount of input from glacial melt and exhibits a similar pattern of runoff, namely peak flows and elevated suspended sediment levels during the summer months. The river is approximately 50 km long, with a drainage area of approximately 900 km² (Zallen *et al.* 1989).

The Kingcome Block of Scott Paper Ltd.'s TFL 43 is situated in the lower regions of this system, extending downstream from below Gatsala River to approximately 12 km upstream from the Kingcome estuary. Within this area, the TFL is comprised of three separate blocks (see Map Atlas) (Zallen *et al.* 1989). The floodplain was logged in the 1920s (B.C. Parks 1993).

Kingcome Village, approximately 4 km upstream from the mouth of the river, and an International Forest Products logging camp at the river mouth are the only nearby habitations. Active logging occurs in the valley and log sorting and dumping occurs in a small portion of the estuary (Zallen 1989). The estuary of the Kingcome River possess extensive sand and mudflats.

The two sections of Kingcome/Atlatzi Rivers Ecological Reserve (#40) are located adjacent to the lower, larger section of TFL 43. The reserve is characterized by extensive stands of lodgepole pine in a fen-swamp environment, which displays an unusual diversity of swamps, associated fens and pine bogland in a coastal valley bottom. Better drained sites support Sitka spruce, western hemlock and western red cedar. The southern unit's hardhack swamps give way to mixed woods containing cottonwood, red alder, Sitka spruce and hemlock (B.C. Parks 1993).

4.2 Species Present

Appendix 1 lists the major species which are known or suspected to occur on the TFL lands or in the adjacent river. Like the Homathko River, the species of particular concern in the Kingcome watershed is the Grizzly Bear. The TFL would be used by a variety of deciduous forest dwelling birds and mammals. The river itself may not

receive much wildlife use in summer because of the murkiness caused by the sediment laden glacial waters. At other times, species such as mink, otters and dippers would be expected.

Downstream from TFL 43, the Kingcome estuary has values for wintering and migrating waterfowl and eagles, mink and river otters, in addition to grizzly bears.

The river and estuary would probably receive its highest wildlife use during spawning runs of salmon and eulachons. In the fall and early winter spawning salmon would be present in the river. In the spring, young salmon moving downstream to the sea and spawning eulachons (in the estuary) would attract predators. During these times, species such as Great Blue Herons, Mallards, mergansers, Bald Eagles, gulls, kingfishers, dippers, bears, mink and river otters would respond to this abundant supply of food, feeding on live and decaying fish and on eggs in the river through TFL 43. Additional species, such as loons, Horned, Red-necked and Western Grebes, Double-crested and Pelagic Cormorants, murrelets and other alcids would be found downstream at the estuary.

4.2.1 Amphibians and Reptiles

Use of the Kingcome portion of TFL 43 by amphibians and reptiles would be similar to the Homathko River portion. Parts of the TFL which are flooded annually during the freshet are not good habitat for these species groups. Away from the floodplain, Western Toads and garter snakes would be expected, and some salamanders may occur (Appendix 1).

4.2.2 Birds

Loons, Grebes and Herons

Loons and grebes would not occur up the river in the vicinity of TFL 43, except that Pied-billed Grebes may breed in beaver ponds or in bog-fen areas with standing water.

Great Blue Herons would be expected in small numbers along the river, particularly in areas, or at times when small fish (such as salmonid fry) were abundant and the water turbidity was low. On the estuary, 3 herons were recorded on 2 occasions out of the 4 aerial surveys.

Waterfowl

Wintering and migrating waterfowl would be most abundant on the estuary. In the TFL area, wintering Trumpeter Swans, Canada Geese, Mallards, Buffleheads and Common Mergansers might occur on backwaters, bogs or beaver ponds during periods when they were not frozen. Potential breeders in Ponded areas include Canada Geese, Mallards, Common Mergansers and Hooded Mergansers. Mergansers require hollow trees for nest sites. Appendix 1 lists waterfowl species expected to occur within TFL 43.

Activities in the watershed have the potential to effect downstream wildlife values. Currently, many waterfowl use the estuary during the nonbreeding season. Four aerial surveys have been done of the estuary (CWIF). These surveys did not usually distinguish whether birds observed were in dyked and undyked areas. The maximum numbers of waterfowl recorded on these surveys were:

Canada Geese	125	(within dykes)	1 April 1980
Dabblers	45		15 October 1966
Goldeneye sp.	66		2 November 1979
Surf Scoters	15	}	1 April 1980
Unident diving ducks	75	} 107 diving ducks	1 April 1980
Merganser sp.	17	}	1 April 1980

Other Aquatic Birds

Gulls would not be very common on the river (Appendix 1). Gulls on the estuary would be most abundant on migration, with winter numbers being lower. During the summer, few gulls would be expected. On four aerial surveys of the Kingcome estuary, a peak of 600 gulls on 1 April, 1980 (CWIF), coincided with the peak of diving ducks, including mergansers, perhaps in response to an eulachon spawn.

Small numbers of migrating shorebirds would stop on the estuary, although few, if any, of these would winter here. Breeding sandpipers expected in the TFL would include Killdeer, Spotted Sandpipers and Common Snipe in appropriate habitats (see Fraser River).

Kingfishers would be expected at any time of the year. For breeding birds to be present, cutbanks would have to occur near the TFL. Birds would be associated with the estuary all year, moving up the river during periods when the turbidity was lowest (late fall through early spring).

Dippers would probably not occur during the breeding season because the Kingcome and its major tributaries are fed by glaciers, resulting in high turbidity during the summer. Wintering birds may be attracted to the area, particularly during the fish spawning periods, when they would feed on dislodged eggs.

Osprey, Eagles and Hawks

Ospreys are present in small numbers along the coast and could potentially occur at the estuary, but are less likely to be attracted to the TFL forests.

Use of TFL 43 by Bald Eagles would likely be low. Bald Eagles may use trees near the estuary for perching or, potentially, for nesting (in spruce or other conifers). Their presence in the area would be highest during the spring and fall fish spawning seasons. No seasonal concentrations have been recorded here (Campbell *et al.* 1990).

Northern Harriers have been recorded at the estuary (Campbell *et al.* 1990). The open marsh habitat of the Ecological Reserve adjacent to TFL 43 may also provide some habitat, but birds would avoid the forested TFL lands.

Red-tailed Hawks and all three species of accipiters are potential residents of TFL 43 deciduous forest.

Other Terrestrial Nonpasserines

Ruffed Grouse would be resident in the deciduous woodlands of the valley bottom, encompassed by TFL 43. Blue Grouse from adjacent coniferous hillsides may occasionally stray through.

Band-tailed pigeons have not been recorded in the Kingcome Inlet area (Campbell *et al.* 1990). Although there are no breeding records at this latitude, their presence in the TFL during the summer would not be unexpected. Mourning Doves are unlikely to occur within the TFL forest, although they have been recorded at the estuary in the fall (Campbell *et al.* 1990).

Other species likely to occur in the TFL 43 forest are listed in Appendix 1. The discussion on owls, swifts, hummingbirds and woodpeckers for the Homathko River would also apply to the Kingcome River TFL 43 forests.

Passerines

Many species of Passerines would occur (Appendix 1) as either breeders, migrants, winter birds or residents. For further information on the species which would occur most commonly, see the discussion for the Homathko River.

3.2.3 Mammals

Insectivores

Three or four shrew species (Appendix 1) would occur in the TFL 43 forest.

Bats

Several Bat species (Appendix 1) would feed over the TFL or over adjacent water. Most of these may find summer roosts in those trees which are large enough to have loose bark or cavities (Nagorsen *et al.* 1993).

Rabbits and Rodents

Snowshoe Hares would be present in the watershed, and are expected in TFL 43.

Creeping Voles and Deer Mice are expected to be present in this area, with the latter probably being quite abundant. Squirrels would range into the TFL lands from the

adjacent coniferous forest mountainsides, particularly where spruce or other conifers are present.

Beavers may occur (Doyle *pers. comm.*) in any backwater areas. Where present, they would cut adjacent cottonwoods for food and dam construction. Beaver ponds provide habitat for other species such as nesting waterfowl.

Carnivores

Wolves are the only canid occurring on this part of the coast. Due to the low ungulate populations, wolf numbers are low (Johnston *pers. comm.*). Cougar numbers are also low (Johnston *pers. comm.*) as a result of the small ungulate populations.

As for the Homathko River, mustelid presence in TFL 43 deciduous forest would depend on the availability of small mammals or fish for food. Ermine, mink and otters would occur at any time of the year. Marten prefer higher elevation coniferous habitats but may be present in the valley bottom floodplain mixed deciduous/spruce forests, particularly during the nonbreeding period (Cowan & Guiguet 1965). Both black and grizzly bears occur in the Kingcome Valley (Johnston *pers. comm.*). A logging community and Indian reserve occur at the mouth of the Kingcome River and hunting has kept the Grizzly population low (Johnston *pers. comm.*).

Grizzly Bears

The discussion on grizzly bears for the Homathko River would also be applicable on the Kingcome River. In Appendix 3 is a description of the Kingcome/Atlatzi Rivers Ecological Reserve (#40) which is adjacent to TFL 43. It includes a list of plants identified there by Hans Roemer, in August 1984. Those grizzly bear food species which occur in Table 1 and Appendix 2 are identified in the list in Appendix 3.

Ungulates

Moose do not occur in the Kingcome Valley. The black-tailed deer population is currently low (Johnston, Doyle *pers. comm.*).

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Appendix 1. Wildlife species occurrence on or immediately adjacent to TFL 43.

SPECIES	Fraser	Homathko	Kingcome
CLASS AMPHIBIA: Amphibians			
ORDER CAUDATA: Salamanders			
Rough-skinned Newt (<i>Taricha granulosa</i>)	✓	✓	✓
Northwestern Salamander (<i>Ambystoma gracile</i>)	✓	✓	✓
Long-toed Salamander (<i>A. macrodactylum</i>)	✓	✓	✓
ORDER ANURA: Frogs and Toads			
Tailed Frog (<i>Ascaphus truei</i>)		?	?
Western Toad (<i>Bufo boreas</i>)	✓	✓	✓
Pacific Treefrog (<i>Hyla regilla</i>)	r	✓	?
CLASS REPTILIA: Reptiles			
ORDER SQUAMATA: Lizards and Snakes			
Western Garter Snake (<i>Thamnophis elegans</i>)	✓	✓	✓
Northwestern Garter Snake (<i>T. ordinoides</i>)	✓	?	?
Common Garter Snake (<i>Thamnophis sirtalis</i>)	✓	✓	✓
CLASS AVES: Birds			
ORDER PODICIPEDIFORMES : Grebes			
FAMILY PODICIPEDIDAE: Grebes			
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	✓	✓	✓
Western Grebe (<i>Podiceps auritus</i>)	r	✓	
ORDER CICONIIFORMES: Bitterns, Herons, Egrets, Ibises and Storks			
FAMILY ARDEIDAE: Bitterns, Herons and Egrets			
American Bittern (<i>Botaurus lentiginosus</i>)	✓	✓	✓
Great Blue Heron (<i>Ardea herodias</i>)	r	✓	✓
Green-backed Heron (<i>Butorides striatus</i>)	✓		
ORDER ANSERIFORMES: Swans, Geese and Ducks			
FAMILY ANATIDAE: Swans, Geese and Ducks			
Tundra Swan (<i>Cygnus columbianus</i>)	o	o	
Trumpeter Swan (<i>Cygnus buccinator</i>)	✓	✓	o
Greater White-fronted Goose (<i>Anser albifrons</i>)		o	
Canada Goose (<i>Branta canadensis</i>)	r	✓	✓
Wood Duck (<i>Aix sponsa</i>)	✓	o	o
Green-winged Teal (<i>Anas crecca</i>)	✓	✓	✓
Mallard (<i>Anas platyrhynchos</i>)	✓	✓	✓
Northern Pintail (<i>Anas acuta</i>)	o	✓	o
Blue-winged Teal (<i>Anas discors</i>)	o	✓	✓
Cinnamon Teal (<i>Anas cyanoptera</i>)	o	o	o
Northern Shoveler (<i>Anas clypeata</i>)	o	o	o
Gadwall (<i>Anas strepera</i>)	o	✓	o
Eurasian Wigeon (<i>Anas penelope</i>)	o	o	
American Wigeon (<i>Anas americana</i>)	✓	✓	✓
Canvasback (<i>Aythya valisineria</i>)	o	✓	

SPECIES	Fraser	Homathko	Kingcome
Redhead (<i>Aythya americana</i>)	o	o	
Ring-necked Duck (<i>Aythya collaris</i>)	✓	o	o
Greater Scaup (<i>Aythya maria</i>)	o	✓	
Lesser Scaup (<i>Aythya affinis</i>)	✓	✓	o
Harlequin Duck (<i>Histrionicus histrionicus</i>)		✓	o
Common Goldeneye (<i>Bucephala clangula</i>)	✓	✓	✓
Barrow's Goldeneye (<i>Bucephala islandica</i>)		✓	
Bufflehead (<i>Bucephala albeola</i>)	✓	✓	✓
Hooded Merganser (<i>Lophodytes cucullatus</i>)	✓	✓	✓
Common Merganser (<i>Mergus merganser</i>)	✓	✓	✓
Red-breasted Merganser (<i>Mergus serrator</i>)	o	✓	
ORDER FALCONIFORMES: Diurnal Birds of Prey			
FAMILY ACCIPITRIDAE: Osprey, Eagles and Hawks			
Osprey (<i>Pandion haliaetus</i>)	✓	✓	o
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	r	✓	✓
Northern Harrier (<i>Circus cyaneus</i>)	✓	✓	
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	✓	✓	✓
Cooper's Hawk (<i>Accipiter cooperii</i>)	✓	✓	✓
Northern Goshawk (<i>Accipiter gentilis</i>)	✓	✓	✓
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	✓	✓	✓
FAMILY FALCONIDAE: Falcons			
Merlin (<i>Falco columbiarius</i>)	✓	✓	✓
Peregrine Falcon (<i>Falco peregrinus</i>)	o	✓	o
Gyr Falcon (<i>Falco rusticolus</i>)	o		
ORDER GALLIFORMES: Gallinaceous Birds			
FAMILY PHASIANIDAE: Partridge, Grouse, Ptarmigan, Turkey and Quail			
Ruffed Grouse (<i>Bunasa umbellus</i>)	r	✓	✓
ORDER GRUIFORMES: Cranes, Rails and Allies			
FAMILY RALLIDAE: Rails, Gallinules and Coots			
Virginia Rail (<i>Rallus limicola</i>)	✓	o	o
Sora (<i>Porzana carolina</i>)	✓	o	o
American Coot (<i>Fulcia americana</i>)	✓	✓	✓
ORDER CHARADRIIFORMES: Shorebirds, Gulls, Auks and Allies			
FAMILY CHARADRIIDAE: Plovers			
Killdeer (<i>Charadrius vociferus</i>)	✓	✓	✓
FAMILY SCOLOPACIDAE: Sandpipers, Phalaropes and Allies			
Greater Yellowlegs (<i>Tringa melanoleuca</i>)	o	✓	o
Lesser Yellowlegs (<i>Tringa flavipes</i>)	o	✓	o
Solitary Sandpiper (<i>Tringa solitaria</i>)	✓	✓	✓
Spotted Sandpiper (<i>Actitis macularia</i>)	✓	✓	✓
Whimbrel (<i>Numerius phaeopus</i>)		o	
Dunlin (<i>Calidris alpina</i>)		o	

SPECIES	Fraser	Homathko	Kingcome
Long-billed Dowitcher (<i>Limodromus scolopaceus</i>)		o	
Common Snipe (<i>Gallinago gallinago</i>)	✓	✓	✓
FAMILY LARIDAE: Jaegers, Skua, Gulls and Terns			
Bonaparte's Gull (<i>Larus philadelphia</i>)	✓	✓	
Mew Gull (<i>Larus canus</i>)	✓	✓	o
Ring-billed Gull (<i>Larus delawarensis</i>)	✓		
California Gull (<i>Larus californicus</i>)	✓	✓	
Herring Gull (<i>Larus argentatus</i>)	✓	✓	
Thayer's Gull (<i>Larus thayeri</i>)	✓	o	
Glaucous-winged Gull (<i>Larus glaucescens</i>)	r	✓	o
ORDER COLUMBIDAE: Pigeons and Dove			
FAMILY COLUMBIDAE: Pigeons and Doves			
Rock Dove (<i>Columba livia</i>)	o		
Band-tailed Pigeon (<i>Columba fasciata</i>)	✓	✓	✓
Mourning Dove (<i>Zenaida macroura</i>)	✓		?
ORDER STRIGIFORMES: Owls			
FAMILY STRIGIDAE: Typical Owls			
Western Screech-Owl (<i>Otus kennicottii</i>)	✓	✓	✓
Great Horned Owl (<i>Bubo virginianus</i>)	✓	✓	✓
Northern Pygmy-owl (<i>Glaucidium gnoma</i>)	?	✓	✓
Long-eared Owl (<i>Asio otus</i>)	✓		
Short-eared Owl (<i>Asio flammeus</i>)	o		
Northern Saw-whet Owl (<i>Aegolius acadicus</i>)	✓	✓	✓
ORDER APODIFORMES: Swifts and Hummingbirds			
FAMILY APODIDAE: Swifts			
Vaux's Swift (<i>Chaetura vauxi</i>)	✓	✓	✓
FAMILY TROCHILIDAE: hummingbirds			
Anna's Hummingbird (<i>Calypte anna</i>)	o	?	?
Calliope Hummingbird (<i>Stellula calloipe</i>)	o		
Rufous Hummingbird (<i>Selasphorus rufus</i>)	✓	✓	✓
ORDER CORACIIFORMES: Kingfisher			
FAMILY ALCEDINIDAE: Kingfishers			
Belted Kingfisher (<i>Ceryle alcyon</i>)	✓	✓	✓
ORDER PICIFORMES: Woodpeckers and Allies			
FAMILY PICIDAE: Woodpeckers			
Red-breasted Sapsucker (<i>Sphyrapicus ruber</i>)	✓	✓	✓
Downy Woodpecker (<i>Picoides pubescens</i>)	r	✓	✓
Hairy Woodpecker (<i>Picoides villosus</i>)	r	✓	✓
Northern Flicker (<i>Colaptes auratus</i>)	r	✓	✓
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	✓	✓	✓

SPECIES	Fraser	Homathko	Kingcome
ORDER PASSERIFORMES: Passerine Birds			
FAMILY TYRANNIDAE: Tyrant Flycatchers			
Willow Flycatcher (<i>Empidonax traillii</i>)	✓	✓	✓
Pacific-slope Flycatcher (<i>Empidonax difficilis</i>)	✓	✓	✓
Eastern Kingbird (<i>Tyrannus tyrannus</i>)	✓	✓	✓
FAMILY HIRUNDINIDAE: Swallows			
Tree Swallow (<i>Tachycineta bicolor</i>)	✓	✓	✓
Violet-green Swallow (<i>T. thalassina</i>)	✓	✓	✓
Barn Swallow (<i>Hirundo rustica</i>)	✓		
FAMILY CORVIDAE: Jays, Magpies and Crows			
Gray Jay (<i>Perisoreus canadensis</i>)	✓	✓	✓
Steller's Jay (<i>Cyanocitta stelleri</i>)	r	✓	✓
Northwestern Crow (<i>Corvus caurinus</i>)	r	✓	✓
Common Raven (<i>Corvus corax</i>)	✓	✓	✓
FAMILY PARIDAE: Titmice			
Black-capped Chickadee (<i>Parus atricapillus</i>)	r	✓	✓
FAMILY AEGITHALIDAE: Bushtits			
Bushtit (<i>Psaltirparus minimus</i>)	✓		
FAMILY TROGLODYTIDAE: Wrens			
Bewick's Wren (<i>Thryomanes bewickii</i>)	✓		
Winter Wren (<i>Troglodytes troglodytes</i>)	✓	✓	✓
Marsh Wren (<i>Cistothorus palustris</i>)	✓	o	o
FAMILY MUSCICAPIDAE: Kinglets, Bluebirds, Thrushes and Allies			
Ruby-crowned Kinglet (<i>Regulus calendula</i>)	✓	✓	✓
Swainson's Thrush (<i>Catharus ustulatus</i>)	✓	✓	✓
Hermit Thrush (<i>Catharus guttatus</i>)	✓	✓	✓
American Robin (<i>Turdus migratorius</i>)	r	✓	✓
Varied Thrush (<i>Ixoreus naevius</i>)	✓	✓	✓
FAMILY MOTACILLIDAE: Wagtails and Pipits			
American Pipit (<i>Anthus spinoletta</i>)	r	✓	
FAMILY BOMBYCILLIDAE: Waxwings			
Bohemian Waxwing (<i>Bombycilla garrulus</i>)	o	o	o
Cedar Waxwing (<i>Bombycilla cedrorum</i>)	✓	✓	✓
FAMILY LANIIDAE: Shrikes			
Northern Shrike (<i>Lanius excubitor</i>)	o	o	o
FAMILY STURNIDAE: Starlings			
European Starling (<i>Sturnus vulgaris</i>)	✓	✓	✓
FAMILY VEREONIDAE: Vireos			
Warbling Vireo (<i>Vireo gilvus</i>)	✓	✓	✓
Red-eyed Vireo (<i>Vireo olivaceus</i>)	✓	✓	✓
FAMILY EMBERIZIDAE: Wood-Warblers, Sparrows, Blackbirds and Allies			
Orange-crowned Warbler (<i>Vermivora celata</i>)	✓	✓	✓
Yellow Warbler (<i>Dendroica petechia</i>)	✓	✓	✓
Yellow-rumped Warbler (<i>Dendroica coronata</i>)	r	✓	✓
Black-throated Gray Warbler (<i>D. nigrescens</i>)	✓		
MacGillivray's Warbler (<i>Oporornis tolmiei</i>)	✓	✓	✓
Common Yellowthroat (<i>Geothlypis trichas</i>)	✓	✓	✓
Wilson's Warbler (<i>Wilsonia pusilla</i>)	✓	✓	✓
Western Tanager (<i>Piranga ludoviciana</i>)	✓	✓	✓
Black-headed Grosbeak (<i>Pheucticus melanocephalus</i>)	✓	o	o

SPECIES	Fraser	Homathko	Kingcome
Rufous-sided Towhee (<i>Pipilo erythrophthalmus</i>)	✓		
Fox Sparrow (<i>Passerella iliaca</i>)	✓	✓	✓
Song Sparrow (<i>Melospiza melodia</i>)	r	✓	✓
Golden-crowned Sparrow (<i>Zonotrichia atricapilla</i>)	✓	✓	✓
White-crowned Sparrow (<i>Z. leucophrys</i>)	✓	✓	✓
Dark-eyed Junco (<i>Junco hyemalis</i>)	r	✓	✓
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	✓	✓	✓
Northern Oriole (<i>Icterus galbula</i>)	✓		
FAMILY FRINGILLIDAE: Finches			
Purple Finch (<i>Carpodacus purpureus</i>)	o	o	
House Finch (<i>Carpodacus mexicanus</i>)	✓		
CLASS MAMMALIA: Mammals			
ORDER MARSUPIALIA: Marsupials			
FAMILY DIDELPHIDAE: New World			
Opossums (<i>Didelphis virginiana</i>)			
North American Opossum	?		
ORDER INSECTIVORA: Insectivores			
FAMILY SORICIDAE: Shrews			
Pacific Water Shrew (<i>Sorex bendirii</i>)	?		
Common Shrew (<i>Sorex cinereus</i>)	✓	✓	✓
Dusky Shrew (<i>Sorex monticolus</i>)	✓	?	?
Water Shrew (<i>Sorex palustris</i>)	?	✓	✓
Trowbridge's Shrew (<i>Sorex trowbridgii</i>)	?		
Vagrant Shrew (<i>Sorex vagrans</i>)	✓	✓	✓
FAMILY TALPIDAE: Moles			
Shrew-mole (<i>Neurotrichus gibbsii</i>)	?		
Coast Mole (<i>Scapanus orarius</i>)	✓		
ORDER CHIROPTERA: Bats			
FAMILY VESPERTILIONIDAE: Vespertilionid			
Bats			
Big Brown Bat (<i>Eptesicus fuscus</i>)	✓		
Silver-haired Bat (<i>Lasiorycteris noctivangans</i>)	✓	✓	✓
Hoary Bat (<i>Lasiurus cinereus</i>)	o		
California Myotis (<i>Myotis californicus</i>)	✓	✓	✓
Western Long-eared Myotis (<i>Myotis evotis</i>)	✓	?	?
Keen's Long-eared Myotis (<i>Myotis keenii</i>)	o	o	o
Little Brown Myotis (<i>Myotis lucifugus</i>)	✓	✓	✓
Long-legged Myotis (<i>Myotis volans</i>)	✓		
Yuma Myotis (<i>Myotis yumanensis</i>)	✓	✓	✓
Townsend's Big-eared Bat (<i>Plecotus townsendii</i>)	?		
ORDER LAGOMORPHA: Lagomorphs			
FAMILY LEPORIDAE: Hares and Rabbits			
Snowshoe Hare (<i>Lepus americanus</i>)	?	✓	✓
ORDER RODENTIA: Rodents			
FAMILY ARVICOLIDAE: Voles and Lemmings			
Long-tailed Vole (<i>Microtus longicaudus</i>)	?	✓	✓
Creeping Vole (<i>Microtus oregoni</i>)	✓		
Townsend's Vole (<i>Microtus townsendii</i>)	✓		
Muskrat (<i>Ondatra zibethicus</i>)	✓		

SPECIES	Fraser	Homathko	Kingcome
FAMILY CASTORIDAE: Beavers			
Beaver (<i>Castor canadensis</i>)	r	✓	✓
FAMILY CRICETIDAE: Cricetids			
Deer Mouse (<i>Peromyscus maniculatus</i>)	✓	✓	✓
FAMILY ERETHIZONTIDAE: New World Porcupines			
Porcupine (<i>Erethizon dorsatum</i>)	?	?	?
FAMILY MURIDAE: Murids			
Black Rat (<i>Rattus rattus</i>)	✓	✓	✓
FAMILY SCIURIDAE: Squirrels			
Douglas' Squirrel (<i>Tamiasciurus douglasii</i>)	o	✓	✓
FAMILY ZAPODIDAE: Jumping Mice			
Pacific Jumping Mouse (<i>Zapus trinotatus</i>)	✓		
ORDER CARNIVORA: Carnivores			
FAMILY CANIDAE: Canids			
Coyote (<i>Canis latrans</i>)	r		
Gray Wolf (<i>Canis lupus</i>)		✓	✓
Red Fox (<i>Vulpes vulpes</i>)	o		
FAMILY FELIDAE: Cats			
Cougar (<i>Felis concolor</i>)	o	✓	✓
Bobcat (<i>Lynx rufus</i>)		?	
FAMILY MUSTELIDAE: Mustelids			
River Otter (<i>Lontra canadensis</i>)	✓	✓	✓
Striped Skunk (<i>Mephitis mephitis</i>)	✓		
Ermine (<i>Mustela erminea</i>)	✓	✓	✓
Long-tailed Weasel (<i>Mustela frenata</i>)	✓		
Mink (<i>Mustela vison</i>)	✓	✓	✓
Martin (<i>Martes americana</i>)		✓	✓
Spotted Skunk (<i>Spilogale putorius</i>)	✓		
FAMILY PROCYONIDAE: Procyonids			
Raccoon (<i>Procyon lotor</i>)	✓	✓	✓
FAMILY URSIDAE: Bears			
Black Bear (<i>Ursus americanus</i>)	r	✓	✓
Grizzly Bear (<i>Ursus arctos</i>)		✓	✓
ORDER ARTIODACTYLA: Even-toed Ungulates			
FAMILY CERVIDAE: Cervids			
Moose (<i>Alces alces</i>)		o	
Black-tailed Deer (<i>Odocoileus hemionus</i>)	r	✓	✓
<hr/>			
✓ Occurrence expected to be regular (present most years) during the appropriate season(s) for the species			
r Species presence recorded in Fraser River portion of TFL 43 during September 1992 surveys.			
o Occurrence expected to be occasional (not present every year) due to marginal habitat or occurrence at periphery of species' range			
? Occurrence unknown or questionable due to marginal habitat or occurrence at periphery of species' range.			

APPENDIX 2.

TABLE 9. Food items known to be consumed by grizzly bears in the Khutzeymateen study area

Food item		
Scientific name	Common name	Portion consumed ^a
Plants		
<i>Angelica genuflexa</i>	kneeling angelica	roots, corms, stems
<i>Aster subspicatus</i> ^b	Douglas' aster	leaves, stems
<i>Athyrium filix-femina</i>	lady fern	young fronds
<i>Carex macrochaeta</i>	large-awned sedge	tips of leaf blades
<i>Carex lyngbei</i>	Lyngbye's sedge	tips of leaf blades
<i>Carex sitchensis</i>	Sitka sedge	tips of leaf blades
<i>Carex</i> spp.	sedge	tips of leaf blades
<i>Cicuta douglasii</i>	Douglas' water-hemlock	roots, flower heads, stems
<i>Conioselinum chinense</i>	hemlock parsley	roots, flower heads, stems
<i>Cornus sericea</i>	red-osier dogwood	berries
<i>Deschampsia caespitosa</i>	tufted hairgrass	tips of leaf blades
<i>Dryopteris assimilis</i>	spiny wood fern	young fronds
<i>Epilobium angustifolium</i>	fireweed	shoots
<i>Epilobium glandulosum</i>	sticky willowherb	stems, leaves
<i>Equisetum arvense</i>	common horsetail	stems
Graminae	grasses	tips of leaf blades
<i>Heracleum sphondylium</i>	cow-parsnip	roots, flower heads, stems
<i>Impatiens noli-tangere</i>	common touch-me-not	stems, leaves
<i>Juncus</i> spp.	rush	tips of leaf blades
<i>Ligusticum scoticum</i>	beach lovage	roots, stems, leaves
<i>Lonicera involucrata</i>	black twinberry	berries
<i>Lupinus nootkatensis</i> ^b	Nootka lupine	roots
<i>Lysichiton americanum</i>	skunk cabbage	underground portion of petioles
<i>Maianthemum dilatatum</i> ^b	false lily-of-the-valley	leaves
<i>Malus fusca</i>	Pacific crabapple	berries
<i>Menyanthes trifoliata</i>	buckbean	leaves
<i>Montia parvifolia</i>	small-leaved montia	roots, corms
<i>Oenanthe sarmentosa</i>	water-parsley	flower heads, stems
<i>Oplopanax horridus</i>	devil's club	leaf buds and petioles, berries
<i>Osmorhiza chilensis</i>	sweet-cicely	roots, corms, stems
<i>Osmorhiza purpurea</i>	purple sweet-cicely	roots, corms, stems
<i>Plantago macrocarpa</i> ^b	plantain	leaves
<i>Potentilla anserina</i> ^b	silverweed	leaves, stems
<i>Ribes bracteosum</i>	stink currant	berries
<i>Rubus idaeus</i>	red raspberry	berries
<i>Rubus parviflorus</i>	thimbleberry	shoots, berries
<i>Rubus spectabilis</i>	salmonberry	shoots, berries
<i>Salix sitchensis</i>	Sitka willow	catkins
<i>Sambucus racemosa</i>	red elderberry	leaf petioles, stems, berries
<i>Scirpus microcarpus</i>	small-flowered bulrush	leaves
<i>Stachys mexicana</i>	Mexican hedge-nettle	leaves, stems
<i>Streptopus roseus</i>	rosy twistedstalk	berries
<i>Triglochin maritimum</i>	seaside arrow-grass	leaves
<i>Urtica dioica</i>	stinging nettle	shoots
<i>Vaccinium alaskense</i>	Alaskan blueberry	berries
<i>Vaccinium ovalifolium</i>	oval-leaved blueberry	berries
<i>Vaccinium parviflorum</i>	red huckleberry	berries
<i>Veratrum viride</i>	Indian hellebore	emerging leaf buds
<i>Viburnum edule</i>	highbush-cranberry	berries

TABLE 9. (Continued)

Food item		
Scientific name	Common name	Portion consumed ^a
Animals		
Insects		
Formicidae	ants	larva, adults
Vespidae	wasps	larva, adults
Intertidal animals ^c		
<i>Anoplarchus purpurescens</i>	cockscorb prickleback	entire
<i>Gnorimosphaeroma oregonense</i>	isopod	entire
<i>Hemigrapsus oregonensis</i>	yellow shore crab	entire
<i>Idotea wosnesenskii</i>	Vosnesensky's isopod	entire
<i>Mya arenaria</i>	soft-shell clam	entire
<i>Mytilus edulis</i>	blue mussels	entire
<i>Semibalanus cariosus</i>	thatched barnacle	entire
<i>Traskorchestia traskiana</i>	beach hopper	entire
Mammals		
<i>Oreamnos americanus</i>	mountain goat	carcasses
<i>Ursus arctos</i>	grizzly bear	carcasses, fresh kills
<i>Ursus americanus</i>	black bear	carcasses, fresh kills
<i>Oncorhynchus</i> spp.	salmon	not gill rakers and sperm sacks
Bird		
<i>Anas</i> spp.	duck	carcass

^a When describing woody shrubs, shoots are considered current year's growth.

^b Plant species found to be used only once or twice and not believed to be important grizzly bear food items.

^c Barnacles, clams, and mussels confirmed; others suspected from bears observed turning over rocks and feeding on animals underneath.

Fish >

KINGCOME/ATLATZI RIVERS

E.R. #40

PURPOSE: To preserve unusual lodgepole pine, Sitka spruce, and alder swamps and associated open wetlands in a coastal alluvial landscape

LOCATION: Central mainland coast, 10 km N of the head of Kingcome Inlet

SIZE: 414 ha LAT: 51°04'N LONG: 126°09'W (Kingcome) ELEVATION: 20 - 400 m
LAT: 51°02'N LONG: 126°07'W (Atlalti)

BIOGEOCLIMATIC ZONE: Coastal Western Hemlock

PHYSICAL FEATURES: The reserve consists of two units, 2 km apart, on the floor of the Kingcome River valley. Mountains adjacent to the reserve rise to 1,700 m, but those at the headwaters of the Kingcome River are among the highest in the province. Proximity to the center of origin of the most ponderous glaciers in British Columbia resulted in pronounced glacial scouring, isostatic depression, and marine flooding, and in probable persistence of glacial environments until a relatively late date. The relatively broad, low-gradient valley of the lower Kingcome River and its peculiar wetlands are unusual in the Coast Mountains and undoubtedly reflect local glacial history.

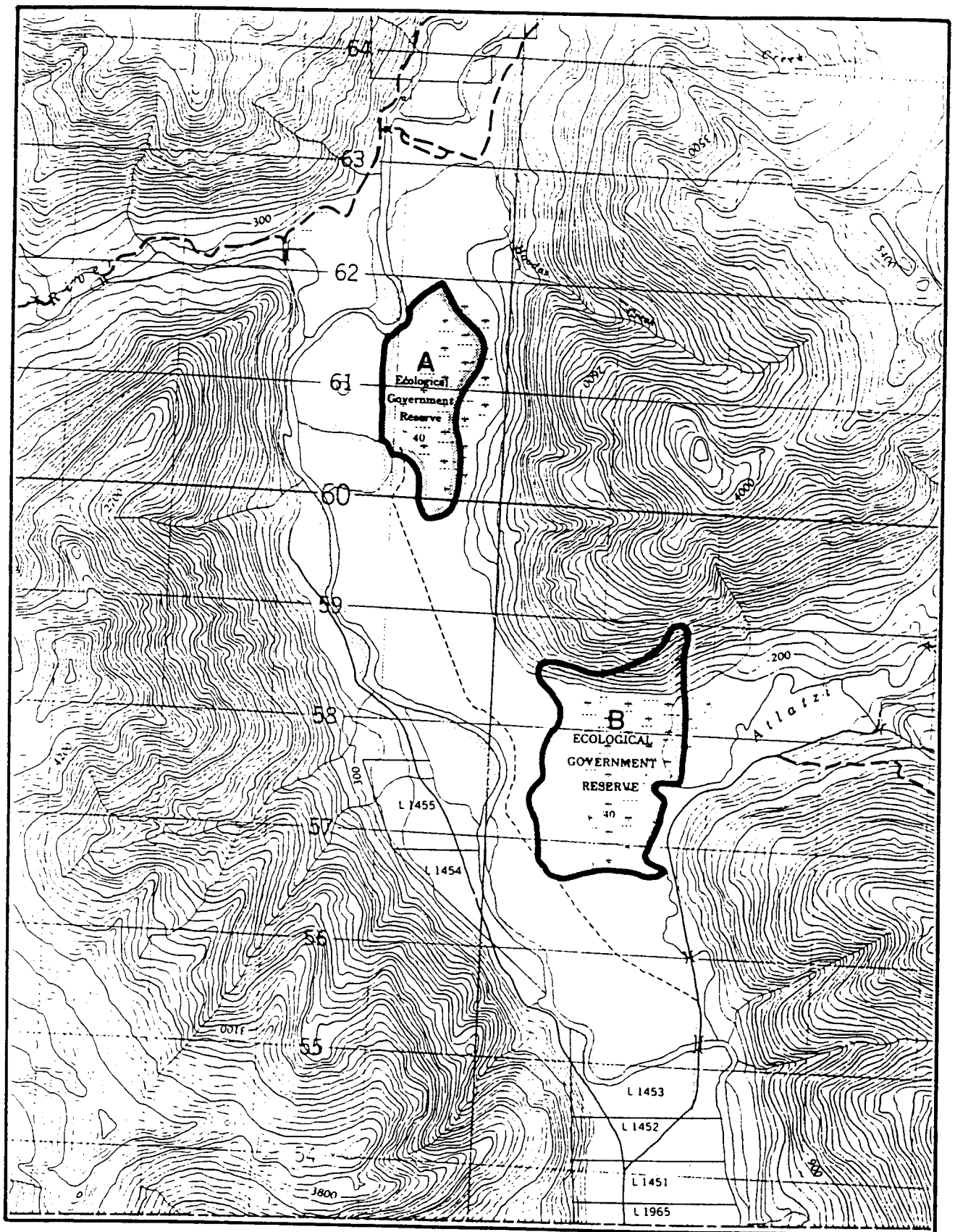
BIOTIC FEATURES: Fairly extensive stands of lodgepole pine in a fen-swamp environment are what first focused attention on this area. The northern unit shows zonation from a wet central fen-marsh through extensive hardhack swamps and boggy pine forest to better drained sites supporting Sitka spruce, western hemlock and western redcedar. The southern unit has less open fen but equally large hardhack swamps, surrounded by lodgepole pine bog forest which gives way to mixed woods containing cottonwood, red alder, Sitka spruce and hemlock.

A great variety of wetland communities are present. Open wetlands may be dominated by sedges, cotton-grass, marsh cinquefoil, swamp horsetail or buckbean. Hardhack and Sitka sedge cover large treeless swamps. Treed swamp communities contain all or some of lodgepole pine, red alder, western redcedar, Sitka spruce, hardhack, huckleberries, blueberries, crab apple, black twinberry and salmonberry, and are always characterized by skunk cabbage and sometimes slough sedge and water-parsley.

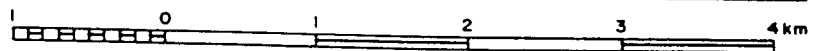
The presence of both black and grizzly bears has been confirmed, but neither the vertebrate nor invertebrate fauna have been surveyed.

OUTSTANDING FEATURES: An unusual diversity of swamps, associated fens and pine bogland in a coastal valley bottom.

OTHER INFORMATION: Order-in-Council no. 2866, 27 July 1972. Application no. 91. Map no. 92 M/1. Access by foot from nearby logging roads. The floodplain, including fringes of the reserve, was logged in the 1920s.



SCALE 1:50000



N.T.S. No.92M/1

ECOLOGICAL RESERVE No. 40
 (A)KINGCOME RIVER (B)ATLATZI RIVER

Vascular Plants Noted by Hans Roemer as Occurring
in Kingcome & Atlatzi Rivers Ecological Reserve August 1984

<i>Equisetum arvense</i>	<i>Carex pauciflora</i>	<i>Maianthemum dilatatum</i>
<i>Equisetum fluviatile</i>	<i>Carex phyllomanica</i>	<i>Menyanthes trifoliata</i>
<i>Equisetum telmateia</i>	<i>Carex rostrata</i>	<i>Menziesia ferruginea</i>
<i>Lycopodium annotinum</i>	<i>Carex sitchensis</i>	<i>Mimulus moschatus</i>
<i>Lycopodium clavatum</i>	<i>Chimaphila menziesii</i>	<i>Montia sibirica</i>
<i>Lycopodium obscurum</i>	<i>Cicuta douglasii</i>	<i>Myrica gale</i>
<u><i>Athyrium filix-femina</i></u>	<i>Cinna latifolia</i>	<i>Nuphar polysepalum</i>
<i>Blechnum spicant</i>	<i>Circaea alpina</i>	<u><i>Oenanthe sarmentosa</i></u>
<i>Dryopteris assimilis</i>	<i>Coptis asplenifolia</i>	<u><i>Oplopanax horridus</i></u>
<i>Gymnocarpium dryopteris</i>	<i>Coptis trifolia</i>	<i>Orthilia secunda</i>
<i>Polystichum andersonii</i>	<i>Cornus unalascentis</i>	<i>Osmorhiza chilensis</i>
<i>Polystichum munitum</i>	<u><i>Cornus sericea</i></u>	<i>Physocarpus capitatus</i>
<i>Pteridium aquilinum</i>	<i>Disporum</i> sp.	<i>Poa</i> cf. <i>leptocoma</i>
<i>Chamaecyparis nootkatensis</i>	<i>Drosera rotundifolia</i>	<i>Populus trichocarpa</i>
<i>Pseudotsuga menziesii</i>	<i>Elymus hirsutus</i>	<i>Potamogeton natans</i>
<i> cea sitchensis</i>	<i>Epilobium</i> cf. <i>paniculatum</i>	<i>Potentilla palustris</i>
<i>Pinus contorta</i>	<i>Epilobium</i> cf. <i>watsonii</i>	<i>Prunella vulgaris</i>
<i>Thuja plicata</i>	<i>Eriophorum chamissonis</i>	<i>Pyrus fusca</i>
<i>Tsuga heterophylla</i>	<i>Eriophorum</i> sp.	<i>Rhamnus purshiana</i>
<i>Actaea rubra</i>	<i>Festuca subulata</i>	<u><i>Ribes bracteosum</i></u>
<i>Agrostis aequivalvis</i>	<i>Gaultheria shallon</i>	<u><i>Rubus parviflorus</i></u>
<i>Agrostis exarata</i>	<i>Galium palustre</i>	<u><i>Rubus spectabilis</i></u>
<i>Alnus rubra</i>	<i>Galium triflorum</i>	<i>Salix</i> sp.
<i>Andromeda polifolia</i>	<i>Gentiana douglasiana</i>	<i>Sambucus racemosa</i>
<u><i>Angelica genuflexa</i></u>	<i>Gentiana sceptrum</i>	<i>Sanguisorba officinalis</i>
<i>Calamagrostis canadensis</i>	<i>Geum macrocarpa</i>	<i>Scheuchzeria palustris</i>
<i>Cardamine</i> cf. <i>breweri</i>	<i>Goodyera oblongifolia</i>	<i>Scirpus microcarpus</i>
<i>Carex canescens</i>	<i>Habenaria dilatata</i>	<i>Smilacina stellata</i>
<i>Carex echinata</i>	<i>Habenaria saccata</i>	<i>Sorbus scopulina</i>
<i>Carex laeviculmis</i>	<i>Kalmia microphylla</i>	<i>Spiraea douglasii</i>
<i>Carex leptalea</i>	<i>Ledum groenlandicum</i>	<i>Streptopus amplexifolius</i>
<i> ex limosa</i>	<i>Linnaea borealis</i>	<i>Streptopus roseus</i>
<i>Carex livida</i>	<i>Listera cordata</i>	<i>Tiarella trifoliata</i>
<i>Carex obnupta</i>	<u><i>Lonicera involucreta</i></u>	<i>Tofieldia glutinosa</i>
	<i>Lycopus americanum</i>	<i>Tolmiea menziesii</i>
	<u><i>Lysichiton americanum</i></u>	<i>Trautvetteria caroliniana</i>

Trientalis arctica
Urtica lyallii
Vaccinium alaskaense

Vaccinium ovalifolium
Vaccinium oxycoccos
Vaccinium parvifolium

Veronica scutellata
Viburnum edule
Viola glabella
Viola sp.

Bryophytes Noted by Hans Roemer in E.R.40 August 1984

Brachythecium sp.	Rhizomnium glabrescens
Claopodium bolanderi	Rhizomnium personii
Coniocephalum conicum	Rhytidiadelphus loreus
Dicranum fuscescens	Rhytidiadelphus squarrosus
Dicranum majus	Rhytidiadelphus triquetrus
Hookeria lucens	Scapania bolanderi
Hookeria ovatifolia	Sphagnum fuscum
Hylocomium splendens	Sphagnum girgensohnii
Leptodictyum riparium	Sphagnum "palustre" squarrosum
Leucolepis menziesii	Sphagnum papillosum
Mnium insigne	Sphagnum recurvum
Pellia neesiana	Sphagnum rubellum
Pellia sp.	Sphagnum squarrosum
Plagiochila asplenoides	Sphagnum subsecundum
Pleuroziopsis ruthenica	Stokesiella oregana
Pleurozium schreberii	Stokesiella praelonga

Primary grizzly bear foods (from page 12).

Secondary grizzly bear foods (from page 12).

UPPER FRASER VALLEY BALD EAGLE NEST SITE HISTORY

Pilot																					1996	1996	1997	1997	1998	1998	1999	1999
NEST SITE	Alt.	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1996	1996	1997	1997	1998	1998	1999	1999
	nest	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	Prod.	Act.	
		Jun.19	Apr. 9	Jun.19	Apr.14	Jun.23	May.18	July.27	Mar.29	Jun.22	Mar.26	Jun.21	Mar.31	Jun.26	Apr.6	Jun.24	Mar.28	Jun. 1	Mar.31	Jun.21	Mar.29	Jun. 14	Apr. 3	Jun. 20	Mar.27	Jun.12	Mar.26	Jun.18
Chawatil	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	1	N	1	Y	1	Y	1	N	1	N	0	Y	0
1 Peters	N	2	Y	0	Y	0	Y	2	Y	2	N	1	Y	2	Y*	2	Y	1	Y	1	Y	2	Y	2	Y	1	Y	2
2 Cheam Knob	N	N/F	Y	1	Y	1	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	Lost	N	0	N	0	N	D/A	N	1
Cheam Isl. Alt?																					N	0	N	0	N	0	Lost	Lost
2a Cheam Isl.	N	N/E	N/E	N/E	N/E	N/E	N/F	N/F	Y	2	Egg	1	Y	1	Y	2	Y	1	Y	0	N	0	N	0	N	0	Lost	Lost
Herrling Isl. N.	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N	0	Y	1	N	I*	Y	0	N	0	Y	1	Y	D/A	N	0
3 Herrling Isl. S.	N	2	Y	2	Y	2	Y	2	Y	1	N	1	Y	2	Y	2	Y	1	Y	2	Y	2	Y	2	Y	0	N	0
Muxlow Farm	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N	0	N	0	Lost	Lost	Lost	Lost	N/E	N/E	N/E	N/E	N/E	N/E	Y**	0
22 Agassiz Brdg.	N	N/E	N/E	N/E	N/E	N/E	Y	0	Y	1	Egg	0	N	0	N	0	Lost	Lost	Lost	Lost	N/E	N/E	N/E	N/E	N/E	N/E	Y	1
15 Hopyard Hill	Y	N/F	N/F	N/F	Y	1	Y	2	Dist.	0	Y	1	Y	1	Y	1	Y	2	Y	2	Y	2	Y	0	Y	1	Y	2
Carey Isl.	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	1	Y	0	Y	2	Y	2	Y	2	Y	0	Y	1	Y	2
Van der kooi farm	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	1
21 Mt. Woodside	N	N/F	N/F	N/F	N/F	2	Y	0	Dist.	2	Dist.	1	Y	2	Y	0	N	0	N	0	N	0	Lost	N/S	N/S	N/S	N/S	N/S
Mt. Woodside River New	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2	N	0	Y	2	Y	2
Tiny Island	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
Scowlitz IR	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
Fairfield Isl.	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
Fairfield Isl. Alt.	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
4a Island 20 East #1	Y	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N	1	Y	1	Y**	2	Y	2	Y	Dist.	N	0	Y	0	Y	2
4a Island 20 East #2	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
4 Island 20 West	Y	1	Y	2	Y	2	Y	1	N	1	N	1	N	1	N	0	N	0	Y	1	Y**	Dist.	N	0	N	0	N	0
17 Chehalis River	Y	N/F	N/F	N/F	Y	0	Y	2	Egg	0	Y	1	Y	2	Y	2	Y	I*	Y	2	Y	2	Y	1	Y**	2	Y	2
16 Harrison Bay	N	N/F	N/F	N/F	Y	1	Y	1	Y	0	Y	1	Y	1	Y*	2	Y	1	Y	0	Y	2	Y	1	Y	2	Y	2
Queens Isl.	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2	Y	1	Y	2	Y	1	Lost	Lost
5 Kerkhoven Farm	N	2	Y	1	Y	2	Y	2	Lost	0	Y*	2	Y	2	Y	2	Y	2	Y	2	Lost	2Y*	Y	2	Y	2	Lost	Lost
Barrett Isl. 22	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
6 Yaalstrick Isl.	N	3	Y	3	Y	2	Y	1	Dist.	0	Y	2	Y	1	Y	2	Y	2	Y	0	Y	1	Y	2	Y	2	Y	2
McDonald's Farm	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
Estok Farm	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	2
7 McGillvary Res.	Y	2	Y	1	N	0	N	0	N	2	N	0	N	0	Y	0	N	I**	Y	1	Y	1	Y	1	Y	1	Y	2
Hatzic Slough	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	Y	0	Y	0	Y	0	Y	0	N	0	Y	0	Y	0
Smith Farm (Rosemary Forre	N	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E	N/E													

Prod.= Eaglets produced at time of summer survey

Act.= Active at time of spring survey

N/S= Not Surveyed

Dist.= Egg take disturbance CWS

N/F= Not Found

Egg = Egg Taken CWS

Lost = Nest blown down or tree lost

N/E= Not in Existence

Y** = new nest tree same nest site

I* = incubating at time of survey

Y=Yes

N=No

Y* = new nest same tree

D/A = Dead Adult on nest

Prepared by : Ken Stenerson

Source : Scott Paper, M.O.E.L.P., C.W.S., helicopter surveys